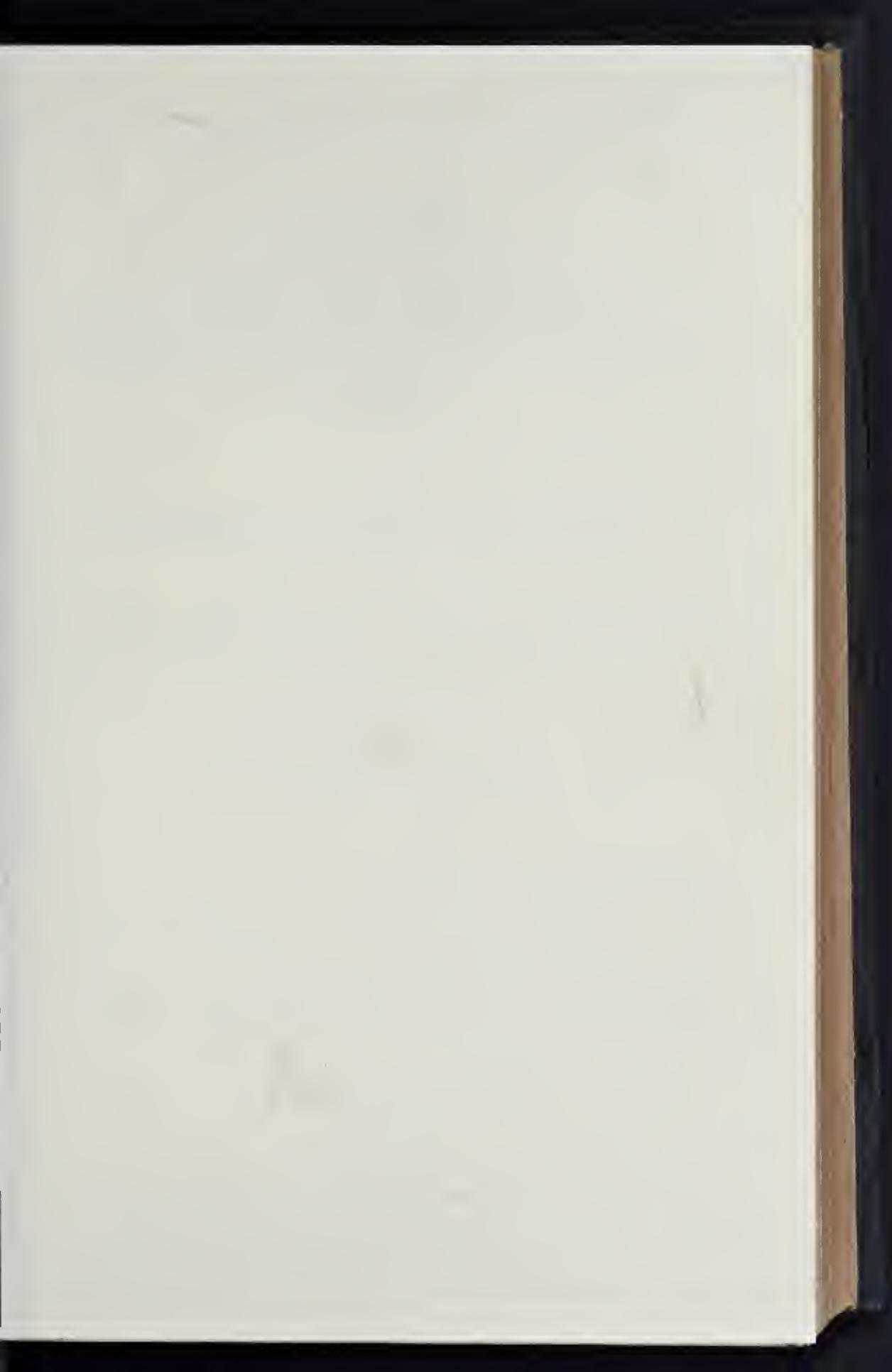




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THE BUILDING

AN

ILLUSTRATED WEEKLY MAGAZINE,

FOR THE

ARCHITECT, ENGINEER, ARCHÆOLOGIST, CONSTRUCTOR,
SANTARY REFORMER, AND ART-LOVER.

CONDUCTED BY

GEORGE GODWIN, F.R.S., F.S.A.

LATE VICE-PRESIDENT OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS;

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"Another Blow for Life," &c.*

"Every man's proper mansion-house, and home, being the theater of his hospitality, the seat of self-fruition, the comfortablest part of his own life, the noblest of his sonne's inheritance, a kinde of private princedom, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned."

"Architecture can want no commendation, where there are noble men, or noble mindes."—SIR HENRY WOTTON.

"Our English word To BUILD is the Anglo-Saxon Bylġan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."—DIVERSIONS OF PUDLEY.

"Art shows us man as he can by no other means be made known. Art gives us 'nobler loves and nobler cares,'—furnishing objects by the contemplation of which we are taught and exalted,—and so are ultimately led to seek beauty in its highest form, which is GOODNESS."

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The BUTTERFLY

Curiosities of London.

R. JOHNSON once remarked to Boswell, "It is wonderful, sir, what is to be found in London." We may apply the same statement to Mr. Timbs's new edition of his work, entitled "The Curiosities of London."* It would be difficult to exceed the diversity, collectiveness, the quaintness, interest—in a word, the curiosity of its contents. Beginning alphabetically, with the Adelphi, and ending with the Zoological Gardens, he carries us from place to place, from building to building, till all London has been traversed, and peopled with its most famous worthies, and pictured with its most remarkable scenes. As page after page flutters past, we see



brave, busy, beautiful, beautiful London in a hundred different aspects, not indeed through the medium of a continuous narrative, but in groups of facts connected with the principal objects of interest in the wide "world-city." Mention of the finds of the fossilized teeth of an elephant in the formation of the great sewer in Pall-mall; of remains of numbers of turtles, crocodiles, elephants' teeth and tusks at Highgate and Islington; of bones of the elephant, hippopotamus, ox, and deer in the brickfields at Brentford; and of the general subterranean presence of vast quantities of pyritized twigs and fruits allied to the class of vegetation now flourishing in the Eastern Archipelago, brings us face to face with the distant ages when London possessed a climate identical with that of the Spice Islands in the Indian Ocean, when from the hot, moist soil rose mighty palms, under whose feathery shade glided immense ho-constrictors and in the branches of which chattered troops of monkeys; while sharks, turtles, and crocodiles disported in the waters once covering part of the metropolitan district: those distant ages, indeed, when the hippopota-

mus lounged in Regent-street, the elephant sauntered down Pall-mall, and London had not become a British settlement. On another page we are reminded that Moorfields is probably the site of the first group of Celtic dwellings, and of the evidence that has pointed to this conclusion. Then we have Roman London picked out for us; and here and there we catch glimpses of the principal events, the stately pageants and banquets, the odd customs, the topography of London in the various centuries of the Middle Ages. Interspersed with all this come the sparkling sayings, the gay doings of the comely personages and wits of the days of the Stuarts; the pith of much that concerned London in the last century; and countless facts belonging to our own day. Mr. Timbs's hook is, in fine, a literary kaleidoscope; for, though his subject is always London, the varied pieces of information he has collected concerning it fall together in such diversified combinations that it is scarcely possible to take it up without seeing a new picture. It is the compression, too, of the industrious accumulations, the painstaking researches, the methodical classification, and the vivid recollections of sixty years: no trifling piece of mental labour.

Perhaps, we should say, off-hand, that one of the most interesting districts in London, from association of ideas, is St. James's, if we were not confuted on the threshold of this observation by the equal claims of other quarters. Even madly, murky, misty Bermondsey has had its romance as charming as that of the Blind Beggar of Bethnal-green; for in the parish register there is an entry inditing an Enoch Arden, in the "form of a solemn vow made betwixt a man and his wife, having been long absent, through which occasion the woman being married to another man, took her again." Prosaic Paddington has but to be unveiled of its modern disguise, to be revealed as the Saxon settlement of the sons of Pæd. Stop the omnibuses, put up the horses, sweep away the straight rows of houses, and straight lines of metal ways, and we can picture a knot of rude homes of blue-eyed, yellow-haired Pædings, bare and brawny armed, half cultivators of the soil, but whole warriors, sheltered to some extent by Notting-hill near by. The omnibuses, railways, and rows of new houses have not quite effaced the Paddington of the Middle Ages even yet. The White Lion, Edgware-road, dates 1524, the year when hops were first imported. The Red Lion, Harrow-road, is supposed to have seen Shakspeare; and Ben Jonson went to the Wheatshaf, Edgware-road. But St. James's, where Swift found lodgings so "plaguy dear," is fuller of more modern associations: it seems studded with familiar names. The courtly poet Waller,

lived on the west side of St. James's-street, when it was called "the long street," and had a terrace-walk before the best houses at the upper end. Pope, as he himself says, lodged "next door to ye Golden Ball, on ye second terras." Gibbon, the historian, died at No. 76. Below the Thatched House Tavern was the shop of Rowland, the author of the fame of Maccassar oil. Sir Christopher Wren died at his own house in this street. Lord Byron lodged at No. 8, in 1811; and Gillray, the once celebrated caricaturist, committed suicide in it by jumping from one of the upper windows of No. 24, says Mr. Timbs; but, according to Mr. Cunningham, No. 29. It is not, however, to the main street that these personal associations are confined. Addison lodged in St. James's-place, and we know whose footsteps came to and fro his lodgings, as well as we know the brilliant list of guests of Samuel Rogers a century afterwards in the same "place." Swift, Steele, Crabbe, and Moore all lodged at different times in Bury-street. The poet Gray, Sir Isaac Newton, and the two Hunters once lived in Jermyn-street; and in this place was enacted the burlesque farce in real life by Mr. and Mrs. Howe, the former of whom left his wife for the space of seventeen years, causing her to believe that he was in Holland, but in reality he was living in the immediate neighbourhood and part of the time exactly opposite to a house to which she had removed, and going to St. James's Church every Sunday for seven years, where he saw her without discovering himself. More especially is this locality associated with the rank and fashion that frequented Almack's in the middle of the last century. St. James's-square takes us back to the reign of William III. and Mary, when Sir William Temple and Sir Horace Walpole lived in Pall-mall, though there were some few houses on the spot in the days of Charles II., as witness that of Moll Davies, one of his mistresses. It was at No. 4 in this square that the late Earl de Grey received the Royal Institute of Architects, during several years, and invited brilliant women as well as eminent men to meet them. Great nights were those.

St. James's Park brings us into contact with Nell Gwyn; for here, as has been oftentimes told, Evelyn, attending Charles II. through the park, heard a conversation carried on between this famous couple, "she looking out of her garden on a terrace at the top, and the king standing on the green walk under it,"—a site identified by Mr. Cunningham as under the park wall of Marlborough House; and in the dining-room of the Army and Navy Club House is preserved one of that ancy lady's looking-glasses. The Strand is another district full of memories, as indeed are the vicinities of St. Martin's-lane, many of the squares, the sites of old religious houses and their gardens, old inns, the halls of

* *Curiosities of London: exhibiting the most rare and remarkable Objects of Interest in the Metropolis; with nearly Sixty Years' Personal Recollections.* By John Timbs, F.S.A. A new edition, corrected and enlarged. London: Longmans, Green, Reader, & Dyer. 1868.

the City companies, the mansions of the nobility, and scores of other places. Indeed, there are few spots in London that some association with celebrated persons or their sayings has not invested with human interest. The north end of Beaufort-row, Chelsea, will always have a charm for those who remember that here lived Sir Thomas More, with his son, daughters-in-law, grand-daughters, and great-grand-children, when he was visited by Henry VIII. and Erasmus, the latter of whom pronounced his house "a practical school of the Christian religion." Scraggy, straggling Kent-street, Southwark, will be as though decked with cloth of gold when we think of the Black Prince carolling along it on his way home from Poitiers; Paddington Canal will be eyed with curiosity in connexion with Lord Byron's remark that the canal of Venice would not be more poetical were it not for its artificial adjuncts; and London Bridge will recall other tragedies besides the ghastly spectacles exposed upon the gatehouses, when, looking down upon the swift waters, we remember their velocity past the narrow old arches caused suicides to choose the minute of shooting through them in boats to destroy themselves, first filling their pockets with heavy stones, as did Sir William Temple's only son; and a brider, braver deed, will cast a glitter upon the tide when we think of Edward Osborne, in 1536, leaping into the river to save the life of his master's infant daughter, dropped from one of the windows of the houses then built upon the bridge, which infant daughter was bestowed by her father, the lord mayor, upon her gallant rescuer in after years, and became in good time great-grandmother of the first Duke of Leeds,—as pleasant a tradition as that of Dick Whittington. A large array of this class of facts will be found in Mr. Timbs's volume. In King-street, Covent-garden, are a few street-doors of solid mahogany, this being the street in which the lady lived for whom that wood was first used in England. In Southampton-street, No. 31, phosphorus was first manufactured in England, by Ambrose Godfrey Hauckwitz, under the instruction of Robert Boyle, who seems to have done for the popularizing of chemistry what the Tradescants did for natural history a century before him; for his laboratory was a place of fashionable resort. In Maiden-lane, the birth-place of Turner, the painter, ledged the incorruptible Andrew Marvel, in a second floor, while M.P. for Hull; and fifty more of such bade-bright spots might be easily counted up: or, for different moods we might seek out where Sterne died, in 41, Bond-street, or the pawnbroker's shop in Wardour-street where Sheridan used to deposit his valuables.

We have had many writers on London, many of whom were Londoners; sometimes, however, it is to provincials or foreigners that we are indebted for sketches that enable us to realize the manners and customs of Londoners in the days of yore. After Stowe sets us down, it is to James Howell, the Welshman, first of the line of historiographers-royal, that we are indebted for many particulars concerning London, before we find Evelyn and Pepys waiting in their gilded coaches to carry us further on. From him we learn that Tothill-field-gardens were the headquarters for the purchase of choice fruit, as Covent-garden is now. "I have sent you," he writes to Sir Arthur Ingram, "a hamper of melons, the best I could find in any of Tothill-field-gardens." To another friend he says, "You writ to me lately for a footman, and I think this bearer will fit you: I know he can run well, for he hath run away twice from me."

And again, July, 1632, he relates, not without a twinge of departing superstition,—

"As I passed by St. Dunstan's, in Fleet-street, the last Saturday, I stepped into a lapidary, or stone cutter's shop, to treat with the master for a stone to be used upon my father's tomb, and casting my eyes up and down, I might espie a huge marble, with a large inscription upon't which was thus to my heat remembrance:—Here lies John Oxenham, a goodly young man, in whose chamber, as he was struggling with the pangs of death, a bird with a white breast, was seen fluttering about his bed, and so vanished; which circumstance would not have been worth commemorating upon stone if it had not been that the sister, son, and mother of this goodly young man, all attracted a similar white-breasted bird to their couches when dying, as the inscription proceeded to relate. To these be divers witnesses," continued the travelled Howel, "whose names are engraven upon the stone. This stone is to be sent to a town hard by Exeter, where this happened."

From this we may glean that the London lapidaries excused some, at all events, of the ancient work now found in the provinces. Writing from the Fleet, where his political services finally imprisoned him, to a friend in Paris,

in 1646, he says, "The devil may walk freely up and down the streets of London now, for there is not a cross to fright him anywhere, and it seems he was never so busy in any country upon earth, for there have been more witches arraigned and executed here lately than ever were in this island since the creation." And, again, from the same confinement, he writes,— "The air of this city is not so sweet," especially in the heart of the city (in and about Paul's Church-yard), where borse-dung is a yard deep; inasmuch that to cleanse it would be as hard a task as it was for Hercules to cleanse the Augean stable. It was a litter taunt of the Italian, who passing by Paul's Church, and seeing it full of horses, "Now, I perceive (said he) that in England, men and beasts serve God alike." The same worthy gives us some word about Drapers' Hall, in a letter to his father, who seems to have sent two of his younger sons to be started in life by those already established. One of the lads was taken in hand by James, and the other by another brother, afterwards Bishop of Bristol, and both were apprenticed to mercers, the one in Chesapeake, and the other at the Flower-de-lance, in Lombard-street.

"When I went to bind my brother Ned apprentice in Drapers' Hall, casting my eyes upon the chimney-piece of the great room, I might spie a picture of an ancient gentleman, and underneath Thomas Howel. I asked the clerk about him, and he told me he had been a Spanish merchant in Henry VIII's time, and coming home rich, and dying a bachelor, he gave that hall to the Company of Drapers, with other things, so that it is accounted one of their chief benefactors. I told the clerk that one of the sons of Thomas Howel came now thither to be bound; he answered, that if he be a right Howel, he may have, when he is free, three hundred pounds to help to set up and pay no interest for five years. It may be hereafter we may make use of this. He told me also, that any maid that can prove her father to be a true Howel, may claim and demand fifty pounds towards her portion of the said hall."

Styrpe, for sixty years incumbent of Low Layton, in Essex, and subsequently rector of Hackney, is but a contumacious of Stowe. Both Pepys and Evelyn, the one president the other fellow of the Royal Society, bring us down to the commencement of the eighteenth century. Pepys died in 1703; Evelyn, in 1706. Then come Hatton and Pennant. From a galaxy of smaller wits two contributors of great celebrity sparkle on the scene soon after these expositors of manners in the days of the last of the Stuarts closed their eyes, in the persons of Dr. Johnson and Horace Walpole, both of whom have left Londoners many a legacy. "The man who is tired of London is tired of existence," said the former, in his admiration and appreciation of the boundless resources of a metropolitan life; and the threads of Walpole's life are so interwoven with London society as to be inextricable. These two were contemporary centres, having distinct rings around them, never clashing, but between them attracting all that was brilliant and gifted in the society of their day. It was Johnson who laid down the scheme upon which George III. formed the most complete private library in Europe, in the "dull, dowdy, and decent" Buckingham House, now at the disposal of the public in the British Museum; it was Walpole's pen that, despite his own proclivities towards pseudo-Gothic ornamentation, swept away all regard for what he called Adam's "gingerbread and sippets of embroidery," in his rapturous praise of the "chaste palace" the Prince of Wales, afterwards George IV., made of Carlton House, from the designs of Holland. His own Strawberry Hill became as nothing in his courtly haste to follow the regal taste. "We went to see the Prince's new Palace in Pall-mall, and were charmed," he wrote to the Countess of Ossory; "it will be the most perfect in Europe. There is an angust simplicity that astonished me;" with more raptures to the same effect; and straightway London became full of "chaste palaces" of every dimension, down to that of a park-gate lodge. "There will soon be one street from London to Brentford," he prophesied with a foresight only surpassed by the great lexicographer's celebrated prophecy that Lexington would be some day lighted by gas. "I have twice this spring been going to stop my coach in Piccadilly, to inquire what was the matter,—thinking there was a mob: not at all; it was only passengers." And as his buckled, and frilled, and spencered men-folk, and his gored and frilled, narrow-skirted, and high-bonneted women-folk jostled one another as they streamed up and down Piccadilly, what a mere thread of a concourse they must have made compared with that which is pouring up and down there now, all hours of the busy day.

"London," says the great authority for many of

the vital curiosities of the metropolis in our own day, the Registrar-General, in 1866, "London is growing greater every day, and within its present bounds, extending over 122 square miles of territory, the population amounted last year by computation to 3,087,991 souls. . . . As far as a radius of fifteen miles stretches from Claring-Cross, an ever-thickening ring of people extends within the area which the metropolitan police watches over, making the whole number on an area of 687 square miles around St. Paul's and Westminster Abbey, 3,521,267 souls." Horace Walpole's pace would be seriously affected could he revisit his old haunts with his old curiosity as to what was going on around him. Mr. Timbs quotes the late return that shows the number of passengers and vehicles passing over London Bridge in twenty-four hours. Surely those who have gone before us, and those who have to come after us, could not light upon a fact more indicative of our strenuous activity than this traffic-gauge. 167,910 passengers pass in twenty-four hours over this bridge, or 6,996 per hour, night and day. Sometimes there are 2,000 persons upon the bridge at once going about their avocations, and 1,764 carriages have been counted to pass over in an hour. And yet, in all this toil and traffic, and jostling and jogging, there are people, ever and anon, who turn their backs to the crunching wains, the swift rumbling omnibuses, the rattling carts, the rind and roar of the multiplicity of vehicles, and, looking over the parapets at the water, through nearly three centuries of time, say "I must have been hereabouts that Osborne struggled with the infant in his arms; and perhaps here that John Temple drowned because he feared his king had suffered an ill-turn through his inexperienced statesmanship; and somewhere here that Margaret Roper must have waited in her boat to catch her father's honoured head, when it was thrown over the bridge to make room for another on the pole on which it had been exposed." Such supreme and ineffaceable attraction have the tragedies of life for us. Man's sympathy is with man.

Mr. Timbs gives us a capital chapter upon the great metropolitan hwereries. Although Whitbread's is the oldest, and, in spite of Peter Pindar, the house of Barclay & Perkins has most interest for us, perhaps, from its having belonged to the Thralls in the last century, and so in some way become part of our associations with the great central Londoner who have just mentioned as giving tone to so much we have met mentioned as Johnson. Certainly his brew-house is one of the curiosities of London, and crowds of foreigners go to see it. Think of a brew-house as large and lofty as Westminster Hall; malt-bins as high as three-storyed houses; a standing army of well-fed cats, to keep the rats in check; 200 horses, costing some 80l. a-piece, each ranged in its own stall, with its name painted on a board over the rack; and some scores of men, every one of whom is taller than a Life Guardsman, and heavier by two stone,—not to say one word of the bewildering furnaces, cisterns, wells, shafts, boilers, details of all sorts, and utensils. He is also definite and minute upon other branches of trade followed by wealthy firms that are as commercial duchies or petty kingdoms to their possessors and their inheritors. Paternoster-row is traversed with this object. From a street in the occupation, first, of turners of rosaries; then of mercers, silkmen, and lacemen (Pepys bought for a morning waistcoat here in 1660); then of sempstresses,—Paternoster-row became one of the head-quarters of the publishing trade, by the removal of the booksellers from Little Britain in the reign of Queen Anne. Mr. Timbs records,—

"At No. 39 have lived nearly a century and a half the Longmans; the imprint of Thomas Longman, with Thomas and John Osborne, at the sign of 'The Ship and Black Swan,' is dated 1725. For several years the firm gave here dinners and *soirees* to authors and artists; and they have acquired world-wide repute as the publishers of the works of Scott, Mackintosh, Southey, Sir Walter Scott, Moore and Missolonghi, Messrs. Longman's own sale of books has amounted to five millions of volumes in the year. They possess some portraits of eminent literary persons. The premises were rebuilt in handsome Renaissance style in 1863; the design including the rebuilding of the adjoining house of Messrs. Blackwood & Sons, of Edinburgh, at the extreme north-west corner. The facade is executed in Portland stone. The character of the carving, especially of the lower stories, is somewhat symbolical nature follows. On the keystone of the central arch is represented literature supported by the arts, sciences, and education. In the spandrels of the same are the 'Ship' and the 'Swan,' being half-sized copies of two medallions, saved from the old buildings, and which had been trade signs on part of these premises since the Great Fire."

Lomhand-street tells still more of its archeology. Before the reign of Edward II. this street

was called by the same name from the fact of the Rothschilds of the Plantagenet era having settled there. These were the Longobards, whose badge, which is that of the Medici family,—three golden balls,—is now the sign of pawn-brokers, who perform for modern millionaires and spendthrifts the part played by the wealthy bankers and goldsmiths in old times. And from that day to this it has been a great money mart. Here dwelt the husband of Jane Shore. Sir Richard Gresham's shop was on the site covered by the banking-house of Martin, Stone, & Martins. Only so recently as ten years ago it has been ascertained that the father of Alexander Pope was a merchant living in Broad-street, when the poet was born, and not a linen-draper in Plough-court. Out of the forty-four names of firms of "Goldsmiths who kept running cashes," mentioned in the "London Directory for 1677," twenty-seven were in Lombard-street.

Dip where we may, there is something entertaining in this new edition of "The Curiosities of London." Mr. Timbs declares correctness to be the cardinal point of the volume; and considering every statement is associated either with names or dates, it is remarkable that so few errors have crept in or escaped the eye of revision. Holborn theatre, however, will scarcely be found on the south side of that ancient thoroughfare. In the list of statues we find no mention of that of the late Prince Consort on the memorial of the 1851 Exhibition in the Horticultural Society's Gardens, the best out-of-doors monument in London. The Art Union, a real curiosity of London (44, not 445, Strand), has raised and expended 351,000*l.* in the production and dissemination of works of art (instead of 150,000*l.*). In the account of Covent Garden Theatre there is no mention of the great conflagration that destroyed it, nor of its rebuilding by Barry. The same calamity at her Majesty's Theatre is, of course, of too recent occurrence to be looked for. Some of the signs that remain might have well been included among minor curiosities, especially those known to have been painted by celebrities, as that by Hogarth in Oxford-street. But we will not pursue these ungracious suggestions.

Everybody who likes London cannot fail to like the more for such labours as those of Mr. Timbs; and those who, for want of information or caprice have not hitherto done so, will find so many historical and personal associations cropping up about them as they wend their various ways, that they will alter their opinion and be grateful to the pens that have added so much to their every-day enjoyment. Every Londoner should read Mr. Timbs's book by way of thanks for the taste, industry, and enterprise that have placed it in his power to do so; and every one else, that he may get a notion of what London includes.

THE EIGHTEEN ERAS OF THE ARCHITECTURE OF JERUSALEM, WITH THE DATES, LOCALITIES, AND PROMINENT CHARACTERISTICS OF EACH EPOCH.

The first occasion on which our present historical knowledge supplies a direct reference to the city of Jerusalem is at a date contemporary with the reign of nine Syrian and Mesopotamian kings, the bricks of one of whom "Arioch, King of Ellasar," are to be seen in the British Museum, impressed with the monarch's name in cuneiform characters, now read as Uruk. The exact date of this reference is of extreme interest, inasmuch as it closely preceded that great geological convulsion which depressed a portion of the valley of the Jordan by more than 2,000 ft., and, arresting the natural course of the river along its still traceable channel to the Red Sea at Akaba, spread its waters into a lake so large that the evaporation from its surface has ever since disposed of the influx. As, however, the historic investigation now attempted refers to architectural dates alone, it is enough here to say that the most careful attempt to restore the chronology of the Book of Genesis with which we are familiar, fixes the interview of the King of Salem with the victorious Arah Sheikh Abram in the year 2533 of the Julian Period. At that early date the city was already devoted to monotheistic worship, the King of Zedek, Salem, or Kadesh being also the "Priest of the Most High God."

In the fragments of Manetho preserved by

Josephus we find the building of Salem ascribed to the Shepherd Kings or Hyksos. There appears, however, to be so much confusion between these shepherd and probably Phœnician invaders and lords of Lower Egypt, who were finally subjugated by Thothmes II. about 577 years later than the above-cited date, and the Jewish bond-slaves, who fled to the desert sixty-three years afterwards, as to render the passage from the Egyptian historian, thus preserved only in a quotation, of little value except as indicating the current opinion as to the Phœnician or Semitic origin of the founders of the Holy City. The supposed reference in Homer possesses little more than a literary interest, and our present historic account of Jerusalem may thus be taken as commencing with the storm by David of the citadel of Zion, J.P. 3670, being 1137 years later than the date assigned to Melchizedek.

The only intelligible explanation of the mode in which Josh entered the Castle of Zion is, that, like Ferdinand of Aragon, in the siege of Naples, nearly 2,500 years later, he introduced a forlorn hope through an unheeded conduit. The fortifications at this time would appear, from the language used in the books of Samuel and of Chronicles, to have crowned the hill of Zion. David "built the city round about, from Milo and inward;" and to the labours of David or his immediate successors the circumvallation of the lower city is, in the first instance, to be attributed; being effected by a wall surrounding the second hill, Acra, built to a considerable height above the bottom of the valley; megalithic in its structure, and to some extent coinciding in its site with the first of the three walls mentioned by Josephus. It is thus to the characteristics of megalithic structure, of position on the steep slope of what was formerly Acra, and of the comparative narrowness of the space that it encloses, that we must look for indications of the wall of David, while it is (with two exceptions) only high up on the southern hill, Zion itself, that we can expect to find even the faintest traces of his predecessors.

In the reign of Solomon the circumvallation of Moriah was commenced, and the Temple was raised upon its summit. To this great monarch is also ascribed the completion of the wall commenced by his father. The main characteristics pointed out by Scripture and by Josephus to denote the work of Solomon are, the enormous size of the stones, the careful dressing of the joints, the union of masonry with the native rock at the base of Mount Moriah, and the formation of the wall forming the then eastern scarp of that elevation close to the brook Kedron. The recent excavations of Lieutenant Warren, tracing the channelled megalithic work to this very point, and to a depth of 70 ft. below the present exposed portion of the Haram wall, when compared with the statements of Josephus, seem to leave no room for doubt that the original work of Solomon is here in good preservation. For similar reasons it would seem likely that the peculiar shouldered arches, or hollowed impost, formed within the vaulting of the south portion of the Haram, are part of the same monarch's work. Again, farther north along the line of the eastern wall, flanking the Kedron, the remarkable problem of the Golden Gate, the entrance of which is marked by some of the most enormous stones yet discovered, and which clearly formed a portion of a system of palatial works subsequently superseded by the military works of the Amœneen or Idumean kings, may find its solution in the name *Porta Judæicæ*, or *Porta Custodiam*, being probably the Porch of Judgment, leading to the palace (perhaps the "House of the Forest of Lebanon"), and to the northern entrance to the original, as well as to the Second Temple. The passage which seems definitively to identify the Golden Gate with the Gate of Judgment will be mentioned in its due order.

In connexion with the megalithic masonry of Moriah may be noticed the quarries entered by Dr. Barclay, and mined within the mountain, where stones in different stages of preparation have been left undisturbed for 2,000, if not for 3,000 years. The very marks of the masons, the smoke of their torches, and here and there some rude note or ornament daubed on the stone, are said to be traceable on the walls of these royal quarries; and it deserves a careful investigation to ascertain whether the square Hebrew characters,—the Phœnician letters to which it is now the fashion of learned men to attribute a greater, but perhaps a more questionable, antiquity,—or the Greek letters likely

to be used under the Idumean kings, are to be traced in these ancient caverns.

In the fifth year of the reign of Rehoboam, the son of Solomon, occurred the second of that series of successful sieges or storms of Jerusalem which, without counting unsuccessful attacks, like that of Sennacherib, or occupations without recorded fighting, as in the case of Necos, king of Egypt, three months after the battle of Megiddo, amount to no fewer than seventeen during the 2,230 years that elapsed from the capture of the Holy City by David to that effected by Saladin. The record in the Hebrew Scriptures is confirmed by the sculptures and hieroglyphics found in the tombs of the Egyptian kings of the twenty-second dynasty, the first of whom—Sesonkhis—is denoted by the same appellation of "subduer of the Menahom," or Syrian shepherds, that is ascribed to Thothmes IV., the Pharaoh of the Exodus, and among the portraits of whose captives that of the "Melech Judah" is represented with arms bound behind him, and with a face in which the Jewish features are as decided as is the expression of dismay and alarm which they are intended to betray. No great building epoch is recorded as intervening between the capture by Shishak, king of Egypt, and that by Joash, king of Israel, 150 years later, when the record of the demolition of 400 cubits of the wall of the city between the Gate of Ephraim and the corner gate affords a means of, to some extent, identifying the wall raised by David with that repaired by Nehemiah.

Uzziah, the eleventh king of Jerusalem, of the house of David, appears to have repaired the damage effected by King Joash, during the reign of the unfortunate Amaziah. "Uzziah built towers in Jerusalem at the corner gate, and at the valley gate, and fortified them. Also he built towers in the desert. . . . And he made in Jerusalem engines, invented by cunning men, to be on the towers and the bulwarks, to shoot arrows and great stones whithal." It seems hardly to be expected that we should now be able to distinguish the work of King Uzziah, whose long and glorious reign, ending in a cloud, was succeeded by that of his son Jotham, the fourth builder king, who "built the high gate of the House of the Lord, and on the wall of Ophel he built much." The former, the great eastern gate of the temple, now lies in undistinguishable fragments against the eastern wall of the Haram; of the latter it is probable that the foundations may be those of a wall now under course of examination.

After the idolatrous and unfortunate reign of Ahaz, whose extinction of the Lamp in the Temple, on the 17th Thamuz, is yet commemorated in the Jewish almanack, Hezekiah, the fifth builder-king, repaired and reopened the temple. "How he made a pool and a conduit, and brought water into the city," as recorded in the Book of Kings, is more minutely explained in the Book of Chronicles, by the expression that "he stopped the water-course of Gihon, and brought it straight down to the west side of the city of David." As it is added that he prospered in his works, and as a reason given for his "stopping" the water-course is, that it should be rendered unavailable for the supply of the army of Sennacherib with water, we may, perhaps, conclude that the diversion of the stream was connected, after filling tanks or basins, with the sewerage of the city. We can hardly fail to find traces of the work of Hezekiah, of which the locality is thus distinctly indicated.

Sixth and last of the builder kings of the line of Judah was Manasseh, the fiftieth and the longest reigning monarch of the dynasty. After his capture by a king of Assyria, whom the recent discoveries at the British Museum enable us to denote by the name, as at present read, of Ashur-bani-pal (a king whose cuneiform records mention a king of Judah as his tributary), Manasseh, on his restoration to his kingdom, "built a wall without the city of David, on the west side of Gihon, in the valley, even to the entering in at the Fish-gate, and compassed about Ophel, and raised it up a very great height." This wall, built at the foot of the hill, enlarged the area of the city towards the west. The wall now in course of uncovering at Ophel may bear traces of the labour of Manasseh, as well as of that of Joash. It abuts on the Haram wall, but shows, by not being bonded into that colossal structure, its later date. We have no further record of building at Jerusalem before the siege by Nebuchadnezzar.

The city of Jerusalem was captured by Nebuchadnezzar, king of Babylon, in the nineteenth year of his reign, on the 10th day of the month

Tamuz, after a siege of eighteen months, 467 years after its capture by David, of whom Zedekiah, the twenty-first king of the line of Judah, was the descendant in the seventeenth generation. On the 9th day of the succeeding month of Ab, being the sixth day of the week, the captain of the guard of the King of Babylon "burned the house of the Lord, and the king's house, and all the chief houses of Jerusalem," and "brake down all the walls of Jerusalem round about." Those familiar with military demolition must be aware that, in the absence of gunpowder, it would have been impossible to obliterate, or even to level, works of the character attributed to the building monarchs of Salem, excepting at a cost of labour and of time nearly equal to that required for their erection, and that such an overthrow and ruin of the bulwarks of the city as would render its walled interior accessible at all points, over the heaps of rubbish surrounding the bases of the ruined walls, was the utmost that we can suppose to have been effected by the forces of Nebuzaradan.

We find accordingly, that when, in the twentieth year of Artaxerxes Longimanus, king of Persia, his cup-bearer, Nehemiah, a noble of Judah, who was made Jirshatha, or governor of Jerusalem, commenced the restoration of the walls of the city, he found no difficulty in tracing their course, even though he viewed it in the first instance by starlight, in the absence of the moon, then in her last quarter.

The description given in the unrivalled portion of the autobiographic history of the Hebrew prince enables us so distinctly to understand the course of the external wall of Jerusalem at the period of the capture of the city by Nebuchadnezzar, as to feel assured that patience alone is requisite to enable the officers of the present survey to trace the remains of the imperishable foundations. The discrepancy between the period of fifty-two days mentioned by Nehemiah, for the finishing of the wall, and that of two years and four months, stated by Josephus, with the check of the dates of the 25th and 28th year of the monarch improperly styled Xerxes in our present copies of the Antiquities, may be understood by reference to the expression (Neh. iv. 6) "unto the half thereof;" the wall being just raised to a height sufficient to exclude casual assassins by the 25th day of Elul, J.P. 4267, and being afterwards raised to the full height attained by the work of Nehemiah, and consecrated on such completion, on the 25th of Cisleu, J.P. 4270, which day, in that year, fell appropriately on the Sabbath.

The key to the topography of the Book of Nehemiah is furnished by the Gospel of St. John (v. 2), where it states that there is (or was at the date of the composition of that history) "at Jerusalem by the sheep [gate] a pool, having five porches." This gate opens on the road from Bethany to the city. Starting from this point, now called the Gate of St. Stephen, the wall took a northerly or north-westerly direction to the tower of a hundred cubits in height, called the Tower of Emath or of Menh, thence, bending to the westward, it ran by the Tower of Hananel to the *Porta Piscium*, which, as commanding the only road by which fish was likely to be brought for the supply of the city, may probably be identified with the line of the Damascus Gate. This portion of the wall must have been on the line originally built by David or by Solomon, and a portion of megalithic channelled masonry has recently been exposed close by the present Damascus Gate. The sites of the *Porta Fetus* and the *Porta Ephraim*, and the question as to the identity of the former with the corner gate, await some further elucidation, the wall between the Gate of Ephraim and the corner gate having been previously repaired by King Uziah for the length of 400 cubits. Towers had also been erected by that monarch to strengthen the corner gate and the *Porta Vallis*, which latter, as its name imports, must have stood in the valley at the foot of Zion; but the western wall of the city, from Gihon to the Fish Gate, had been built by King Manasseh, and as that monarch is also said to have compassed about Ophel, it is probable that the whole line of wall west and south of the city, and returning northward to the recently discovered junction with the original wall of the Temple enclosure, dated from the restored power of that king, and was raised by Nehemiah upon the work of the sixth builder sovereign. The *Porta Vallis*, the *Porta Strepituum*, the *Piscina Subæ*, the steps to the ancient citadel, the second pool, the fort, the double bending of the wall, the water-gate to the east, and the tower gate, are all defined points which

the present explorers of the Holy City will be able, if properly supported, accurately to determine.

The comparison of the account given of the rebuilding of the wall of Jerusalem with that of the course taken by the two bands of priests who perambulated the bulwark on the day of its consecration, when thus applied to known topographical facts, leads to one of the most interesting discoveries which has resulted from the recent study of the subject. South of the Sheep-gate, and south also of the *Conaculum Anguli*, or north angle of the Haram wall, is the gate called in the Vulgate the *Porta Judicatus*, in the first passage, and the *Porta Custodia* in the second. Meeting in this gate, the two companies "stood in the House of God," with the northern courts of which the Golden Gate must have naturally communicated. The date and character of this unique piece of architecture will appear from the following considerations.

Permanent ownership of land was one of the most marked institutions in the Hebrew law of the time. The history of Ahab shows the difficulty experienced by even a sovereign in the attempt to appropriate a portion of land required for the completion of the enclosure of the royal palace. In inquiring for the site of the king's house built by Solomon after the completion of the Temple, and for which he left the City of David (2 Par. viii. 11), we are thus naturally directed to examine the locality of the land purchased by King David of Ornan or Arannah the Jebusite, "in Mount Moriah" (2 Par. iii. 1), on a portion of which the Temple was erected. The vast walled area of some 1,800 ft. by 900 ft., rising like an enormous altar from the very bottom of the Kedron and of the Tyropean valleys for a height (recently proved) of more than 150 ft., is identified with the enclosure of Moriah not only by the tradition of the spot, by the unmistakable evidence of the megalithic masonry, and by the relative position with regard to the other points topographically determined, but also by the minute details given by Josephus, and by the description to be gathered from the passages in his writing (Ant., xv. xi., 3; and Bell., v. 2), stating that the *enclosure* of the Temple and of Antonia was double of the (approximate) square occupied by the courts of the former. The length of the stadium mentioned by the historian must be determined by the fact. As to the position of the walls, and proportion of the enclosure, the colossal masonry bears unequivocal witness.

North-west of the Temple cloisters, and thus occupying half of the artificial summit of the hill, was the building which the High Priests Jonathan and Simon "made stronger by very high towers" (Ant., xiii. v. 11), and which became the only citadel of Jerusalem after the demolition by Simon of the fortress raised by Antiochus Epiphanes, on Acre, with a purpose similar to that with which Philip II., or his lieutenant Alva, built the citadels of Antwerp and of Naples. Hyrcanus added a tower. The filling in of the Tyropean valley with the material derived from the lowering of Acre by three years' labour under the pontificate of Simon, has been recently verified by Lieut. Warren. The Antonia of Herod was, we are distinctly told by Josephus, a rebuilding of the stronghold of the Amonean kings (Ant., xviii. 4. 3). If the consideration of the permanence of landed ownership be yet considered as inconclusive to identify the spot with the Palace of Solomon and his descendants, a further link is supplied by the reproaches recorded by the Prophet (Ezek. xliii. 8) against these princes for "setting of their threshold by my thresholds, and their post by my posts, and the wall between me and them," a passage most clearly descriptive of the relative positions of the Temple and the royal palace.

Tracing, then, the occupation of the northern half of Moriah from Herod, through the Amonean princes, to the kings of the house of David, and thus determining the position of the new palace of Solomon, the character of the *Porta Judicatus* seems to leave no doubt of its being great judge, even the porch for judgment," of the great king. After the completion of the new cloisters by Herod, the *Sica Solomoni* is mentioned by the fourth Evangelist; and as it is certain that no work attributable to the second builder-monarch would have remained at that time in existence on the summit of Moriah, it is most natural to attach the name to that porch

or entrance, of wonderful beauty of execution, marked by colossal stones, on which a false rustication has been wrought (as if to render an earlier work harmonious with the noble rustication of the lower wall), which must have given access to the enclosure of the palace and to that of the House of the Lord. The substitution of a porch, or open and canopied tribunal, for the tree under which the throne of the Eastern kings was erected for the most ancient sessions of a species of Court of *Pie-poudre*, or summary royal justice to every applicant, has a close parallel in the arched and canopied porch which the Crusader, Charles of Anjou, erected in his city of Sorrento (where the ancient arms of France, with the *brisure* of the red Angevin label, are yet distinctly visible), the Oriental character of the singular building recalling forcibly the idea, from which the Crusading king may have derived his plan, of the Golden Gate. As this entrance from the northern courts of the Temple to the road to Bethany, in the same way that the nearly adjoining Sheep-gate led from the interior of the city towards the same suburb, the reference in the passage quoted (John x. 23), and that in the Acts of the Apostles (iii. 2-11), in which the *Porta Speciosa* is identified with Solomon's Porch, are most simple and natural. The inexplicable character of the Golden Gate, its rare beauty of workmanship, its colossal stones, its quasi-subterranean position, now that the upper buildings of the Temple itself have been cast into that vast accumulation of *débris* that fills up the valley of the Kedron to the depth of 70 ft., cease to perplex the mind, when the structure is thus regarded as the Porch of Judgment, a building which retained its designation unaltered from the time of Solomon to that of Nehemiah, which was spoken of as "Solomon's Porch" by the Apostles, and which, giving entrance both to the palace and to the Temple, is situated in the very spot appropriate to its name and use. (See 1 Kings xxiii. 10; 2 Samuel xix. 8; Ezek. xli. 1, 4.)

It is necessary to refer to the restoration of the Holy House by Zerubbabel, as it will be soon perceived that no possible relic of this work can now remain *in situ*, and that the only imaginable connexion still traceable between the buildings of the first, the second, and the third temples, is to be sought in the Golden Gate, and in the massive structure of the Haram wall, with its yet remaining gates and vanils.

Of the noble works of the princes of the Amonean dynasty, at least in Jerusalem itself, we can look for no distinguishable trace, although the protracted and herculean labour by which they not only demolished the citadel built by the Great Persecutor of their countrymen on the summit of Acre, but reduced the height of that mountain itself, until it was below the level of the buildings that crowned the height of Moriah, has left evidence in that filling up of the Tyropean valley through which shafts have recently been sunk by Lieutenant Warren. We must pass, therefore, in our investigations over the 400 years that separated the rule of Nehemiah from that of Herod the Great, and even then we must pause with astonishment at the evidence of the thorough destruction effected by the legions of Titus. But traces must be certainly discoverable of the wall which surrounded the fourth hill, called Bezetha, the foundation of which was laid by Agrippa, in the reign of Claudius Cæsar, and which was afterwards raised to the height of 20 cubits. This, the third wall of Joshua, cannot, from its position, be confounded with any more ancient fortifications. On its line were built, by Herod, the great octagonal tower of Psephinus, at the north-west corner, and Hippicus, 25 cubits square, hard by, while the foundations of Psephinus, 40 cubits square, and of Mariamne of half that size, must still remain in the vicinity to mark the site of the older, or first, wall.

The utter destruction effected by Titus is witnessed at this distance of nineteen centuries by two striking facts, which the recent exertions of the survey have brought into full light. One is the relative level of the present surface of Moriah as compared with that of Acre, from which it is clear that the actual level of the area of the Haram enclosure must have been reduced far below that to which it had been raised by the Idumeans, and even by the Amonean kings. The second is the corresponding indication afforded by the immense mass of *débris* now covering the lower half of the existing wall of the mountain, which raises the level of the Kedron by more than 70 ft., and throws

the present false channel of the brook proportionally to the east of its natural course. The obscure passage in which Josephus speaks of the raising of the Temple 20 cubits by Herod, and of the rebuilding of this additional work, after the foundation had given way, by Agrippa, would not inappropriately describe the raising of the whole platform on the summit of the enclosed hill. But however high Solomon and his successors may have piled story upon story, each of which thus successively became subterranean, and was excluded from the light of day, the lofty cloister, with its spiral columns and Corinthian capitals, the ascending courts of the Temple, and the structure and site of the Holy House itself, have been so ruthlessly swept into the valleys at the foot of the yet existing Haram wall, that we can expect to derive but little information from investigation of the present domed surface of the hill; nor can we have any reason for attempting to connect the rock which in one spot protrudes, with any known feature of the destroyed sacred buildings. A pile of 70 ft. in depth of rubbish must be composed of the ruins of works more massive than those of the cloisters and the Temple alone; and the height now wanting to enable the observer on Moriah to look down on the summit of Aera may enable us to form some idea of the manner in which not one stone of the upper structure of the altar-mountain has been left upon another.

Later than the eleven, — or, including the hostile citadel of Aera, the twelve,—building epochs of Jerusalem above pointed out, are five distinct periods of less striking interest, of each of which we may expect to find some definite trace before we arrive at the last 600 years of Moslem rule and squalid neglect. Fifty years later than the siege by Titus, the relics of the work of Hadrian may be recognised, where lighted on, by deeply incised, rude Roman letters, by coarse cornice-work, by representations of human or of animal life, or by pagan emblems. Two hundred and ten years later the marks of the handwork of Constantine the Great; still later those of the Pagan Julian, and of the Christian Justinian, are fertile subjects of controversy. After 300 years of Christian occupation and architecture follow 460 years of Saracenic rule, the Arabic inscriptions, and the Mauresque style of which period are also the subjects of technical contention. To the succeeding ninety years of the Crusaders must be attributed all heraldic emblems, crosses of the Knights of the Temple and of the Knights Hospitaliers, inscriptions in Franco-Latin, and no doubt the cross, somewhat resembling that famous cross of Toulouse under which the followers of Raymond de St. Gilles flocked to the first crusade, which has been recently disinterred without the Damascus Gate. Finally, after the conquest by Saladin, we must look for Arabic, and then later for Turkish relics alone. A clear and close application of the rules above indicated as to the locality and characteristics of the sixteen, or, including Antiochus, and distinguishing the Turks from the Arabs, the eighteen, epochs of the architecture of Jerusalem will lighten the labour of the survey, and attach fresh interest to each successive discovery.

With regard to the yet undiscovered tombs of the kings of the house of Judah, to the description of which the remarkable group of monuments north of Bezetha in no way corresponds, it may be remarked that David and ten of his successors were buried in the royal sepulchres in the City of David, that is to say, in the original citadel of Zion. So little is said of this ancient fortress after Solomon removed his residence from the spot (2 Par. viii. 11), that it may be imagined that the site was chiefly venerated as that of the royal mausoleum, looking down, like the last resting-place of the princes of another line who bear the empty title of Kings of Jerusalem, from the magnificent Saperga, in solitary grandeur. Four of the dynasty of David are recorded in the Book of Chronicles as buried in the citadel, but not in the royal sepulchres; and two were entombed in the garden of the palace, or in the Garden of Uzza, which, from the denunciation of the prophet Ezekiel (xliii. 7-9), must have been within the walled precincts of Moriah. The remaining four monarchs of the race were not borne to the sepulchre of their fathers. The founders of the Assyrian dynasty were buried in their own city of Media, and the magnificent Herod was entombed as Herodion; so that the existing tombs of the kings, situated far beyond the limits of the City of David, and of the palace and enclosures

of the later kings, remain a problem of which the solution regards a yet higher antiquity than the consecration of the Holy City as the resting-place of the ark of God.

SYNOPTIC VIEW OF THE BUILDING EPOCHS OF THE CITY OF JERUSALEM FOR 4,000 YEARS.

Epoch.	Julian Period.	An.Urb. David.	King or High Priest.	Locality.	Nature of Work.	Characteristics.
I.	2533 3670	...	Melchizedek David (I.)	Zion	Wall on brow; condit. Storms and captures Zion.	Cyclopean masonry.
II.	...	...	...	Zion	Tomb; wall; fort.	Excavated tomb.
III.	3703	33	Solomon (II.)	Moriah	Wall of Mountain; Tem- ple; Palace; Porch of Judgment; ascent to Temple.	Rustic masonry work; shouldered arches; bridge; characters written in quarry.
	3749	79	Seeoukhoris, 1st king of 22nd (Buhastite) dynasty	...	Takes Jerusalem and breaks down wall, 400 cubits.	
	3986	228	Joash, 12th king of Israel	...	Takes Jerusalem and throws down walls; anno Sabbatico.	
IV.	3913	243	Ac. Uziah (XI.)	Lower city	Towers; corner gate; valley gate.	Position of gates.
V.	3985	295	Ac. Jotham (XII.)	Ophel Moriah	High gate of Temple.	Foundation of wall. Obliterated.
VI.	4011	341	Ac. Hezekiah (XIV.)	Lower city	Pool; wall repaired; con- duit.	Conduit.
	4059	289	Ashur-hani-pal, king of Assyria	...	Takes Jerusalem.	
	4137	467	Manasseh (XV.) Nebuchadnezzar, king of Babylon	Zion, Ophel	Wall; Burns Jerusalem and breaks down wall.	Base of hill; First wall of Josephus.
VII.	4137	467	Zerobabel	Moriah	Temple rebuilt	Obliterated.
VIII.	4193 4267	523 597	Nehemiah	Zion, Moriah, Lower city	Circuit of wall and gates	Hasty re-construction; position of wall.
	4544	874	Antiochus Epiphanes	...	Takes Jerusalem, and builds citadel.	
IX.	4547	877	Judas Maccabeus	Aera	Citadel Recovery and rebuilds wall.	Obliterated.
	4551	881	Antiochus Eupator	...	Takes Jerusalem, and throws down walls; anno Sabbatico.	
	4591	891	Jonathan, 53rd High Priest	Zion and Aera	Wall built between; re- builds and fortifies wall	Position of foundation.
	4685	895	Simon, 54th High Priest	Aera	Levels summit.	Filling Tyropoeon val- ley.
X.	4670	900	Hyrcanus, 55th High Priest	Moriah	Builds tower.	Rebuilt as Antonia.
	4651	981	Pompeius Magnus	...	Takes Jerusalem.	
	4674	1004	The Parthians under Pacorus	...	Take Jerusalem.	
	4677	1017	Sotius and Herod	...	Take Jerusalem.	
XI.	...	...	Herod, 1st Idumean king	Moriah Lower City	Town of Antonia, clois- ters, temple re-built, passage, four towers.	Margalithic stone, not rusted; measured bases of towers; similarity to work at Herodion.
XII.	4753	1083	Agrippa, 4th Idumean king	Bezetha	Foundation of wall north of city.	Third wall of Josephus.
	4753	1113	Titus	...	Takes and levels Jeru- salem	
XIII.	4831	1161	Hadrian	Moriah, City	Wall; gates.	Altars; deeply incised rude Roman letters; Pagan emblems.
XIV.	5043	1373	Constantino	Without wall	Church of Holy Sepul- chre.	Crosses; Christian in- scriptions; cruci- form plan of founda- tion.
	5066	1396	Julian	Moriah	Work on Gates.	Romanesque style.
	5199	1549	Justinian	...	Recovers Jerusalem.	
	5327	1657	Chosroes, king of Persia	...	Takes Jerusalem.	
	5341	1671	The Emperor Heraclius	...	Recovers Jerusalem.	
	5349	1679	The Caliph Omar	...	Takes Jerusalem.	
XV.	...	...	...	Moriah	Mosques.	Arabic inscriptions; Mauresque style.
	5399	2139	The Crusaders	...	Take Jerusalem.	
XVI.	...	...	...	...	...	Temples and Hospi- tallers' crosses; in- scriptions; churches, monasteries, walls, Arabic inscriptions.
	5699	2239	Saladin	...	Takes Jerusalem.	
XVII.	...	...	Saracens.	...	...
XVIII.	6166	2496	Turks.	...	...

THE ASH.

The ash (*Fraxinus excelsior*) is one of the most beautiful trees of our flora: it never possesses the rugged grandeur or attains to the gigantic proportions of the oak or the beech; but its loveliness and grace more than compensate for its lack of size and majesty. The timber, though little used for building purposes, is invaluable for special manufactures, and the life-history and associations of the ash are second to no other tree.*

At every season of the year the ash presents something worthy of close study, both to the naturalist and the artist. During the winter months the flowers are packed in rather large jet-black buds, which in April (and before the leaves appear) become ruptured, and an abundance of small thread-like golden flowers are thrust out. They soon become detached, and are then blown about in the air. They are at first sight not very easy to understand; for at times they are either wholly male, wholly female, or may be hermaphrodite. Taken in masses, however, they form radiating groups of yellow threads, with clubbed tops. When the tree is in

fruit in the autumn the well-known "ash-keys" take the place of the flowers, both flowers and fruit being always abundant.

The pendulous foliage of the ash appears late in the spring, and is known to every one for its surpassing grace and beauty. After being studied in detail for form and colour, the character of the foliage as a whole is perhaps best seen during boisterous and stormy weather. It is then that the lovely curves of the branches, and the lightness and grace of the drooping leaves, are best exhibited. The waving to and fro of the limbs, and the alternate display of the dark upper side and the lighter under side of the foliage, is very striking. The ash is very late in coming into full leaf, and is one of the most susceptible of trees to the frosts of autumn: in fact, the first severe frost of the year will frequently strip every leaf from the tree. It is, therefore, seldom that any autumnal change of colour, so remarkable in the beech and other trees, is to be observed in the leafage of the ash. Every one who has noticed groves of trees at the fall of the year must have remarked that it is no uncommon thing during the late autumn or early winter mornings to see an oak tree in nearly full leaf with every leaf and branch silvered with a thick hoar-frost, presenting one of the most beautiful sights it is possible to

* For descriptions of the oak, yew, beech, elm, &c., see previous numbers of the Builder.

imagine; but the effect of the frost on the ash is to lay every leaf in a thick carpet under the tree. When denuded of leaves the aspect of the tree is very variable, and often grotesque in the extreme. The odd shapes it sometimes takes, its chiroscrous bark, black leaf and flower buds, and curious parasites probably had considerable influence in the formation of the astonishing beliefs held by country-folk in the olden times regarding this tree.

The timber of the ash is noted before that of every other tree for its remarkable toughness and elasticity; it is superior to lance-wood for most purposes, because it will not suddenly snap, as the latter wood is apt to do; it is chosen invariably for all gardening and agricultural implements; it is frequently used by carriage-makers, and is not unknown as a building material, at least one odd staircase in this country being wholly formed of it. In ancient times its toughness and elasticity recommended it for the shafts of spears; in more modern ones for the staves of Alpine climbers, and for the horizontal bars of the "flying trapeze," on which the "Brothers Idiots" disport in the latter situation its springy and elastic character is seen to great advantage. It is said that a bar of ash-wood will bear a greater strain, without breaking than a bar of wood taken from any other European tree.

The parasitic creatures and plants peculiar to this tree are comparatively few in number, but the ash is very subject to attacks from the vagabond class of parasites, the members of which order are ever ready to fix on the vitals of any tree: one of the most striking is certainly the gigantic *Polyporus squamosus*; it is more frequently found on the ash than upon any other tree; sometimes it grows at the base amongst the grass and wild plants, almost out of sight; and at other times it affects the very summit; it sticks out like a huge shelf, and one instance is on record where the parasite attained a circumference of 7 ft. 5 in. It is common on ash trees every where; its spawm infesting the wood, and predicting speedy death. An allied species, *P. fracticosus*, which is quite peculiar to the ash, and at times attains a circumference of 9 ft., is very common in some districts, but for some unexplained reason it never occurs near London; it is similar to the huge *Polyporus* that attacks the elm, which is abundant in some districts; but although the elm is so common everywhere in the neighbourhood of London, the parasite never puts in an appearance. More singular than either of the foregoing, but far less common, is the "cauliflower Hydnum;" it is but rarely met with in this country, but when it does occur its appearance is so striking that the most unobservant person would not be likely to pass it unnoticed: in colour and form it is exactly like a large cauliflower; for food it is as good as the meadow mushroom. One of these curious objects grew on the extreme top of a very old ash this autumn not far from the "Cat" Inn, at East Barnet; with the assistance of a gardener and a high ladder we succeeded in detaching the specimen, and (after dissection) testing its edible qualities, which we found excellent. On very old ash trees, and on dead ash trunks, may often be seen jet black hemispherical bosses, 2 in. or 3 in. in diameter; old trees are frequently covered with these singular things, which are peculiar to ashes, and are known under the name of *Hypoxylon concentricum*. There is, too, a very curious flecked agaric to be found on this tree (*Lentinus Dunali*): last autumn we saw a tree on Stamford Hill covered from top to bottom with this curious plant; it is said to be rare.

When the fruits of the tree fall to the ground in the autumn, there are two species of fungi ready to attack them and prevent their germination, and what is most singular is the fact of these species being never found on anything else but ash-trees; there are also five species ever ready to attack the twigs and fallen branches.

There is a very singular growth of ash branches called by country-folk "stags' horns," in which the smaller branches are curiously flattened, having a width of about 2 in. or 3 in., and a thickness of $\frac{1}{2}$ in. only. At times this growth is not uncommon; we have frequently gathered specimens. Round holes, 2 in. or 3 in. in diameter, may often be seen pierced right through ash trunks and branches: they are made by the woodpecker. The roots of the ash (which are generally close to the surface) are usually very much knotted, and full of singular knobs. These are much valued for fancy cabinet-work. The *manna* of our markets is obtained from a near ally of the ash.

The ancient (and, indeed, the modern) beliefs

regarding the ash-tree are most remarkable. Given trees, through which ruptured children have been passed, are said to be common all over the country; but we have not met with them in our visits to ash districts. The old Northern mythology represents the earth as resting on a mighty ash-tree. The court of the gods was said to be held under an ash, and, in fact, that man himself was made from the ash. We read in old books that it was at one time a custom in this country for a new-born child to be made to drink of ash sap for its first draught. The feat was managed by getting a green branch and firing one end, to cause the sap to exude from the other, which, on being caught in a spoon, was administered to the child. Another curious custom, to avert evil from cattle, was (and is), to bore a hole in an ash-tree, and immerse a poor living shrew mouse in the cavity.

An old Elizabethan author, referring to this tree, says,—"The leaves of this tree are of so great a vertue against serpents, as that the serpents dare not be so bold as to touch the morning and evening shadows of the tree, but shuneth them farre off," and, in another place, that "the serpent being perced in with boughs laid round about, will sooner runne into the fire, if any be there, (t) than come neere to the boughes of the ash."

There is a very curious and ornamental variety of the ash common in parks and gardens, called the "weeping ash;" it has pendulous branches, which, on springing from the stem, make direct for the earth, sometimes in nearly a straight line; it is no uncommon thing, however, to see one of these trees, as it were, change its mind, and instead of sending its branches downwards, send them all, or half of them, straight upwards. The first weeping ash came up by accident from a seed, in a garden in this country about a hundred years ago.

The mountain ash, which is such an ornament to our parks and suburban gardens, with its masses of red berries in the autumn, belongs to the Rose family, and is in no way connected with the "common ash;" a similarity in the foliage probably suggested the popular name.

WORTHINGTON G. SMITH.

SYSTEMATIC PROPORTIONS IN ARCHITECTURE.

THE ARCHITECTURAL ASSOCIATION.

The ordinary meeting of members was held on Friday evening (the 20th December), at the House in Conduit-street, the president, Mr. R. Phéné Spiers, in the chair.*

The Chairman, in calling attention to some of the prize drawings which had been exhibited at the Royal Academy (and which were now shown in the room), observed that it was a subject for congratulation that all the students of architecture who had taken prizes at the Academy were members of the Association, including Mr. Gover, who had obtained the travelling studentship, and Mr. H. S. Wood, Mr. Morley, and others, to whom silver medals had been awarded.†

Mr. W. White then read a paper on "Systematic Proportion in Architecture," in the course of which he enforced the desirability of procuring general harmony of outline as well as of subdivision in buildings; and these, he contended, could not be obtained without a careful ground plan, drawn according to geometrical and arithmetical ratios. He was aware, he said, that exception might be taken by those who objected to a mechanical instead of a mental process; but he held that the most subtle eye and the most adroit hand could not regulate the proportions of a building without the aid of mechanical deductions. A school of architecture would, he thought, effect much towards accomplishing this object and establishing a national

* The following gentlemen were elected members of the Association.—Mr. S. Wall, Duke-street; Adelphi; Mr. C. E. Burt; Mr. F. W. Gritten, St. George's-road; Mr. A. Lockwood, Tooling; Mr. R. Rakes, Gloucester-street, Finsbury; Mr. T. W. Cutler, Winchester-street, Finsbury; Mr. E. E. Smith, Parliament-street; Mr. W. Oakley, Charles-street, St. James's; Mr. F. Mellor, Engineer's Office, London and North Western Railway, Euston Station; Mr. E. G. G. Lowe, Marylebone-street; Mr. R. E. Howard, Clapham Park-road; and Mr. R. E. Smiles, Denbigh-street, Finsbury.

† Touching the travelling studentship at the Academy, it has been complained to us that the drawings of the unsuccessful competitor, Mr. E. H. Fahey, were hung for inspection much less advantageously than those that were awarded. We are not in a position to speak of this; but, having seen Mr. Fahey's drawings, can, at all events, say that they are a very creditable set.

and feasible system. The early architects seemed to have worked by the equilateral triangle and the square, as an examination of their works showed that nearly all their buildings were made to work according to those mathematical outlines. Mr. White exhibited a number of drawings to prove this hypothesis, and explained, with the aid of the black-board, the theory which he advocated. His views have already been set forth in print.

Mr. Blashill observed that the most interesting portion of the question was that which related to its practical working. It might, he thought, be taken for granted that every one who designed a building had some system to go upon. Modern architects worked by feet and by inches, and to a much closer scale than there was reason to believe the Mediaeval architects did; but in his opinion the reason the equilateral triangle was found so frequently in their buildings was, that it was a form which could be most easily struck by the compass. In church building it was by no means so to suppose that the architects of the middle ages determined their proportions by the number of worshippers, the nature of the ceremonials, and so forth. But even if these considerations did not offer the true solution, he would like to know why a slight departure from the canons of symmetrical proportion, as laid down by Mr. White, should injure the design of a building. He owned that, after listening attentively to that gentleman, he still failed to get a clear notion of any fixed principle which guided ancient architects in the pursuit of beauty. He was quite willing, however, to express his agreement with Mr. White in the necessity of careful study of the ground-plan, without which it would be impossible to attain that harmony and repose so essential in all architecture, but more especially in church-building.

Mr. L. W. Ridge expressed his concurrence in the soundness of the propositions laid down by Mr. White, and gave it as his opinion that the architects of the most famous churches of the best period of art worked by the equilateral triangle and the square. He instanced the Abbey Church of Westminster as a case in point.

The Chairman was of opinion that the ancients were guided in the designing of their buildings by certain rules of proportion, although they had not the mathematical instruments and scientific advantages of those who followed them. It was, he thought, to be regretted that in the present day the study of proportion did not receive greater attention, and if the establishment of a School of Architecture would effect that object, he would be glad to see it. If, as asserted by members of the Gothic School, there was no proportion in that style, how, he asked, was that careful study and measurement of Gothic buildings proved that the architects of them had worked to certain proportions? This argument alone showed the want in our own day of a true understanding as to the manner in which architects should pursue their studies. For his own part, he could say that he always found the greatest assistance from having learned a certain system of proportion. In practice, also, he found that this knowledge enabled him to work much quicker.

Mr. White thought that Mr. Blashill had himself answered his own argument. What was wanted was—not that one man should be able to build a thousand churches, but that we should have a thousand men competent to build them.

The Chairman announced that a special meeting would be held on the 8th of January, for the purpose of resuming the discussion on concrete dwellings.

It was also proposed on an early day to pay a visit to East Sheen, in order to inspect the concrete houses built there by Mr. Blomfield.

HOW TO DEAL WITH "GREEK FIRE."—Amid so many Fenian alarms (more than there are sufficient grounds for), a reassuring voice is heard from Dr. Henry Medlock, who is satisfied that "Greek fire" is not so dangerous as it has been represented to be. It consists of phosphorus dissolved in bisulphide of carbon. When thrown upon any combustible material the liquid rapidly evaporates, and the phosphorus then bursts into flame, evolving suffocating vapours of phosphoric acid. Water will only temporarily extinguish the flame, which bursts out again when the water dries up; but the so-called Greek fire may be immediately and permanently extinguished by a solution of common washing soda,—one pound to a gallon of water.

DOMESTIC ARCHITECTURE OF MEXICO.

The Domestic Architecture of a people is a very interesting subject of investigation and inquiry. In the earliest ages man's wants and necessities were of the rudest and most primitive character, originating in the desire for protection from the inclemency of the weather, and from its ravages and attacks; and it is curious to observe how very similar are the ideas that prevail, how alike the hut of the ancient Briton to the wigwam of the American Indian, and also to the huts that now exist in many parts of Ireland, and even in some of the poorer agricultural districts of England and Wales, even in these days of the popular outcry for improved labourers' cottages. The first want of mankind, even in a barbarous state, after satisfying the cravings of nature, is to seek a shelter for himself and progeny, and to proceed to construct it of the first suitable material that comes to hand, that can be easily converted and rendered available, and fashioned with tools of the very rudest kind, made of stone or hard wood, or principally spced by hand. We cannot wonder at the rough and uncouth erections that have existed from the earliest ages.

The relative position of the architecture of a country is looked upon as a type of its state of civilization; and, where the principles of construction are unknown, or but imperfectly practised, that nation must be in a state of semi-barbarism, and its only hope to emerge therefrom is by the aid of spreading knowledge and as the arts progress, and some system is developed founded upon certain laws of proportion, and upon correct rules, deduced from an analysis of what is suitable to attain the end proposed.

As nations emerge from barbarism to a state of civilization, it will be found there are many different stages or grades of construction practised, suitable to their wants and knowledge at the time, and, as they progress in wisdom and skill, it assumes amended shapes and forms adapted to the further requirements and necessities of the period, and thus it continues its onward movements, until it has culminated in the various systems and styles of architecture that now prevail in the various countries of the world.

Hence it is that the practice of architecture has led by its different treatment to the many varied forms it has assumed in the respective countries, modified, no doubt, in various ways by the advancing civilization of each country, but in each case its peculiarities are stamped upon their important works in succeeding generations, even up to the present period of time.

The styles of architecture of a country are also regulated in a great measure by other causes, the geological and physical nature of the country, and its resources in materials of all kinds suitable for different species of erections, and that in all cases must have governed the mode of construction; and as the resources of a country are developed and its productions gradually brought into profitable use, it assumes the endless variety of shapes and forms that characterise the buildings of ancient and modern times in all countries.

In many parts of Great Britain we have different varieties of construction, although the style of architecture approximates: in many districts where the prevailing geological formation is clay, bricks are extensively used, almost to the exclusion of stone, except in ornament and decoration, and its parts are frequently frittered away from ineffective design or petty details; and we have not availed ourselves of many new and improved shapes for bricks, as was expected when the duty was taken off, and the size and shape were not restricted. Again, in other districts good building stone of various kinds are situated on the geological formation, and handsome and even elegant erections of stone, characterized with greater boldness, adorn our towns and suburban districts. Therefore, the style of architecture of every locality and country is governed in some measure by the natural productions of that country and its capability to supply all the many diversified and necessary materials required in the erection of buildings.

The style of Mexican architecture is decidedly of the Spanish type, influenced by changes brought about by its gradual development and modern practice; and, although there are many remains of remarkable works distributed over the country executed by their much earlier predecessors, the Toltecs and the Aztecs, who

founded cities, made roads, and constructed large and enduring pyramids, and other wonderful erections now in ruins, and, having no previous monuments of older nations to guide and regulate their ideas, their works are necessarily impressed with the stamp of originality and novelty, and the changes above alluded to were doubtless occasioned by the early examples left them by those migratory tribes, combined with the inventions and discoveries of their later and more enlightened masters the Spaniards; and their works are chiefly remarkable for great space and boldness of plan, rather than from elaborate design and workmanship, in the façades of their principal buildings, cathedrals, and churches. The outline of their domestic agricultural buildings is generally flat and low; but the architecture is pleasing from its boldness and originality rather than from its constructive detail; and ornament being generally but sparingly used, the mass of the buildings, their arrangement, and mode of construction give the erections an appearance of solidity, safety, and convenience that compensates in a great measure for their want of elaborate display in ornament and workmanship.

But there are many exceptions in their cities and towns, where they maintain their well-known boldness of design in the general erection and plan, and their façades are elaborately ornamented in a style peculiar to themselves, and which appears to be in good taste and pleasing, of an interesting and novel character, particularly to the traveller accustomed to European systems of construction and details of execution; but we shall return to this branch of the subject in a future paper, in which we intend to treat fully of town and suburban residences, jot down their points of interest and advantages, and draw useful conclusions from an analysis of this peculiarly interesting subject, which is imperfectly known: at the present time our object is to draw attention to their agricultural buildings, and other subject-matter indirectly connected with them.

The agricultural buildings of Mexico consist of the "wigwam" or hut; the "rancho," and the "hacienda:" the latter means, in pure Spanish, "estate" or "farm;" hut in Mexico, where pure "Castilian" is not spoken, it is applied to the "casa grande" of the estate. The hut is the residence of the agricultural labourer, or Indian, employed to work on the estate, to cultivate the land, clear away the bush and trees, plough and sow the seed, and gather in the crops. But since the period of anarchy has predominated in that unhappy country, when they achieved their independence and threw off the Spanish yoke, in the struggle for power by the different petty chiefs, plunder and self-aggrandizement was the ruling motive, and agricultural pursuits were neglected, vast tracts of country were thrown out of cultivation, consequently the forest and bush now cover the ground where once flourished abundant crops of the varied productions of this part of the tropical zone.

At the present time, whenever it is determined to cultivate the land, a clearance is first effected of the bush and trees, and when all is cut down and effectually cleared, the Indians generally select the timber and poles suitable for the erection of huts and ranchos, and these are carefully moved on one side to a place of safety, and at the same time they also procure what "vines" or tendrils of parasitical plants they desire and are necessary in the erection of the buildings.

After the whole of the timber has been overhauled, and all suitable pieces selected, the waste timber and bush are then allowed a little time to dry, which is soon done effectually under the powerful rays of a tropical sun; the torch is then applied to the dry mass, and an extensive conflagration then takes place, lighting up the surrounding forest and country, and striking terror into the wild animals and serpents that abound in those districts.

On the complete destruction of the *débris* the ground is cleared, and means are at once taken to erect the hut out of the materials previously selected, and that is not a very lengthy operation. Small huts of trees, cut with short lengths of the branches, so as to form a fork, are placed as corner-posts of the building, and wall-plates are let into the forks of the corner-posts, and secured in their places by the tendrils of parasitical plants, more particularly the "lianas;" upon the wall-plates are erected the rafters for the roof, similarly secured to the wall-plates and ridge-pieces. Uprights are

placed for doors and windows, with heads and sills, and these are usually made of cedar boards; and the sides of the building are closed in with small poles, laid horizontally, and close together, and well secured with ties to the upright posts. After the framework of the building has been completed, they then proceed to cover in the roof with slight poles or laths, and this is covered thickly with thatch, made of the long tough grass of the country, made up closely in bundles, and laid closely and firmly together on the roof, and secured with ties to the laths, and framework of the roof. The floors are sometimes nothing but the bare earth, but red tiles are sometimes used, which are about 12 in. square and 2 in. thick, for the superior class of huts. These huts are occupied principally by the permanent class of labourers, or sometimes by peons that are located on the estate, to work out some debt contracted or punishment inflicted by the State; in fact, another name for slavery, as they seldom obtain their freedom as labourers, and drag on a miserable existence in perpetual bondage and servitude.

The wigwam is not so permanent or substantial an erection as the hut, and is used chiefly by the wandering Indians, who form a considerable class in that country; and their nomadic life is instilled into their very nature, "grows with their growth and strengthens with their strength," and cannot easily be abandoned; and when a tribe of Indians break up from their cantonments, they selfishly burn and destroy their old residences, so that no one may profit by their labour, or other wandering tribes reap the advantage of their toil and care.

The wigwam of the Mexican Indian differs but slightly from the ancient low hut of their British contemporaries, or other primitive people: timber is used for the framework of the building (if it can be called such), for the support of the roof; in fact, the erection may be looked upon almost as a roof with its base placed upon the ground and its sloping sides supported by rafters, and ridge-piece, wattled or covered with thatch made of the strong tough grass of the country, which abounds in low swampy places in the forests and prairies. Openings are left in the side to emit smoke, and which serves for ingress and egress, but so very low that it is necessary for them to stoop, or creep in on their hands and knees. The framework is secured together with lianas, that abound so extensively in the forests, and which are readily and cheaply procured, and afford the poor Indian the only known method to secure his primitive building together, or to prevent it from being washed away by the torrents of rain that sometimes prevail, or scattered abroad by the strong "norths" or hurricanes of those latitudes.

It is truly astonishing how well this simple mode of construction lasts; the long, tough, and enduring grass of the country, and the tendrils of the lianas, effect the object to which they are applied; the building continues for a long period well and securely tied together and roofed in, as an effectual protection to the destructive action of the elements.

And notwithstanding their usefulness, the lianas are some of the most beautiful and graceful of nature's varied productions; they intertwine and interlace the whole of the interminable forests together, and their large lily flowers hang in luxuriant clusters of blossoms and glitter in relief on the dark foliage of the trees, adding with numerous others equally graceful, diversified, and beautiful, to the splendid aspect of tropical forest scenery. The lianas are some of the most remarkable vegetable productions of the tropical world, and constitute an ever-varying feature in the forest scenes. They are sometimes so gigantic as to overtop the tallest trees, and descend again to the ground in vast festoons; they pass from one tree to another, and bind the whole forest together in a maze of living network, and their stems are often as thick as a cable of a man-of-war, and in consequence it is not possible to penetrate the recesses of a forest without the aid of the axe. Some become quite tree-like in the thickness of their stems, and often kill by constriction the tree which originally supported them, and when these have decayed the convolutions of the lianas exhibit an astonishing mass of confusion, magnificent in their luxuriance of foliage and flowers. No tropical flowers excel some of them in splendour, and they are seldom to be seen in our hot-houses owing to the difficulty of cultivation.

Having given a short account of the homes of the native Mexican Indians, we will give an epitome of their system of agriculture. As soon as the *débris* of the forest is consumed with fire,

and reduced to cinder and charcoal, the whole of the remains are spread evenly over the surface of the ground, and prepared for ploughing, &c.; the plan adopted is rather unique in its character, and may interest our readers. It is not on every occasion that ploughing is resorted to, but when it is the instrument used is cut and shaped out of some of the hard woods of the country, somewhat like the plough and plough-shares of this country, but there is not a particle of iron about them, probably on account of its scarcity and expense, and these ploughs are drawn by a pair of oxen, yoked together (which are usually fine animals); the yoke is formed and shaped out of a hard piece of wood, and is fixed on the horns, so that the point and force of draught proceeds direct from the head and neck, and not from the shoulder, as with us.

In the same way the Mexican Indian carries extraordinary heavy weights for many miles on his back, with a hand or strap passed across the forehead to support the weight, so that the whole weight depends on his head and neck, and his shoulders and arms are free to aid his locomotion.

The other instruments used are hoes something similar to those for hoeing sugar-canes in the West Indies, but larger than we use in this country, they are sometimes square and sometimes round on the blade. The above constitute the whole of the stock of materials required by the small Indian farmer to cultivate his land, and produce his abundant crops of sugar-cane, maize, tobacco, coffee, and other valuable crops. In some cases ploughing is not even resorted to, but the bush and underwood are burnt down, and they then proceed to plant the land with maize beans, &c., and it is so rich and fertile with the decayed vegetation of years that, in rainy seasons in particular, it produces magnificent crops of maize and other produce to reward the husbandman's toil and to support him in indolence, probably for a long period, or until the time arrives again for a similar effort to sustain the wants of nature or to replenish his exhausted exchequer.

The habits and mode of life of the Mexican Indians are very simple and rude: the chief furniture of the hut is a stretcher for a bed, and which is also used as a seat or table as may be required; they usually place a few stones together to be used as a hearth, and their cooking, which is customary of the poorest and most meagre kind, is prepared in rough earthenware vessels of native make.

Their favourite aliment is "tortillos," "tamales," "atole," "tiste," and "frijoles." The first is prepared from maize by the female Indian as follows: the corn is first soaked in water until it becomes soft; it is then ground to a powder on a smooth stone, when a little water is added, and it is worked flat with the hands, and which (although they are very expert) takes them some time to do. It is then baked over a wood fire in an earthenware vessel, and becomes somewhat like a pikelet. The "frijoles," which are a species of small black beans, are cooked in pots, thoroughly stewed and mixed well with lard, so as to be of a thick consistency, and on this light and weak diet the Indian and his squaw not only satisfy the wants of nature, but esteem it a luxury, and might possibly be the envy of the gods. And thus they drag on their simple unenlightened life, satisfied with the meagre blessings Providence has vouchsafed them, and the poorest productions of a soil and climate that are equal to the supply of the wants of the most refined and fastidious.

The "rancho" is the next least important building on the estate, and is used principally by superintendents, stewards, foremen, or men placed in authority over the ordinary labourers in the cultivation of the estates.

It is a less pretentious building than the hacienda; but, nevertheless, is a very important structure in the management of the business of the estate, and is usually situated at those points best adapted for the purpose.

It is sometimes built of stonework, and frequently of timber. In fact, built in a similar manner to that described for the hut; but there is more labour bestowed on the timber and its framing, and greater care is employed in its construction.

They use similar angle-posts with uprights at intervals, to serve for doors and windows, with a roof constructed of rafters, collars, and ridge-pieces securely framed and pinned together.

The sides of the building are sometimes closed in with small round poles, or wattled, and even close boarded, and the doors and windows

are usually made of pitch-pine or cedar wood. The roofs, which are thatched with the strong and durable grass of the country, are made to overhang considerably at the eaves, so as to protect the walls of the building from the wash of the tropical rains; and many of them have a pretty and interesting effect, particularly when situated in a picturesque situation, surrounded with choice and beautiful tropical trees, and the artistic effect is further occasionally enhanced by the addition of an ornamental verandah or portico formed of trellis-work, in which are entwined the many beautiful tropical creeping plants, such as varieties of the convolvulid, Virginia creepers, jessamines, and others of the lovely flowers that adorn our gardens and conservatories. We should think there are few countries on the face of the habitable globe to which Nature has been so bountiful in the best and most heauteous of her choicest productions, such as we prize so much and cultivate with such assiduity in our conservatories and ornamental gardens of our gentry, that flourish wild and luxuriant in that highly-favoured land; as if Providence, to counterbalance the bad propensities and dark deeds of her people, had lavished all her beauties, richest treasures on the floral world as some trifling compensation to universal society.*

WHO SPOILT THE PARLIAMENT HOUSES.

As Mr. Edward Pugin "declines to submit his case to any jury except that of the general public," I presume it is intended that each member of that rather numerous body should deliver his verdict separately. After a careful perusal of the correspondence and of his pamphlet, for which I have waited till now, I have no hesitation about mine. It is that Sir Charles Barry was the real and responsible architect of the building, in every usual and proper acceptance of the term; but with this finding I should like to hand in the following rider:—That what is good and appropriate in the design of the Parliament Houses, we owe to Sir Charles Barry; and that almost all that is either bad or crotchety is due to the influence of Augustus Welby Pugin.

It is admitted on all hands that the plan of the buildings is "solely" due to Sir Charles Barry. This, however, involves the further admission that the architectural arrangement of the river front is also solely his. This, I presume, no one who knows anything of the two men would be inclined to dispute, even without this admission. Its formality and regularity are diametrically opposed to every precept that Pugin ever preached, and every principle he ever practised. However mistaken he may have been, he was so sincere and earnest in all that concerned his art that it sounds like a slur on his memory to say that he ever consented to be employed, even in a subordinate capacity, on what he must have considered such an abomination. All, on the other hand, who knew Barry, know what an intense admiration he had for Inigo Jones's works; and the river front is an exact reproduction of that architect's design for Whitehall, with only the Italian details changed into Gothic. What is meant by the "new design" mentioned in Mr. Pugin's pamphlet (page 21) is only too clear. In Barry's original design the windows of the two stories were grouped together with deep reveals, and considerable light and shade were obtained by the form of the buttresses. In the design on which Pugin was employed, the windows became merely pierced panels, and the whole is that unmeaning network of flat, overdone ornament which we now see. What we probably have to thank Pugin for, besides this, are the ugly but truly Gothic roofs that disfigure this and every part of the building,—there were no roofs shown in Barry's original design,—and the extinguisher that caps the Clock-tower, instead of the beautiful spire of the design as originally published.

It was, however, in the erection of the Victoria Tower that the influence of Pugin seems to have been most handsomely felt. As originally designed by Sir Charles, this tower was not only a beautiful object in itself, but harmonized most perfectly with every feature of the building to which it was attached. As executed, it contains as many offences against architectural propriety as any building of modern times. It always was a mystery to me how a man of Sir Charles's good

common sense, and acknowledged taste, could be guilty of such a blunder. But now that we know where the blame really lies, I regret the injustice that I did to his memory by what I wrote on this subject in 1862, at page 326 of my History of Modern Architecture.

The first thing that raised a suspicion in my mind as to the real state of the case was the publication of a design for the interior of St. George's Church, Southwark, in Mr. Ferrey's Life of Pugin (page 170); but it was not till the publication of his son's pamphlet that I knew how intimate the relation was between the two men, and how much influence Pugin had on the details of the Houses of Parliament. If other proof were wanting, the frontispiece of this pamphlet would suffice. The absurdly low aisle, attached to the exaggeratedly tall clearstory, is the counterpart of the big hole for the cat and little hole for the kitten style, which characterizes the entrance and exit doors for the state-coach under the Victoria Tower, and the still more absurd exaggeration of its upper stories.

In Barry's original design the state-coach passed through the tower by two similar and well-proportioned doorways to the royal porch at the foot of the great staircase, which occupied the position of the present royal gallery. This was a noble and dignified architectural arrangement, and worthy of the Palace. The present dark monastic back-stair may be archaeologically correct, but as an architectural design it is simply detestable, and one of those features which were no doubt due to the influence of the late Mr. Pugin.

It would be easy to go on and point out other matters for which Sir Charles has been criticised, but for which Mr. Pugin has proved that his father is to blame; but space warns me to desist, and there can be no doubt that now his challenge will be accepted and the matter thoroughly investigated. The controversy has, however, an importance beyond that of the personal interests involved in it, as it is another instance of the thoroughly vicious system on which architecture is now practised. Had Sir Charles Barry been left to follow the dictates of his own sound judgment and good taste he would have designed a modern building suitable to the age and purposes to which he had to fall to be an anachronism and an absurdity. He consequently fell under the influence of one whose facile pencil and marvellous memory for Gothic details dazzled him as they have done others. In a moment of weakness he forgot the distinction between archaeology and architecture, as too many have done before and since, and hence all this blundering and heart-burning.

It would be well if the lesson taught by this example served as a warning as to what we are to expect from the designs for the new Law Courts: there the matter, however, promises to be worse than in this instance. In the Parliament Houses it was only the design of a real architect marred in execution by the pernicious influence of a mere archaeologist. In the case of the Law Courts, we are threatened with the design of an archaeologist who has the skill of all the architects of Europe will not suffice to redeem for its inherent inappropriateness and absurdity.

JAS. FERGUSSON.

WHAT HAS BEEN DONE IN LIVERPOOL.

THE marked and progressive improvement in the health of both Liverpool and Leeds during the past three years has become a powerful argument in favour of those who have always urged the adoption of sanitary reform, and the appointment of efficient and responsible medical officers of health. It is at the same time a thorn in the side of that unfortunately strong party in Manchester and other large towns, where these matters are still only talked about, and discussed in the town council. An M.D. recently addressed a somewhat amusing letter to the *Manchester Guardian*, in which it was sought to prove that the improved health of Liverpool was due to the magistrates of that town not having increased in 1866 and 1867, the then existing numbers of 1,881 public houses, and 729 beer-houses. So absurd a conclusion may be excused from an enthusiast in teetotalism, more especially as his letter elicited a reply from Mr. Joseph Robinson, of Liverpool, containing a much more conclusive and satisfactory explanation of the improved health of Liverpool, from which we glean the following facts.

* To be continued.

PROVINCIAL NEWS.

Liverpool, as is well known, has long had its medical officer of health; but there is reason to believe that it is only within the past two or three years that the terrible mortality from cholera, and an ever-present epidemic of typhus, thoroughly awakened the corporation to their responsibility, and led them to an earnest co-operation with their sanitary staff. The officers whose duties are more or less intimately connected with the sanitary well-being of the town are;—a borough engineer and building surveyor, with a salary of 1,300*l.* per annum; a medical officer of health, 1,000*l.*; an inspector of scavenging, &c., 400*l.*; an inspector of nuisances, 250*l.*; and the deputy borough solicitor, who attends the health committee, 600*l.* In addition to these there is a considerable staff of subordinates, who act under the orders of these officers.

Now let us turn to what has been effected by these officials. Mr. Robinson traces the principal cause of the reduction of the death-rate to the powers given to the Corporation in the Liverpool Sanitary Amendment Act of 1864, and in the Liverpool Improvement Act of 1867, to raise and expend the sum of 200,000*l.* in the opening up, widening, and ventilating of courts and alleys, and in providing sites for water-closets in courts, instead of cesspools. About half of this sum has already been spent. Courts have been widened from 3 ft. to 13 ft., and middens have been done away with, and trough water-closets (daily attended to by the Corporation) have been erected at the ends of the courts in place of the middens at the entrances. Furthermore, the Corporation has, during the present year, done its own scavenging, finding the horses, plant, and men, superintended by an inspector, at a salary of 400*l.* a year, as above stated. Under the old contract system, the middens were incompletely emptied, and there were sometimes arrears to the extent of 1,500 left unemptied. It is said that there are never any arrears now; and that the system is so well organised that the nuisance arising from the midden system is reduced to a minimum.

To remedy, as far as possible, the evils of over-crowding, the Corporation has obtained Parliamentary powers to register all sub-let houses,—that is, houses in which more than the members of one family live together. The result is, that irrespective of registered lodgings-houses, nearly 2,000 other sub-let houses are under the direct control of the medical officer of health. The occupiers are authorised by inspectors to allow a certain number of persons, according to measurement, to occupy the different rooms; and any offence against the regulations is punishable by fine or imprisonment.

Among other results of the labours of the Health Committee which have no doubt exerted a beneficial influence upon the health of Liverpool, may be mentioned the ventilation of sewers, an inspection of all houses where infectious diseases have appeared, the daily inspection of courts, and all trough water-closets; the providing of suitable conveyances, gratis, for the removal of patients to hospitals; and the notices served to cab-drivers and owners of the danger and the penalties to which they render themselves liable for carrying in licensed cabs persons suffering from contagious diseases.

The above evidence brought forward by Mr. Robinson proves conclusively that the corporation of Liverpool has been lately dealing with the sanitary condition of the town in an earnest and a liberal manner. Now, the death-rate in Liverpool during the past ten weeks of the current quarter has averaged 23.7 per 1,000, against 29.6 and 23.4 in the corresponding ten weeks of 1865 and 1866. That this result should have no intimate connection with the labours of the corporation and the health committee, the most earnest opponent of sanitary expenditures can scarcely believe. The expenditure in Liverpool has been, no doubt, large; but if sickness has been reduced in the same proportion as the deaths, which there is no reason to doubt, the money, even financially considered, cannot be said to have been buried in a napkin; the return in reduced rates is inevitable. Sneb a *resumé* of what has been done in Liverpool well deserves the attention of the inhabitants of Manchester and other large towns, where this question of sanitary reform, and the appointment of a medical officer of health, has still to be decided. In Manchester and Salford the death-rate in the past ten weeks has averaged 31.5, against 35.0 and 28.5, in the same periods of 1865 and 1866.

Weston-super-Mare.—The foundation-stone of the wing to the hospital has been laid. The new wing will correspond with the one on the north of the building, thereby making the front uniform. It will be 26 ft. by 18 ft., and will accommodate six extra beds for fever or malignant and contagious diseases, so arranged as to prevent any spread of contagion. The design is by Mr. Hans F. Price, architect. Mr. R. Tripp, as already mentioned, is the contractor, for 308*l.*

Runcorn.—The new public hall recently erected in Runcorn has been formally opened. It is built of red brick, in the Gothic style, and is situated in a square off Church-street, the principal thoroughfare in the town. Mr. Culshaw, of Liverpool, was the architect; and Mr. Thomas White, of Runcorn, the contractor. The large hall will conveniently seat 800 persons.

Truro.—The foundation-stone of a suite of public rooms has been laid, with Masonic honours. The site is on the Quay, on ground formerly used as the Custom House, stables to the Dolphin, and cottages. The new rooms, as described in the *Cornish Telegraph*, will, by arrangements with the town, be carried back from the present point 5 ft., so improving the street and entrance to the town from the eastward. The building will have two fronts—one facing the Boscastle Bridge. The style is to be Tudor Gothic, and the building is to be of Mylor stone, with Bath stone dressings, and ornamented brick chimneys of Elizabethan style. On the north front there will be three entrances—one to the Bishop's Library, at the western end or wing; the eastern one to the Masonic Hall, which will form the ground wing to the block; and the main entrance in the centre, which will be carved, and over will be a large window, also decorated. On the south side there will be two entrances—one to the billiard-room, the other to the Bishop's Library. From the centre entrance will rise the staircase to the upper rooms. From the lobby, on the ground floor, there will be an entrance to a corridor, which runs the full length of the building. On the south side will be a room for the county library, 32 ft. by 27 ft. 6 in.; county library reading-rooms, 29 ft. by 20 ft. 6 in.; a billiard-room, 29 ft. by 20 ft.; Truro Institution library and reading-room, each 29 ft. by 17 ft. 6 in. On the north side, a club-room, 40 ft. by 21 ft. 6 in.; committee-rooms, 21 ft. 6 in. by 12 ft. 6 in.; offices and apartments for the keeper of the halls. From the lobby, 21 ft. 6 in. by 16 ft., will rise granite stairs to the second floor on either side. At the eastern end of this floor will be the Masonic Hall, 32 ft. by 27 ft. 6 in., with waiting-room, 23 ft. 6 in. by 17 ft., and closets, &c. Next, on the south side, will be the assembly and concert room, 85 ft. long by 38 ft. On the north side will be a supper-room, 40 ft. by 21 ft. 6 in.

Oldham.—The winter garden and ball-room just completed at Werneth Park, Oldham, for Mr. John Platt, from the designs of Mr. Peter B. Alley, architect, Manchester, were lately thrown open to a large gathering of Mr. Platt's friends, including the Right Hon. W. E. Gladstone, M.P., Mr. W. H. Gladstone, M.P., the Mayor of Manchester, Sir Elkannah Armitage, and others.

Saniford, Orms, Somerset.—The dilapidated old parsonage-house and offices have been pulled down, and a new rectory-house built from the designs of Mr. J. H. Colson, architect. The total cost, with offices, has been 1,456*l.*, partly defrayed by a loan from the Bounty Office.

THE CASTLE OF SCHWERIN, IN THE GRAND DUCHY OF MECKLENBURG.

The Castle of Schwerin (renovated and rebuilt by the reigning grand duke, Friedrich Franz, in 1844-57) has an origin of considerable antiquity. A castle was standing on the site in 1018, which belonged to Slaven Stammeder Obotriten, and bore the name of Zuorin, or Zuarin (*i. e.*, wild forest or hunting-part). In the year 1161 this castle was burnt down by Obotrite König Niclot, on his flight to the castle situated to the west of Mecklenburg, from Duke Heinrich der Löwen. It now fell into the hands of the Saxon duke, who immediately rebuilt it, and placed his brave knight, Gunzelin von der Hagen, in charge of it. It was, for those times, very strongly fortified, inasmuch as Niclot's son took all the other Saxon castles in 1164, but Schwerin and Thow he could not conquer. In 1166 Heinrich founded

the dukedom of Schwerin, and invested the knight Gunzelin von der Hagen with it, as first duke. The dukedom of Schwerin existed until 1353, when it was obtained by Duke Albrecht I., of Mecklenburg, and annexed to his dukedom. Schwerin immediately became the residence of the duke and his followers, and it has so remained, with little interruption, to the present day. It is worthy of note, that in the year 1629 the Emperor Ferdinand, after forcibly dethroning hereditary princes, invested Wallenstein, duke of Friedland, with the Mecklenburg lands, who in the same year continued the residence there; but in the year 1631 Duke Adolph Friedrich of Mecklenburg, aided by the Swedes, retook his castle.

Concerning the parts built by the first residing dukes no direct knowledge has come to us; still it is probable that the foundations of several buildings were laid in the middle of the fifteenth century, and Duke Magnus (1477-1503) may be considered the builder of the older parts of the castle on the south side. His successor, Duke Heinrich V. (1503-1552), but especially Johann Albrecht I. (1552-1576), continued the building; but it was Duke Adolph Friedrich I. (1608-1658) who entirely finished the old castle, as it remained until its break up.

Professor Semper, of Dresden; Government architect Stüler, of Berlin; and Government architect Demmler, of Schwerin, were ordered to furnish designs in 1843. None of the three designs, however, found unconditional favour. In the spring of 1844, Demmler went by special order to France, accompanied by Herr H. Willebrand, to study the castles of Chambord, Blois, and Fontainebleau; and to England, to examine in particular Windsor Castle. After this Demmler furnished a new design, which at last was approved. The Grand Duke himself had considerable architectural knowledge, and his Majesty King Friedrich Wilhelm IV. of Prussia much influenced the design.

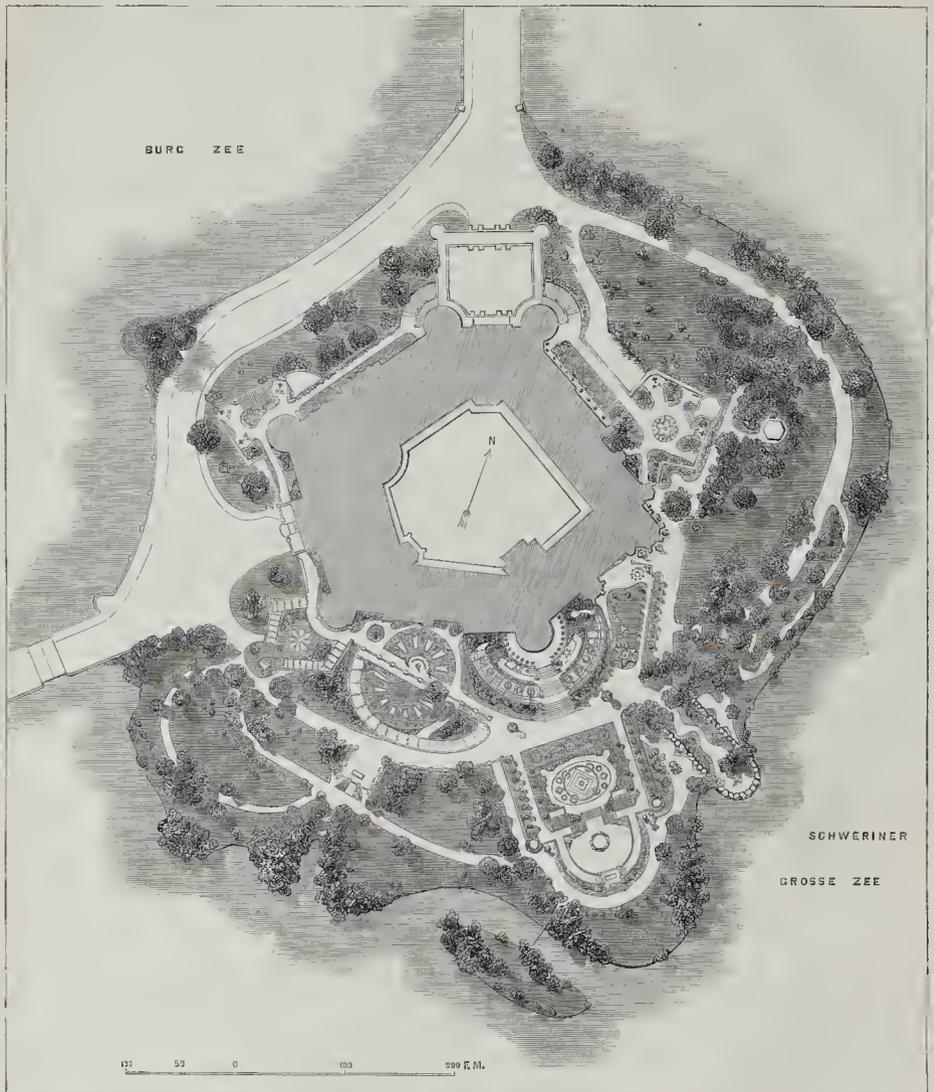
Demmler continued the building from 1844 until 1851, when in January he was obliged by political agitation to retire. Under him worked the following architects:—Behnke, Willebrand I., Willebrand II., Daniel, Lakow, Krüger, and Stern. From January 1851 Government architect Stüler, of Berlin, undertook the superintendence, and H. Willebrand I. became the head working architect.

To give an idea of the arrangement of the whole building, we may say that the castle has four stories,—the ground-floor, partly with an *entresol*; the main floor; the state apartments; and a fourth story.

The ground-floor has by far the greatest dimensions in consequence of its serving as support to the terrace surrounding the castle. It contains the church, the armoury, kitchen, and housekeeper's apartments, the gates and entrances to the castle, and the rooms for the office of the marshal of the court. In the *entresol* are the rooms for the princely children and their servants, the offices of the grand ducal cabinet, dwelling apartments for guests, and the official residence of the chatelein.

On the main floor are the residence of the grand duchess, the rooms for small court-festivals and for foreign princes; besides the upper part of the church, extending through two stories. On the state floor are the residence of the grand duke; the state apartments, with large saloons for court festivals (the saloons also extend through the fourth story); and some apartments for foreign princes. On the fourth story are the rooms for the court ladies, adjutants, and their servants; as well as for the *suites* of foreign guests. The grand staircase leads from the ground-floor to the state floor, and is principally used on great court festivals taking place in the saloons of the state floor; but also at smaller festivals on the main floor, and for the strangers' rooms in the *entresol*. The staircase is surrounded on each landing by a gallery connecting the localities adjoining the staircase: of this, however, we shall give an illustration hereafter.

The glass paintings in the armoury, as well as in the castle church, were done after cartoons of G. Leuthe by Gillmeister, the fresco paintings in the church by Professor Pfannschmidt, of Berlin. The walls and ceilings in the different state rooms and the church are by Pfannschmidt and Peters, of Berlin; Elster, of Brunswick; and T. Fischer and Tontzen, of Schwerin. The models of the statues of the grand dukes, as also the heralds of the south-west portal, are by Albert Wolf and Willgohs, both citizens of Mecklenburg.



THE CASTLE OF MECKLENBURG SCHWERIN.—Plan showing Position and the Building.

The immense equestrian statue in the first hall of the fourth story was executed by Genschow, also a native of Mecklenburg. How much the building cost is not known; but one calculation brought the amount to 3,000,000 thalers before its completion.

The garden, of which we give a plan, surrounds the ducal castle, partly ancient and partly restored, and was newly laid out in the Renaissance style, between the years 1844-57. Part is situated on an island to the south-east of the tower, with which it is connected. There are two bridges, one a massive stone bridge, which has five arches, joining the town; the other a wooden drawbridge, joining the garden. The plan of the castle is a pentagon, and the front looking towards the garden east and that

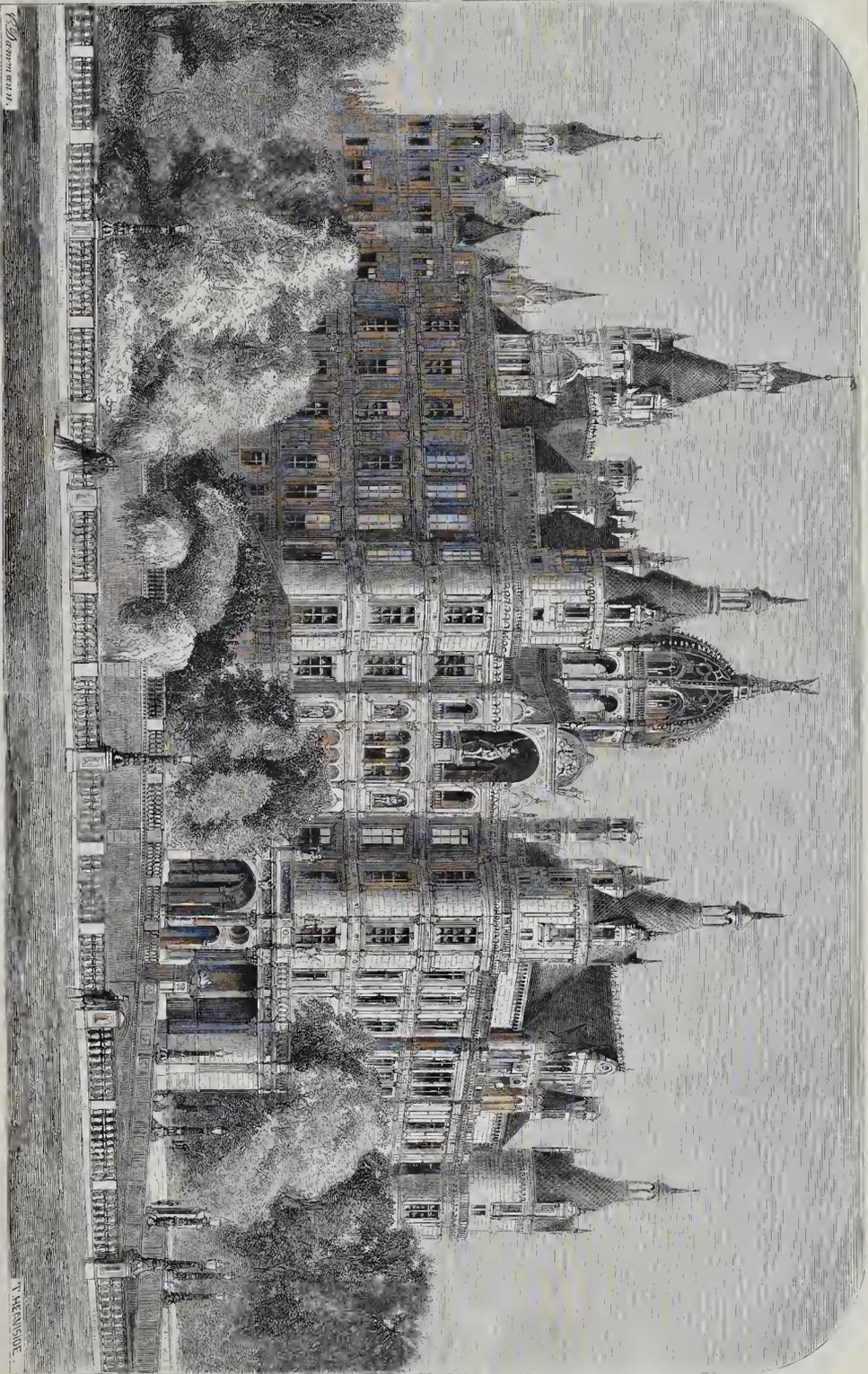
to the west have bastions 25 ft. high; there is also a third on the north side; all mounted with cannon.

On the south-east side is a way, partly by a viaduct, to a large staircase, which leads, in three landings, to the platform of the tower: this is 250 ft. high; and from the platform a door opens directly into the rooms of the grand duchess and the state rooms. The grand duke lives over these, and the church is situated to the north. In front of the staircase is a terrace borne by pillars, and richly garnished with statues, orangeries, flower borders, and arabesques.

The three granite landings are covered with vine trellis. The garden, in which are to be found statues and the choicest shrubs and

plants, is of no great extent, but is so interesting and varied, presenting alternately hill and dale, that the observer gazes delighted at the picturesqueness of its formation, and enjoys the charming views of the surrounding densely-wooded banks, the town, and the lake, a mile broad and three German miles long, through plantations of trees, lending light and shade to the view.

We may remind our readers that Mecklenburg, North Germany, consists of Mecklenburg-Schwerin and Mecklenburg-Strelitz, and that the House of Mecklenburg is the oldest reigning family in Europe. Mecklenburg-Schwerin is bounded east by Mecklenburg-Strelitz, south by Prussia, west by Hanover and Holstein, and north by the Baltic.



W. H. Bennett del.

THE CASTLE OF NECKLENBURG SCHWERIN.—HEER WILHELM, ARCHITECT.

T. HENNINGSON.

THE NEW YEAR.

NEW YEAR, I greet thee with a trembling smile;
Thou art all cold and strange: I love thee not,
Yet would I strive to welcome thee aright.
No song of mirth, nor sound of revelry,
Within the sacred precincts of my home,
Disturbs the solemn hour of thy birth,
And the last moments of the Dying Year.
In silent contemplation I will part
From that old friend whose requiem e'en now peals,
And, peeling, quickens into gayer tones
To herald thy approach, thou New-born Year.
In silent contemplation, too, awe-fill'd,
I gaze upon the cross-roll'd scroll thou bearest,
In which is writ our future weal and woe,
Each private sorrow and each public care!
I would not loose the clasps of that dread scroll:
Sufficient to the day the roll is,
And good to come can scarcely come amiss,
No: keep its fastenings fir'd till, one by one,
Thy God and mine unbind them at His will!

The hour has fled. Now from the distant clocks
A single stroke boons on the frost-bound air,
And tells, a portion of thy life has pass'd
Already from thee, fleeting New-born Year!
Thus going at thee, thou no longer seem'st
So strange and cold; I kiss thy outstretch'd hand,
And swear myself thy soldier, bold and true,
To serve thee faithfully what'er betide,
So help me God!
And now pass on, New Year,
While I—with humble powers, but earnest soul—
Firm at my post, do battle for Thy Right.

R. F. H.

1868.

"THE TRINITY OF ITALY."

To this volume* there attaches much of the same sort of unusual interest which belongs to a portfolio of photographs, taken at leisure, on sunny days, and from well-chosen points of view, by some resident in a well-known and picturesque district. Accurate portraits of detached portions or isolated features of landscape, and of scenes and objects, sometimes graceful, often homely, but always picturesque, alternate in such a portfolio with general views of those grander and more startling features, towards which alone the passing artist would find time to direct his camera, and the result is a deeper realization of the essential character of the locality than could be obtained otherwise.

The hook under notice has provoked this comparison, both by the vividness and truthfulness of many of its descriptions and scenes, and by the remoteness of the subjects of many of them from the heat of an ordinary tourist or traveller. The author appears to have resided for a considerable number of years in Southern Italy, chiefly in or near Naples, and he has here produced a book, of which the scope embraces the consideration of the past history, the present position, and the future possibilities of the Italian peninsula, and which, in handling such subjects, shows grasp, and breadth, and vigour.

The volume will, however, more generally attract readers, and we venture to add, not less truly inform them, by its portraits of peasants and princes, ministers of state and men of pleasure or of business, and by glimpses at society, national character, and Italian temper and habits, which it affords; these pictures, and especially the very curious details given of the court and person of King Ferdinand II., have been given with a faithfulness due to keen and habitual observation, and that, too, from points of view such as very few Englishmen have been able to occupy.

The strange title of this book gives no clue whatever to its contents or scheme. It is not a religious or a polemical work, but simply a review of Italy, as a sageacious writer has known her and reflected upon her condition and her prospects. Here are no descriptions of paintings, sculptures, and antiquities, nor oven of public works; and yet there are special grounds, beyond those which make a good book about one of the most interesting countries in Europe welcome to all persons of culture, why many of those who are habitual readers of this journal may find "The Trinity of Italy" repay the trouble of perusal. Those who have in the course of architectural studies visited Italy, and learned to feel for her that affection which no other country seems so uniformly to inspire, will find much here to gratify them. Those, too, whose business connects them directly or remotely with public works, or in fact affairs of any sort in Italy, and above all such as have actually to visit that country for business pur-

poses, may glean valuable cautions from such passages, for example, as the following:—

"The laws of Southern Italy are generally admitted to be excellent. Their administration parades one of the general administration of the country. It is unnecessary to say that in any cases where the interests of the Government are concerned the action of the tribunals is as heavily weighted in their favour as are the chances of the lottery. And this is the more easy, from the fact that the naked law of a case, so to speak, is not regarded in Italy as it is in England. The action of the courts is more like that of a court of Equity, or, at times, of inquiry. The legal documents, far from being drawn in the barbarous jargon adopted by the English lawyers of the nineteenth century, make efforts not only at logic but at rhetoric. The great cheapness of printing leads the better-occupied *avvocati* to put most of their briefs and arguments in type, an example that might be followed elsewhere with great advantage; but at all times the judges are in the habit of attaching as much weight to what they consider the merits of the case as to the letter of the law. *Salus populi suprema lex*, and the administration is naturally the judge of what is and what is not conducive to the *salus populi*. A court of peculiar infamy, that of the "Contumaziosi," in which two or three legal agents of the Government sit in order to decide on any inconvenient pecuniary claims urged against the administration, with full powers, which they freely use, to declare them void, has been abolished by the Italian Parliament. But the odious and unjust practice of *elevatione del conflitto* remains in full force. The meaning of this phrase is, that, if a decision has been pronounced by a court of justice hostile to the claims or to the interests of Government, the latter can withdraw the case from the court of law, and decide it by ministerial or Royal decree—that is to say, by a circular of the minister under the signature of the king. This absolute injustice is practised by the ministers of Victor Emanuel as complacently as by those of the Bourbon kings."

The picturesque account of the seldom-visited city of Bari, and the spirited descriptions of the court and rule of the faithless King Ferdinand (Bomba), of whose astute countenance, hy-tho-ye, a fairly good portrait is given in the frontispiece, may he referred to, and might have been quoted from, as among the best portions of the work; but we prefer making a few extracts touching the financial position of Italy. The writer has views as to the European public debt not unlike those that have been set forth in this Journal.

"A rise or fall," he says, "of one or two per cent. in the price of Consols, a fact absolutely unimportant from any but the most contracted and personal point of view, will fill men's minds with hope or with panic, while the slow, silent, overwhelming increase of the public debt of Europe takes place unheeded. What writer of the day has called attention to the fact that, with almost the sole exceptions of Holland and of England, every shilling paid to the public creditors of Europe during the last ten years has, with the other hand, been borrowed from other public creditors within the same time? Who has brought out into the light of day the ugly fact that 150,000,000 sterling, out of the 175,000,000 sterling annually due to the owners of rents and funds, has to be annually raised by loans; and that to keep faith with the fund-holder, without so steadily increasing the obligation as to make an ultimate crash only a question of time, the existing taxation of Europe must be increased by one-third? Yet these are the simple and unquestionable results of but a few lines of figures."

Taking the accounts as they stand up to the close of 1865, and saying nothing at present of the large increase in debt effected in 1866, he finds that during the last decade Italy has contrived to increase her debt at the rate of more than 18,000,000 sterling per annum. As yet there are little signs of checking that increase, which may be stated as the incurring of a debt of 19 francs per head per annum for every Italian for ten years.

So long as the national expenditure remains permanently in excess of income, so long as the maintenance of a host of *employés* who do not work, of an army that has not covered itself with honour, of a navy that seems as unable to meet the waves of the Adriatic as the shock of battle,—so long as the *status quo* in these matters is maintained, every help that is given to the minister of finance will but help him further down hill,—every fresh expedient for giving a temporary aid to the distressed exchequer will but augment the magnitude of impending disaster.

SCHOOLS OF ART.

The Dublin School. — The annual distribution of prizes to the successful students attending the Art - Schools of the Royal Dublin Society took place on the 23rd ult. by his Excellency the Lord Lieutenant, before a large and distinguished assembly. Mr. Waldron, D.L., opened the proceedings by explaining that the medals and prizes for distribution were of three kinds: first, the prizes of the Department of Science and Art; next, the Taylor prizes; and lastly, those of the Royal Dublin Society. Mr. Waldron said he believed his Excellency would be satisfied that, perhaps with no exception, next to the school in Kensington, their school in Dublin held the highest

place of any in connexion with the Science and Art Department. Lord. Colonel Adamson, Chairman of the Art-Committee, then proceeded to read the report, which spoke of the growing taste for art-study amongst the lower and middle, as well as the upper, classes. He regretted that they were only recipients from Government of what were called payments on results, although in this respect not differing from Edinburgh; and he thought that a suitable opportunity for publicly expressing their earnest hope that the Metropolitan Schools of both Ireland and Scotland might ere long each have some reasonable grant made to meet the expenses of these establishments. Colonel Adamson said he believed he would not be justified in omitting, on that occasion, in the presence of his Excellency, to express the high opinion entertained by the Fine Arts' Committee of the talent and zeal of their head master, Mr. Edwin Lyne. The report alluded to the absence of any systematic arrangement of the works of students of art-schools of this and other countries in the Paris Universal Exhibition,—tending, as it would, to enable us to form a true estimate of the relative degrees of perfection attained by different countries in art-instruction, more particularly with a view to the improvement of those branches of manufacture which are susceptible of ornamentation and the processes that unite artistic and manufacturing skill, such comparison would be of the greatest advantage, not only to those immediately concerned with 'art-education, but also to manufacturers and producers, who would do much to advance their interests were they to second more earnestly the efforts of the schools generally for the improvement of designs. They, however, relinquish the traditional patterns and processes with reluctance. There is even now a desire on the part of the public for design of a better kind than is generally furnished; for, by the teaching of Schools of Art and exhibitions, the public taste has rapidly improved, and the general training in drawing and the fixed positive rules of art, has resulted in influencing the public taste to a higher appreciation of the beauties of nature, and all rendering of it, whether conventional or otherwise." The successful students were then introduced to his Excellency by Mr. Lyne, and were presented with the various awards; after which Sir George Hodgson, bart., returned thanks to his Excellency for the honour of his attendance on that interesting occasion. His excellency applied in a speech of considerable length, and urged the importance of a more universal study of art on the part of artisans, and attributed the great deficiency of our day to artists not being workmen, and workmen artists, as was the case in the Middle Ages, when John of Bologna, Michelangelo, Benvenuto Cellini, and a host of others, united artistic and workmanlike skill.

The Manchester School.—The annual meeting and distribution of prizes in connexion with this school took place in the Lecture Theatre of the Royal Institution. Mr. Burge, in the absence of the Very Rev. the Dean of Manchester, presided. Mr. Aspin, the secretary, read the report. The total receipts for the year had been 1,019l. 2s. 9d., and the expenditure 899l. 4s. 7d. The balance in the banker's hands was 106l. 19s. 11d., against 77l. 4s. 9d. in the preceding year. Not a single donation had been received during the year, and were it not for the increase in the students' fees the financial position of the society would not be in so sound a position. Mr. Mückley, the head-master, read an elaborate report on the state of the school. Regret was expressed that the students were with great difficulty induced to undertake those studies which pertained to the decorative art. It was much to be deplored that students did not see their interest in working with a view to meet those demands for decorative design which would certainly be made in the future. At the Government examination held here in March last, forty passed, and seven gained third-grade prizes; and at the national competition, one gold medal, two silver medals, three bronze medals, and a hook prize were awarded. Mr. Tom Taylor, prior to distributing the prizes, delivered a lengthy and able address on art education. He was afraid, he said, that we must admit that whatever might be said of particular schools, or the activity of particular places, direct art-education in this country,—look at it from whatever point we might, and allowing as much as we could for the advances of recent times,—was still sadly deficient. Indirect art-education seemed, on the whole, to be in a better light. We educated, with more or less success,

* "The Trinity of Italy; or, the Pope, the Bourbon, and the Victor." By an English Civilian. London: Moran & Co., 1867.

a larger and larger number of artists, and their works found a larger and larger number of buyers. The material circumstances of professional art were wonderfully improved. Still, with all this, there was little direct art education. He saw many signs of improvement, however, but urged that very much more was required to be accomplished.

The Cork School.—The annual distribution of prizes to the candidates who were successful at the late competitive examinations in this school came off in the Athenæum. A large and respectable auditory were in attendance. The walls of the Rotundo were hung with a numerous display of the principal performances of the pupils. Amongst the most noticeable of these were works in mechanical and architectural drawing, which departments have the most immediate and practical application in the educational programme of the institution. Mr. Brennan, the master, read the report of the working of the school for the last twelve months. It stated:—The total number of persons who have received instruction was 364, being an increase of twenty-two on the preceding year. Of this number 182 students attended the classes at the central school, the remainder, consisting of National School and other children taught either in the evening classes at the central school, or in their own schools by pupil teachers under the supervision of the institution. Thanks to the continued liberality of the Earl of Cork, the committee have been enabled to continue the aid in teaching to the National schools. At the Government examinations in freehand drawing, geometry, perspective, model, and mechanical drawing, twenty students were successful; and four, having passed in all the subjects, received certificates of the second grade. At the last examination of drawings sent up by the school to South Kensington, the works of eleven students were marked satisfactory, six students received prizes, two received honorable mention, eleven students had their works selected for National competition, and one student received a Queen's prize for art.

MEDIEVAL SCULPTURE.

In his third lecture at the Society of Arts, Professor Westmacott said, the earlier painting and sculpture employed in the Gothic period scarcely deserves the name of fine art, wanting as it is generally in almost all art qualities. It is true it was only used for decoration; but still it professed to imitate something, and this should have been Nature. Wells cathedral is one of the oldest edifices in England which is richly ornamented in this way, and it exhibits crowds of statues on its exterior. These are of the most primitive character—out of proportion, and, in execution, rude in the extreme. The contrast, as regards the accessory art connected with Gothic architecture, is remarkable when compared with that employed by the great Greek artists—in the Parthenon, for instance. Here the most perfect architecture of its kind was enriched with expressive sculpture of the most perfect forms in nature; and it is this combination or union that constitutes the highest form of art. The short duration of Gothic architecture, and the constant changes it underwent, may account, in some measure, for the incompleteness of the imitative arts in connection with it. It must be borne in mind that in the short space of about three hundred years it passed through many phases—from the Romanesque to the Pointed, or Early English style—from that to the Florid or Decorated, and then to the Perpendicular, when it may be said to have collapsed altogether. So unstable and unfixed in its own principles, it scarcely allowed of perfection in the arts associated with it, though those arts had a fixed standard, had that standard been followed. No person of sensibility, or who has any genuine feeling for the beautiful and picturesque, can deny the charm, or altogether resist the fascination that is found in the best examples of true Gothic architecture. Much of this may be owing to religious association; much to the imagination, which is pleased to conjure up anew, and picture to itself, visions of the olden time. But there is, unquestionably, also a positive claim to admiration, in the originality, the bold fancy, the variety and play of parts, the contrivance of scenic effects in the perspective views, and in the striking contrasts in *chiaro scuro*, which are so remarkable in the monuments of this peculiar style of art. Still,

with all these admissions, the lecturer said he was bound to protest against the outrages committed against truth and fitness, and, indeed, common sense, which were so constantly seen in the Gothic use of accessory imitative art. This fault was the more to be regretted, because there were many redeeming indications of grace and feeling in the sculpture, especially in drapery and in the sentiment of monumental design. But how the fitness of nature was abused is seen when human faces of saints, kings, nuns, and ecclesiastics are found employed as corbels and brackets to bear weights, or as terminations to dripstones, or as gargoyles or draining pipes; or when entire or truncated figures, angels or others, are seen suddenly starting from walls; their drapery clinging to them in stiff horizontal folds, instead of falling by any law of gravitation; or standing figures thrust into arched hollow mouldings; or others dislocated and distorted to accommodate them to fill up spandrels of arches or other spaces. These incongruities are the more curious and striking because it has been seriously asserted by the admirers and advocates of Medievalism, that these were the days when religious art was actuated with a devotion, and a feeling of truth, purity, and a pious impulse, unknown at present. It is a mistake. Students of Gothic art must know instances enough which contradict this theory, not only as regards truth in imitation, but in the scandalous and even indecent sculpture still to be met with in screens, stall seats, and other parts of some of the most admired Gothic churches. These exhibit proofs of a license, in this respect, which certainly would not be thought of in these degenerate days, and more especially as decoration in places devoted to religious worship. Still, there was a promise of excellence in this Christian art. There often was much gracefulness in composition, and, in the draperies especially, elegance and beauty. Some places showed very superior art to others, as, for example, Lincoln; and there were signs of improvement of the most encouraging kind. Unhappily, a revolution, fatal to the progress of art, changed the character of the age. This was occasioned by the passion created for classical studies, by the discovery of manuscripts and remains of Greek and Latin literature, in the fifteenth and sixteenth centuries.

FROM SCOTLAND.

Auchingranton.—A united Presbyterian church has been opened here. The edifice stands on a piece of ground bounded on the south by Auchingranton-road, and has its principal elevation to that road. The design is in the Classic style of architecture, and, as there are no cross roads to open up the view, the main external features of interest are concentrated on the entrance front. The lower portion of this front is rusticated, and pierced by a central entrance doorway and windows to vestibule. Flanking the centre of the front, and slightly receding from it, is the staircase, on the one side rising to the level of the frieze below pediment, and on the other (the south-west angle) a campanile rises to a height of 95 ft. from the ground. This tower, which contains a stair to the gallery, hell-chamber, and other rooms, is covered by a projecting roof. The church is designed to seat from 800 to 900. In the area the pews are circular on plan, every sinner thus facing the pulpit direct. The extreme length of area from the front of the vestibule to a hall behind the pulpit is 70 ft.; the breadth between the walls, 51 ft. 6 in.; and the height from floor to ceiling 32 ft. 6 in. Behind and in connexion with the church, buildings have been erected, containing a hall to seat 150, head's house and offices, session-house, vestry, waiting-room, &c. Adjoining the church, a manse is being erected from designs by Mr. J. Grahame Peat, architect, Hamilton; and the contractors for the various works are as follow, viz.—Messrs. William Paterson, mason; Robert Henderson, joiner; John Buchanan, slater; William Hinchaw, plasterer; Lachlan Taylor, plumber; John Rae, gasfitter; Andrew Brotherton, painter; and Richard Ferrie, upholsterer, all of Hamilton; John Hay, heating engineer; G. Smith & Co., ironwork of tower, Sun Foundry; R. McConnel, iron parapet, railing, &c., Port Dundas Foundry, all of Glasgow. The measurements are not yet completed; but it is believed the expense of the church will amount to upwards of 4,000*l.*

Castle Douglas.—A new Roman Catholic church has been opened here. The edifice is built of the local trap stone, with hands and dressings of Dumfriesshire red sandstone, and consists of a nave 28 ft. wide and 74 ft. long, beyond which extends a chancel 16 ft. deep, terminating in a semi-octagonal apse, giving a total length of 80 ft. The principal front faces Cotton-street, and shows a large window of four lights divided into two compartments under moulded arches, having a circle through the head of each. The tympanum is filled with a large rose; and the whole is comprised under a deeply-recessed and moulded arch. A turret is attached to the left angle of this front, and contains in its lower story the stairs to the organ-loft; and above the belfry, which is octagonal in plan, and is pierced on each side by tall lancet openings. Above this the spire rises to a height of 85 ft. from the ground. The porch is attached to the tower. It is reached by a flight of steps, and is entered through a moulded arch carried on polished granite shafts. The pointed roof is of deal, stained and varnished. The nave is lighted with copied lancet windows, glazed with quarry glazing, but it is intended to fill them with stained glass. The organ gallery is at the end of the church facing the sanctuary. It will contain an organ built by Messrs. Forster & Andrews, of Hull. There is also a confessional at this end of the church. The congregation is provided with open benches of simple design. The roof of the church is of deal, stained and varnished, and hoarded over throughout. The sanctuary is divided from the nave by an iron railing, gilt and painted. This part of the church is paved with Mosaic and encaustic tiles. An arcade runs round three sides of the apse; each bay containing one wide arch, and one narrower on either side, carried by polished granite shafts, with moulded caps and bases, relieved by a background of enamelled majolica tiles. The centre arch of the side bays contains a lancet window filled with stained glass representing St. John the Evangelist, and St. Andrew. The rood-loft is of carved oak. The architect was Mr. George Goldie, of the firm of Messrs. Goldie & Chalmers, of London. Mr. McCartney, of Castle-Douglas, was the contractor for the general work, under the immediate direction of Mr. Lait, clerk of works. Various firms have contributed to the wood-carving, tiles, metal-work, &c., amongst whom we may name Mr. Hayball, Mr. Wailes, Messrs. Maw, Messrs. Hardman, Messrs. Peard, &c., &c. *Glasgow.*—In the late storms in the North Sea, four painted windows for Glasgow Cathedral have been lost. Considerable progress has been made in the erection of painted windows since we last noticed the state of the works. Thirteen have been commissioned for the clearestory by the Messrs. Graham, the Messrs. Thompson, Mrs. Ramsay, Mr. Walkinshaw, Mr. Rae Arthur, Mr. Towers-Clark, the Misses Urquhart, Mr. George Oswald, and Mr. Gavin Steele. Of these two are in progress; two lost now, but will be re-commissioned; the rest are erected. Two windows for the crypt were also on hand the *Finnis*; and as they have been for a considerable period in the hands of the artist, the loss will be much felt; but we understand that they will take much less time to replace, as all the drawings for them exist, and the glass has only to be executed. Wire guards have now been erected on the windows at the west end of the cathedral.—The Corporation is about to open new galleries for the exhibition of pictures in the buildings in Sauchiehall-street which it purchased some years ago. The collection bequeathed by the late Mr. McLellan was exhibited in three galleries built by that gentleman; but, on the suggestion of Mr. John Blackie, jnr., lately Lord Provost of Glasgow, these halls were refitted and set apart for public purposes, including the Annual Modern Exhibition of the Institute. Mr. Blackie also suggested that permanent galleries should be provided for the collection of pictures in the possession of the Corporation; and consequently a portion of the Corporation Buildings, measuring 180 ft. in length by 42 ft. in width, has been converted into picture-galleries by the architects, Mr. Heath Wilson and Mr. David Thomson. The space has been divided into an entrance-hall, to be occupied by sculpture; a gallery, 80 ft. in length; two square halls, and two smaller rooms; all suited for the exhibition of pictures, and lighted from the top. The Corporation intends to inaugurate these new galleries by a portrait exhibition, limited to portraits of Lanarkshire people

who have been eminent in connexion with the history of the county and of Glasgow during the last century or century and a half. It is intended that they shall be open free to the citizens when the local collection is hung upon the walls; the leading object of the Corporation being the education of the people, so far as it may be possible, in a knowledge of art. We hail the step with thankfulness.

FROM NEW ZEALAND.

Auckland.—Of the public buildings in Auckland to be erected under the Public Buildings Commission, appointed for that purpose by the General Government of New Zealand, the Supreme Court, and Post-office and Custom House, are now fast progressing. The Supreme Court is in a forward state. The building is situated on a reserve in front of the old House of Representatives, and forms a conspicuous object on entering the Bay. The principal front faces Waterloo-crescent, and the Government House is formed by an arcade of three pointed arches springing from clustered shafts, which forms the main entrance. The Supreme Court chamber, occupying the centre of the building, will have an open timber and panelled roof, surmounted with an ornamental lantern by which the court is lighted. The court is surrounded by a corridor, 6 ft. wide, connecting it with the Judges' Chambers, and suites of rooms for the counsel, jury, and witnesses. The registrars' and sheriffs' departments will be on the right and left, entered from corridors on either side of the building. On the upper floor will be an insolvent court, and suites of offices in connexion with the establishment. The natural slope of the ground has enabled the architect to introduce a basement-story at the north end of the building, which is subdivided into cells and rooms for prisoners awaiting their trial. The external size of the building is 145 ft. by 97 ft. It is being built of pressed bricks from the yards of Mr. Holland, of Newton, and Bath stone dressings from the Cornish quarries.

TECHNICAL EDUCATION.

A LETTER from Mr. B. Samuelson, M.P., to the vice-president of the Committee of Council on Education, concerning technical education in various countries abroad, has been issued in a printed form. The hon. member was appointed by the Government, on a special mission, to inquire into this subject.

In summing up the results of his investigations and observations, he says:—I have endeavoured to give a fair though brief account of the state of primary and technical education in France, Switzerland, and Germany, as well as a very slight notice of some of its features in Belgium. I have also attempted to show by examples what is the condition of some of the leading industries in those countries. I do not think it is possible to estimate precisely what has been the influence of Continental education on Continental manufactures. That the rapid progress of many trades abroad has been greatly facilitated by the superior technical knowledge of the directors of works everywhere, and by the comparatively advanced elementary instruction of the workers in some departments of industry, can admit but of little doubt. At the same time, it cannot justly be said that their superior education has led our neighbours to make any striking improvements. The manufacture of the more important textile fabrics certainly does not owe its present advanced position in any marked degree to Continental inventiveness. In the production of iron and steel, also, if a step has been taken in advance of us as regards some peculiar though important products, this is due, except, perhaps, in the case of the steel castings of Bochum and Firminy, less to the development of new discoveries than to a careful and intelligent improvement of processes—common to all, and to some priority in the utilisation of resources at least as readily within the reach of our manufacturers as of those of any other country. I have not the least doubt that the ground which we have lost will be speedily recovered, both by our ironmasters and our engineers, unless, indeed, a return of prosperity should lead to a renewal of the contentions between masters and workmen which have caused such mischief to both. It would be

an event of national importance if the iron and engine-building trades, like those which I named at the outset of this report, would establish boards of conciliation. Even as I write, I am rejoiced to learn from Mr. Mundella that the locomakers of Nottingham have followed the example of the kindred traders of that town, and that Sheffield is inclined to imitate them. It is not by the payment of low wages, or by the premature employment and overtaking of children, that any great manufacture can be made to prosper in this country, but by mutual forbearance and goodwill between those whose interests, though debatable and opposite in detail, are identical in the main.

At the close of his letter, Mr. Samuelson says:—If I may venture to suggest some further measures, which may, in my opinion, be speedily and safely adopted by the State to promote education, I would sum them up as follows:—First, as to elementary education. Let no child under twelve be allowed to work until it can read and write. Make it the duty of every parish to see that its children have the means of elementary instruction. Encourage elementary schools by special grants to establish advanced classes. Assist the pupils of elementary schools who have shown remarkable ability to continue their education in a superior school. Secondly, as to technical education. Revise your science minutes, and abolish the limitation to working-class pupils of the capitation grants to science teachers. It is simply a stumbling-block to the weak consciences of committee-men, and prevents the establishment of classes remunerative to the teachers. Pay a larger sum per head for the more difficult subjects, and thereby remove the temptation to the teachers of science schools to ride physiology and inorganic chemistry to death. Give a thoroughly scientific training in Jermyn-street to a small number of young men, chosen, if you like, in part from amongst your more promising "science teachers," in order to qualify them as professors of science. Distinguish between these and the men who merely get up one or two subjects in order to teach a science class. Supplement local efforts to establish or to extend secondary or superior scientific schools (not mere science classes), by building grants or loans, and by the endowment, or partial endowment, under proper conditions, of professorships. Begin with Manchester (if Manchester is not too proud), whose citizens are trying to raise 100,000*l.* for the enlargement of Owen's College. Let one condition of assistance to a scientific school be, that a perfecting school (Fortbildungsschule) shall be affiliated to it; and of the endowment of a professorship, that the professor shall teach in the perfecting school. Lastly, consolidate your department of education.

ACCIDENTS AT THEATRES.

LAST week, about ten o'clock at night, an explosion of gas occurred in the New Theatre Royal, South Shields, which for a time caused considerable consternation, though, fortunately, little or no damage was done. It appears, that during the evening, by some means not explained, a gas bracket at the foot of the gallery stairs was broken, and an escape of gas ensued. A light was taken to look for the cause, and an explosion took place. The play was brought to an abrupt conclusion: the actors for the moment being panic seized, ran from the stage; the audience, too, became alarmed, but no injury was done.

Joseph Shepherd, a carriage trimmer, has died from injuries he received at the Cabinet Theatre, Liverpool-street, King's-cross. It appears that a fellow workman asked the unfortunate deceased to leave his own work and go to the roof to assist him in removing a chandelier. This he did, but instead of walking on the planks, he stepped on to the canvas forming the ceiling of the theatre. He had no sooner done so than he fell through into the pit, a great distance, and was, it is stated, impaled on the spikes that are in that portion of the pit that separates it from the orchestra.

On Friday in last week a terrible babban and alarm were produced in the Lyceum Theatre, Strand, by the ignition of some small portion of the scenery and the want of presence of mind on the part of two or three of the performers. Other members of the company, however, behaved admirably, and the tumult was arrested. The scene at one moment was most alarming.

THE LAMPS IN HYDE-PARK.

WE were about to say the "Lights in Hyde-park," but that would have been too flattering. Well, a savant who has not seen the lamps, writes to prove that theoretically, with a reflector of the kind described, they cannot possibly give a bad light. Some of our readers will remember of the man who said to his comrade, "Never you mind, Tom, they daren't put you in the stocks;" and his reply, "I know they daren't, Jack, but they have." The lamps, theoretically, cannot be unsatisfactory, but they are. Our "Enraged Correspondent" was quite right in his objection. Beyond the mischief done by the form and position of the reflector, air seems to be wanted. A few nights ago, about eleven o'clock, we found several extinguished, and many filled with mist, and burning dimly as an old oil-lamp of past days. Lord John Manners should look to them.

THE TRADES' MOVEMENT.

FROM New Year's-day two Acts of Parliament of a similar nature take effect in the regulation of labour. The first, on the extension of the Factory Acts, was passed on the 15th of August, and the second, for regulating the hours of labour for children, young persons, and women employed in workshops, was passed a few days afterwards. The Factory Act is to apply to all works in the United Kingdom, in which fifty or more persons are employed in any manufacturing process, and the exceptions are set forth in the schedule annexed to the statute. In the second statute it is declared to be expedient to extend protection, so far as respects the regulation of the hours of labour, to children, young persons, and women working in the smaller establishments, and further to make provision respecting the employment of a fan or other mechanical means for the prevention of the inhalation of dust in workshops in processes of grinding. The Act is to apply to the whole of the United Kingdom. No child under the age of eight years is to be employed in any handicraft. No child is to be employed on any one day in any handicraft for a period of more than six hours and a half, and such employment is to take place between the hours of six in the morning and eight at night. No young person is to be employed for more than twelve hours, with intervening periods for taking meals and rest, amounting in the whole time to not less than one hour and a half, and the employment to be between five in the morning and nine at night. No child, young person, or woman is to be employed in any handicraft on Sunday or after two o'clock on Saturday, except where not more than five persons are employed, and where such employment consists in making articles to be sold by retail on the premises, or in repairing articles of a like description to those sold on the premises. No child under eleven years is to be employed in grinding in the metal trades or in fastian cutting. "Child" is to mean one under thirteen, a "young person" of thirteen and under eighteen, and a "woman" eighteen or upwards. Every child who is employed in a workshop is to attend school at least ten hours in every week during the whole of which he is so employed. On the application of a teacher, the occupier of a workshop is to pay for the schooling, and to deduct the same from the wages.

The General Union of Carpenters and Joiners of Great Britain and Ireland has just issued its fortieth annual report, which shows a steady increase of new lodges and members. The expenditure during the year ending July 31st, 1867, was 10,353*l.* 3*s.* 7*d.* Of this amount 2,392*l.* 9*s.* 3*d.* were expended in dispensing relief during sickness; there have also been paid 3,062*l.* 13*s.* 7*d.* in alleviating the privations of members and their families arising through loss of employ; also 127*l.* 14*s.* 8*d.* to members who have been compelled to leave their homes in search of employment; 12*l.* for loss of tools by theft and fire; and 2,229*l.* 7*s.* 6*d.* have been applied to the support of members thrown out of employ through disputes with their employers. Twenty new lodges have been opened during the year, and between 200 and 300 financial members have joined. In about thirty towns where the General Union has branches, the men have obtained advantages during the year in the shape of an advance of wages or a reduction in time, and in many instances of both.

A meeting of ploughmen has been held at Dunry to consider whether a sick and funeral society should be formed in connexion with the Farm Servants' Protection Society. There was a good attendance, though little interest seemed to be taken in the object of the meeting. David Runciman, farm servant, Spot, was called to the chair. The general opinion of the meeting was, that they were almost all connected with similar societies already; and after a somewhat protracted discussion it was agreed that the Farm Servants' Protection Society only should be supported.

The strike at Aberdeen on the part of the moulders and the lock-out by their masters have not yet come to an end. An amicable arrangement had been come to, and the men were to return to work. This they did; but at one establishment objection was taken to two non-union workers being allowed to work along with them. The masters would not give in, and consequently work was again suspended at all the shops in town. Matters remain in this position; and there appears to be a strong determination on the part of the masters to stand out. The workmen, on the other hand, it is believed, would give way on the point of wages, but not to allow other than members of the union to work along with them. Pretty freedom!

RAILWAY INTELLIGENCE.

A list of twenty-four British railways, with the prices quoted on the 1st of January, and on Thursday in last week, shows a loss of value in the twelvemonth of 17,137,000l.

The action of North v. Waring Brothers, & Eckersley, as to the Solway Viaduct, in the Court of Session, is concluded. The jury returned the following verdict:—

"The jury unanimously find for the pursuer in the first issue on the first and second counts of said issue, and award the damages claimed in the first count, viz.—225l. 6s. 3d. salary due pursuer at the date of his dismissal, with interest thereon, from 12th October, 1866; and on second count award three months' salary, at the rate of 332l. 6s. 5d. per month, due from 12th October, 1866, to 12th January, 1867, with interest thereon at the current rate."

On the third count, which claimed 5,000l. for "loss of profit and injury to his character, credit, and feelings," the jury found no damage due. On the counter issues, in which Messrs. Waring Brothers & Eckersley claimed 4,000l. damages from Mr. North for breach of agreement, the jury found unanimously for Mr. North.

The North-Eastern Railway Company have just finished a railroad from the quayside, Newcastle-upon-Tyne, through tunnelling up to the higher part of the town where their goods station is situated. Houses (some built only of late) had to be taken down, and other material hindrances removed. The railroad is nearly a semicircle, though only half a mile in length. About two-thirds of the distance is tunnelled, and where the road is open walls of brick support the banks. The masonry of the tunnelling is 2½ bricks in thickness, all set in Portland cement. The rails are of steel. Near Linnestreet the railway line is not only tunnelled itself but crosses another tunnel which has been in use for some time by the proprietors of the Spital Tongues Colliery for conveying coal to the quayside for shipment. Mr. Walter Scott was the contractor.

DUBLIN.

THE new Church of St. Bartholomew, situated on Elgin-road, Pembroke Township, has been consecrated by the Archbishop of Dublin. The site is at the junction of the Clyde and Elgin roads, an open situation, affording ample opportunity for displaying architectural beauties to the fullest extent. The plans were prepared by Mr. T. H. Wyatt, of London. Mr. James Scanlan was the contractor. The church is now complete, except the steeple. It is in the Early English style of architecture, of cruciform shape, and contains about 550 sittings. The church, in the interior, consists of a nave, with north and south porches, and double transepts opening into the nave by double arches at either side. The space under the tower forms the choir, beyond which is the apsidal chancel. At either side of the choir are aisles, forming respectively vestry and organ rooms. The length from east to west, internally, is 128 ft.; the width of nave is 27 ft., and the width across the

transept is 77 ft. The arches opening from the vestry into the choir and transept are filled with screens, and the corresponding arches at the opposite side with the organ pipes. The chancel and choir are paved with encaustic tiles. The seats in the choir are of polished oak, and the sittings throughout the church are of pine, stained, varnished, and polished, ornamentation to some extent not being neglected. The pulpit rests upon a base of Irish marble, with marble columns, and the superstructure is of Caen stone, carved. The gasfittings were manufactured at the establishment of Messrs. William Curtis & Sons, of Dublin. Mr. Harrison executed the carvings; Mr. Eakin, the staining and decorative work; Messrs. Brawn, Birmingham, the ironwork; and Messrs. Haden, the warming. The cost up to present is about 6,500l. All the seats are free.

MILTON CHURCH, NEAR GILLINGHAM.

THE new church at Milton was consecrated on Tuesday, the 17th ult., by the Bishop of Salisbury. The district in which it is placed adjoins the parish of Gillingham, and the greater portion of the expense is borne by Captain Matthews and family.

The church provides accommodation for adults and children, the seats being all free. It has been erected from the designs of the architects, Messrs. Slater & Carpenter.

The general character of the design is Early English, treated freely. The plan consists of a nave and two aisles, apsidal chancel, west tower and spire, vestry and south porch. The internal length from the wall of tower to the east wall of chancel is 85 ft., and the width of nave and aisles 40 ft.; the height to the ridge of the roof is 36 ft., of the tower and spire 100 ft.

The nave has on each side an arcade of three arches, with cylindrical columns and carved capitals, in which natural foliage, such as the fern, ivy, oak, &c., is introduced. The aisle windows are coupled lancet, with moulded internal arches resting on detached shafts with carved capitals (three shafts are to be replaced with red Devon and Irish green marbles). The roofs are of open deal, with curved and moulded trusses, with arched brackets and wind-braces and moulded collars. The chancel has moulded and cusped lancet windows, and a pointed harrel roof of deal, with mouldings forming the panels. The vestry and organ-chamber open by an arch on the north side of the chancel and east end of aisles. The chancel-arch is of lofty proportions, and on the caps are carved wheat and the vine, with conventional sculpture.

The communion-table is raised five steps above the nave, and the chancel is paved within the altar-rails with tiles,—the rest of the church with stone. The font stands in the tower. It has a circular moulded and carved bowl resting on clustered shafts with carved capitals. It is the gift of Mr. Lilly, one of the contractors. The window of the chancel and the east window of the aisle are filled with stained glass by Ward & Hughes.

The whole church is built and faced with Tisbury stone, supplied by Mr. Lilly; the woodwork and building being executed by local tradesmen, and the stone carving by Mr. Whitehead.

ENGINEERS AND LOCAL BOARDS.

I REMIT you the particulars of a decision given by Mr. Ingham, judge of the County Court here (Whitehaven), which is of the greatest importance to engineers, solicitors, clerks, surveyors, and every other person having dealings with local Boards.

The following is a brief summary of the facts. In the early part of 1866, I carried out for the Cleator Moor Local Board a system of sewerage, the Board paying me the usual commission of 5l. per cent. on the outlay. In November of the same year I happened to be at a meeting of the Board, when the chairman (Mr. Jonas Lindow Bars) proposed the following resolution:—"That Mr. Pickering be requested to make a survey of the country surrounding the district to discover the most available sources of water supply, and report thereon as early as possible." The resolution was carried unanimously, and duly entered on the minutes. In a conversation which followed, I had further verbal instructions to do all that was necessary to develop a satisfactory scheme in the following month (4th

December). After having made a survey, and having investigated five schemes, some of which had been suggested by persons having a knowledge of and interest in the district, I recommended the Board, in a lengthy report on the whole question, to carry out one of the schemes at a cost of 3,300l. The Board ultimately adopted my recommendations. Soon after this the greater part of the old members either retired or were not re-elected: the chairman leaving the Board. I sent in my account, charging them 1l. per cent. (on the proposed outlay) for the survey, preliminary plans, estimates, &c., intimating that if the Board wished me to carry out the proposed works to completion the 33l. would be in part payment of the usual commission. The Board never officially refused to pay me; and as there seemed some prospect of the works being carried out I did not press for a settlement, but reminded them in two or three letters, when they quietly shelved the letter without discussing it.

Ultimately, I brought an action for 33l. (12l. 10s. 3d. had been expended by me in the survey out of pocket). The judge held that I could not recover, as I had not a contract under seal and signed by five members of the Board (11 & 12 Vic., cap. 63, sec. 55), but remarked "it was a grievous case," and refused to allow the Board costs.

The effect of this judgment (if his honour's law be good) is that scarcely an engineer in England employed by local Boards can recover for services rendered (when a Board came forward and repudiated their solemn acts both orally and in writing). A clerk could not recover for any legal or other work he may have been ordered to do, nor yet for the expense out of pocket. A solicitor could not recover for any legal business, parliamentary or otherwise. No person whatever could recover for any work done or goods supplied. I never knew a single instance of an engineer having an instruction under seal, &c., for work for which the charge might vary according to circumstances; it had not been the practice at the Cleator Board to give instructions under seal, &c., nor is it the practice at any other Board with which I am acquainted. When a contractor is doing works of magnitude it is usual for a contract to be under seal, &c., but then the amount is fixed; but, as before, I never heard of an engineer having a sealed instruction. I trust that solicitors, being clerks to Boards, will look into this matter.

RICHARD PICKERING.

TWENTY-FOUR THINGS WORTH KNOWING.

1. Why is not Waterloo Bridge purchased and thrown open to the public free of toll? Other barriers are being removed.
2. Why do not people keep the way in front of their own doors clean in frosty weather, as they are ordered to do?
3. Why is there not a publicly-exhibited request to open-air orange-eaters not to drop the peel on the footpath?
4. Why is there not a horizontal railing, or some such contrivance, put over the Somerset House chasm (west front)?
5. Why are heavy bales of goods still craned high in the air, to the mortal risk of passers by?
6. Why are some of the Hyde Park grass-plots guarded by low rails, conveniently placed for falling over?
7. Why are the streets too feebly lighted to reveal lurking footpads?
8. Why are not the factories inspectors all practical men?
9. Why do bonseholders allow their coal-plates to remain unfastened, thereby imperilling pedestrians?
10. Why do dustmen demand "beer-money" when they have only done that which they are employed to do?
11. Why are not policemen authorized to take away the pipes from little boys who smoke in the streets?
12. Why are wayfarers almost compelled to enter a public-house if they want to rest themselves?
13. Why are vehicles allowed to charge the mob on illumination nights, after (say) nine o'clock?
14. Why, as the trees in Piccadilly are approved of, are not other leading thoroughfares planted likewise? This has long been talked of.
15. Why does not the Westminster Palace

clock come as prettily as it did at first? Surely M.P.s are used to its sounds by this time.

16. Why are the fountains in Trafalgar-square still as erratic as ever?

17. Why do many builders still put their water-pipes where the frost can easily get at them?

18. Why does not the mother of every child capable of losing itself stitch its name and address inside its frock?

19. Why is mortar (!) made with garden mould permitted to be used in house building?

20. Why are not the pipe and stop-cock attached to the water-tank over a theatre always comatible during a conflagration, so long as the outer parts of the building remain unburnt?

21. Why are the breasts of gallant firemen not decorated with the Victoria Cross, with or without the pension?

22. Why are certain railway-cars pierced with glazed holes, not big enough to pass your hat through, the idea being that such perforations afford protection to travellers?

23. Why does a sweep claim the soot removed from a stranger's chimney as his own property?

24. Why was the tank at Her Majesty's Theatre expected to melt while it held water? It is a fact that you may boil water in a pewter pot.

J. G.

ON ART EDUCATION.

SIR.—We in England have latterly been informed of some particulars respecting art education in France, and we are struck by the paradoxical nature of the former, thought that facility of design among Frenchmen was due to greater attention to outline drawing being paid abroad than at home, and less to shading and colouring. We are in the habit of practising in the workmen's drawing schools of France consists in working at shadows with a stump.

Imagining that a grave question among art principles lies in this matter, I take the liberty to request some space in order to enlarge upon it.

If English artists are, or once were, pre-eminently behindhand in design, through concentrating their attention on effect and colour, and *chiaroscuro*, how can French workmen be taught design by working at shadows with a stump? That is the question upon which I wish to suggest an explanation.

French workmen are said to be expert in adapting their hands to the supply of their wants under new circumstances. In the Crimean campaign French soldiers made themselves at home, while the English starved, in England, we carry division of labour to such an extent that a woman from Sheffield, emigrating to America, and being asked what she could do, answered "Pack files."

Now, under such a division of labour as this, the facilities that relate to precision of form tend to become monopolised in a few hands. The carpenter may acquire a correct eye for form and dimension—so may the engraver, by means of processes incidental to their trades; but if a lawyer crosses a street, he is not led by his habits to judge whether the street be 50 ft. or 100 ft. wide; and not only so,—he might say, were the question started, "That is a thing which I leave to a surveyor to judge of," and he takes no shame to himself for his want of discrimination. Modern habits tend to increase the division of labour through which the judgment of form and space becomes leviated by the majority. How many miles off is that distant church? Will my legs carry me so far, or must I hire a horse? might have been queried fifty years ago. At the present time, the question of distance is replaced by a habit of inspecting the time-table, not improbably to the injury of our power of comprehending a landscape by Claude or Turner.

Such a habit of thought, with regard to distances, forms, and contours, tends to become confined to particular classes, through an extensive division of labour, this limitation does not extend to the more sensual elements of the beautiful. Abstract thought cannot divorce itself from all fleshly lusts, in the same degree as a lawyer may divorce himself from the knowledge proper to a surveyor. Art requires a common ground of interest between the professor and the rest of the world. The more sensual features of painting, namely, glowing colours, afford this common ground. A person who is incapable of seeing any more grandeur in the form of an oak-tree than in that of a dumpling when impaled on a stick, may, nevertheless, enjoy the greenness of the foliage. Does not this point out a reason for the cultivation of colouring in England, the country of division of labour?

The son of a carpenter, while incapable of the kind of precision which the father displays in setting out a hand-rail, may, nevertheless, have a vivid sense of the difference between green and red colours. He may turn painter and gilder, and win more admiration from the tradesman whose shop-front he decorates, than ever falls to the lot of his father on the score of precision in lines.

On the other hand, the son of the tradesman himself may be incapable of sufficient precision of thought to balance his father's ledger. If he have an eye for colour, he may turn artist, and become patronised by the wealthy, while the tradesman who has inherited the precision of thought from his father is in the business of the nation. "Oh for pure outlines!" says the departing Academy professor. The pupils in reply turn pre-Baphaelite, and work outline to death.

Now, if we strive to teach drawing to those who are free from the prevailing looseness of ideas of form,—to the Frenchman who gets his money,—to the English tradesman who is precise in setting out a hand-rail or a toothed wheel,—we are delivered from inducement to work outline

to death. The workman whose daily labour has filled his brain with visions of straight edges and mitre-boxes and angles of 90°, and angles of 45°, and distinctions of probably straight lines, from exceedingly straight lines, may be safely allowed to indulge at the evening drawing-class, in processes of blending, and rounding off, and softening, and shading, which would be ruinous to pupils with a contrary set of antecedents. In the one case it is the hard man to be humanized; in the other, the effeminate man is to be endowed with force and decision of character.

G. M.

ASSESSMENT OF GAS AND WATER WORKS.

THE important question of the proper rateable value of gas and water works has recently arisen with respect to the parish of Nottingham. Notwithstanding the extension of the two establishments in this important town from time to time, the amounts at which they have been assessed to the poor rate have for several years remained stationary, the companies maintaining that they were assessed at their full value, whilst the parochial authorities believed them to be considerably underrated. Mr. J. S. Norris, of Nottingham, was therefore directed, on behalf of the parish (St. Mary's), to value the works of the respective companies, and the result was that he returned the rateable value of the gas-works as 4,280*l.*, instead of 2,700*l.*, the old amount, and that of the water-works as 4,927*l.*, instead of the old amount of 1,550*l.*, the valuation being made under considerable difficulty, owing to the companies refusing the parochial authorities access to, and information concerning, any of their works other than those in the respondent parish. Against the new assessment the two companies appealed to the Court of Quarter Sessions, but eventually both parties agreed to refer the matter to, and abide the decision of, Mr. Sergeant Hayes, of the Midland Circuit. The two cases accordingly came on for hearing before that gentleman in London, when Mr. Field, Q.C., and Mr. Cave, of the Midland Circuit, instructed by Messrs. Hunt & Son, of Nottingham, solicitors to the Gas Company, and by Messrs. Fox, Brown, & Barrow, of Nottingham, solicitors to the Water Company, appeared for the appellants, and Mr. Keane, Q.C., of the Norfolk Circuit, and Mr. Gine, of the Oxford Circuit, instructed by Mr. C. G. Croft, solicitor of Nottingham, appeared for the respondents. Evidence was given in support of the companies by Mr. T. Rawley, C.E., Mr. T. G. Barlow, C.E., and Mr. H. A. Hunt, surveyor, all of Westminster; and Mr. Norris's valuation was supported by Mr. H. J. Castle, surveyor, of Chancery-lane, London; Mr. John Higginbottom, surveyor, of Longton, Staffordshire; and Mr. Westcott, accountant, of Coleman-street, London. After several protracted hearings and repeated adjournments, the learned Arbitrator has at length made his award, fixing the rateable value of the gas-works in the parish at 3,020*l.*, and that of the water-works at 3,740*l.*, being an increase upon the old rateable values in the gas case of 320*l.*, and in the water case of 2,190*l.* The cases were strongly contested throughout, but the chief points of contention were the proper percentages to be allowed to the hypothetical tenant in respect of the three items of interest on tenant's capital, trade profits, and casualties, the companies claiming under the three heads admitted only 5 and 10 per cent., whilst the parish insisted on 15 and 20 per cent., and the two first-named items, and ignored the last. Reference was made in the course of the arguments to various leading cases, particularly that of the Parish of Lee, in The Phoenix Ins. Co. v. Westminster, decided by the Court of Queen's Bench in the early part of the present year.

RATTENING IN THE BUILDING TRADE.

SIR.—I read in your paper a few weeks since of a case of supposed rattening, at a church, building at Nottingham by Mr. Cowland. It occurs to me that I have been treated to a similar case in the same compound of steel and mischief, as, on the night of December 27, some person or persons, evidently in the trade, broke into the premises, 115, Euston-road, and damaged several chimney-pieces, knocking off the trusses, and taking them away with them.

Your insertion of this in your widely-circulated paper may assist in bringing the guilty parties to justice, by putting persons likely to purchase such things on their guard, as they have evidence of having been on chimney-pieces before, having holes drilled in them for dowels.

J. W. BIRD.

BATHS.

SIR.—To obviate the difficulty of heating the water for a bath, in a small house where proper appliances are wanting, could any of your ingenious readers suggest a floating stove, or any other mode by which the water might be heated in the bath itself?

A POOR VALETUDINARIAN.

CHURCH-BUILDING NEWS.

Bradford.—St. Michael and all Angels' Church, Brick-lane, has been consecrated by the Bishop of the diocese. The church is the eighth of this town which the Bradford Church-building Society was formed to provide. The plan of the church consists of nave, with north and south aisles, chancel, vestry, with organ-chamber over, and tower to the south of south aisle. The style is Geometrical. The chancel, which is a continuation of the nave, without the usual division of a chancel-arch, contains a large five-light east window. The organ-chamber, with the view of economising space, is placed above the vestry, with arches opening into the north aisle and chancel. The nave is four bays in length, lighted by a large circular window in the west

gable, with an arcade of five lancet-windows beneath. The tower opens into the south aisle beneath an arch, and the upper portion contains a gallery for children. At present the tower is roofed in at the level of the aisle walls. The benches and other fittings of the church are executed in deal. The church is warmed and ventilated on the hot-air system, by Messrs. Haden, of Trowbridge. The works have been carried out under the superintendence of Mr. D. Kersbau, as clerk of the works; and the contractors for the various portions of the building were Messrs. Foulds & Brothers, of Bingley, masons; J. T. Sagar & Co., Manningham, carpenters and joiners; Charles Wilson, plumber and glazier; Hill & Nelson, slaters; J. B. & J. Ackroyd, plasterers; and Brown & Pullan, painters. The total cost of the church, including the boundary wall, will be about 3,600*l.* Accommodation is provided for 705 persons. Messrs. T. H. & F. Healey, of Bradford, were the architects.

Oving, Bucks.—The church here has been re-opened by the Bishop of Oxford, having undergone restoration. The whole of the interior has been refaced, and an arch on the north side, which had been built up, has been thrown open, and now forms the entrance to a new vestry. It is evident that at some time there has been a north aisle. New clearstory windows, in the Decorated style, have been substituted for the old square ones. The new seats are in deal. The east, and part of the south wall of chancel, are re-built. The character of the old windows is retained. There is a new open roof, and an oak screen has been placed in the south arch. The new rood is of alabaster, with Devonshire marble; super-altar and cross (by Mr. W. Thompson). The floor has been laid with Maw & Co.'s encaustic tiles, and part of the east end in panels, with freestone bands. The whole of the work has been carried out under the direction of Mr. G. E. Street, architect. Mr. G. Cooper, of Aylesbury, was the contractor. The plan adopted for warming the church is Porritt's underground stove.

Croxtan, Kerrial (Leicestershire).—The complete restoration of the interesting church in this parish is in an advanced state. The works are being carried out under Mr. G. G. Scott, by Mr. John East, of Melton Mowbray; and Mr. Youmans is clerk of the works. It is said the bowels of King John were interred in the south aisle of this church. In the burial-ground are many ancient monumental slabs and tombs.

Alfreton.—The restoration of the parish church of Alfreton promises to be speedily accomplished. The plans have been prepared by Messrs. Hine & Son, Nottingham, and contemplate the pulling down and rebuilding of the present chancel (which much needs repair), and of the vestry; the erection of a north and south transept, and an organ chamber; the throwing open of the tower to the church; a new roof to the nave; new windows to the north side aisle; the taking down of the present unsightly galleries, and the entire re-peaving of the church. By the contemplated enlargement and alterations many additional sittings will be obtained; and the committee, on the authority of their architects, estimate the entire cost of the restoration and enlargement at about 2,000*l.* A new clock and organ are both greatly needed.

Lyncombe.—The new church of St. Luke, Lyncombe, has been consecrated. The church is in the Early Decorated style, with nave, chancel, and transepts; and when completed there will be a tower and spire, running, it is intended, to a height of 120 ft. The architects were Messrs. Hickee & Isaacs, who furnished the designs gratuitously. Mr. E. Hill was the contractor; the carpenter's work being done by Messrs. Smith & Son; and the plastering and painting by Mrs. Mole. The interior presents an unassuming appearance. There are 384 sittings—one-third free. The total cost of the church, purchase of land, &c., is, we believe, 2,150*l.*, which is not wholly subscribed, and to build the contemplated tower and spire will entail a further expenditure of 250*l.*

Ashton-under-Hill.—The parish church has been re-opened. The restorations consisted in clearing away the school-room, lengthening the aisle, to the extent of two bays of the arcade, and new roofing the tower; taking away all the old seats and pews, and replacing them with open seats, all of one design, in deal, stained and varnished; placing a new pulpit of oak on the south side of the chancel arch; and a reading-deck opposite to it on the north side; flooring the space within the altar-rail (which is new

* As regards the point of class distinction, though with an application quite wide of artistic purposes, the keynote of the present article is struck in a succinct speech by the Bishop of Oxford, at the recent Church Congress at Wolverhampton, as reported in the journals at the time.

and very simple) with encaustic tiles from Maw & Co., of Broseley; paving the chancel with glazed bricks of two colours; adapting the space under the tower for a vestry, &c. The architect was Mr. Baker, of Birmingham; and the builder, Mr. C. Ancill, of Overbury.

Scarrington.—The small church of Scarrington, with Aslockton has been restored. The old edifice was in a very dilapidated condition; but the restoration has done more for the interior than the exterior of the edifice. A good south aisle has been added, and the interior generally has been renovated. Mr. J. H. Hakewell is the architect, and the works have been carried out by Messrs. Marriott, Warrant, & Scott, Nottingham. A new arch has also been thrown out from the belfry, through which the congregation pass on entering the church. An organ-chamber has been erected, in which it is intended, at some future day, to place an organ. The two windows on the north side and the centre compartment of the chancel window are filled with stained glass from Messrs. Ward & Hughes, of London. The figures in the chancel window represent the Ascension of Our Lord, and the window was placed there in memory of Mr. Henry Flowers. The other two windows represent the Annunciation, the Adoration, and the Circumcision, and were erected by Mr. T. Vincent, London, in memory of his father and mother. The seats in the church are red deal varnished, and accommodation is afforded for 200. The total cost of the restoration has been about 700*l*.

Burnley.—St. Andrew's Church, Burnley, has been consecrated by the Bishop of Manchester. The edifice is situated on a rising ground adjoining the new schools, on the Colne-road. It is of stone, and will seat about 550 persons. The cost has been about 3,000*l*. The plan consists of a chancel of about 27 ft. by 18 ft.; a nave and north aisle of six bays each; a north chancel aisle, roofed transept-wise, and arranged to serve as organ-chamber; and minister's and choristers' vestry, the minister's vestry being partitioned off, and entered through an inner porch; a south aisle of five bays, a sort of double transept on the south side, nearly square on plan, partly projecting from the chancel and partly from the south aisle, and having a central pillar with arches springing from it. This transept, or south chapel, is approached through a separate door, and is appropriated chiefly to the school-children. The tower stands at the south-west corner of the church, buttressed at the angles, and surmounted by a broached octagonal spire, the angles of which are placed in the direction of the cardinal points. The belfry stage has four two-light traceried windows, and the spire gabled storm-lights and other cusped piercings. The basement of the tower serves as a porch, in the western side of which is a cinquefoil-headed door, and on the northern side an arch opening into the nave. The west wall of the nave contains a large four-light traceried window, beneath which stands the font, which is of Portsmouth stone, the gift of Mr. T. Chaffer, the owner of the quarry. It has been executed by Mr. Shaw, of Liverpool, from the architect's designs. The east window is of three lights, with a traceried rose in its head. In the absence of a recess the east chancel wall will be temporarily relieved by a little colonnade. There is a legend referring to the monogram, "We have redemption through His blood." The chancel stalls, subsele, and other fittings, are of the best Danzic oak; the other seats, which are low, open benches, are of deal. The passages to the seats are laid with black and red tiles, in patterns, and the chancel and sanctuary with encaustic tiles. The aisle windows are arched and cusped: that of the north transept is a traceried rose, and those of the south transept are of two lights, with traceried heads. There are two gabled clerestory windows on the south side and three on the north side, each containing a two-light traceried window. The west gable contains a panel, with St. Andrew's cross. The walling is of Parpout stone, banded in two different shades. Catlow stone is used in the ashlar of the doors, windows, &c. The windows are glazed with tinted cathedral glass; the east chancel window is filled with coloured cathedral glass in geometrical patterns. This and the glazing have been done by Messrs. Edmundson, of Manchester. The work generally, with but little exception, has been done by Burnley tradesmen. The architect was Mr. J. Medland Taylor, of Manchester.

Exeter.—The ancient parish church of St. Mary Major, Exeter, which was removed in

1865, has now been rebuilt, and consecrated by the Bishop of Montreal. Known in Norman times as the place of holding the Archdeaconry Court of Exeter, distinguished by the remains of a massive Romanesque west tower, recorded in history as one of the parish churches of Exeter in 1222, it would seem to be an offence almost against archaeological feeling that so venerable a monument should have been entirely rebuilt. The requirements of so large a parish for more church accommodation, however, and the ruinous "patched up" state of the building, its dark interior encumbered with two awkward galleries, determined the case. The church has been designed by Mr. Ashworth, in the Early English style, the principal features being tall, twin lancet windows, and canopied buttresses. The enlargement has been effected chiefly by adding an aisle, 56 ft. 6 in. by 20 ft., which is divided from the nave by an arcade of four deeply moulded arches springing from piers, each formed of a cluster of marble shafts. The nave has been lengthened 8 ft., the chancel 9 ft., and the whole is removed nearly 12 ft. farther west, a house having been taken for a site for the west tower, which it is intended to surmount with a stone spire, rising to a height of 75 ft. The roofs are of red deal stained, ceiled between the rafters, the chancel roof being boarded, and covered with lead. The principal ribs spring from carved stone corbels, and these and the capitals are by Mr. Herley, of Taunton. The seating is all open with fittings of wainscot; the avenues are paved with Minton's tiles, and the tower with the old monumental slabs. There is an organ chamber on the south side of the chancel, and new vestry, with external door adjoining. The cost of the edifice is so far 6,000*l*. The contractor is Mr. Tozer; Messrs. Mitchell & Son doing the Bath-stone work. The stained glass is chiefly by Mr. Wailes, of Newcastle. The north window of the chancel, a memorial given by the parishioners to commemorate the rebuilding their parish church, was furnished by Mrs. Beer.

Tattenhall.—The old parish church of Tattenhall is fast falling into decay, but a movement is being made to erect a new church, from plans submitted by Mr. Douglas, architect, which will give increased accommodation to the parishioners. The architect has examined the fabric, and finds that it will require 3,000*l* for the rebuilding. Contributions will be received by the Rev. Fielding Ould, Tattenhall Rectory. The sum of 1,200*l* has been promised.

ROMAN CATHOLIC CHURCH BUILDING NEWS.

Whitby.—St. Hilda's Church, Whitby, has lately been completed, and solemnly blessed by the R. C. Bishop of Beverley. It has been upwards of two years in course of erection. The style of architecture adopted is severe Early Pointed, founded on a careful study from the best work, in the time-worn ruins of the old abbey, so familiar to all lovers of pure Early Pointed work. The plan has been determined by the peculiar nature of the site, which has a rapid fall along the line of Brunswick-street, to the corner of Bagdale. It has nave and aisles, the southern being considerably wider, and having cross arches to carry the roof. The total internal length is 101 ft.; width from wall to wall, 54 ft.; height from floor to point of barrel vault of nave ceiling, 54 ft., and a spacious sacristy, forming the connexion with the old presbytery. The necessity of using carefully the limited quantity of ground at the architects' disposal, has rendered necessary the omission of a chancel arch: a distinction, however, is made, the roof over chancel being panelled and boarded. The nave arcade has columns 18 ft. from centre to centre, and is 27 ft. in height, the walls being of great thickness. The aisle windows are 14 ft. from the church floor, and give abundant light throughout. There is no clerestory; one roof of braced and coped curved rafters, spanning nave, and aisles. The interior is far from complete. The altar is of Caen stone and alabaster, with pillars of serpentine, and has a rich enamelled tabernacle door, of *reposse* brass work, by Barkentin, of Regent-street. The font is of stone, carved with shafts of alabaster and serpentine, and is the gift of the principal entrance is in Bydale, a flight of sixteen steps, 18 ft. wide, approaches the doorway, which is

deeply recessed, and has nook shafts of red granite, one on each jamb, with a niche over, and statue of patron saint. The great doors are of English oak, 12 ft. high, with carved meeting post. Above is an arcade of lancets, and in the gable a large wheel window. The baptistery terminates the north aisle, and at the opposite corner rises the octagonal helix or campanile, to a height of 145 ft. The cross and vane of lead and wrought iron, are 12 ft. high. The front to Brunswick-street has a series of gables, which give the opportunity of well lighting the church. The roofs are covered with small strong Welsh slate, arranged in simple patterns, and crested with a bold rigging of red tile. The architects were Messrs. M. E. Hadfield & Son, of Sheffield. The font and altar have been executed by Mr. Earp, of London. The contractors were, for the masonry, J. Seales; carpentry, J. White; plumbing and glazing, Brown; plastering, Blakeley; slating, Hargreaves; painting, Readman, all of Whitby. A memorial window has been placed in the church. It is by Messrs. Wailes, of Newcastle, and has been placed in the church by the families of Lawson and Tarnbull as a memorial. In one of the lights is the Resurrection, and in the second, our Lord blessing little Children.

Boole.—St. Alexander's Church, close to the Miller's-bridge Railway Station, has been opened for divine service. The edifice is a parallelogram, divided into nave and aisles, the former terminating in an apseal end. The extreme length of the building is 108 ft. by 50 ft. in width, and is 53 ft. high. The building is extremely simple in outline. The architect was Mr. E. Welby Pugin, whose designs have been carried out by Mr. Glaister, the contractor, the woodwork being supplied by Mr. Hughes.

DISSENTING CHURCH-BUILDING NEWS.

Middlebros.—The foundation-stone of a chapel has been laid in Milton-street, Newport-road, for the United Methodist Free Church. It will be in the Gothic style of architecture, and will accommodate from 320 to 350 persons. The building will be 48 ft. in length, 35 ft. in width, and about 30 ft. in height, and, exclusive of the site, which has been given by a few proprietors of land in the neighbourhood, will cost about 850*l*. There will be a schoolroom underneath, and the chapel itself will be so constructed that a gallery may easily be added. The seats will be open; there will be a platform pulpit, and an orchestra behind it. The plans have been prepared by Mr. John Hunter, of Middlebros.

Bradford.—The Old Chapel-lane Unitarian Chapel has now been removed, and the work of erecting a new edifice already commenced. Messrs. Andrews, Son, & Pepper are the architects of the building. The front of the church will face Chapel-lane, the principal feature being a gable, rising 84 ft. from the ground to the top of the cross, with a large five-light window, 21 ft. wide and 41 ft. 6 in. in height, in the centre. This window will be filled with tracery, and above it in the gable, a cinquefoil window will afford facilities for ventilation. It was originally proposed to erect a spire at the western side of the gable, 125 ft. high, but this idea was abandoned. The nave is to be 40 ft. wide, while the height to the top of the ceiling will be 50 ft. The pillars supporting the five arches forming the nave into which the church is divided will rise from a narrow aisle at either side, and this aisle in addition to the central one, will give access to the seats. The church will be lighted from the sides by two-light windows, and the aisles by small windows. A chancel, with organ-chamber, vestries, and other conveniences, will be provided. The pews will be of red deal, and of modern design. The church will seat 500 persons, and it will cost about 5,000*l*. Upon stone, from Idle quarries, will be used for the exterior, and it will be covered with red and blue slates. The works have been let to the following tradesmen:—Messrs. Barraclough & Son, of Horton, masons; Mr. W. Crabtree, joiner; Mr. Schofield, plumber; Mr. Dixon, plasterer; Mr. H. Briggs, painter; and Messrs. Hill & Nelson, slaters.

Blandford (Dorset).—The new Independent Chapel in this place has been opened. It is a Gothic design, and occupies a site in the centre of the town. It contains chapel, class and assembly room, a large school-room, and vestry. The architect was Mr. Street, of Warminster; the builder, Mr. Walden, Christchurch.

Widfield.—A new Congregational Chapel has been erected in Gardau-street, and recently held for divine service.

Newcastle-upon-Tyne.—The Methodist New Mission Chapel, Garden-street, was to be opened on Sunday, the 15th inst. The building occupies a site on the north side of Snow-street, at its junction with Derby and Garden Streets, adjoining the ordinary street dwelling-houses, and its side or front wall running with them, the architect has so far succeeded in his design as to destroy the blank monotonous appearance a long wall in this position is so liable to give, without losing space or encroaching on the footway. The chapel measures externally 100 ft. by 30 ft., and is 24 ft. in height from floor to ceiling. It is computed to seat 260 persons, and the whole cost will be 7000. Mr. S. Oswald, was the architect, and the various works have been executed by Mr. R. Ridley, mason; Mr. R. Matfield, carpenter; Mr. Hastie, slater; Messrs. G. & Son, plasterers; Mr. Charles G. Plumber, Messrs. Glaholm and Messrs. Ker & Emley having supplied the gasfittings. The painting and glazing have been executed by Fenwick Pickup. It is intended to erect school and class rooms, and vestry in connexion with the chapel.

Leighley, Yorkshire.—The Wesleyan Chapel has been painted and decorated. The scheme of colouring adopted is much fuller in effect than that usually ventured upon in chapel decoration. The colouring generally is subdued in hue, relieved slightly by touches of colour. The whole interior effect has been produced by colour only, graining having been dispensed with. The effect of the whole has been heightened by the introduction of inner windows of ground glass, transmitting a soft diffused light over the whole. Messrs. Forster & Andrews, of Hull, have just erected an organ in the chapel. The whole of the decorations have been carried out by Messrs. S. Bottomley & Sons, of Cross-street.

INVENTS CONNECTED WITH BUILDING.

APPARATUS FOR MIXING, PRESSING, OR BUILDING COAL AND OTHER SUBSTANCES FOR THE FORMATION OF ARTIFICIAL FUEL, AND SPLITTING THE SAME INTO BLOCKS.—*D. D. Parker.* Dated 17th January, 1867. —The object of this machine is a rectangular receptacle placed upon a bed-plate, a vertical shaft mounted in suitable bearings being placed in the centre thereof. The upper portion of the shaft is furnished with blades or knives affixed at convenient distances from each other, and to the lower end thereof is attached eccentrically a circular disc so as to revolve therewith, and in the manner mentioned. The disc is placed in the interior of a rectangular box of cast-iron or other suitable material, such box fitting the exterior of the lower portion of the before-mentioned receptacle, but free to move thereon on the bed-plate, at each end of the main shaft of the machine, and extending beyond the same, is placed a series of tubes of rectangular section, such tubes being constructed of cast-iron or of any other suitable material. The upper portions of such tubes which are within the interior of the machine are open for the admission of the substances under treatment, as hereinafter mentioned. Above the tubes, and within a main body of the machine, are hollow iron rods, the faces of which have slots formed therein, through which slots project iron points or teeth, the same being mounted loosely on eccentric spindles in the interior of the rollers, in such manner that they shall project the required distances from the faces of the rollers during the revolution thereof. The rollers forming each pair revolve in contrary directions, so as to draw down between them, by means of their motion and of the points or teeth, the substances under treatment. The substances to be submitted to the operation of the machine having been, if necessary, prepared in a pug-mill, or in any other suitable manner, are conveyed by means of endless bands, or in any other convenient mode, and introduced at each end of the machine on either side of the central shaft. Upon the central shaft being caused to revolve the revolution of which, together with that of the before-mentioned rollers, is effected by means of wheels and gearing actuated by any suitable motive power, as well understood, the materials introduced into the machine are subjected to the action of the knives or blades, and

also of the points or teeth carried by the rollers, and being thereby mixed and incorporated pass into the before-mentioned horizontal tubes. By the action of the eccentric disc the rectangular box in which the same is contained is alternately moved back wards and forwards so as to force the materials through the tubes towards their respective extremities, the entrance of such materials into the tubes being alternately permitted and prevented by the motion of the box. As the blocks issue from the tubes they may be received by revolving moulds divided into compartments and mounted upon axes, and caused respectively to revolve through the required distances by rods connected with the moving box. Upon the box issuing from the tubes and being received by the moulds, the latter are caused partially to revolve by the operation of the connecting rods, whereby the blocks are brought into such a position that they can receive additional pressure or impressment from any suitable apparatus which it may be considered desirable to use in conjunction with this invention; or, instead of using revolving moulds, the blocks may be subjected to additional pressure or impressment upon issuing from the moulds in the manner usually practised in similar operations. The like process takes place alternately at either end of the machine with the motion of the box.

APPARATUS FOR PREVENTING DOWN-DRUGHT IN CHIMNEYS. *C. Wenner.*—Dated 19th February, 1867. —This invention consists in the use and application of a curved hood or cowl, into which the upper portion of the chimney-pot or funnel is made to project, such hood or cowl being open at the exit end and turning with the wind on a vertical shaft, and has an opening in the back or long curve of a smaller sectional area than the area of the exit end of the cowl, and into this back opening a horizontal funnel or conical tube is fitted in order to catch the wind. By this arrangement the air passes from the small opening in the back of the hood or cowl over the top of, and at right angles to, the chimney or air shaft through the said hood or cowl of larger sectional area, expanding at the same time, and causing a great upward draught in the chimney or ventilating shaft. To prevent any back current the hood or cowl is made of sufficient length to allow the current of air which issues from the small opening in the shape of a cone to touch the sides of the cowl before passing into the open air, so that no air current can enter through the front opening.

FLOORS AND ROOFS OF HOUSES, &c. *H. Y. D. Scott.*—Dated 19th February, 1867. —The object of this invention is to construct fireproof floors and roofs of houses and other buildings in concrete in a more economical manner than has heretofore been accomplished. The patentee proposes to dispense with the use of the ordinary joists, and to make use of wrought iron tie-rods extending from wall to wall (or when the space to be covered is of large extent or span from girder to girder), placed at intervals of 10 ft. or 20 ft. apart to assist in carrying the weight of the concrete, the thickness of which will increase with the increase in width of the span to be covered. These girders will form part of the main supports of the floor for large spans, while the tie-rods will hold together the mass of concrete between the girders.

APPARATUS TO DEEPEN, EXCAVATE, SCOUR, AND REMOVE THE MUD, SLIME, STONES, AND OTHER FOUL MATTERS FROM THE BEDS OF RIVERS, STREAMS, &c.—*H. A. Bonneville.* Dated 27th January, 1867. —This apparatus consists of a wheel or cylinder bearing teeth and iron hockets on its periphery, which serve to deepen, excavate, scour, and remove the foul matters at the bed of all running waters, the axis of the said wheel being upheld by two boats bound together and placed on each side of the said wheel. Movable dam boards and hatches or flood-gates are placed at the back of the apparatus, in order to intercept as completely as possible the current of the watercourse, so that all its strength may be brought to bear on the said dam-boards and hatches or flood-gates, and compel the boats to follow more or less rapidly the course of the stream, as may be required, by means of moorings which are gradually let go. The downward motion of the boats gives rotation to the wheel, which, in its rotation, will dig the bed of the river or watercourse according to the greater or lesser depth at which the said wheel has to be let down, and it removes the matters to the upper surface of the wheel, whence they are thrown into an overflow or conduit of the wheel placed above the boats, which serve to carry the said matters away.

Books Received.

Original Designs for Wood-Carving; with Practical Instructions in the Art. By A. F. B. London: Longmans, Green, & Co. 1867.

This handsome folio volume contains very useful instruction for those who would acquire the valuable art of wood-carving, the attainment of which in a greater or less degree is within the reach of most persons. The writer keeps the whole process under three heads: 1st. Preparing the block; 2nd. Blocking out the work; and 3rd. Moulding and finishing it; and gives good instruction on all. The designs are twenty in number, partly from nature (foliage and fruit), and partly geometrical. We must confine our praises to the former.

VARIORUM.

"A HANDBOOK of English Literature." By W. G. Larkins, published by Routledge & Sons, gives in very small compass a general view of the authors of English literature, both prose and poetry. Each author is spoken of in the order of the date of his or her death, succinctly and sensibly. Passing by opinions from which we might dissent, we have no hesitation in saying that a careful study of this little book, an easy task, will serve to give to those who have neglected the knowledge, or not yet commenced its acquirement, a very clear idea of the history of English literature. —Mr. Tegg has issued reprints of several standard works, in small compact volumes, —"A Sentimental Journey, and the History of a good warm Watch-coat" (Sterne seems in demand just now); "A Tale of a Tub," with "Life of Swift;" and "The Life of Nelson," by the Old Sailor. The latter popular little volume contains a *fac-simile* of one of Nelson's letters. —The January number of the *Popular Science Review* (Hardwicke) contains a very interesting paper by Dr. Maxwell Masters, on "Sensitive Plants," with illustrations, and a chapter by Mr. Robert Hunt on "The Science of a Snow-Flake," also illustrated. —"Spider Nests" are illustrated in the new number of Hardwicke's "Science Gossip," and Dr. Lucecum gives some information concerning the "Agricultural Art of Texas." In the course of the observations it is stated that these ants sow the seeds of a grain-bearing grass (*Aristida stricta*) weed and preserve it, and at the proper time gather the seeds and carry them to the granary: something more than instinct this. —The re-issue of "Cassell's Popular Educator," in parts, deserves notice. It treats continuously and in a good manner of all sorts of subjects, astronomy, botany, drawing, English, mechanics, and fifty others. We can recommend it strongly. —The January number of *Cassell's Magazine* is full of entertaining reading, with illustrative engravings. —*Echoes from the Clubs* become louder and more entertaining, and wital may now be enjoyed for less money than at first.

Miscellaneous.

SACKVILLE-STREET, PICCADILLY.—With reference to some notes of Sackville-street, recently given in our pages, a correspondent points out that there is not a lamp-post in the street. The lamps are all suspended upon iron brackets, in the fashion so prevalent in the days of oil, before the age of gas. The remark is quite correct.

NEW PULPITS.—The new carved pulpit at Christ Church, Bath, which has been designed by Mr. J. Elkington Gill, is Early English in character. The body is circular in form and stands upon an oak pedestal. Below the cap mouldings are nine trefoil-headed openings, exclusive of the entrance, with carved columns, at the foot of which there are eighteen panels minutely carved in foliage pattern. The frieze mouldings are descriptive of foliage. Messrs. Brown, of Frome, were the builders; Mr. Skilman, of Bath, executed the carving; and the iron and brass work was done by Mr. J. Brown, of Frome. —A new stone pulpit, with lectern and altar-rails in iron and brass, and prayer-desk and choir seats of oak, have just been erected in the church of Finstock parish. The whole work supplied by Messrs. Hardman, of Birmingham, has been provided at the expense of Lord Churchill and his family connexions, as a memorial to their mother, the Dowager Lady Churchill.

WAGES IN NEW ZEALAND.—A correspondent, recently returned from New Zealand, denies the correctness of the wages stated by Mr. Ross, in his recent letter to us, from Dunedin. We have no reason, however, to doubt the accuracy of that gentleman, who is in practice there as an architect.

A PAINTED BEDSTEAD.—We have seen with much pleasure a bedstead of yellow deal, made by Edward Grimes, builder's foreman, and with the assistance of R. Edge, house-painter, decorated in Mediaeval style. The wood was first stained clear and varnished, and then stencilled in various patterns called from the Art-library at South Kensington, of which Grimes is a frequenter. The result is highly praiseworthy. The originator of the bedstead has also invented a cooking-stove which has a promising feature.

THE PRIORY CHURCH, MALVERN.—Lately it was discovered that something had gone wrong about the roof over the north-east aisle, whereupon the vicar and churchwardens instructed the Messrs. Haddon to examine into the cause of the apparent failure, who reported that, in the absence of proper means of ventilating the chamber formed between the stone groining of the ceiling and the roof timbers, *Merulis lachrymans* had been generated, the result being dry rot to such an extent that the whole of the upper timbers and hoarding must be taken off and replaced with new; and, at the same time, the architects recommended the construction of ventilating flues in order to prevent a recurrence. This report having been submitted to Mr. G. G. Scott, the architect on the former occasion, and having received his approval, the contract for taking down and replacing the roof timber and the performance of the other works incident thereto has been made with Mr. Smart, builder, who will forthwith carry out the same under the supervision of Messrs. Haddon, Brothers, architects.

THE YORK WORKHOUSE CHAPEL AND DINING-HALL.—Lately Mr. J. L. Foster, one of the guardians of the York Union, applied to the Board for permission to undertake the decoration of the large room in this workhouse, which is used as a chapel and also as a dining-hall. Leave was given, and the funds were provided by a private subscription.

Mr. J. W. Knowles, of this city, mural decorator, carried out the work. The ceiling, which is divided in certain places with beams (supported by pillars), has been coloured a warm buff, and thrown into panels by an ornament of a darker shade. The walls from the ceiling to the window-heads is coloured the same buff as the ceiling; from thence down to the dado they are sage green, having ornamented hands of a deep yellow and red running across horizontally, the intermediate spaces being filled with fleur-de-lis of a darker green. On the face of each pillar, which is coloured grey and deep yellow alternately, is a fret in Indian red, banded by a style of sage green. A fret is also stencilled under each beam. The seats have also been stained and varnished.

FIRES.—The workshops at the Derby station of the Midland Railway have been burnt, and property valued at several thousand pounds destroyed. The cause of the fire is unknown. The *Newcastle Chronicle* takes the town Council to task for its obduracy, indifference, and inactivity in the question of grappling with fires. "The whole town," says the *Chronicle*, "is at the mercy of the Water Company. Having few other means at hand to grapple with a fire other than those which the Water Company supplies, everything of course depends, in case of an accident of this kind, on the quantity of water in the mains. In the instance of the *Queyside* fire, the force was only sufficient to supply a single hose. It is simply ridiculous, however, to complain of want of water when the Tyne itself was flowing within 100 yards of the burning buildings. How did it happen that that magnificent supply could not be used till some hours after the fire had been in full play? The simple fact is, that this wealthy and populous town of Newcastle is not furnished with proper means for extinguishing fires. Fire-engines and fire-brigades are elsewhere held to be necessary institutions in a town. Here, however, we seem to think they are not worth our attention. Is it creditable to Newcastle that it should not itself possess the means of meeting its own emergency? All that is wanted is that the Council shall vote a few hundred pounds for the establishment of a volunteer fire-brigade."

SOUTH LONDON WORKING MEN'S COLLEGE.—The principal of the college in Blackfriars-road is Professor Huxley, who is to deliver an inaugural address on (this) Saturday, the 4th inst., in the evening at 8.30. The admittance to strangers is 6d. each, and to members 4d. The entrance is in Collingwood-street. The secretary is Mr. William Rossiter. The college is intended to offer to working men in South London an education of a sound and efficient character on terms within their means.

PREPARATIONS FOR SNOW.—The Board of Works for the Westminster district (Mr. Arntz, surveyor), has issued printed instructions for the removal of snow in the event of its fall, a praiseworthy step. If all the other metropolitan Boards do the same, London will not again be exposed to such an annoyance in this direction as once befell it. We have not heard the result of the offer of premiums by the Metropolitan Board of Works for the best method of getting rid of snow from the streets. Some time ago we described an invention having this end in view, wherein a jet of steam was the means employed.

A NEW NORTH LONDON SYNAGOGUE.—The foundation-stone of a new synagogue has been laid in Thornhill-road, N.W. The building will be in the Italian style, and is divided into three bays, and has an octagonally-coffered ceiling. It has a large gallery round three sides of the interior. The dimensions of the synagogue proper are 65 ft. by 45 ft. wide, by 35 ft. high. In the basement is situated a house for the headle's residence. The accommodation in the synagogue will be for 700 persons. The cost, it is anticipated, will be about 5,000*l.* The architect is Mr. H. E. Collins. The stone was laid by Baron Ferdinand de Rothschild.

EXPLOSION OF A POWDER-MILL AT FAVERSHAM. Eleven persons have been killed by an explosion at Messrs. Hall & Sons' Powder-mill, Faversham. The exploded buildings were the press-house, the corning-house, and the powder-house, the roofs of which were blown high into the air. Walls 9 ft. in thickness were blown down, elm trees in the surrounding fields torn up by the roots, and dykes emptied of water. The sight was a most sickening one as the remains of the poor fellows were collected. The cause is believed to have been accidental, notwithstanding rumours that the Fenian conspirators had done it. These wretches must be glorying in the panic that attributes all sorts of accidents to their devilry, which seems to have no intelligible purpose but the production of just such a panic.

A CURE FOR NEURALGIC HEAD-ACHES, FACE-ACHES, AND TOOTH-OR JAW-ACHES.—Sir: About ten years since I was laid up with an excruciating neuralgic headache, which seemed to encircle the ear of that side of the head alone affected. The idea that the headache had something to do with the ear as a centre occurred to me, although, in the ear itself, there was no pain. I had a little almond-oil, and also spirits, dropped into the ear, but without any good effect; when the thought suggested itself that perhaps a little of the anæsthetic ether (not the nitric) might do good, by deadening the nervous pain. I had some drops of rectified sulphuric ether, therefore, put into the ear; and, in the course of half an hour, my headache was entirely gone. I have since found, both from my own occasional experience, and that of others, that ether, so applied, is, in nearly all cases an effectual cure of these very painful head-aches, face-aches, jaw-aches, and tooth-aches, which are commonly known as neuralgic and rheumatic. If a very severe case, two or three days may elapse, during which the pain may be apt to recur, especially from new and even slight exposure to draughts; but repeated application of half a dozen drops, or less, of ether, at a time, seems certain to subdue the most violent attack, sometimes in a very few minutes. A drop or two of almond or olive oil, afterwards put into the ear, I have thought, tended to protect from a new attack. As the ether sometimes gives pain in the ear for a moment while being applied, a single drop should, first of all, be carefully put in, and then more, as the case will allow; but I have never suffered the least bad effect, either in my hearing or otherwise, from the use of ether in this way, nor have I heard of any from others who have tried it at my recommendation.—J. E. DOVE.

SOUTH KENSINGTON MUSEUM.—In the week ending December 28th, 1867, the visitors were 17,490 in number.

ROYAL LITERARY FUND.—We understand that the Right Hon. B. Disraeli, Chancellor of the Exchequer, will preside at the next anniversary dinner of this corporation.

THE COPPER TRADE.—Messrs. Vivian, Young & Bond (Dec. 27) write:—Business in West Coast produce has been confined to about 20 tons bars, which were taken at 68*l.* in Liverpool at which price there were no longer buyers.

BUNHILL-FIELDS BURIAL-GROUND.—On New Year's-day, Bunhill-fields Burial-ground fell into the possession of the corporation, by Act of last session. The corporation will once set about planting the ground, laying out walks, &c., and preserving the tombstones. The ground will then be thrown open to the public under proper regulations.

GALVANISED IRON CISTERNS.—Recent experiments conducted by the French Government show that the water-tanks on board a ship should be coated inside with tin, and not with galvanized iron, as at present. It was discovered that the water, under certain various conditions, dissolved the zinc off the iron, and rendered it injurious to health.

DISTRESS IN LONDON.—At the suggestion of Miss Bardett Conitts, an association has been formed for behoof of those suffering in the Eastern district, based on the wholesome idea that wages paid for work done are more welcome and really paid to the poor than gifts in charity. Men of various persuasions have met on a common ground to perform a public service; and with the unanimous vote of the Dissenters, the chosen president is the Bishop of London. The work proposed is exactly that most needed in the Bethnal-green parishes—the cleansing of the streets, alleys, and courts, and the making or repairing of roads. The labour performed will be supplementary, and in excess of the ordinary proceedings under the local boards. Money will be needed. Miss Bardett Conitts has undertaken to pay the wages of two hundred and fifty persons for six months, at eighteenpence a day; she has guaranteed the rent of ground required for stone-breaking,—employment suited to dock labourers,—and has contributed 300*l.* towards the road-making fund.

THE RESTORATION OF BANBURY CHURCH.—At a meeting of the members of the Royal Archaeological Institute, held on the 7th December, Mr. Octavius Morgan, F.S.A., vice-president, in the chair, the Rev. W. Lowe, M.A., vicar of Banbury, Cheshire, communicated an account of the church there, now in course of repair, and of interesting objects found in the progress of the works. Surrounding the chapel of the Calveleys, in the north aisle, and of the Spurstows, of Spurstow Hall, in the south aisle, were elaborately executed and painted screens, formed of oak. A large number of the panels, tracery, and other parts of these screens, were exhibited by Mr. Lowe. The paintings were remarkable for the force and brightness of the colours used, but the execution is somewhat coarse, and was most probably provincial workmanship. Remains of painting in distemper had been found on the walls, probably a St. Christopher and an altar-piece, apparently representing the Resurrection of our Saviour, with attending saints, &c., painted on a red hack-ground powdered with white stars, and edged with black.

TENDERS.

For the erection of a theatre and publichouse at Croydon. Mr. T. Smith, architect:—

Hill & Keddell	£3,767 0 0
Emor	3,665 0 0
King & Sons	3,610 0 0
Harell	3,470 0 0
Masley & Rogers	3,378 0 0
Tongue	3,237 0 0
Chappell	3,205 0 0
Dover	3,207 0 0
Sawyer	3,042 0 0
Erbecher & Son	2,883 0 0
Fellner	2,719 0 0
Kelting	2,630 0 0
Munday & Hutchinson	2,593 0 0

For new residence and apartments at Great North-street, Herts, for Mr. Frederick Potter. Mr. Frederick Gotto, architect:—

Chappell	£1,959 0 0
Skinner	1,631 10 8
Cook	1,616 16 0
Nash & Matthews	1,438 0 0

The Builder.

VOL. XXVI.—No. 1301.

English Artisans on the Paris Exhibition.

VERY remarkable book has been published; a book likely, if we mistake not, to effect a considerable amount of good.* It will be remembered that the Society of Arts raised a subscription with the view of sending to Paris a certain number of selected workmen, each of whom on his return, was to make a report of what he had observed during his stay, in reference to the special industry in which he was engaged. H.R.H. the Prince of



Wales aided, and the Privy Council Committee on Education, offered 500*l.* towards the intention, provided that the Society raised at least the same amount by voluntary subscriptions.

The sum subscribed amounted to 1,039*l.* 9*s.* 6*d.*, which enabled the council to assist upwards of eighty skilled workmen, representing the principal industries of the country, to visit Paris, and to examine the quality and cost of the work executed in their respective trades by the best workmen of foreign countries.

The council received valuable co-operation from the Chamber of Commerce in Birmingham, who subscribed to the fund and recommended twenty-five workmen and foremen to represent the various branches of trade carried on in that district. The visit of the workmen from Birmingham was organised by a local committee, who received valuable aid from Mr. W. C. Aitken. The various reports sent in, edited by Mr. Charles Critchett, the assistant-secretary of the Society of Arts, are now before us. All such forms of expression as, though not strictly in accordance with grammatical rules, appeared to convey more forcibly than any other the writer's meaning, were retained, and only such literal and grammatical corrections (with a few trifling omissions) have been made, we are told, as were absolutely essential. The reports bearing upon cognate branches of industry have been generally kept together. We give a list of all the writers, to mark our opinion of the credit they have done themselves and their class.

The reports, fifty-three in number, by artisans from London, Sheffield, Coventry, Bradford, Newcastle-under-Lyne, &c., are,—

Cabinet-making	Charles Alfred Hooper.
Ceramic decoration	Aaron Green.
Saws and tools	William Bramhall
Cutlery	John Wilson.
Chair-making	Benjamin Lucraft.
Glass-painting	Francis Kirchhoff.
Wood-carving	James Mackie.
"	R. Baker.
Cabinet-work	Thomas Jacob.
Wood-cutting machinery ..	William Walker.
"	Thomas J. Wilkie.
The Ribbon trade	L. S. Booth.
Ribbon-weaving	Joseph Gutteridge.

* Reports of Artisans, selected by a Committee appointed by the Council of the Society of Arts to visit the Paris Universal Exhibition, 1867. London: Bell & Daldy.

Lace	Edward Smith, Joseph Bird, and George Dexter.
Hosiery	George Kondall and George Cault.
Pottery	William Beardmore.
Tiles and Pavements	Samuel Cooper.
Terra-cotta	Michael Angelo Pulham.
Pottery and porcelain, with some notes on iron manufacture	John Randall.
Bricklaying	George Howell.
Plasterers' work	John Jeffery.
Carpenters' and joiners' work ..	C. Bartlett.
Joiners' work	T. W. Hughes and John D. Prior.
Masonry, &c.	Alexander Kay.
"	George Broughton' Forbes and John McEwen.
"	Thomas Connolly.
Couch-making	Thomas Magrath.
Ship-building	E. F. Mondy.
Mining and metallurgy	Francis Oats.
Silver-work	P. A. Rasmussen.
"	George Page.
Silver chasing	R. E. Barrett.
Hammered iron	William Lethereu.
Ornamental wrought-iron work	T. Winstanley.
Ivory-carving	Joseph Bentley.
Engraving	G. Berry.
Die-sinking, especially adapted to silversmiths and other metal trades ..	William Elliott.
Watch-making	John Gregory and James Strager.
The Horological Department ..	Hermann F. Jung.
State of the watch trade	George Cook.
Tailors' work	R. Sinclair.
Book-binding	Leeds Great.
Leather-work	Walter Blunt.
The manufacture of caoutchouc	William Bourne.
Figured shawls	Samuel Bosst and John Appleton.
Machinery for worsted fabrics	John French.
Worsted yarn	George Spencer.
Worsted and mixed textile fabrics	Daniel Hillingworth.
French horticulture	John Evans.
Mechanical engineering	William Learmouth.
The condition and habits of the French working classes (special report)	Robert Coningsby.
"	Richard Whiteing.

The reports, twenty-nine in number, by artisans from Birmingham, are,—

Introductory Report	Mr. W. C. Aitken.
Gas-fittings and chandeliers ..	Sam Taylor.
Plumbers' brass foundry	Thomas Bexley.
Cabinet brass foundry, &c.	William Gorman.
General brass foundry	Henry Dry.
Church bells	James Ansell.
Tubes in all metals	John Fisher.
Saddlery, &c.	John Clay.
Leather, harness, saddlery, whips, portmanteaus, &c.	Frederick Thompson.
Jewelry, with diamonds and precious stones	W. G. Deeley.
Jewelry and gilt toys	James Plamplin.
Buttons	Thomas Johnson.
"	S. W. Richards.
"	William Bridges.
Steel pens	J. L. Pettit.
Small arms	Charles Hibbs.
Paper-maché	David Sarjeant.
Japanising in general	Thomas Archer.
Needles and fish-hooks	William Guise.
Sheet and plate glass	Richard Pearshall.
Table and fancy glass	Thomas C. Barnes.
"	W. T. Swene.
"	T. J. Wilkinson.
Die-sinking	Charles Wm. Moore.
Electro-plate	Henry J. Fellows.
Tin-plate working	Edwin Poole.
Labour-saving machines ..	Henry Fowler.
Railway carriage and wagon building	Benjamin Whitehouse.
Design	Frank J. Jackson.

It is scarcely necessary to say that some of the writers, when they make comparisons, do so without full knowledge of both sides,—several of them of either side. A large amount of common sense, however, is shown by the great majority, and what they have said should set many of their fellow-workmen thinking. The writer of the report that stands first, C. A. Hooper, goes into raptures with all he sees and finds every comparison very disadvantageous to his countrymen, of whom he has, seemingly, but a poor opinion. On the road, when in Paris, he meets a van full of joyous workmen in blouses,—

"They are singing French songs; the van is hung round with Chinese lanterns; they are going home, sober and happy, from some excursion. I think for the moment of a similar scene in London; had they gone through Holborn in this same manner, hundreds of boys would have followed and roared and shouted, and would have smashed every lantern on the van; here the people simply looked and smiled as they passed. Again, I thought of a party of British workmen returning from a banquet, as I have often seen them, roaring drunk, swearing, and howling and stopping at every 'publie' to drink, and 'drive dull care away.'"

The carving seems to him wonderful; it must

have "grown into shape and form." In the workshops of London they have foremen and overlookers who wear fine cloth, and decorate their persons with jewelry, and to whom they are expected to look up as to some one very superior. In Paris the foreman appeared in the same garb as the men—the fine blouse common to both; each one treated the other with proper respect, as became the office he fulfilled; you were not disgusted with either the pride of the one or the degrading servility of the other; each man knew his place and kept it. Oh! I many times while in Paris blushed for my countrymen! He often asked himself, "Where are the Paris roughs?" Everybody was not only smooth, but highly polished. In Paris the man in his blouse could sit and enjoy the society of the upper class in a grand *café*; but he is not at all surprised that it is not so in England, because there are people in his own trade with whom he finds it impossible to associate out of the shop; how much more were they separated from the educated and refined. "The great fault must be in the training of the people." To him the life of a Parisian workman appeared to be all happiness. And then every one behaved to him so well.

The question naturally arose, what is the cause of this marked difference between us and them? and his reply is, we want in our country a system of "national education," free from all sectarianism, and entirely secular, leaving every one to exercise his own judgment in religion, and to worship God according to his own conscience. Let us have free access, Sundays and week-days, to all the national institutions. Let there be no restraint on rational, healthful, innocent recreation, and let us have this always encouraged. Let Government restrictions be put upon, and strongly enforced against, every thing and every place of a vicious, low, or degrading nature.

The next writer, Aaron Green (Ceramic Decorations), takes a cooler and deeper view, as do the majority of those who follow. Mr. Green, with due admiration of what is done in Paris in his department, maintains the excellence of the English works, and denies the truth of the assertion that has been made that "the best specimens exhibited by English manufacturers are painted by French and even German workmen": and that in "elegance of outline and delicacy of tint these artists excel all rivals."

"Is it true that our artistic deficiencies are really so great? My answer is, no. And in corroboration of my opinion, I beg to refer to remarks made by J. C. Horsley, R.A., who, in his report, published in the *Illustrated London News* of August 17th, says—'In porcelain painting there is nothing better than the works of Allen, Mitchell, and Simpson, artists employed by Minton. Now, these are all of them Staffordshire men, born within three or four miles of the manufactory where they are now employed. Another witness to this fact is found in Leon Arnoux, esq., himself a Frenchman, and one who knows more than any living man of what Minton's workmen are capable. What does he say? Why, I find in his report published in the *Illustrated London News* of September 14th, the following, when speaking of Minton's productions:—'But the best things in their glass cases are the many vases of soft porcelain with figure paintings. The largest pair, in *bleu-de-roi*, representing the toilet and birth of Venus, are from original paintings by Francois Boucher; they exceed in size all other vases produced in the soft material; they have been very successfully painted by Messrs. Allen and Mitchell, the same artists who have executed the painting on an Italian pair of vases decorated with a frieze of young Cupids playing in a picturesque landscape.'

William Bramhall, speaking of saws and tools, thinks England is still in advance of France, Belgium, and Germany for the highest excellence in the perfection of model and of a cutting edge in saws and tools (without regard to their price), principally owing to the finer quality of the steel and greater care in their grinding, having greater natural advantages for superior grinding and facilities for power. The same does not apply to American tools, however, axes more especially, which for exactitude and finish have the appearance of being die-struck, so uniform are they in every respect. They are models of their kind, and show the grit of the Old Country in their formation, *minus* the prejudices that

cing to us, and having a freer scope for individual exertion.

One peculiarity in Paris he finds is the giving of a share of the profits to all employed, — to those who conduct themselves properly and respectfully to their fellow-workmen as well as to their employers. Another is the development of "speciality," or a gift for a particular kind of work. A man or boy is encouraged to express his likings or dislikings for his employment; and it is no rule that because his father was a chimney-sweeper he must through life pursue the same vocation. "If he has the ability to command an army there is a place for him in prospect. One of the leading French generals is of humble origin. Worthy sons of labour, who strive for progress, are recognised, honoured, decorated, and pensioned."

He finds the general domestic condition of the French *ouvrier* greatly inferior to that of the British workman. If we speak of him with regard to his family comforts, adjudged by the English standard, home he has none. "There is not a word in the French language which can express the idea of an English home, for the best of reasons—the idea has never been conceived."

"We have said of the *ouvrier*, 'home he has none'; but he has a French home, which is eight stories high,—as on Boulevard Richard Lenoir and numerous other places,—is a B. square, and he pays eight francs per fortnight for the accommodation, and must carry his muddy waders,—which he has previously bought,—and all he needs, to his sky-high chamber, and must bring all his refuse down from that elevation; and he is in good quarters when he is thus located. He has a little bed that turns up, and a little table that lets down, which must be done alternately each night and morning in order to make room. He has a couple of small chairs, as many basins, plates, knives, forks, and tablecloths, and a *bonnet* (a red cap) which is a tasty pot if possible, and a bird in a cage, nearly comprise his household goods. One suit of clothes, with blue cotton overalls, and a change of under-linen, constitutes his wardrobe (he is substituting leather shoes for wooden shoes); he has a perforated treepot for a stove, and with this, with a basket of charcoal and charcoal dust, whose fumes are poisonous, he must cook his Christmas dinner; and his condition is improved, for ere there are no lavoirs, or washing-houses, where his wife can wash for the public, if she does not work at any thing else?"

Instead of envying them, he has to report upon the inferior condition of our Continental fellow-labourers, with deep thankfulness that "we are not as other men are."

Benjamin Lucraft, writing of chairmaking, arrives at the conclusion that, with the single exception of France, but little or no progress has been made since the Exhibition of 1852. As to Great Britain, without the least doubt or hesitation, yet with the most profound regret, he says, our defeat is as ignominious, and, he fears, disastrous as it is possible to conceive. He feels that the art-workman of France has a great advantage over those in England. In Paris they are surrounded by works of that kind which none but the most obtuse can long remain unimpressed by. Their museums and palaces are central, and most numerous; their decorations and furniture are of the highest order, and nearly always open to the people.

"Do our aspiring artists take up their abode in Rome on account of the climate? Not a bit of it; there they are surrounded by works they venerate and love, and their very nature gets impregnated with them. But I do not want London kneecap to pieces to make a city of palaces, that the people may acquire a taste for things lovely to the eye; still, something must be done, or the working classes of this country will be grievously wronged, and the whole nation suffer."

He would have the council of the Society of Arts use its influence with her Majesty's Government for the establishment of local museums of art-manufacture, with lecture-halls, libraries, and other necessary adjuncts and appliances for the use and instruction of the people, and open at such hours as would suit their convenience and opportunities for going, which, as a matter of course, is in the evening, when lectures by competent men would be largely attended.

Many of the other reporters dwell on the desirability of establishing museums and lectures, for which we have ourselves called for years. Nevertheless, we must say that, besides the museums and means of study, we want, on the part of workmen, a determination to use them. They do not at present avail themselves of the opportunities the schools of art, and such collections as the Architectural Museum, afford, to the extent they should.

Mr. Lucraft inquired particularly into the apprenticeship system. Seeing some lads at work with the men in a carver's shop, he went to the head of one about fourteen; he was carving a chair-back of a Medieval pattern from a working drawing; it was nearly finished, and well carved. Finding, from inquiry, that he had

done the whole himself, he expressed his surprise that one so young was found capable of carving so well; and was informed that boys at school were specially prepared for the trade they fancy, or that their friends have decided upon for them; so that a boy about to be apprenticed to learn carving, is instructed in ornamental drawing, modelling, and designing. Three or three years and a half is the longest time they serve. It would be a good law, he thinks, for this country, that prohibited the hiding of any one for more than four years; our young men of seventeen or eighteen would then be better instructed than they are now at twenty-one;—not simply by hiding them only for four years, let us interpolate.

Francis Kirchhoff, as to glass-painting, is of opinion that the French work, when compared with the English, shows a greater diversity of design in construction, and more freedom and grace in the drawing of the ornament; but that, in excellence of colour and pleasing harmony, the English glass is much superior.

James Mackie, after giving an account, according to his light, of the wood carvings at the Exhibition, speaks of the art-education of the carver, and sees that the inquiry proposed occupies too large a field for one whose personal observation and experience are confined to England and a short stay in France, and therefore that he must look solely to those countries.—France in particular deserving our best attention.

The people of France are in the midst of glorious monuments of grandeur and beauty bequeathed to them by their forefathers. The people appreciate them, and industriously and intelligently continue to build up and still further heighten the great edifice of art. The architecture of Paris is a great school, and the student who enters daily receives valuable instruction. It would seem almost impossible, he thinks, to be in the midst of so many examples and not grow up imbued with a love for, and also instructed in, the art of carving. Fine and well-carved oak doors are to be seen of a character we never see publicly exposed in England. The stone carving is good and well finished; and by the circumstance of its thus being side by side with the wood, the quality of the latter must, he maintains, be greatly and beneficially influenced.

He visited the *Ecole Impériale Spéciale pour l'Application des Beaux Arts à l'Industrie*. On that occasion there was an exhibition of the works of the students, and the number and variety were considerable and interesting. These studies were little more than good sketches in clay, but it was evident that the students were learning a most useful lesson, that would stand them in good service when they went forth into the world. It seemed abundantly clear that the system pursued was simple and rapid, and that the teaching and practice produced valuable results. "It seems to have great vitality never being without deep and warm interest to the students, features that should distinguish every school, and without which they will assuredly fail in accomplishing the objects sought to be attained. This system of being content with good sketching in all branches of instruction in art seems to be the life and soul of art as applied to manufactures; good sketching is acquired, and as few will require to gain a subsistence by making finished pictures, a valuable and sufficient power is gained that is always in great request and is never lost."

If a workman desire to study animal and vegetable life in connexion with his art, the entrances of the Jardin des Plantes are free to him and the public at all times. This is a great advantage. Galleries being open on a Sunday, he considers, must have considerable influence on the taste.

From what could be gathered, piece-work seems to be the prevailing system, and by the workmen is preferred to journey-work, or payment by the hour or day. In the piece-work system there is a liberty that is very precious to Frenchmen. However valuable machinery may be, our French brethren consider that their faculties are such as to make them very different things to a mere tool, or a convenient piece of mechanism.

Much of the inferior work in Paris is hadly paid for, and the pay is said to be less than is given in England for a similar class of work; but the good average workman, and particularly the superior workman, is paid in accordance with a scale of remuneration that is much higher than that which prevails amongst us. "A franc an hour, and sometimes more, is a very general

price, whilst piece-work is much more remunerative."

"To sum up, it is asserted by Englishmen well acquainted with the Paris workshops, and also by French workmen, that our system requires great alterations, and, among other things, piece-work, where practicable, should be substituted for journey-work, paying more liberally,—not adhering to a level scale of remuneration, which is alike assented to by both employers and workmen, amongst us,—letting each gain that which his unfettered hands will obtain. Not till then will our work be characterised by anything but dexterity and mediocrity. To keep down energy by insufficient remuneration, is to establish a class of dull workmen, who will never give us good art. To insist upon long hours of labour, with no rest, on some days, will not give facilities for study, or enable the workman to enlarge his store of knowledge, or give him that interest and pleasure in his labour without which no great success can be expected."

With regard to the associations of the workmen, he could learn but one or two facts. The carvers are associated together, numbering several hundreds. The members consist of workers in both wood and stone, but principally wood, and also modellers. Their objects are to promote the exchange of friendly sentiments, furnish trade information to each other, and especially to the unemployed. They have a committee in hand to the subject of wages. Having found that some of the Paris shops were paying a very low rate of remuneration, it was determined to ask for an increase of 20 per cent.; and the demand was acceded to in each case.

He feels that the education of the workman is of primary importance. Our schools have rendered valuable service, and much of our progress is traceable to their influence; but they are capable of doing more, if only a new life be infused into them. Our great buildings are full of excellent examples, which deserve to be more studied than they are. In our museums and galleries there are splendid examples of art that, if studied, would work wonderful changes in our taste and power. He knew that they were not esteemed as they should be, and also that they were not so accessible as they should be.

"Establish more museums of industrial art, he they ever so small, and let them be open at convenient hours and days for the artisan class. Let the architects look to the carving that is being done in our new London, for much of it is a scandal and a disgrace to our taste, and its effects upon the carver's education are most damaging. Something better is demanded. If we are to have any art in our streets, pray let it be good and instructive." Let our system of instruction and practice at our schools be simple, inviting, and interesting; not dull, repulsive, and crushing, as it certainly has been to many. We have the stuff amongst us,—let it be cared for in a large and liberal spirit, and it will be strange indeed if the England of the future does not see something more worthy of her great name.

R. Baker, on Wood-carving, writes very well. Take a specimen:—

"In comparison with the French, the English carving is tame and spiritless; the French workman seems imbued with a true sense of his art, and with a warmth of feeling which gives it life and sentiment, and this gives his work its superiority. If we examine attentively a portion of French work, we find the main object of the carver is to give his work spirit and expression. Take a rose, for instance: it expresses all the characteristics of a rose; the form, the life, and even the colour is there substituted; and yet it is not the exact copy of the form of a rose, for if it was, it would look poor and lifeless, and it looks rich and full of life, and this is done with comparatively little labour. The carver must understand and feel the true spirit of the object he is carving; otherwise he may bestow much labour, and display much skill and cleverness in tooling, but his work will still be deficient in that which is essential to its artistic merit; not that there is a total absence of this artistic feeling in the English work, but they seem to have studied cutting their work sharp and clean, in preference to anything else. As a whole, the English carving is equal, and, perhaps, superior to any of their previous exhibitions. Their progress is seen not so much in what is actually exhibited, as in the almost entire absence of decidedly bad work. There are scarcely any of those tasteless and inferior institutions of nature which usually abound in our exhibitions; this indicates improvement in taste."

Their workshops are conducted in a manner which allows the greatest individual freedom; by conversation, and the mutual exchanging of thoughts and ideas, the workshops become an important source of information and instruction; but the most important difference, he says, between the French and English workmen is, in Paris they are paid according to their abilities; in London wages are nearly uniform [notwithstanding what Mr. Roddis said in our pages]: one encourages a man to become proficient, the other is discouraging, because he has no hopes of being rewarded for his perseverance. "As soon as a French workman shows signs of special abilities he is patronized and encouraged, and by working in accordance with his inclinations, he con-

tinuously gains experience, and ultimately arrives at great perfection. In England we have not such special stragglers, but spend the best part of our time in executing work repugnant to our feelings."

The writer makes the odd observation that "our architects leave the embellishment of our cities too much in the hands of the builders, who are not notorious for their refined taste. I think this is the root of our inferiority." He ought to know better than to suppose that the architects have any control in the matter.

Thomas Jacob, who reports on cabinet work, thinks a person who has once seen Paris, walked through the main thoroughfares, and visited the public buildings and churches, must feel quite contented to be beaten by a people for whom their Government has done, and is still doing, everything possible for their artistic improvement, and whose wish it seems to be that every building shall be not merely just sufficient for the purpose it is intended to serve, but, in the true sense of the word, a monument, erected and decorated without any apparent regard to cost; the material which is principally used (a white stone) having the double advantage of being quite soft, and almost as easily worked as a Bath brick when new, and of becoming as hard as a rock after being some time exposed to the atmosphere. A Parisian, he thinks, may very properly be considered to "live in a school of art; and a taste for the beautiful is so diffused amongst the people (a natural consequence), that scarcely anything is attempted that does not exhibit considerable taste. Besides the advantage of being continually in view of these fine buildings and monuments, they have several splendid museums, in which all who are disposed can study, at almost any hour convenient to themselves, particularly on Sundays.

He thinks an excellent method of raising the character of the English workman as a mechanic or an artistic workman would be something of this sort:—

"Whenever a boy leaves school, let him be furnished with a certificate, stating the progress he has made in learning while at school (as is done in a few schools at the present time); and if he is apprenticed to any trade let him be encouraged to bring to the school, periodically,—him a year,—specimens of his work, or a note from his foreman, stating what progress he was making towards usefulness. Here would be an opportunity afforded of giving him a few words of encouraging, sound advice, which parents are too often unable to give."

He wishes Mr. Cole, or his colleagues, would publish a series of popular essays on various subjects; such, for instance, as the harmony of colours, adaptation of form to material, &c. Why should there not be an elementary work on geometry, perspective, and orthographic projection, for, say, 2d.? All these things would tend greatly to increase the abilities of the workmen, as many are quite ignorant of even the simplest problems, in consequence of the difficulty they have to obtain such works.

The two reports on Wood-cutting Machinery are interesting and useful. As to Pottery, William Beardmore says, without fear of contradiction, that the British potters have nothing to dread in coming in contact with foreign workmen; "our superior style of work, the beauty and simplicity of our designs, the excellent ornamentation, the richness of colours, the white firm body, the fastness of the glaze, make us feel proud of our position in the great Paris Exhibition, 1867."

Writing on the subject of terra-cotta, Michael Angelo Pnabm considers that England stands foremost in the quality of works in terra-cotta, for specimens exhibited for architectural purposes, in beauty of design, good taste, displayed in harmony of colours, and in the adaptation of terra-cotta for building purposes; also for the execution of works, in this beautiful material, requiring artistic skill, forethought, and perseverance to bring about successful results, as shown in many of the English examples. It is not surpassed for good colour, finish, straightness of mouldings, and is in long lengths; it is also well fired to stand any climate; and that next to England stands Prussia.

The wages or salaries paid to men, women, and boys, in Paris, seem to be according to their grades or different kinds of work. Good finishers get from 8s. 6d. per day (10 hours) downwards, according to merit or skill; some as low as 2s. 6d.; but at piece-work they can earn sometimes 12s. per day,—those are the best workers,—others in proportion; some piece-work prices are more remunerative than others; some goods can be hurried over quicker.

Women get 1s. 3d. per day of 10 hours; boys according to their abilities. He learns that there are about 500 hands employed in pottery and terra-cotta works in Paris, numbering about 55 or 60; there are about 420 men, 40 women, 40 lads; only four manufacturers have steam-engines to mix and grind their stuff. About 350 men are in lodgings with their own furniture, 80 in furnished rooms, others as boarders; 40 lodge with their parents.

Although Paris is not a brick city, there are many bricks used there; and on the subject of Bricklaying, George Howell writes a useful report. Coignet's *béton* he finds dearer than brickwork. Of first-class brickwork in Paris he finds none, judged by an English standard. The best attempt yet made was at their market, "Les Halles," which was executed at the expense of the Corporation of Paris, and designed to ascertain the difference in cost between stonework and brickwork, the result being as follows:—Brickwork per cubic metre, 12l., or 8l. 8s. per cubic yard; whereas, Raviere stone, which is considered very good, is delivered in Paris at 4l. 8s. per cubic metre, or about 3l. 7s. 6d. per cubic yard. This latter price leaves so large a margin for working and fixing, that it may easily explain how little first-class brickwork is done in Paris. But this is only judging from their (the French) standard; for a more monstrous absurdity could not be conceived, as he reasonably says, than the notion of paying at the rate of 94l. 6s. per rod for brickwork. Yet this was the price, he was informed, these "halles centrales" cost in erection. It is a very fair piece of ganged brickwork, every brick rubbed and squared, bed and face, with joints not exceeding one-eighth. He thinks that the finest piece of ganged work in London could not exceed 20l. per rod, and in very many instances excellent work is done for 15l. or 16l. The prices for materials, taking one thing with another, will be found pretty nearly equal: their bricks and sand are cheaper; their lime dearer.

Writing of bond, he gives an amusing anecdote:—

"I once saw a curious historical blunder by an able architect, a member of the Antiquarian and other learned societies. Having a great liking for the thirteenth century style, he determined to carry it out; in all its details, in a large residence he built for himself on the banks of the Thames, about 12 miles from London. He carefully prepared all his plans; had castings made purposely for bolts, brackets, grates, &c.; carefully selected his tiles from Milton's for the halls, and also the flat tiles for the roofs; polished oak floors, beams, stairs, &c.; and doors and frames, windows, &c., scrupulously exact as to their historical character and appropriateness. In fact, he bestowed all possible care on his residence to make it a reflex of the thirteenth-century style. As it neared completion, he invited several friends from London, professional and otherwise, to inspect his mansion. Many, very many, expressed their hearty approval. About this time I went to take charge, as foreman, of a large pair of villas, built in a kind of Venetian-Gothic style, close to the thirteenth-century specimen I have described. I at once noticed the unfortunate incongruity, but did not deem it advisable to rush into print with the discovery, as I knew that the proprietor had bestowed great pains on, and felt great pride in, his undertaking. Some short time after, he came to reside in his chosen home, and personally superintended the few finishing touches to his creation. One morning, about breakfast-time, he came to me, and asked my opinion as to the style, &c., of his residence. After cordially approving of every thing which he pointed out with some enthusiasm, I told him that it was all very well, but he had dressed it in a modern costume. I then explained to him that whilst he had bestowed such care upon all possible details, yet he had adopted a style of brickwork totally unknown in this country till the time of William III., viz., Flemish bond, when it should have been the Old English. He at once saw his error, and acknowledged it; but I determined not to send a letter, as I had at first intended, to the *Builder*, for I saw that it would give him intense pain."

Mr. Howell (who, like Mr. Lucraft, is a leader amongst his class) confesses that their *Conseil des Prud'hommes*, is of essential service, and he hopes Lord St. Leonard's Act will pave the way to a thorough system of arbitration in this country.

John Jeffrey, who writes also on bricklaying, coincides in this. "I should like," he says, "and I believe thousands of English workmen would like, to see a *Conseil des Prud'hommes* in England, similar to the one in Paris, which would prevent those outrages, so painful for us to hear of, now being revealed to the Royal Commission."

We are not half-way through the book, but must break off, possibly to return to it. It is published at a very small price, considering the amount of paper and print, and we shall hope to hear that it has reached every workshop, Working-men's Club, and Mechanics' Institute in the kingdom. It should set our workmen thinking, as well as those who are interested in industrial and social progress, and do good in more ways than one.

THE WORKS OF BARRY.

The life and career of Sir Charles Barry have already received a notice in this Journal, and references there applied to former notices of his works have revived past recollections and given renewed interest to that last summing-up of works and ways that every artist must be prepared for who sets his mark upon the world,—may, will ever have in mind as the future occasion of his best, because most disinterested, rewards. His biography has already been amply characterized,—the life as lived,—and of the life as written it is not necessary,—as now we propose to restrict ourselves to architectural criticism—to say more. We are presented with illustrations with a certain liberality; we read the motives that influenced various peculiarities of design, the architect's own afterthoughts and self-criticisms; and, moreover, some interesting independent observations by no means dictated by the disposition to worship without scruple. We may differ in opinion from even what we find so candidly set down, and must very frequently; but shall often owe the opportunity of differing to frank revelations. We discern no endeavour either to bide away evidence or overlay it with painful sophistication, or to smother objections however legitimate, in the birth; and the author of the biography, and they who have assisted, show the true respect they devote to the subject of it by not sacrificing their individual independence.

A list in the appendix, of architectural designs executed or not, in order of date, enables us to arrange our observations, as we propose to do to some extent, with reference to that historical development that results from a development within the designer's mind under counter influences reacting from without.

"The building," says the author, "which first gained him high reputation, and which even now holds a high place among his works, was the Travellers' Club." The select competition for this dates 1829, when he was in his thirty-fourth year. The building is small, but that the arrangement of the ground brought its narrowest ends only into view, was perhaps from the height that it was contemplated to allow, a favourable circumstance. Again, that the two fronts have no connecting flank view gave an opportunity to treat them with a certain comity of contrast that still by no means compromises unity.

That the design, to a certain extent, recalls the villa Pandolfini, is only to its honour; for assuredly it does not repeat it. The simplicity of the rectangular building and the proportion of the details and delicacy of their finish, are very agreeable. The unbroken cornice unites the whole, and is happily relieved by the depressed but visible roof above, as below it is united to the ashlar by what is rather an enriched wall-plate than a proper frieze.

The gradation thus obtained, and which is repeated with modifications in the adjacent Reform Club, is certainly very happy; its capabilities are even yet not fully worked out. The expression of the articulation of roof and wall that so often unhappily fails, is thus perfectly vindicated; and wall-plate, bed-mouldings, and sloping roof introduce the same effective triplicity that has helped so much to secure permanent admiration for the grouping of architrave, frieze and cornice.

Barry, we read, held the position of the door at one extremity of the street front to be a blemish inconsistent with the symmetrical principle of his design, but forced upon him by considerations of convenience, and the very small frontage at his command. We should rather be disposed to applaud the success with which he contended against limitations, than assent to an objection which amounts at last to a regret that the problem before him was not this but another altogether. The door at the extremity is the standing difficulty in the treatment of our ordinary street houses. The more important it is made—and the tendency runs in this direction—the more lopsided does the front become; and the illustrative vulgarism of a pig with one ear becomes exaggerated by hypertrophy.

We lately remarked in an old-fashioned street an ingenious attempt to meet the difficulty, in a house of sufficient importance to have five good-sized windows in each story and four to the right of the door. The centre of the house comprising three windows on all the stories was set forward so far more than the thickness of a brick; yet even so it dominated the lateral narrow one-windowed divisions, and the door thus became only an irregularity in a subordinate part. The

front of the Travellers' Club is happily of sufficient breadth for the windows on a level with the door, to intimate an apartment of handsome dimensions, and in no way strained by the reduction for entrance; while the treatment of this avoids enhancing to the point of obtrusiveness its natural superiority. Under the given necessity, the case could not be better managed; there is nothing for it in such circumstances but to accept the conditions, repress the pretensions of the doorway (which scarcely become it in such fortune), equalise it as nearly as may be with the window embracement, and then make some sacrifice to give a predominant importance to the symmetrical window-range of the best floor.

The garden front, as it exists, is at a disadvantage as compared with the engraving; for the balustrade has been forgotten, abolished, or economized, and the structure thus appears sinking into, or rising out of, a hole; and the expression of basement, on which Barry was always so anxious to insist, is quite lost.

Another objection, it may be as little, attaches to the original design. As we look at this front at present from Carlton Gardens, we see an attic story growing up irregularly from the centre of the building, and garnished most unhandsonely with ventilators and chimneys. The parasitical out-growth,—such it seems,—has the appearance of rooting deep among the very central organisms of the structure; the difficulty that might be found in giving it the desired amount of extension,—to a design already complete, is quite conceivable, but the mischief has surely been aggravated beyond imposed necessity.

One word more: the unpierced space above the windows is so excessive, that it suggests darkness within, whether the space be occupied by unusual height in the room above the windows,—the semicircular heads of these are unpierced,—or by unhandsome and unnecessary cocklofts between the ceiling and the roof.

Reason, no doubt, steps in and volunteers the inference that the interior space is occupied by rooms lighted by a skylight, unseen and unindicated, or by windows turned towards an interior court or borrowed light. But architectural expression ought not to be, and will not be dependent on ungrounded conjecture. This is a difficulty that we may notice several times within a walk,—we see it in the upper stories of other club-houses, and it is apt to beset picture galleries. The case is one of necessity, for such blank walls of rooms so lighted will have to be presented to view; but there are preferable options in dealing with them. In the case of interior windows the utmost that can be said is, that the outer blank wall can still be so treated as to intimate that it does not at any rate shield only the dark top of the ill-proportioned story below it. When a skylight is in question, we have no hesitation in affirming that its existence should be expressed by at least a coping on the visible roof, the necessity for the definition of the floor it pertains to, remaining the same.

It is on grounds here implied that we have ever believed that in the Greek temples that were lighted from openings in the roof, the visible roof must have exhibited the coping of the opening that interrupted the ridge, though probably raised so high that the sides ranged with it. So far from such a feature deforming, it appears to be an æsthetic necessity; by such frank and conspicuous admission stone could be excluded the suggestion of the cella as being blocked in and miserably dark in the midst of its highly-illuminated porticoes and ambulatories.

The elbowed vousoirs of the lower windows—a misery of architectural anachronism—cause a certain pang.

The Gothic design of the Birmingham Grammar Schools dates four years later, in 1833. Barry had by this time become dissatisfied with his earlier works in the style, and did not enter on a new design without having studied both the original examples and the literature of the Mediaeval Renaissance.

The building, we read, "attracted great attention and considerable admiration from the public and from the critics." This is but a cold account, and the tenor of other observations intimates that again the artist failed to satisfy himself. Several objections are noted, and various plans for improvement; yet we miss an allusion to one of those errors that declare themselves too distinctly to spectators of the executed work, though invisible in the drawings and ever evaded instinctively by the draughtsman or the photographer. New-street, in which the schools are situated,—and situated on the side

where they are most advantageously seen,—is but narrow as compared with the length of front to be taken in at a view. The building, therefore, when we stand opposite to it is seen but momentarily, and to disadvantage, and the best aspect—frontispiece, as our ancestors would have said—should have presented itself well to the oblique view as approached from the direction of the town-hall. This fails, however, and unhappily. The seven lofty and enriched windows are enlaid between rectangular buttresses of such projection, and that hug them so closely as, from the approach indicated, to produce entire eclipse. They only declare themselves at a point from which the full line of front cannot be taken in, and then begin again to retire at our next step, and the blank sides of the buttresses fold round like shutters. The effect is much the same in the engaged colonnade of the Royal Institution in Alhemarle-street; but there, at least, the windows are plain and the interposing shafts are ornamented. There would have been but poor palliation by a clock-tower, which the architect proposed to erect at one end of the front, "for greater variety, and also to give greater importance to the building as seen down the street." Still less desirable, for more incongruous, would have been the lantern which is shown in the engraving as designed, but was never executed.

Symmetry and regularity are claimed for the design, and as regards the latter, with justice; but the symmetrical scheme is not vigorous. The front, no doubt, is divisible into equivalent halves, but the dividing line passes through no more important centre than a window,—one of seven similar and a door. A bay window over the entrance and a gabled parapet above were thought of, but renounced for a reason that seems illusory enough, but that always deterred Barry from advancing the centre of a composition,—he fancied the effect would be to destroy the apparent size of the building. In result, the centre of the front has less emphasis than the centres of the wings, which, disproportionately small as they are, completely overmaster it by this point of dignity and assertion of superior organization.

Passing over the alterations of the College of Surgeons, we come to the design for the New Palace at Westminster, begun August 23, 1835. The drawings were sent in on the following 1st November, and the award was published on leap-year's day, 1836. From this date almost to the death of the architect the design may be said to have been in progress,—so considerable were the extensions required, so important and vital,—in respect of some we are almost induced to say fatal,—were the modifications originated or adopted. New developments rose before him to the very last, and assuredly in respect of vigorous and rapid industry, courage and enterprise, versatility of resource and strength of will, never was there an architect more equal to the greatest architectural opportunity that has occurred since the Fire of London, than Sir Charles Barry. So far as his qualifications failed to produce a result fully worthy of the occasion, we are inclined to ascribe it in part to certain deficiencies in his intellectual education, and then to the circumstance that he came into the great battle of professional life precisely when taste was taking a direction opposite to that for which his own excellently conceived and executed plan of self-education had prepared him. It was due in part of his own otherwise valuable self-reliance that to the end of his career he had little esteem for theory; and finding good sense and instinctive apprehension so often leading him right, he lost the advantage of the counterbalance that definite principles give to personal predilections. The Travellers' Club and the Reform Club are those of his works that best embody the ideal that he brought home with him from the observations and studies of his great tour, and that show both within and without how prepared he was to nationalize, to acclimatize, all that his models have of most effective, to the exclusion of not only what would be out of place in England, but also of what was unhappy even in Italy and would be anywhere. Thus prepared, he was turned at once aside upon competition for Gothic churches at Brighton and elsewhere; he was thrown out of his natural stride at the very start—he had to give the world not his best, but the best he had that they were in a humour to bear, and this best could scarcely be at a postponed notice what it would have been had his early years anticipated the kind of claims that would be made upon him. That he was, at least, equal

to the occasion as against all competitors, might freely be allowed by those who would still be conscious that in a style that to him was not old but new,—less antique than modern,—his practice could scarcely be decided in a moment, and he to the last proved open to biases of influence and winds of secondary suggestion that he would not have admitted for a moment had fortune led him by his expected path. Hence came in a certain vacillation, as unfortunate as unnatural to him, in his development of the Westminster design; and we may trace its influence and intrusion even into later works professedly in Italian taste. The Reform Club dates in 1837—a year or so after the Westminster award—and it still retains the original Barry stamp of elegant simplicity and vigour; but if we look back to the design that gained the award originally we shall find the same mint mark is there also. Years of every varying design are expended at Westminster; a new aspect has come over the palace entirely, and the latest work of the master in Classic Renaissance—the Halifax Town-hall—betrays the same, but no more vigorous and sophisticated than transformed the competitive design which still remains warm admiration into the palace as executed.

Those who are so fortunate as to have preserved a copy of the engraving that long ago headed the Stationers' Almanack, will see the image of Barry's original and really noble conception. We cannot pursue the comparison into all its details. Some of the most critical changes were these:—The original buttresses of the river front, however little else there was in their favour,—and a buttress inevitably suggests not a front of a building at all, but a side,—were at least a relief to the decoration of the windows, and so rendered a service that is forfeited by the turrets, which, though of greater projection, are now so mingled with the general surface by the diapering and panelling, fretwork and flagrees,—the very tangled web of uniform enrichments, as to give no aid to breadth or relief in any sense. "The towers of the river-front remained for some time without visible roofs; and, when the roofs were introduced, they were so kept down (in deference to the advice of others) in relation to the angle turrets, that some confusion of principle resulted. He regretted afterwards that he had not kept down the pinnacles and made the roofs boldly predominant." The architectural pretensions of high roofs is a question that here must be for the present declined; but there need be no reservation in lamenting the equipage, so to speak, that is involved in their conflict with the pinnacles. The most conspicuous instance is, of course, the most unfortunate; and nowhere is the comparison of the original with the executed design more painful than in the skyline of the Victoria Tower as executed. Pinnacles assert themselves shamelessly in competition with the high-pitched roof, which still is sufficiently master of the situation to vindicate at least its pretensions, and lifts aloft the armooring flag-staff in token of a spirit protesting against tyranny, if incompetent to conquer. The pen is rather apt to run away with the intention when the comment turns to such unfortunate alterations; but, at least it is Barry that we would vindicate against Barry. The reduction of the height of the pinnacles would have mended matters but slightly, while the roof, to which predominance would then have been transferred, retained the inherent weakness of expression due to its emergence from belting walls, with which articulation fails to be effectively pronounced.

"The great Victoria Tower underwent repeated alterations. It had been originally treated with all the solidity of a 'keep.' But the reduction on plan was compensated by increase in height, and the whole character of the design was necessarily changed. The entrance had been of moderate dimensions (professedly designed on the model of the Erpingham Gate at Norwich), and the top of the niche-hand ranged with the cornice of the building. It was now raised to its present magnificent dimensions; the niches remained; and the upper part of the tower was divided into three large and two smaller stories. The design and arrangement of these cost incalculable trouble before it assumed its present form, divided into three windows, and the upper story rendered the prominent one by the arched and canopied leads of the windows."—P. 254. Mischief,—nothing but mischief; incalculable cost of trouble worse than thrown away. We reprint the paragraph from

the hook as it stands; but apparently an error of punctuation or style makes it read as if the division of the upper part of the tower into five stories were the later modification.

We observe here how liable an architect may be in the progress of a large work to sacrifice the effect of the whole by his efforts in favour of the part under his hand at the moment. "In the tower as it stands, he always felt pride and pleasure, and trusted that it would be the great feature of the building by which his name would be best known hereafter." But woe to the fame of an architect whose name is attached preferentially to a single feature, however vast, rather than to the entire building, to which, as a feature, it should after all be subordinate. "The magnificent dimensions of the entrance" as modified,—as exaggerated,—destroy the building attached to it. This doorway is equal to the joint height of the whole four stories of the facade seen along with it;—the stories are dwarfed even more than the entrance is enhanced. The height so rashly styled magnificent could only have become so by being supported by a certain proportionate gradation of openings; this, however, would have been quite out of the question, and the only opportunity,—the Peers' entrance,—is carelessly thrown away; it is an entrance ranging with the meanest,—the basement story,—and betraying infallibly the consciousness that always haunted Barry,—how very unnecessarily!—that a porch must of necessity have the appearance of being an excrescence.

The exaggerated height of the windows of the tower as altered contribute their share to the degradation of the dignity of the building. The great space between the tops of the upper range of large windows and the parapet is unhappily suggestive of darkness within,—of needless, uncomfortable emptiness or solid calosity.

The adaptation that was effected of Westminster Hall was, we must profess in all frankness in our opinion,—we have not here an alternative view of Sir Charles Barry,—a mistake no less and of much the same kind. It is not alone that some profanation of historical memories was involved in the change, and that what was a hall became reduced not even to an ante-room but to a passage; but the scale of this anterior so far surpasses that of the chambers and halls that are entered after passing through it, that we are confronted with the grossest architectural antinomia. Roominess is the characteristic that fails us most regretfully among the passages and corridors, and even in the halls of debate; but the sense of being "cabineted, cribbed, confined" is, in truth, artificially aggravated after such an introduction. The adaptation brought with it the necessity for the axial divergence of St. Stephen's Hall relatively to the central hall, and that man's sensibilities to angular bearing are little to be envied for their delicacy who is not put out by the irregularity and pursued by a feeling of disarrangement even into the depths of a committee-room.

The biography frankly admits, what otherwise we would willingly have doubted, that it was the individual preference of Sir Charles that led to the so uniformly distributed surface decoration (p. 257). He became averse to leaving any surfaces plain, as liable to have the appearance of "neglected spots." We almost could recognize here a revival of the early impressions that engaged his admiration for the lavish decoration of wall surfaces by the incised sculpture of the Egyptians. The tendency was not confined to his Gothic works; it spread to his designs in other styles; it is as rampant in his last work, the Halifax town-hall, as at Westminster,—and even in the quieter elevation of the Treasury buildings, or Board of Works, it has its willful way.

The world had little to regret when the elevation of Sir John Soane was superseded here, and where now is there one of his elevations remaining?—but, at least, his Corinthian order was in itself very beautiful. The columns were adopted in the new design; but they may now be passed unadmired and repressed by the most enthusiastic devotee of Classicism, and be unrecognized. They are now engaged in a wall, of which the masonry is so channelled that the grooves only confuse the flutes and arrises of the shafts, and by the breaking of the stylobate below, and the entablature above all the contrasts that were relied on in design, to add glory to foliated capital and moulded base, are lost for ever. We cross over the road, and notice how Inigo Jones secured the dignity of his columns, and gave by moderated subordination an organic vigour to his design, and re-

gret that Barry, who felt such true admiration for him, had not rather laid himself open to the influences of his predecessor than of contemporaries.

Other works remain that may hereafter afford scope for further observations; at present, we conclude. We have endeavoured to emulate the spirit that we have praised in the biographer; to employ the one weight, the one balance, to be just both to an artist, of whom the nation has many reasons to be proud, and to ourselves as critics, whose only concern is, that the pride should be so intelligent as to the past as to involve no dangerous contingencies of wrong imitation in the future. W. WATKISS LLOYD.

DOMESTIC ARCHITECTURE OF MEXICO.*

THE "hacienda" is the most important building on an estate, the residence generally of the proprietor, and stands somewhat in the same position as the mansion or castle of our landholders and gentry: it is frequently of very large extent, quite equal in space and proportions to some of the largest mansions of this country, and we dare say at one period it exercised the same wide civilizing influence that emanates now from those important places.

Attached to every hacienda is a capacious chapel fitted up in the gorgeous style of Roman Catholic countries, and there was a resident priest to administer to the spiritual wants of the proprietor and his dependants, and whose business, it was presumed, was to lead them in the right path; but as most of these are closed or in ruins, and the priest *non est*, it may account in some measure for the want of their deterring influence to the serious depredations that very frequently occur, and to the anarchy and disorganization that exist in that distracted country.

As the grandeur of our feudal castles has departed, and the feudal lord and his retainers exist only as matter of history, we think the social position of the Mexican hacienda has dimmed its lustre and usefulness; it is no longer the centre from which emanates all emoluments and pleasures, and pains and penalties; it is no longer the magnet of attraction for the surrounding country, with open house at all times to dispense hospitalities and as a resting-place for the wearied and benighted traveller: the will to dispense these good and benevolent duties now exists in many places, but the means to discharge them are wanting; the shadow is there, but the substance has long ago disappeared; and these *advantages* are doubtless due to the republican form of government they so much extol, and seemingly admire.

The hacienda, as the principal building on the estate, generally occupies the most commanding and best position as to site and aspect, and is built on a plan best adapted for the business of the estate: we will briefly describe one at which we spent some weeks of our sojourn in Mexico, the property of one of the wealthiest dons in that country.

It is called "Potrero," and is situated about half-way between Paso del Macho and Orizaba, a convenient halting-place for rest and refreshment, and is just on the borders of that immense forest that covers a large tract of country for about twenty miles, running east and west, and embracing the rugged and lofty Chicahuiztlan mountains, the haunts of the Mexican brigands and desperadoes. On arriving at Potrero you enter upon a comparatively open and level country, but still very much covered with hush and plantation. The building is square on plan, though many are rectangular, and the outer area of the square is covered with a block of building composing the different apartments, properly roofed in, and with very wide overhanging eaves, supported on pillars at intervals; and this forms on the outside a wide arcade or gallery, and on the inner side a covered corridor that extends quite round, from which the different apartments are approached; and the centre part of the enclosed area is open and uncovered, and used for various purposes of the estate.

It is erected only of one floor, and the site is raised, so that the apartments are approached by a step or two, and in the middle of the front is a large gateway, closed in with folded doors, which forms the only access to the building and premises. In the inner area are placed the plant, and frequently the valuable live stock of the

estate; so that the whole are secured safely within the four walls of the hacienda, and, indeed, the walls are built so substantially and well that they would withstand an ordinary siege.

In the front part of the building are the principal apartments,—the reception and dining rooms; and in the wings, on each side, are the sleeping apartments, and the back of the building is occupied with the kitchen and servants' apartments, stables, &c. The apartments are lighted with large windows opening down to near the level of the floor, and are closed in and protected with iron gratings, and shutters to close at night. The floor is covered with large red quarry tiles, about 12 in. square, of native manufacture.

The walls are thick, and built of very small rubble masonry, almost like *béton*, with bondstones at intervals to tie them together; and it is astonishing to see how substantially they are built, and how well they resist the vibrations and concussion of earthquakes, showing the excellent quality of the lime they use for building purposes; and the fronts, when finished, are plastered over smooth and coloured.

The roofs are of the ordinary collar-beam construction, covered over with close boards and bright red horse-shoe tiles, laid double, one course with the convex side down, the other the convex side uppermost, and made to overlap one another: these tiles are also the produce of the country.

The interiors of the rooms are tastefully fitted up in the Mexican style. The walls are usually pale green or blue, pale salmon colour, pink, or French white; the base moulding, for about 15 in. deep, is dark brown, or black. About 4 ft. 6 in. above the floor there is a surbase formed of a wreath or scroll of coloured leaves and flowers, to imitate nature, laid on by means of stencil-plates, and a cornice is formed in a similar way, and these are generally well executed, and give the apartment a finished and even elegant appearance.

They do not disfigure their walls with ugly, ill-designed paperhangings; but resort to Nature to afford them suitable patterns for decorations, and to display their artistic skill.

The furniture of the houses is generally made of the excellent hard woods which the country produces, and usually in the European style; and some furniture, such as rocking and other chairs, and other common-place articles, are imported from the United States of America.

We have seen some old furniture, doubtless of Spanish make, tables and other articles, beautifully designed and carved, that would do credit to any age and country, showing that the Mexican is not totally devoid of taste for the fine arts, however he may be morally and politically debased.

The principal apartment being in front of the building, on each side of the windows are placed rows of rocking-chairs, with a piece of rich carpeting placed between on the floor opposite the window for the sitters to place their feet upon. It is to this rendezvous they resort in the leisure hour, or when the business of the day is over, to chat with their friends and indulge in the fragrant weed,—*cigarrillos* or *cigarras*,—a luxury both sexes are habituated to.

In the chambers it is usual to place one or more beds or "cots," as they are called. A "cot" is simply a stretcher or frame-work, supported on cross-legs, which are made to fold up, and covered with stout cloth or strong wrapping. On this are erected at each corner slight posts to support a tester frame-work, over which the "pavilion" mosquito-net is placed; and sometimes you are supplied with a mattress and sheet, "serape" or quilt; at other times you lie without a mattress, and simply a sheet and quilt, which is usually sufficient for comfort, except in the rainy seasons, when everything feels damp and chilly.

In the kitchen they have no grates or stoves for cooking and the culinary business of the houses. A hearth is formed of masonry, solidly built together, about 2 ft. 6 in. high, and of sufficient length and width for their requirements; and upon this hearth is prepared everything that is necessary, and the cooking is principally accomplished with charcoal fire.

The cookery is usually in the Spanish style. Almost everything is cut up into small pieces and stewed, sometimes plentifully seasoned (spiced) with garlic. They use a great quantity of lard, so their dishes are of very thick consistency, and very unctuous to the taste, not agreeing with every appetite. Their soups of different kinds are generally well prepared, and, perhaps, almost the only thing an Englishman

* See p. 7, ante.

can relish. Their meats are hard and tasteless; their pastry indifferently made, although they possess a superabundance of the finest fruit possible for the purpose, and other good ingredients. The wines they generally use are claret and catalan, although other kinds may be had in abundance by paying a good price for them; and our favourite beverage, beer, is sold at $\frac{1}{2}$ dol. (2s.) per pint bottle.

The clarets are tolerably good, but the catalan is very indifferant, occasioned, it is said, by adulteration, as it is asserted that Compenchy logwood is extensively used in the preparation of that article, which, doubtless, would produce the peculiar well-known tint, but not the requisite fruity flavour. Their dinners usually consist of six courses, finishing up, as the last course, with the inevitable "fríoje," a dish composed of small black beans, as aforesaid, stewed until quite soft, and thickened plentifully with lard. This dish is devoured with much gusto by the native-born, but is not much relished by Europeans.

The hacienda before alluded to was built on the side of a large square, forming one side of it; another side was occupied by the chapel; another the sugar-boiling houses and buildings connected; and the other with workshops, stores, &c. In this square it is their custom on their high days and festivals to indulge in sports and public pastimes, such as the bull-fights, which are not conducted in that barbarous and cruel way they are in old Spain; and in the evenings of those days they display their skill in pyrotechnics, in which they have the vanity to think themselves *au fait*; indeed, their exhibitions are exciting and brilliant, and very attractive to the beauty and *élite* of the country.

At this historic hacienda, the late Emperor Maximilian, and almost every important personage that has visited that country, has taken up his temporary abode, and shared the hospitalities of the generous and wealthy proprietor. Emperors and princes, ministers, marshals, and generals, "who fill the roll of fame," and others, too numerous to mention, have partaken of the hospitalities and obtained temporary shelter, which its strong enduring walls and substantial roof afforded; and in a thinly-populated country like Mexico, the advantages of such a place can only be appreciated by those who have borne the fatigue and danger of travelling through such a country, over the worst and most detestable roads in all Christendom, and successfully escaped the revolver or macheta of the ever-to-be-expected and dreaded Mexican brigand.

During the reign of the ill-fated Maximilian, and the occupation of the country by the gallant French army, the main roads had assumed, to a considerable extent, a degree of safety, quite unusual for such an ill-trained and ill-regulated country; but on the restoration of the republican form of government, presided over by that arch-traitor Juárez, the main roads, as heretofore, will be occupied by the hold and villainous banditti; and every person, foreigner or otherwise, possessed of any means, will be mercilessly robbed, and perhaps savagely murdered, as a fit inauguration of the re-establishment of the so-called *liberal* Government.

Close to "Potrero" are many huts erected for the use of the labourers of the estate, occupied by Indians and Negroes, who live on good and harmonious terms, and there does not appear to be any jealousy of races; but in other instances, where the estates have been thrown out of cultivation, the Indians and Negroes have resorted to the neighbourhood of some of the towns, and there have erected huts and established regular villages, some of considerable extent and population, as they prefer living detached and isolated from the more civilized part of the community established in the towns.

The estates in Mexico are seldom fenced off or divided into inclosures, except in a few cases, where walls are built as a boundary to the public roads, or in separating estates, or in sunk fences in separating pasture from cultivated land; and it is no uncommon thing on the extensive prairies to see no fence or boundary, even so far as the eye can reach, over the broad expanse of country.

The landed estates of Mexico are of fabulous extent: the Potrero estate, we understand, covers an area of 25,000 acres, which is covered to a considerable extent with forest, containing a great variety of magnificent timber; the fortunate proprietor owns other estates also of considerable magnitude; and there are other estates of even still greater extent than these, and we cannot wonder that, with so much land placed in the

hands of one man, and with such a sparse and unsettled population, it is not all cultivated, or at least but partially, although it is probably as rich and productive as any tropical land in the world. And to show how very productive it is, we may mention there are eighty acres that have been laid out of the Potrero estate for a coffee plantation that produce to the fortunate cultivator 3,000*l.* per annum; and if every part of this huge estate were cultivated in a similar way that was suitable for it what a magnificent and princely income it would yield to its wealthy proprietor. Of this there cannot be any doubt, as coffee is in great demand, a ready sale is effected in the country, and even exported abroad through the merchants at Vera Cruz. Under the mild, benevolent, and enlightened government of the late Emperor, forfeited estates, and those which the proprietors refused to cultivate, were taken possession of by the State, and an attempt was made to colonize the land with immigrants from the United States, and other countries, by dividing it into farms of from 320 to 640 acres, to be paid for at the rate of $\frac{1}{3}$ dollar per acre, and the payment for which was to be spread over five years.

These farms were much sought after by the disbanded soldiers of the Confederate armies of the United States that escaped to Mexico, and by immigrants who left the United States in consequence of the protracted and bitter war raging there; and many of the parties had entered upon their allotments, and had commenced operations to clear and cultivate the land; but this was not accomplished without considerable opposition from the old proprietors, and from parties of Indians and Negroes who had been old dependents, or had squatted on the land, and which was shown in deprecations upon the stock, and even by shooting one or two Americans; but doubtless on the fall of the empire, all the well-considered plans, the enlightened arrangements for bringing that fertile and fruitful land generally into cultivation, would be abandoned, and this fine and productive soil will relapse into its original barrenness, and the impenetrable bush and forest will spring up again and obliterate, as it were, this otherwise highly-favoured land from the fair face of a bounteous nature.

The mechanics employed on the estates, and in the construction and repair of the buildings, are not a very industrious or skillful race of men; their carpentry is generally roughly finished, being principally jack-planed: to plane it smooth would be attended with too much labour, and their framing is generally in square panels, formed of small scantling for the doors and window sashes: the carpentry to the roofs is generally of the roughest character, but they are strongly framed together. The material they prefer to work in is cedar wood, principally because it is soft and readily converted; the better and harder woods are utterly rejected, because of the extra labour attending their manipulation.

Their turned work also is not well executed, and is likewise finished roughly, on account of the extra labour required; and this is to be regretted, as there are vast quantities of fine tough wood suitable for turning, and which would have afforded a fine field for employment to an industrious population.

Their mason's work is generally very good; their rubble stone walls, composed of very small stones, is remarkably sound and good, and this arises principally from the superior quality of their limes and mortars, which set exceedingly hard, forming a wall almost as solid as a rock.

There is not much ashlar used in their buildings; but where it is employed, it is skillfully squared and dressed; but it is attended with a great expense, on account of the small amount of work executed by each man per day.

In plasterer's work they excel considerably; but that in a great measure may arise from the superior character of their limes and mortars, as before mentioned. The walls are smoothly and finely finished,—indeed, so well finished that they take colour and look well, and are frequently handsomely ornamented with elaborate designs in stencils, of a variety of colours, representing animals, foliage, fruit, and wreaths or scrolls of the heauteous flowers of the country.

In smith's work there is not much scope for their skill. Iron is expensive in the country, and not very easily obtained, and it is not much employed about the estates or in their agricultural implements; nevertheless there are some fine specimens of ironwork used for window-guards, with ornamental heads, about the

haciendas and the houses in the cities and towns, possibly imported, or the remains of those introduced by the Spaniards.

The price of labour varies from about 4 reals * to 6 reals a day for agricultural labour; and for mechanics, from 1 dol. to $\frac{1}{4}$ dol. per day, according to experience and skill; but there is very little dependence to be placed upon them so as to obtain their services regularly: they would, perhaps, continue in your employ until paid, which was sometimes weekly or fortnightly, and if you paid them on a Saturday night they would leave without saying a word, and when Monday morning came you would not see them again,—not a man would he there to resume the work. This frequently causes great inconvenience, but as it is the custom of these roving Indians, inherited from their forefathers, to constantly change their places and employments, and as their wants are so very few, and their necessities of life so cheap and abundant (a few reals would keep one in idleness a considerable time), it must be submitted to, and borne with patience and equanimity.

It is wonderful how small a portion of soil under the bright and azure sky of Mexico will maintain and afford sustenance to a family: the same extent of land which would yield wheat for two persons in this country would produce sufficient, in that prolific soil, for fifty persons; and the return of corn for that highly-favoured and productive country is never under seventy, and sometimes exceeds a hundred-fold.

In the foregoing remarks upon the agriculture of Mexico we have alluded more particularly to the great staple productions of the soil, and have omitted to mention a great variety of fruits and vegetables that abound very extensively in the cultivated parts, and that yield large profits to the producers; and when we observe, that in addition to the vegetable productions of the tropical zone it produces almost every species known to Europeans, it once shows the great advantages of its soil and climate, and which only requires an orderly and industrious people, and sound and enlightened government, to be one of the richest and most flourishing countries on the habitable globe.

MORE SCHOOLS OF SCIENCE AND ART.

At the present time a representative of the Department of Science and Art in the Privy Council, Mr. Baekmaster, is travelling and explaining, in various towns, an offer from the Government to assist in the formation of local schools of science and art. This is done in the form of a lecture, generally given in connection with the local mechanical and scientific institution.

We will mention the kind of aid Government proposes to give. Existing classes, drawing attention to the fact that the teachers are paid according to the efficiency shown by their pupils, and that the latter are encouraged by prizes of hooks and medals, and the prospect of being considered qualified to teach others on the same terms, when they have passed a first-class examination. Situations on Government works in the colonies and elsewhere, have occasionally rewarded exceptionally apt scholars; but this was only mentioned as a fact conversationally, at the close of one of the lectures, and not held out as any part of the promise. First as to the teacher. The inducement held out to him is that for every pupil he has who can pass an examination which will be held on a certain day all over the kingdom, he will receive a fee of 1*l.* There are, however, to be five grades of efficiency; and for every pupil passing the second grade, he will get the larger premium of 2*l.*, and the third grade 3*l.*, and the fourth 4*l.*, and for those who pass the fifth or highest class of examination, he will receive the still larger fee of 5*l.* Now for the pupils. Those who pass the lowest and middle classes of examination, will be entitled to Queen's prizes, or a stated value of hooks, to be selected from a printed list sent for the purpose; and the four pupils obtaining the highest number of marks on each subject will receive four Queen's medals, one gold, one silver, and two bronze. Adult pupils of day classes will be entitled to receive certificates instead of medals. Furthermore, the Department of Science and Art promises to assist the expenses of apparatus to the extent of fifty per cent. upon the outlay.

The sciences recommended are practical, plain, and descriptive geometry, building construction,

* A real is equal to 6*d.* of our money.

elementary mathematics, advanced mathematics, theoretical mechanics, applied mechanics, acoustics, light and heat, magnetism and electricity, inorganic chemistry, organic chemistry, geology, mineralogy, animal physiology, zoology, vegetable physiology, systematic botany, mining, metallurgy, navigation, nautical astronomy, steam, and physical geography, or any one or more of them.

The first step to be taken towards the formation of a school of evening classes to teach either of these sciences, or drawing, is the formation of a committee of five persons. It is with this committee the Government co-operates, and it is by the means of the various local committees that the examinations on the sciences are all held on the same day over the kingdom. Any one who has taken a degree in either of the universities is qualified as a teacher, or any one who has passed an examination in any science, in any of the Government schools, is qualified to teach that science. After twenty-five lessons the pupils are allowed to compete for the prizes offered. A further convenience is offered in permission for persons who have not been instructed by the certificated teachers to attend the examination if they desire to do so.

Three hundred classes are now in operation, some of which are in small agricultural villages; and last May 15,000 pupils were examined through the agency of the local authorities. To show the need of a wide dissemination of the good intentions of the Department, we may add that of all this number, seventeen only belonged to the vast tract of country lying between York and Glasgow.

What are the difficulties in the way that prevent a large, if not general, adoption of the proffered assistance to cultivate the brains of the rising generation? First, there must be a long suitable room; then it must be warmed; then it must be properly lighted, before a single article of apparatus need be purchased. This involves a considerable outlay, amounting in most small towns to an insurmountable obstacle. A small grant towards this "money sunk" and generally inevitable preliminary expenses would clear the road in many cases. If our skilled artisans are to keep their place among the artisans of the world, they must look to their heads as well as their hands. And this appears to be an opportunity of doing so worthy of their best consideration.

THE BEHAVIOUR OF CONCRETE IN FRANCE.

As the subject of the employment of concrete in the construction of buildings is attracting a good deal of public attention, the following letter from M. Boileau, the architect of the concrete church at Vésinet, near the terrace St. Germain, not far from Paris, which appears in the *Moniteur des Architectes*, will be read with interest. It will be noticed that M. Boileau points out one or two defects in the French material (not exactly the same as our concrete, by the way), which have been only slightly alluded to before,—the liability to contraction and expansion in particular.

Illustrations, consisting of plan and an exterior and interior view of the church at Vésinet, will be found in our volume for 1865, pp. 800 and 805, and we also gave some particulars of the building in the preceding volume.

The following is M. Boileau's letter, which we print with some few unimportant contractions:—

"I ought first to observe that the merit of having been the first to suggest the use of *béton* instead of ordinary masonry in the church at Vésinet does not belong to me. It was M. Pallu, the founder of the park of Vésinet, a gentleman fond of new inventions, who gave M. Coignet the opportunity of using his plan for the first time in the erection of a monumental building. My responsibility as architect having been properly provided for, I, of course, had nothing to object to the trial of such an interesting experiment.

Although the concrete used in the church at Vésinet is not employed in those parts on which the stability of the building mainly depends, the vaulting of the nave being constructed with ribs of cast-iron in the ordinary manner; the enclosing walls, and especially the tower, which are of concrete, and were moulded at a height of about 100 ft. from the ground, with all the architectural and sculptured details required, enable me to judge of the results both favour-

able and unfavourable which have been obtained. * * * * *

The sand used in the *système Coignet*, as in all good mortar, ought to be sharp river sand, not too fine, so that the proportion of lime or cement used should be merely sufficient to bind the grains together, but not to fill the interstices between them. These pores, by allowing the air to pass freely, cause the concrete to set rapidly; but when once the concrete is dry it becomes extremely absorbent. It was found that during rain the projecting cornices, which ought to have protected the walls, served, on the contrary, to wet them, by communicating the moisture deposited, and that the rain was driven by the wind entirely through the thickness of the walls and injured the painted decorations. The susceptibility of the blocks to the influence of moisture varied according as the pressure applied, which was by hand-power and consequently irregular, had more or less consolidated the materials of the concrete.

The inventor asserts that this inconvenience will cease when once the walls shall have become thoroughly saturated. This remedy, which may be satisfactory in the case of sewers constructed of concrete by reason of the impurity of the sewage, cannot, it is evident, operate upon buildings until after the lapse of considerable time in consequence of the intermittent character of the rainfall.

It must not be concluded from what has been said that a permanent dampness is to be feared; for, although the concrete absorbs moisture very freely, it dries again with incredible quickness directly the moisture ceases to act upon its surface.

Concrete, in the same manner as large masses of rubble, but to a much greater extent, is subject to contraction and expansion, which relegates to the category of chimeras the inventor's pretensions to construct monolithic edifices with this material. In walls of a certain extent which were built in one continuous length, the action of cold dry weather occasioned vertical cracks at intervals. . . . It was noticed that in the spaces of from 5 ft. to 6 ft. wide between these fissures there were no secondary cracks. From this circumstance it may be assumed that concrete, when undergoing contraction or expansion, behaves in the same manner as metals, glass, &c., and that a wall of this material placed freely on a level surface would contract and expand as a whole like an isolated bar of iron, without fracture; but walls built in the ground not being able to contract for their entire length, the shortening necessarily takes place in divisions, and cracks are caused by the resistance of the foundations to the general movement.

In order to reconcile the assumption of obtaining a monolithic construction with the results occasioned by the elasticity of the material, it is necessary, supposing, by an effort of the imagination, walls could be completely disengaged to admit that their dimensions might be increased or diminished, according to the variations in the temperature. Without considering the disturbance which would be produced in a house of this description, there is no need to point out the resistance which would be offered by the floors and roof to the general movement to annihilate this fiction.

However, the inconveniences of elasticity are less irremediable than those arising from permeability, and they might be, if not entirely avoided, at least considerably decreased, by a combination of divisions, allowing free expansion, such as are used only on a smaller scale in zinc work and joinery.

Besides the effects of elasticity which prevent the successful application of concrete (*béton aggloméré*), for the formation of large monoliths, there is a practical difficulty which cannot be obviated without great precaution, when it is intended to construct large blocks, which are required to be perfectly solid and immovable, such as engine-beds, &c. In order to ensure perfect consolidation, it is necessary that the fresh concrete should be added before the other is dry, and constantly pressed, which requires uninterrupted attention by day and night.

The vibration of the engines has in some cases separated the layers of concrete, forming the engine-beds, in consequence of the concrete not having been added continuously.

With regard to appearance and decoration, it is not to be expected that the same regularity of line and surface can be obtained in concrete as in worked stone. Besides the great difficulty of placing the wooden boxes which serve as moulds, which conceal the surfaces and joints, the in-

fluence of the weather causes distortions which are necessarily reproduced in the blocks moulded in these faulty receptacles.

With regard to the question of cost, concrete can only be used advantageously for building in places where stone is dear, and where river-sand can be procured cheaply on the spot. At Paris, where masons' work costs as much again as in those departments which possess quarries, the cost of concrete is equivalent to the cost of rubble masonry, rendered with Roman cement. This is quoted in the builders' price-list for the City of Paris, at 50 francs for plain walls and arches, which is double the price of squared limestone masonry in the same list. For architectural works in which mouldings are introduced, it costs as much as stone of good quality, including labour and fixing. From this comparison, which is based upon the relative high price of masons' work in Paris, it will be seen that concrete costs four times as much as worked stone, and twice as much as rubble work costs in places where these materials are not found on the spot. Finally, it is shown that even in Paris, if in a concrete building, the same prices were allowed as for ordinary masonry, the remuneration would not cover the expenses.

Setting aside buildings constructed on the spot after a special design, the true economy of concrete consists in its application for portions of decoration which require to be reproduced a great number of times, and in which hand-labour is superseded by a system of manufacture, such as balusters, which are now executed equally well in terracotta and with some improvement in point of colour.

With a reservation in favour of what a longer experience may produce, the advantages and disadvantages of the use of concrete, which has only been employed during the last ten years, and has only been under observation at the church at Vésinet for four years, may be summed up as follows:—

- Resistance to the atmosphere, crushing, and frost.
- Decided permeability.
- Percipible expansion and contraction.
- Imperfect adhesion between the layers.
- Irregularity in decorative features.
- Economy not proved.

I hope that the preceding information will fulfil the expectations of my fellow architects, who have wished to have my experience to enable them to judge of the results obtained by the use of concrete in building.

L. A. BOILEAU."

THE GLASGOW SEWAGE QUESTION.

A PAPER on this question has been read before the local "Association for the Consideration of the Sewage Question," by Mr. John Mierchie. He made various objections to the sending of the sewage to the sea, and to its being used for irrigation purposes, as being detrimental to the sanitary condition of the city. I propose, he continued, that the water-closet at present in use be given up, and that a thoroughly-trapped air-tight dry ash closet be substituted; such closet being fitted with a hopper for riddled ashes, and having efficient mechanical appliances for injecting ashes when the closet is used; that each closet be connected with a perpendicular glazed fire-clay soil-pipe from 6 in. to 8 in. diameter; that this pipe be connected at its lower end with an air-tight bucket, and that its upper end terminate above the roof of the house for ventilation and easy access for regular sweeping and cleansing, with an apparatus fitted for the purpose. It is possible that in many tenements and houses it may be found impracticable to find conveniences for working the closets in connexion with a soil-pipe as described. In such cases, or as an alternative modification of the plan altogether, if it were preferred, I would have an air-tight box or bucket attached to the bottom of the closet, but removable at pleasure, into which the excreta, urine, and riddled ashes should drop, such bucket or box being carried down, or out, every evening into the court or close, and the contents therein deposited in an air-tight receptacle provided for the purpose. I propose, further, that the city provide a complete plant of railway manure trucks, lorries, and iron boxes, fitted to contain about half a ton each; that manure depôts and sidings be constructed at numerous and convenient points along the various railways branching from the

city. I propose that the municipality be mapped out into districts; that to each district be attached a lorry and staff of assistants, whose duty would be every night to visit every tenement and house in their beat, detaching the buckets affixed to the end of the scull-pipe, or removing the box or bucket from the close, or court, or door, as the case might be, emptying the contents therein into the half-ton boxes on the lorry, replacing the buckets, and, when loaded, proceeding to the appointed station, transferring full boxes to the trucks, and retreating to their beat with a complement of empty ones. In the districts of the city, or tenements, where private closets were not introduced, and where common privies were used, I would have provided an iron box with screen, into which all ashes produced by the tenants would be introduced; and over the top of, and communicating with, this box, I would place closets, the droppings from which should mix with the ashes, the whole to be removed nightly, in the manner described as applicable to private closets.

Mr. Marchie gave estimates, showing that by the sale of the excreta, after paying all expenses, an annual balance of 15,430*l.* 10*s.* would remain in favour of the city; and that, even after paying interest on an expenditure of 220,000*l.* for remodelling the whole water-closet system of the city, and providing plant and appliances to work the system, a balance of 5,439*l.* 10*s.* would annually remain in favour of the city.

The local association before whom the paper was read, it may here be mentioned, are anxious to give the fullest ventilation to all theories on the sewage subject, whether propounded by any of their own number or others who have given attention to it, and the committee are open to receive and consider all plans which may be submitted to them. We need scarcely say that we do not recommend Mr. Marchie's plan for their adoption.

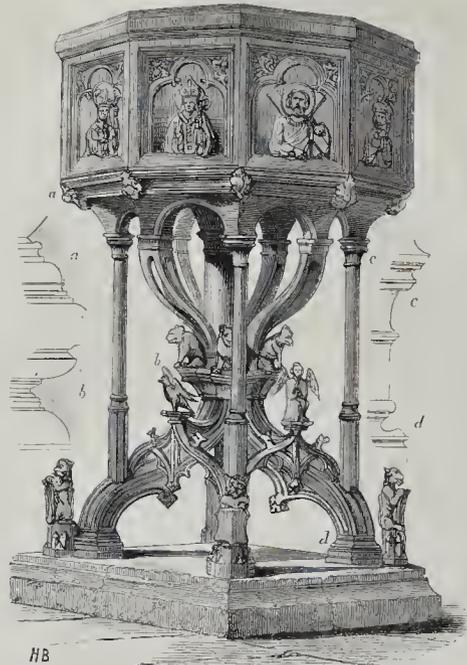
BRONZE FONT AT OCHSENFURTH, BAVARIA.

It would be difficult to describe the form of this font, but we give an illustration which will be more intelligible than any description. The font is said to be the work of Peter Fischer; the workmanship is exceedingly delicate. The eight bas-reliefs round the basin represent the following saints:—St. Clara, St. Henry, St. Catherine, St. Andrew, St. Killian, St. Burkard, St. Mary, and St. Barbara. This font, like some we have before mentioned, is cast in bronze.

NEW PALACE YARD, WESTMINSTER.

The design of Sir Charles Barry for the completion of his great work in Westminster, towards New Palace Yard, is familiar to readers of the *Builder*, from an illustration recently given in these pages, on the occasion of our notice of Dr. Barry's memoir of his father. The Government having left the question in abeyance, decided in 1864 to complete the unfinished western face of the Clock Tower, and to enclose the two open sides of New Palace Yard with an iron railing, sufficiently high and strong to exclude a mob on important occasions. The works now nearly completed, under Mr. E. M. Barry, A.R.A., and represented by our engraving, are the results of this determination, and consist of the facing with stone of the lower part of the western front of the clock tower, the erection of a very handsome iron railing, with gates and stone piers on the north and west sides of New Palace Yard, and the construction of a cloister or covered way on the eastern side. The railing is entirely of wrought iron, made by Messrs. Hardman. It is in bays of 17 ft. long, between piers of Portland stone, upon each of which is placed a globular lamp on a wrought iron standard. At the gates and angles the piers are larger, and are surmounted by clusters of lamps. Each bay of the railing is subdivided into three compartments by groups of standard bars, arranged on plan in the form of a cross. The ornamentation of the upper part of the railing is composed of the Tudor rose, well beaten up; and the lower portion displays the portcullis of Westminster. The globe lamps were manufactured by Messrs. Stevens & Son.

In the centre of the western railing, between the carriage-gates, is to be placed the statue of Sir Robert Peel, by the late Baron Marochetti;



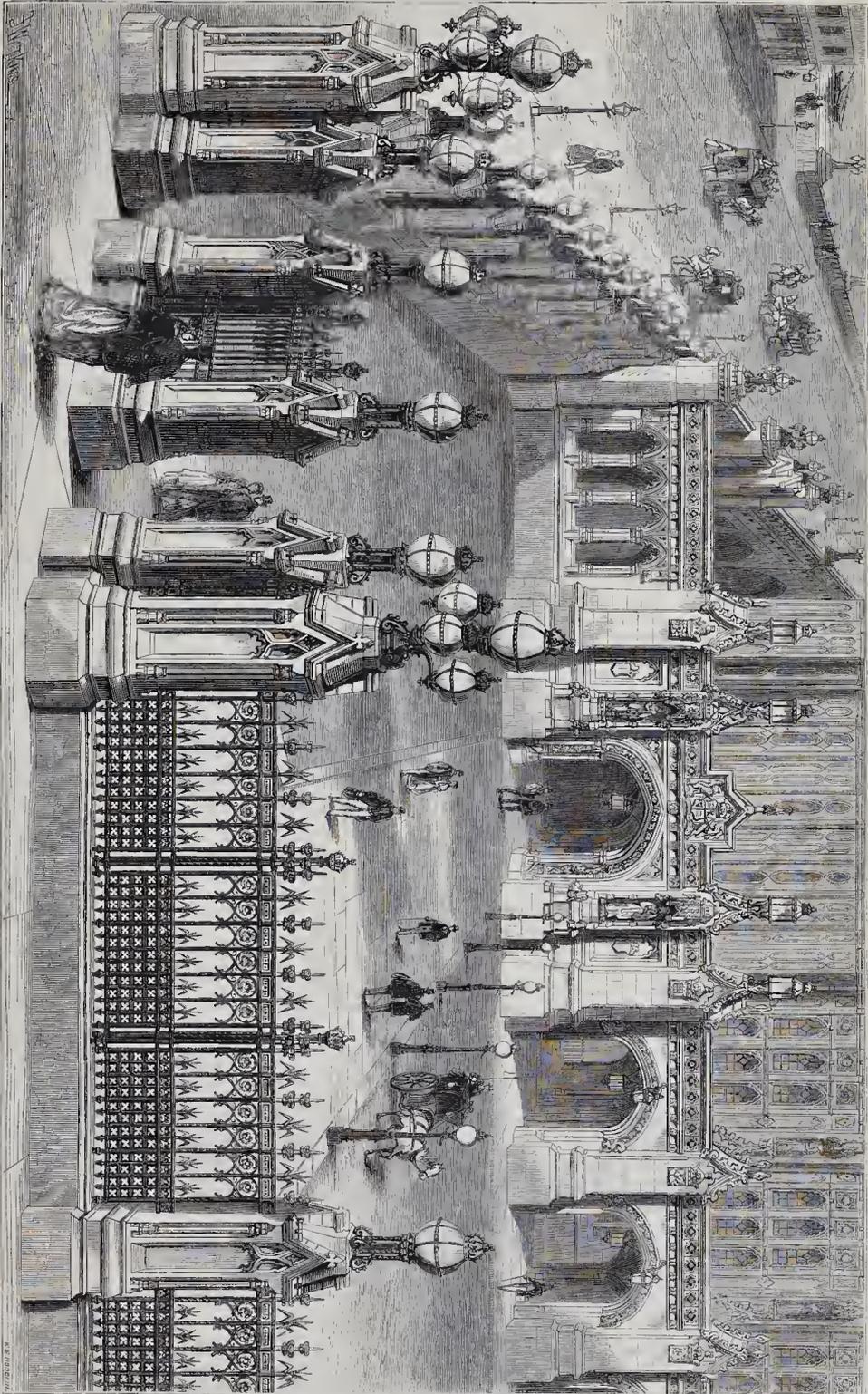
BRONZE FONT, OCHSENFURTH, BAVARIA.

and the corner opposite to Parliament-street is the site allotted for Mr. Woolner's statue of Lord Palmerston. The tops, and some other portions of the railing and lamps have been gilt, by Mr. Craze.

The interior of New Palace Yard has been levelled throughout, and its surface lowered in some places as much as 10 ft., with the object of preventing the disagreeable effect of raking lines against the building, and of increasing the apparent height there of Westminster Hall. A portion of the plinth of the latter which has hitherto been buried, has been exposed to view by the excavations. The cloister along the eastern side gives a covered access, for foot passengers, from Westminster Bridge to the Commons' private entrance, and to Westminster Hall: a flight of steps leads from the bridge at the foot of the Clock Tower. It is intended to carry on the cloister, by means of a tunnel or subway, under Bridge-street, to the Thames Embankment, and the underground station of the Metropolitan District Railway, about to be formed on the north side of Bridge-street. When this subway is completed, Members of Parliament and others, coming from the West End and City by the Railway and the Embankment, will be able to enter the New Palace by means of a covered way extending the whole distance, and almost on a level. They will thus avoid the necessity of ascending to Bridge-street, and descending again to the New Palace, having encountered by the way the dangers of a crowded crossing in Bridge-street increased by the accession of traffic coming to it at right angles from the Thames Embankment. The external design of the cloister is made to range with the existing archways and buttresses to the members' private entrance, with which it is joined, at the south-east corner of the yard. Two of the archways form carriage entrances to the Speaker's court, and these, with the archway in front of the Clock Tower, are flanked by niches, and are distinguished by their details from the rest of the arches. The niches are to be filled with statues of kings, by Mr. H. H. Armistead;

those of Alfred and William I. are already placed in the niches near the Clock Tower. The aesthetic objection to leaving New Palace Yard open has always been felt to be the difference between the level of Westminster Hall (and consequently of the New Palace) and Bridge-street, causing the former to appear sunk in a hole. The erection of the cloister has been adopted as a mode of lessening this difficulty, by advancing the lower story of the building after the precedents of Belgian Town-halls, and other edifices. The cloister is rather higher than the upper part of Bridge-street, which it joins, and thus serves to mask, to some extent, the difference of level, and at the same time provides a convenient covered approach, as above described. Each bay of the cloister has a groined roof, with a circular aperture in the middle of each groin, covered by a sheet of glass. The groining of the bay next to Westminster Bridge, at the entrance of the subway, is square on plan, with diagonal ribs filled with perforated tracery. Polychromy is introduced in the interior of the cloister by the use of red Mansfield stone in bands, and for the groining ribs and hones. The exterior is entirely of Portland stone. The works are contracted for by Mr. W. Field, and the carving has been executed by Mr. T. Earp, and his assistants, in a bold and effective manner. Mr. E. C. Pressland is the clerk of works.

A PRESENT TO BOLTON.—Dr. Chadwick, who formerly resided and practised at Bolton, has intimated his intention of making a magnificent present to the town. He intends to offer 10,000*l.* to be applied to the erection of working men's model cottages, the rentals from which are to be devoted to the maintenance of an orphanage which he proposes to erect. In the first instance, the orphanage will be for the admission of girls, but it will ultimately be extended so as to receive boys; and to carry out this benevolent design a sum of about 17,000*l.* will be necessary.



NEW PALACE YARD, WESTMINSTER.—MR. E. M. BARRY, A.R.A., ARCHITECT.

W. & A. GILBERT

MURAL DECORATIONS.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The first ordinary meeting (after the recess) of this Institute was held on Monday evening last: Mr. David Brandon, vice-president, in the chair. Mr. Weale, of Belgim, author of various works on architecture, was elected honorary and corresponding member. Mr. Charles Innes, of Whitehall, was elected fellow, and Messrs. John Hebb, of Tollington Park, and E. H. Bown, of Harrogate, were elected associates.

Professor Donaldson announced a donation of 500*l.* from Mr. Tite, M.P., president, to the Library Fund, for the purchase of selected works on Architecture by English and foreign authors, of which the library is at present deficient. A special vote of thanks was passed to Mr. Tite for his munificent gift; and, on the motion of Professor Kerr, it was referred to the council to consider an appropriate form of recognition of the president's liberality and warm interest towards the Institute.

Mr. W. B. Scott read a paper "On Mural Paintings for Penkill Castle, Ayrshire." The subject of the pictures, of which the cartoons or preliminary drawings necessarily made when the artist has to paint on the wall itself were exhibited, is taken from "The King's Quair" or King's Book, by the first King James of Scotland, being already partly executed as the decoration of the walls of the circular staircase leading to the present drawing-room of Penkill Castle, the method employed being a kind of tempera,—the author would not call it encaustic, since that is not applied to fast the colours into the plaster. The medium used is a solution of wax in turpentine, and the use of this medium has been an experiment which Mr. Scott thought might be worth a few minutes' consideration. Having given a general description of the arrangements of this old "peel-house," or castle, as it existed up to the beginning of the seventeenth century, he went on to state that this interesting old place was left to go to ruin at the end of the last century, and when the late Mr. Spencer Boyd repaired and inhabited it, a few years ago, he built an entirely new staircase, more commodious than the old one, although retaining the newel form proper to the date of the house. It was for the decoration of this circular staircase these cartoons were drawn; and in carrying out the commission, the artist, being allowed to choose his own subject, selected an early Scottish poem, written by James I. of Scotland, when a prisoner at Windsor, in 1420, on his love for Jane, granddaughter of John of Gaunt, a poem in six cantos, in imitation of Chaucer, and one of the most beautiful and perfect productions of that epoch, although very little known. The pictures, six in number, illustrated the several cantos which Mr. Scott described. The first and second of these pictures, he stated, were painted on the wall in the summer of 1865, the medium used being, as already remarked, wax dissolved in turpentine, a medium frequently used in Italy for the common decoration, of which one sees so much there, and adopted by Mr. Parris, in going over the pictures in the cupola of St. Paul's. This medium Mr. Scott tried, in the first instance, on one of the figures of artists for the Museum at South Kensington, and as he was expressly required, at Penkill, to paint on the wall itself, he determined to try it on a larger scale. The effect was all that could be wished. He explained that when employed on a surface not previously touched, the turpentine is absorbed with a portion of the colour and the oil in which the colours are originally ground, whilst the wax retains a great amount of luminosity in the tints, with the uniformly dull surface absolutely necessary in wall-painting. The unity of surface is attained characteristic of fresco and the simplest tempera painting, with greater brightness in colours. The pigments used are not restricted to earths, as in fresco, but embrace nearly all the wide range now furnished by the colourmen, without any perceptible chemical change resulting, the medium employed penetrating the plaster sufficiently to protect the colouring matter on the surface from contact with the lime. Notwithstanding this, it was stated that the part of the wall which is exposed to the south wind, the wet wind in that locality, has in the course of the last two severe winters and wet springs shown symptoms of decay. The great enemy of painting in this country is damp, and it appears that no external wall, without slothing or other means of ventilation, is a safe surface for the artist. Whether the wall in ques-

tion had never been allowed to become dry during the four years from its construction to the time of the artist's commencing his operations, or whether the wet soaked through from without, in spite of the Portland cement with which it was painted from the first, was a question which no one seemed able to solve. The remaining portion of this south side has been lined with sheets of zinc, on which the future pictures will be painted, with what result has yet to be seen.

With regard to the remarks on a former occasion relating to fresco painting by gentlemen who appeared to urge the superiority and desirability of that method, Mr. Scott stated he was afraid that his assertion that it would never be practised again in this country, or perhaps anywhere else, might be construed as an effort at self-defence, the work he then submitted to the members being rather easel pictures than wall decorations, having comparatively little of the simplicity induced by tempera painting and necessitated by fresco. Such, however, was not the case; but a deliberate opinion, the result of many years' consideration. He did not mean that we should never see little pieces of fresco on lath-and-plaster frames, as we may see books illuminated by hand or imitations of ancient enamels; perhaps we might even see fresco on a small scale applied to some purpose by some one who persists in conjuring by an old form of incantation; and if the artist abstains from all colours but those composed of earths, if he has ten years to prepare his lime, if his wall is thoroughly protected and ventilated, if the weather is every day favourable, and if the artist has had a lifetime of practice, perhaps once more we might have a good result; but this was certain, fresco had had a revival of twenty years in England and forty in Germany, and all the best artists in both countries who had practised it—Kaulbach in Germany and Maclise in England—had gladly resigned it for the newly-invented *silica* medium. In Italy itself (continued Mr. Scott) the reign of fresco lasted little more than a century. All the earlier works remaining are tempera. Not many years ago it was not unusual to hear people talk of all Italian wall paintings as fresco; but it is quite certain no such thing exists. When the Commission was appointed to consider the application of painting to the new Houses of Parliament, in 1841, Cornelius, a German artist residing in Rome, was called over in November of that year; and the late Prince Consort, who was at the head of that Commission, seconded the views of his compatriot, and fresco was determined upon. Tempera and the earlier works were scarcely ever alluded to; and while the Munich frescoes—all the open-air ones, at all events,—were beginning to peel off, English artists who had never painted anything but *genre* pictures in oil produced those examples now going to pieces in the so-called Poets' Hall. Fortunately, the *silica* process was shortly afterwards discovered, so that Maclise, the greatest of English historical painters, and one of the greatest European artists, has been freed from the waste of energy and danger of premature decay in painting his two great works, "Waterloo" and "The Death of Nelson;" but the last years of Mr. Dyce were embittered by the difficulties, delays, and repaintings involved in this primitive process, fitted only for a dry climate and a summer of continuous equable temperature.

Professor Donaldson, in proposing a vote of thanks to Mr. Scott for his communication, referred to the unsatisfactory results which had invariably attended fresco painting in this country. Notwithstanding the most diligent researches on the part of the late president of the Royal Academy, both as to the surface of the walls and of the materials to be used in the case of the decorations of the corridors, &c., of the new Houses of Parliament, it seemed that all the endeavours of artists to conquer the difficulties of fresco painting, so as to render it imperishable, were always frustrated. He thought we might look with great hopes to the new process of water-glass painting; but even where that process was adopted, there was a dampness which covered the surface, which, though not chemically affecting the picture itself, was prejudicial to the just appreciation of it as a work of art. Under these circumstances it was gratifying to find that a gentleman like Mr. Scott, with his large practical experience and knowledge of his art, had adopted a process which he believed was calculated to be successful in this country.

Mr. Scott remarked that the effect upon the surface of the pictures in water-glass mentioned

by Professor Donaldson arose from the accidental circumstance of too great a quantity of silica having been dashed upon the surface with a large and clumsy kind of brush, instead of by the more careful method of using a syringe for the purpose; and that tended to impart a whitish bloom to the surface of the picture. He believed it was Mr. Maclise's opinion that that effect could be removed without injury to the picture.

Professor Kerr having offered some critical observations with regard to the disposition of the pictures before them and the treatment of the figures, remarked that the practical question of damp in walls was one which ought not to be passed over by a body like this without some consideration. They all knew very well that a stone wall, even when built of granite, would draw the water through several feet thickness. It seemed to him the best advice he gave with regard to walls on which these kind of paintings were to be placed was to treat them with one or other of the recognised stone-preserving processes: probably that of Ransome was the best for the purpose. If that were not successful, it might be desirable for the sake of the paintings to coat the outside walls with some material impervious to wet, as paintings of this description should not be allowed to go to ruin from the unfortunate state of the stone wall on the outside. With regard to the water-glass pictures in the Houses of Parliament, he thought that process would eventually prove to be a mistake, because silicate of potash has a very strong attraction for the moisture of the atmosphere, which might produce a damaging effect upon the pictures. Even where the water-glass was treated with chloride of lime, there was a large quantity of salt thrown off; and, until that was got rid of, there was a strong tendency to absorb moisture. With regard to the material Mr. Scott was employing in the execution of these pictures, he had no opinion to offer; but he strongly advised that gentlemen to reconsider the idea he appeared to have formed, of painting any portion of them upon plates of zinc. It would, in his opinion, be preferable to remove the portion of wall which showed appearances of dampness to a sufficient depth, and replace it with a composition of a more satisfactory kind.

Mr. Charles Barry complimented Mr. Scott upon the successful treatment, as he regarded it, of the subject he had taken in hand, in this, as in the former case, which he brought before the Institute. Looking at the instance now before them, he hoped Mr. Scott would be able to find some means of protecting the inner surface of the walls from damp, without depriving the external wall of its original stone character, and not sacrifice the ancient glory of the exterior of the building by coating it over with a foreign material. He suggested two ways of obviating the difficulty of damp in the wall. The most obvious one, if they had any apprehension from the porosity of the material, that the moisture would get through, was to make an inner wall, with interstices of space between it and the outer wall. He agreed with Professor Kerr in the caution he had given, as to the contemplated use of zinc plates, on which to paint the pictures remaining to be executed.

Mr. Wm. White, after some general remarks on the treatment of mural painting, observed that he had seen several of the pictures of Mr. Gambier Parry, which he understood to be in a sort of tempera, and he did not know of an instance in which they had failed. With reference to the use of zinc plates, he had been informed by decorators, that thoroughly scrubbing the surface of the metal, and either gilding or silvering it over before the paint was applied, a very excellent and durable surface for painting upon was obtained. A further suggestion was that zinc paint should be used instead of lead paint, inasmuch as the latter would set up galvanic action, which deteriorated the surface. He agreed that the most efficacious way of keeping damp from pictures of this kind, was the plan of double walls, in which case any dampness that penetrated through the outer wall dropped down, and left the interior wall, ventilation being duly attended to, perfectly dry.

Mr. Barry hoped that the notion would not be endorsed by the meeting that gilding or silvering of the zinc plates would prevent the destruction of the surface by galvanic action, inasmuch as a greater amount of galvanic action was set up between metals of different degrees of oxidation.

After some further conversation, in which Mr. Wyatt Papworth, Mr. Charles Fowler, and

Mr. Collman took part, the vote of thanks to Mr. Scott was unanimously passed.

A short paper by Mr. J. MacLean descriptive of "The Old Roof recently discovered over the Nave at West Chnroh, Stirling, N.B.," having been read, the meeting adjourned.

THE STONEMWORK OF LONDON AND PARIS, CONTRASTED.*

In the first place, we will look at the method of building, and then at the quality of the work, and the scaffolding used for the purpose. We will take Paris first. In 1862 I visited Paris, and while there saw most of the large works which were in course of erection, such as the Great Northern Railway Station, the New Opera, and many others which I need not mention. The first thing that struck my attention was to see all the buildings constructed from the stone as it left the saw; that is, not worked on the face. I saw the men working the stone after being fixed, and came to the conclusion that there was something deficient either in the contractors, or in the managers of the several works, and those impressions were confirmed when I visited Paris in September last. While there I again had the opportunity of visiting numbers of large works in course of erection, and on examining the mason-work I found it would not bear the inspection which mason-work ought to be able to bear. Now a word or two on their method of building. I was much struck with the method they employ in fixing their work. They have one or two hoisting-places, as the case may require. The stone is lifted up at these places and rolled from the place where it is landed some 20 ft., 40 ft., or even 80 ft. on the wall. I saw them roll a stone, some 7 ft. by 3 ft. by 2 ft., on a wall some 5 ft. or 6 ft. thick. This stone was rolled about 70 ft. by 8 or 9 men with bars. It is then laid in the required position, lifted up some half an inch from the stone below by bars caulked all round with rope or some soft material to prevent the mortar from running out from the horizontal bed. It is fixed,—in fact, by a process of grouting. You must hear in mind that this stone was rough on the face. Most of the horizontal beds are grouted with plaster and dust from the stone. These beds are from $\frac{3}{4}$ in. to $\frac{1}{2}$ in. thick. This style of fixing I saw at the New Opera, which has recently been uncovered. This method of grouting the beds they have found to be an improvement on the old method of fixing. Another thing which I saw was the party walls of the houses left some $\frac{1}{2}$ in. or $\frac{3}{4}$ in. from the front wall; that is, not worked close up to the bond. This space is to allow for swelling, as the party walls generally swell, and would otherwise push out the front work. I need not mention that the want of connection of the party walls with the front walls causes very unsound work.

We will now look at the quality of the work as done in Paris, and from the facts which I shall mention, we shall be able to judge which is the best method when our own work is described hereafter. All their projections are roughly cut out before being fixed, and after being fixed, they commence at the top of the building to form the moulding roughly with chisels almost similar to our own. After they have attempted to put them in shape by the chisel, they scrape them over with a tool something like a plane. On passing along the scaffolding, I noticed the manner in which the men generally hold their tools, which perhaps some of our Englishmen have noticed. The tool passes from the thumb over the little finger, or under three fingers and over one, and they use an oblong mallet. One could not help noticing the attitude in which these men work; some are sitting down, some kneeling, and some standing. The slow motion of the mallet also drew my attention. The sound of the first blow had disappeared before the second one was given. Some of the men were working a plinth of a hard stone, kneeling and sitting down to it, the plinth being before them in a perpendicular position, fixed in the building. I shall have more to say on this part when I draw the comparison between the London work and the Paris work.

The scaffolding now claims our attention. Their lifts generally are square on plan, with a large

piece of timber at each angle. These pieces are braced together, and act as standards, regulated according to the height the lift is required. Some are worked by hand and some by steam; they are fixed at the most convenient points of the building; and right and left of them a scaffold is erected for the men to fix the stone, and also to stand on to work the stone when fixed. This sort of scaffolding seems to be woven into the nature of the French people. Wherever you go, you see this style of scaffolding used, and some of these lifts were exhibited at the Exhibition.

I will now draw the contrast between the French work and our own, so that we may be able to judge whether our fixing, working, and scaffolding are equal or not to the French.

It is well known that most of our fixing is executed by the use of the "traveller," by which we lift the stone, in place of the French lift. If it is necessary, we have one traveller on the top, in addition to the one we lift with. If the stones are not too heavy, several are lifted together. The edge of the stone is brushed off, and then wetted. A soft bed of mortar is laid on the lower stone. The ends of the stones are generally grooved, and run with cement. The fixer can lower the stone on the bed, and seldom does he require to lift the stone a second time if he be master of his business.

It has been said that we cannot erect a stone building so quickly as they can in Paris. I think we can. By the above method, I have seen from thirty to forty stones fixed in ten hours; and a stone from 150 ft. long and 100 ft. high, with mouldings and projections, columns and caps, fixed in twenty-five weeks, including building the scaffold. I have also seen 40 tons of stone lifted 70 ft. high in eleven hours; and stone 15 tons lifted 31 ft. from the ground and fixed in two hours. This is quite sufficient to enable any one to judge which is the quickest way. I have come, indeed, to the conclusion, that we can fix six times the quantity of stone that the French can in a given time, and with half the number of men. If the contractor or manager of the New Opera had erected a timber scaffold, such as I have described, instead of having nine men to roll the stone to the appointed place, three men would move it, and a fixer and his man would fix in a given time six times the quantity of stone than they now fix. It must be a great saving to the contractor to have six times the amount of work done with half the number of men, and, moreover, the work done by this simple method will be much sounder. As we mentioned above, the party walls were not worked into the front walls to allow for swelling. This swelling might be prevented, and the walls could be joined together, if they were to use more sand with the plaster employed as mortar, and keep the stones well wetted while being fixed; or, if they use lime for mortar, the mortar should be made up some two or three months before being used, and then tempered up again. Treated in this manner, mortar will not swell, but will set hard. The fixing in Paris is not good, because it is impossible to fix ordinary stones by hand to make that sound work which is required; and it is also impossible to wet the beds of the stone sufficiently as the Paris stone requires when fixed by hand.

Let us now look at the contrast between their work and our work. In the first place, it seems to me that the foreman of masons in London requires more thought and talent than the foreman in Paris. Here all the mason's work is got out to dimensions worked on the banker, and jointed to sizes to fit the position where it is intended to go. Blocks of some hundreds of different dimensions, and for many jobs, varying in shape and form, all worked true and straight so that when fixed, they will require no working. I have seen on one job twelve or thirteen hundred stones all worked before the commencement of the fixing. I mention this in proof of what I said above in reference to the foreman. These stones have a hare $\frac{1}{2}$ -in. bed, and 1-16th in. joint instead of the $\frac{1}{2}$ -in. bed of the French style. The mouldings at Paris which have been worked after being fixed, have scarcely a straight portion two feet long in them, and the model in which they are moulded and scraped about is almost a disgrace to the empire to which Paris belongs. I mentioned above the attitude in which the Paris workmen work. In London the men generally stand upright to their work. If my readers had been with me and seen the position of the men working the plinth at the New Opera, they would have come

to the conclusion that these men had recently been imported from some island where mason's work was never done. I mentioned to the manner in which they hold their tools. This manner is a great hindrance to the progress of the work, as is also their sitting and kneeling down. In these positions they cannot put forth the strength required. The business-like way is to stand upright, and have the stone before you so that the weight of the mallet when lifted up will cause it to drop down with the force required. In the French method you have to push the mallet from you to the work, which will not come with such force as if the men stood upright, and let the mallet drop down.

I will now mention our method of timber scaffolding, so that you may judge between ours and the French. Our scaffold varies according to the weight we have to lift; we always pitch the standard inside and outside of the wall at a proper distance, so as to allow the scaffoldings to be erected, one for the masons and one for the bricklayers. The standards are some 12 ft. apart, and 10 in. to 12 in. square. This scaffolding can be taken up to any height that may be required by throwing out braces and forming cross ties. The span from the inside to the outside will be regulated according to the thickness of the walls and the convenience of the rooms. When the scaffolding is erected to the height required, horizontal pieces of timber are laid across to brace the iron metals to; then we have two pieces of timber which answer as trusses, resting on either side of the horizontal timber on a cradle with two wheels at each side: this is moved about by cog-wheels. A jenny is placed on the top of the trusses, which is also moved in a similar way. This jenny travels on the metals above mentioned, and is constructed so that the block and fall may be attached to it. In many cases the traveller is worked from the centre as well as the jenny. The timber scaffold saves all poles for standards; you want only the horizontal poles for ledgers. The French people have a pole scaffold inside and out; but if they were to adopt our plan of scaffold, it would be a great advantage to them, both in time and money. A timber scaffold may be regulated to any strength required, and can be erected to any ordinary small front as cheap as, if not cheaper than, a pole scaffold. There is a timber scaffold in Hyde Park, at the national memorial to Prince Albert, which is an exception to the general rule of scaffold for strength. It would be of some advantage, perhaps, to the French mechanics when visiting London to look at it. I might have entered into this subject on a much larger scale, but have mentioned a few plain facts, so that readers may be able to judge if the English method of fixing, working, and scaffolding, is not better than the French.

I might have expressed a few thoughts also on the brickwork of Paris, but suffice it to say that in some of the brickwork the mortar joints were not close like ours, but almost as large as the bricks. Since the mortar they use swells, the more mortar they put in the beds the greater will be the swelling. The remedy for this swelling would be as above described, and keeping the joints to $\frac{1}{4}$ in. or to $\frac{3}{8}$ in. thick; then they would not have any explosion in the brickwork.

THE CO-OPERATIVE MOVEMENT.

A GENERAL meeting of operative masons has been held at Wilcock's Rooms, Westminster, for the purpose of hearing from Mr. Alfred Walton, architect, a proposition for the formation of a co-operative building company among the different branches of the building trades' operatives. The chairman having opened the business, Mr. Walton said he had come specially to London to address the men in the five branches of the building trades—the masons, bricklayers, plasterers, joiners, and painters, each body separately, for the purpose of ascertaining if there were not a few hundred men in each trade, out of the many thousands composing them, prepared to unite together and establish a building company on a large scale on the co-operative principle. He believed if they carried out the principle to any extent it would do more than anything else to counteract the evils of lock-outs and strikes. He then went on to detail his plans at some length. He would recommend the shares to be fixed not higher than 1s. each, and that as soon as 500 members had taken up and subscribed for their shares, business should at once be commenced. He referred to what

* The following remarks are by a practical man, Mr. William Cross, manager of works at the Prince Consort Memorial, Hyde Park.

had been done by the masons of Scotland, who a few years since had begun in a more humble manner, and had built several squares and terraces of large and substantial houses. Mr. T. Conolly, a mason, who had been sent over to the Paris Exhibition by the Society of Arts to inquire into and report upon French masonry, gave a full and interesting account of the successful working of the Co-operative Masons' Society of Paris, who were now executing some half-dozen of the largest building contracts in the city of Paris. He cordially recommended the proposal of Mr. Walton to the consideration of his fellow-workmen. A long discussion ensued, and a resolution was adopted approving the plan laid before the meeting, and calling an aggregate meeting of the whole of the London masons, unionists and non-unionists, further to consider the subject.

A meeting has been held at Heckmondwike in connexion with the Co-operative Society in that town. Lieutenant-Colonel Firth presided. The report submitted was of a very favourable nature, showing the society to be in a flourishing condition. Mr. Powell, M.P. for Cambridge, was present, and delivered an address, in the course of which he observed that it was the desire of every member of the Houses of Parliament to give to his working fellow-citizens every means and every facility whereby they might combine for purposes calculated to promote their happiness, or to increase their wealth. If there was any country calculated to be the field of successful co-operation, he believed that country was England. If there was one national instinct more strong than another, it was the instinct of association. Mr. Powell quoted statistics in respect of the condition of co-operative societies in England. He saw it stated that there were in England at the end of last year 752 societies, but out of these only 436 sent in their reports to London. In these 436 the number of members was 173,000. The cash received for goods sold in the year ending 31st December, 1866, was 4,445,000*l.*, and the total value of assets and property was somewhat more than 1,000,000*l.*, but on the other side of the account the total amount of trade liabilities was 334,000*l.*, being a very large balance in favour of co-operative associations. He did not believe that any great revolution would be brought about by these societies—he meant any fundamental revolution entirely changing the condition of affairs which we saw around us; but he believed that by means of these co-operative associations friendly relations might be brought into existence between different classes. By their agency the labouring and working man, himself having capital, would sympathise more with the trials and the difficulties which beset capital; and, having some property himself, he would understand more how to value and how to defend it. Mr. Powell, in closing, urged that working men by being members of a co-operative association would benefit themselves, and be enabled the better to educate their children.

A lecture was lately delivered by Professor Fawcett, at the Workmen's Hall, Barnwell, before a crowded audience. The lecturer said, in 1844, twenty-eight poor weavers in the town of Rochdale thought they could improve their condition by chibbing together their small savings, and then purchasing commodities at wholesale prices and selling them out by retail. They were so poor that they could not embark in a large way, so they put into a common fund 2*d.* per week, which was increased to 3*d.*, and at length gathered together over 20*l.* With this a few articles of grocery were procured at wholesale prices. They soon found that there was a considerable profit on the transaction, and in 1864 the number of members was 4,747, while the profits amounted to 20,000*l.* a year. Their success, said the professor, was mainly owing to a rule they laid down when the society was established, from which they never departed; if they had departed from it he had no hesitation in saying that the scheme, instead of resulting in most splendid success, would have been a disastrous failure. That rule was, that under no circumstances whatever should any credit be given. The result was that from the establishment to the present time there had never been a single farthing of bad debt. Proceeding, he observed that within the last few months a co-operative society had been formed at Barnwell, and although the amount of business might not be now large, yet, if it was carried on upon the same principles, and with the same skill as that at Rochdale, there is no reason why similar success should not be realised, and the same

benefits would then be conferred upon them as upon the labouring community of Rochdale. But, though he had spoken of the Rochdale Society in flattering terms, he was anxious to impress upon them that that institution did not illustrate co-operation in its highest and most useful form; in fact, defining co-operation strictly, it scarcely deserved the term. What he understood by co-operation was a union between capital and labour. Unfortunately for the industrial interests of this country they were thus divided: the capitalist found the capital, and another class the labour; the capitalist was remunerated by profit, and the labourer by wages, and there was no connexion between them but a pecuniary one; the capitalist was anxious to hire labour at the lowest, and the labourer to sell at the highest price, and this led to the most baneful antagonism. How much better a system might be introduced. The Professor mentioned that in Manchester there existed a co-operative society of haters, and in London of picture-frame makers, and then proceeded to state that on the Continent they were more frequent than in this country. Some said the French loved co-operation, because they were socialists and communitists. Socialism and communism were most impracticable schemes; but they were not wicked ones, and socialists and communists, though their schemes always had resulted and always would result in failure, deserved this praise, that their advocates first established co-operation. It could not be said that they were bad and wicked men, but enthusiastic, and their enthusiasm was always directed to what good they could do for their fellow men. He gave instances to prove that beneficial co-operation between capital and labour was not a utopian idea, but one that could be realized, if those who engaged in it had sufficient moral qualities to combat the first difficulties they had to encounter. Modified results might be obtained by some co-partnership schemes between capital and labour, and he thought those schemes would become most common in England; they would be transitional as it were, and would prepare the workmen by degrees for something higher.

PHYSICAL COMMOTIONS THROUGHOUT THE GLOBE.

At the beginning of last month we drew attention to the curious coincidence of burricues or cyclones, earthquakes, and volcanic eruptions which was then occurring. Since that time at least thirty earthquakes have been announced as having taken place at St. Thomas, where the great hurricane played such havoc; and in America generally there have been many earthquakes, both in the States and in Canada, and long-extinct volcanoes at Rota, in Nicaragua, on the western slope of the American high-land, have broken out afresh, blazing with a light which lighted up the cathedral-towers of Leon city, ten miles off. Vesuvius is still becoming more and more active; and not long ago Hecla had a tremendous outburst. Even in this country there have been slight shocks of earthquake in the west of England. In September last we collected together and published in the *Builder* accounts of a most unusual number of casualties by lightning, far beyond anything we recollect of having ever occurred in this country. What does it all mean? Are we on the eve of some great geological crisis or convulsion? or is it merely a passing thro, anticipative of, or preparative to, some such great crisis in a future age?

GUISELEY NEW TOWN HALL.

ON the 26th ult. this edifice was opened with a performance of the "Messiah." The building is prominently situated on a site of 1,200 yards of land at the end of the town of Guiseley, near to the railway station.

The arrangement in the building for the local government offices consists of a board-room, clerks' offices, fire-engine room, lamp-room, &c. The rooms set apart for literary and educational purposes, comprise a public reading-room, 30 ft. by 17 ft., a large room for library, a school-room, 32 ft. by 18 ft., class-room, lavatory, and conveniences. The whole of these rooms are heated by hot-water pipes. The public lecture-room is 65 ft. long, 36 ft. wide, 27 ft. high, and will accommodate upwards of 800 persons seated. The platform and gallery for orchestra are

placed at one end, and a gallery at the other. The principal entrance is 24 ft. by 13 ft., with a flight of stone steps to the lecture-room and gallery. The erection of the building, which is due principally to the munificence of Mr. M. W. Thompson, M.P. for Bradford, has been effected at an outlay of about 3,000*l.* The contractors, who have executed the works from the designs of Messrs. Knowles & Wilcock, architects, of Bradford, are Messrs. Freeman, masons, of Otley; Jessop & Westmoreland, joiners, of New Wortley; Mr. A. K. Kenyon, plumber, of Yeadon; Mr. Alfred Firth, plasterer, of Rawdon; Mr. Edwin Thornton, slater, of Shipley; and Mr. Edward Haley, painter, of Bradford. Mr. Abner Rhodes, of Bradford, was clerk of the works. It is intended to transfer the building, under certain trusts, to the members of the local board, as trustees for the time being, for the benefit of the public of Guiseley for the purposes of education, and for the transaction of the town's business, making it, in fact, into the town-hall of the place.

REREDOS, ST. PETER'S, THANET.

A REREDOS has lately been erected in the parish church. It consists of a retabulum in stone, in which are sunk a central niche, flanked by two quatrefoils, each filled with mosaics. The former bears a white marble cross, and the latter contain angels carrying shields charged with the sacred monograms IHC and XPC respectively. Wheat and vine are carved on either jamb of the central niche, and the whole is surmounted by a cornice of leaves, severe in form. The wall on the sides, up to the height of this cornice, is lined with slat slabs, with a rough face, and bearing the Creed, Lord's Prayer, Commandments, and apostolic emblems painted on them in oil, and in the last and largest space, the pelican, as an emblem of our Lord and of the Holy Communion; below them is a dado of marble and alabaster inlay. This and the stonework were executed by Mr. Thos. Earp; the painting and mosaics were done by Messrs. Heaton, Butler, & Bayne, from the designs of Mr. Edward J. Tarver, architect. The whole was put up by a subscription amongst the parishioners, raised by Mr. Thomas Gray, of Orlihar House, whose family have long dwelt at St. Peter's.

"WHO SPOILT THE PARLIAMENT HOUSES?"

SIR,—The petulant tone of Mr. Fergusson's letter, in the *Builder* of the 4th inst., convinces me of the soundness of my judgment in besitating to submit my case unreservedly to the decision of a committee of which he would possibly have been a member.

While, on the one hand, the evidence he has examined compels him to give a verdict, to a certain extent, in my favour; on the other, the almost childlike delight with which he perverts it into an opportunity for vilifying my father, is so clumsily disguised as to make his criticism of little value.

1. Mr. Fergusson is not satisfied with having to find on the evidence, but he advances a question totally foreign to it. His letter is as ingenious as it is disingenuous. Never mind who "spoilt" the Houses,—that is a question of principle and taste. Who produced the original designs in 1855 before they were "spoilt?" Mr. Fergusson having come forward to record his decision on a proposed examination of my pamphlet, I refuse to release him from his obligations to meet the main question and the evidence on which it rests. At present he has only admitted the force of what is supposed to prove that my father "spoilt" the original designs; but he ignores altogether the evidence on the special point in dispute, and assumes that Sir C. Barry was the real architect, for the sole purpose of propounding the absurd, though amusing theory that my father "spoilt" all Sir Charles's work by his "crochets." My evidence all proceeds from the same sources. Half of it proves that Mr. Pugin spoilt the other half, says Mr. Fergusson; therefore Pugin was the author of the bad half,—Sir Charles Barry of the good. I do not know whether Mr. Fergusson is a Cambridge man; but I doubt it. Meanwhile, what becomes of the Messrs. Barry's emphatic denial, and Mr. Wolfe's assertion, "that all the import-

ant changes in the building which decided its character were originated and designed by Sir C. Barry alone, in the country, when he was not in communication with my father."

2. I beg to remind Mr. Fergusson that I qualified my statement about Sir C. Barry being the sole author of the "plans" of the Houses, by suggesting that even these must have been modified by the exigencies of the elevations. The formality and regularity of the south front do not necessarily prove that it was originally the design of Sir C. Barry, any more than the substitution of "pierced panels and an unmeaning net-work of flat overtones ornament" for "windows grouped together with deep reveals" and massive "buttresses," prove that Sir C. Barry was over-persuaded by my father to relinquish the latter, his own design, for the poverty and flatness of the present elevations. Setting aside the gratuitous assumption of all this, the direct opposite is the more probable fact. Who better than my father could appreciate "deep reveals" and grand effects of light and shade, and who knew better how to produce them? I shall be happy to submit to Mr. Fergusson a design of my father's, prepared in 1833, showing a façade quite as regular as that of the Houses of Parliament, having "windows grouped together with deep reveals and considerable light and shade obtained by the form of the buttresses." The real truth is that my father's original work was "spoilt" by Sir C. Barry, to whose decision, so far as "architectural arrangement" was concerned, he was obliged to yield; and Mr. Fergusson shows his entire ignorance of my father's early works in propounding a supposition which entirely reverses the probabilities, if not the facts, of the case.

3. The cat-and-kitten simile is, no doubt, remarkably amusing and quite satisfactory to Mr. Fergusson, but, for the life of me, I cannot see the point of it. As an architect, I know that contrast is the essence of effect: I know also that without contrast size is neither adequately distinguished nor appreciated. Neither do I perceive the value of Mr. Fergusson's application of his criticism to the entrances under the Victoria Tower. At all events, he has failed to perceive from Sir C. Barry's own letter that he himself sent the "plans" of this part of the building to my father to design the elevations, and at the same time furnished the dimensions for them. But considerations as to the true apportionment of the various parts of the work to their relative authors do not seem to trouble Mr. Fergusson in the pursuit of his extraordinary proposition.—"All that is Pugin's is bad: all that is Barry's is good." That is enough for him. His partiality is as plain as it is pungent. A fair and equitable judge truly in deciding on the present rival claims!

4. As regards the Victoria Tower, the entries in the diary prove that my father was at work on the original production, and few will accept Mr. Fergusson's oracular denunciations of its present appearance. He complains that an "extinguisher" caps the clock tower, instead of the beautiful design as originally published. One may well question Mr. Fergusson's competency to set up as an architectural critic if he desires to see a spire on the present clock-tower; but what will he say when I tell him that such a spire on a clock-tower, proportioned to it, is actually executed at Scarisbrick Hall, whither I shall be happy to accompany Mr. Fergusson whenever he may claim my promise to do so. This building was designed and partly carried out at the same time as the Houses of Parliament, and is sufficiently successful to elicit from one of the first statesmen of the day the following expression: "If I have reason for not believing all that you claim for your father regarding the Houses of Parliament, it lies in the fact that the work at Scarisbrick is so much holder, effective, and more successful than that at Westminster."

Mr. Fergusson contrasts archeology with architecture, as though the results of the two studies were absolutely incompatible with or spoilt each other; and that whilst the Gothic revival had alone been archeological, the Classic were quite free from this vice, and altogether creative. But I should like to know, if my father and others of his contemporaries had not been archeologists, where would Gothic architecture have been confined, I imagine, to such specimens as Sir Charles Barry's original churches, of imperishable mark, which are certainly as free from archeological cypisism as any Classical buildings are, for the most part, mere

plagiarisms as existing edifices. There is quite as much, if not more, archeology in Sir C. Barry's Palladian or Renaissance structures as in any Gothic works I have ever seen, and as perfect a freedom from the true originality of genius. Successful more or less, as reproductions or adaptations of existing works, they may be, but original productions they are not. And why it should be culpable and ridiculous to revive the glories of an old minister or civic hall, but praiseworthy and excellent to transfer the Farnese Palace or the Venetian Library from their own sunny soil to a London street, I am at a loss to conceive; or why the architect in his study and adaptation of the latter buildings should be less an archeologist than the architect of the former. What Mr. Fergusson from his normal condition of fretfulness and querulous dissatisfaction ridicules as a fault in others he exalts as a merit in Sir C. Barry. Happily he is always in such exaggerated extremes of praise or blame, that his judgment in questions connected with Gothic art has little influence, and we may be allowed to place his taste on a level with his impartiality. He has often done great service in destroying monsters, but he must leave to others the task of restoring what they have laid waste. A man who stigmatizes an architect like Mr. Street as a mere archeologist, is but little likely to do more than destroy. Mr. Fergusson stands in relation to architecture as Mr. Carlyle does in some respects to philosophy: he can tear a fallacy to tatters, but oh! for something good to replace it. Mr. Carlyle, however, thinks. Mr. Fergusson assumes and decides. *Sic volo, sic jubeo; stet pro ratione voluntas.* (It is an idiosyncrasy of his literally to rage in the presence of Gothic art. He must be exorcised before he can pronounce on its merits).

E. WELBY PUGIN.

SOME SUGGESTIONS.

Snow in the Roads.—I beg to suggest that snow could be speedily and economically removed from roads and streets by a few yards of stove-piping laid along the gutters (the ends partially stopped with a brick), having a few strong gas-jets flaming within. All snow swept or shovelled against it would instantly melt and run down the gratings.

A Foothold for Horses.—Short steel spikes (similar to cricketers' spikes) could be made to clutch firmly the rim of the horse-shoes, thus enabling the horse to have a sure foothold on frost-bound roads. They could be fixed quickly, as many to each shoe as deemed needful. They would not clog, and could be renewed at a penny each.

A Plea for worn Flagstones.—I recently noticed some paviers wantonly breaking a great many old stones, some large and in tolerably good condition. It seemed a pity, when so many places are yet unpaired. Why could they not be disposed of cheap, the same as old bricks?

Water and Fire: Plugholes in the Roads.—Would it not be an improvement to remove them to a cut bay or recess in the curbstone? They would be easily found on emergencies, and not so liable to get clogged with stones, dirt, &c., as they are daily now.

R. T.

THE THAMES EMBANKMENT.

At the meeting of the Metropolitan Board of Works, Mr. Bazalgette, the chief engineer, presented his report on the progress and cost of the Thames Embankment. As regarded that portion between Westminster and Waterloo Bridges, the whole of the dams had been completed, and considerable portions thereof had subsequently been removed from the face of the work. The Westminster Steamboat Pier and the Charing-cross Steamboat Pier were in progress, and other necessary works were considerably advanced. Filling-in behind the Embankment walls and in the works generally had been carried out to the extent of about 500,000 cubic yards. With respect to the contract between Waterloo Bridge and the Temple Gardens, a length of 1,280 ft. of the parapet was complete, and there remained but 210 ft. to be formed to complete the entire length of the river wall comprised in the contract. The Temple Steamboat Pier was also in a forward state, not more than 2,000 cubic feet

of stone, the whole of which was upon the ground, being required to complete this portion of the work. The approximate cost of the whole of the works executed, including 350l. for the materials upon the ground, was 22,500l., of which the sum of 1,060l. was due to the progress made in the past month. As regards the south side of the river, of the 2,370 ft. of dam and staging constructed between Westminster and Lambeth Bridges, 1,100 ft., had been removed from the face of the works. Within the completed dams a length of 1,900 ft. of the river wall had been constructed to a height of 7½ ft. above Trinity high-water mark. The approximate value of the whole of the completed works, including 23,900l. for the materials upon the ground, is 147,000l., of which the sum of 1,000l. was due to the progress made in the past month.

HOW THE THAMES EMBANKMENTS ARE GETTING ON.

Sir,—It may be interesting to your readers to have placed before them the following summary of progress during each of the past seven months of the three contracts at present let of the Thames Embankment:—

1867.	No. 1, North. Mr. Furness's.	No. 2, North. Messrs. Ritson's.	South. Mr. Webster's.
June	47,555	41,137	42,000
July	8,911	1,106	1,500
August and	16,890	3,127	6,500
September	11,000	1,566	6,220
October	6,000	3,348	1,000
November	7,900	1,989	1,000
December			
Seven Months ...	66,366	11,363	19,220
Total done to end of 1867 ...	435,000	224,000	147,000
Total to complete	85,000	4,400	162,000
Total of Contract	520,000	228,000	309,000

JASPER.

SNOW AND THE SEWERS.

Sir,—The original idea of using the main sewers for the removal of snow from the streets was mine, and was made public in the *Builder* last January. If the snow be put down the sewers, whether it be melted by "gas-jets," "steam-jets," or "water-jets," I claim the original idea of using the sewers for that purpose. This plan was never put in practice until I suggested it.

JOHN PHILLIPS.

HOME COLONIZATION.

"We've got no work to do."

Sir,—As the columns of the *Builder* have always been open to suggestions for social improvements, I hope this privilege will be accorded to the following on home colonization. In this large manufacturing community, where fluctuations in trade are inevitable, the choice of a trade perfectly free to every youth, and from several other causes, an excess of craftsmen over the labour in demand will repeatedly occur. How may this be alleviated? By emigration to the colonies, is the ready reply. Nor do I deny that this is the true *dernier ressort* of overpopulation: but there is yet plenty of room at home if labour could be better distributed. It has, I believe, been officially stated that "there is in this country as much cultivatable land lying waste and profitless as would employ all the unemployed in England." Now the English people, with their usual tenacity to any notion they have once adopted, rest in the delusion that going half round the world, paying large sums for passage, outfit, &c., has some peculiar efficacy in establishing all who go through the preparatory process, in opulence in a distant colony. This is a great mistake. There is no special virtue in the mere emigration, but, on the contrary, a loss of human power and energy to the old country; the most vigorous and enterprising leaving a constantly-increasing residuum of enervated and unhealthy population behind: in fact, distant colonization is doing in some measure for England what continuous war did for France. Now the virtue of a colony lies intrinsically in this,—the withdrawal of surplus labour from overcrowded centres and re-aggregating it in natural proportions. This might be accomplished as well, and at less cost, upon the cultivatable, but at present neglected, lands in Great

Britain. To do this scientifically, statistics should be consulted, in order to obtain an approximate idea of the relative proportion which different trades have to population. A capitalist so informed might establish a colony which would well repay a large outlay. But a national scheme of home colonization could be devised, which would effect a redistribution of labour highly advantageous to the happiness and prosperity of the country.

W. CAVE THOMAS.

. The question, of course, would be, can the land be made remuneratively productive? There is no doubt that much of it could be made so. We may mention that for some few weeks past, an "Association for the Employment of the Destitute Poor in Reclaiming and Improving the Waste Lands of the Kingdom," has been in progress of formation.

THE DEATH-PLACE OF GIBBON.

"CURIOSITIES OF LONDON."

THE very interesting leading article in last week's *Builder*, founded on Mr. Timms's admirable book on the above subject, contains an error which—as a denizen of Sussex and jealous of its honours—I beg permission to correct. In column 3 of the first page I read, "the courtly poet Waller lived on the west side of St. James's street . . . Gibbon, the historian, died at No. 76." This he certainly did not, if the "History of Sussex," and a long inscription cut in a marble slab in Fletching Church, Sussex, are to be believed.

Every Sussex man and woman who has dipped at all into the history of the county, knows, and is proud to know, that the last resting-place of the Historian of Rome belongs to us. Gibbon came over from Lausanne on a visit to Lord Sheffield, at Sheffield-place, Fletching; and while there was seized with the illness of which he died. Lord Sheffield buried him, with all the pomp and ceremony he could command, in his own family tomb—an enclosed hay, on the north aisle of Fletching Church; and on the front of the tomb, facing the congregation, he placed the engraved slab mentioned above, to lead to future ages how great he considered the honour of having been able to call Gibbon his friend.

If I were in Sussex, I would be delighted to send you the inscription in its entirety; but, being in London just now, I am separated from my authorities, and am forced to draw on my memory,—not on my imagination; so Mr. Timms must not lay that flattering unction to his soul, and think I may be wrong after all. "Fletching Church and Gibbon's Tomb" are among the sights we delight in showing to visitors to our "Sussex wilds,"—now rapidly becoming "wilds" no longer.



. That Gibbon is buried in Fletching Church we are aware: that he died at Lord Sheffield's we are not so certain. The statement in the "Handbook of London" is precise,—"Gibbon died January 16th, 1794, in No. 76 [St. James's-street] (south corner of Little St. James's-street), then Elmsley the bookseller's, now the site of the Conservative Club."

"CURIOSITIES OF LONDON."

I THANK YOU for the special care and tenderness with which you have treated the new and enlarged edition of my "Curiosities of London," in the *Builder* of Saturday last. Allow me to state, in reply to the omission you advert to in the Covent Garden Theatre article, page 782, that the burning of Smirke's Theatre, in 1856, is there mentioned, as well as the present theatre from the design of Mr. E. M. Barry, in 1858. JOHN TRENDS.

. We had looked to the paragraph headed "Royal Italian Opera, Covent Garden Theatre," which did not give the information referred to.

MARKS ON DEALS.

SIR,—Would any of your correspondents kindly give particulars of the various marks by which the different kinds of deal are denoted? For instance, so that if a young beginner enters a timber-yard, by such and such kinds of mark he can go and select best and second of Peterburg, &c., without being deceived by the yard foreman or others who are trying to effect the sales. Y. Z.

THE DEATH OF BARON MAROCCHETTI.

WE heard with great regret that Baron Marocchetti, the well-known sculptor, had died rather suddenly in Paris, on Saturday last. He was born at Turin in 1805, and was hence in the sixty-third year of his age. He was of French extraction, though born in Italy, and was educated in Paris, at the Lycée Napoleon, and afterwards with Bostio, a Parisian sculptor of some note. He completed his studies in Italy. In 1827 he returned to France, and in the same year exhibited a group, "A Girl playing with a Dog," for which a medal was awarded him. This group he presented to the King of Sardinia. In 1831 he exhibited his "Fallen Angel," and somewhat later he executed for the Academy of Arts of Turin a statue of Monsignor Mossi. Shortly after the revolution of February, 1848, Marocchetti came to England, where he soon became known in art circles. In 1851 he contributed the model of a colossal equestrian statue of Richard Cœur de Lion to the Great Exhibition. This model brought the sculptor into very general notice in this country. The statue was afterwards executed in bronze, and placed close to the Palace of Westminster, the cost being defrayed by national subscription. For the citizens of Glasgow he executed an equestrian statue of the Queen, which was inaugurated in 1854. In that year he exhibited at the Royal Academy, "Love Playing with a Hare." In 1856 he executed the granite monument to the memory of the English soldiers slain in the Crimea. He also executed the statue of the late Duke of Wellington at Stratfieldsaye. One of his most recent works is the monument to Lord Clyde, in Waterloo-place. Marocchetti was made a Chevalier of the Legion of Honour in 1839.

THE ARCHITECTURAL ASSOCIATION.

THE ordinary meeting of members was held on Friday evening (the 3rd inst.) at the House in Conduit-street, the President, Mr. R. Phéné Spiers, in the chair.

Mr. J. A. Bunker read a short paper on plumbers' work, in the course of which he touched upon the use of lead historically, chemically, and practically, showing that the Babylonians, Persians, and Egyptians used it for carrying and storing water, and that the invention of soldering was a very ancient one. In our own country the Saxons made lead a useful auxiliary in their buildings, especially for roofing, as also for the coffins of persons of distinction. In the Middle Ages, too, organ pipes were made of lead, and it was matter of tradition that the old St. Paul's Cathedral was accidentally burned by the carelessness of some workmen who were employed to solder the pipes of the organ. Having explained the manner in which lead was cast and milled, and the proper mode of soldering pipes, Mr. Bunker recommended that in using lead for gutter flats, flushings, &c., care should be taken to leave room for expansion of the metal, and that snow-boards should be used to protect roofs from the feet of careless workmen. In conclusion, he recommended students of architecture to pay especial attention to that portion of the specification which included the plumber's work, as want of attention in this respect often entailed much loss and inconvenience.

A member inquired whether Mr. Bunker could give the meeting any information with reference to the merits of sheet zinc (Vieille Montagne) as compared with lead. Objections had, he said, been made to lead on the ground that the chemical action of the atmosphere occasioned it to corrode; but the excellent condition of the roofs of some of our cathedrals and old parish churches would lead to an opposite conclusion. He also desired to know what was the best and easiest mode of preventing pipes from bursting in frosty weather. He had tried the experiment of allowing the tap to run very gently at such periods, and never had a pipe burst.

Mr. Bunker said he had come prepared to speak about lead, and not zinc, although he believed that the latter metal, if properly laid, was a very useful material. For his own part, however, he always recommended the use of lead, as although the cost was in the first instance greater than zinc, the old lead was always worth from 18s. to 20s. a cwt. He was unable to state why lead did not answer upon oak wainscot, but the solution might be found in

the circumstance that oak contained a good deal of iron. In the old cathedrals it would be found that lead was not laid upon oak. With regard to the best mode of preventing lead pipes from bursting in frosty weather, he believed the most effectual remedy was to insert a stop-cock at the lower end of the service-pipe. As for allowing the tap to run, he feared the water companies would strongly object to such an expedient, however useful it might appear.

The Chairman, in calling attention to some drawings of lead finials and vases in Continental ohniviches, exhibited by Mr. Bunker, pointed out the beauty of the design, and the solidity of the material. It was, he thought, a pity that architects of our day did not endeavour (wherever practicable), to introduce lead work for finials and vases, as there was a hardness and solidity about it, which recommended it for general adoption. In cases where it was necessary to use ornamental ironwork, it would be very desirable to make the design as bold and solid as possible.

It was stated that at the next ordinary meeting of the Association, a paper would be read by Mr. Henry Mathews, "On painting as a fine art, and its principles, and their full development in the works of the ancient masters."

LEICESTER CLOCK TOWER COMPETITION.

A DESIGN by Messrs. Goddard & Son has been selected after modifications. Messrs. Millican & Smith write:—

"The 'Haymarket Structure' Committee having received 106 designs in reply to their advertisement to architects, proceeded to select the best, and to assist them in the selection, obtained votes from the subscribers who visited the exhibition of the drawings at Messrs. Vico & Moore's: the votes so recorded gave ours a majority of twenty-four over any other of the 106 designs.

The Committee in their own voting again placed ours first among the three designs selected by them. At this point, for reasons best known to themselves, instead of awarding the premium according to their election, the Committee broke faith with all the competitors by handing over the final selection of one design to the Town Council, who, having chosen two out of the three designs submitted to them, appointed a sub-committee to issue further instructions for modified drawings from the two competitors. Against the unfair decision of the Council upon these modified drawings we now beg to protest.

We claim that our design is entitled to the first place, by the choice of the subscribers and that of the original Committee, and because, to comply with the modified instructions of the Council Committee, we had merely to omit the buttresses to the base and increase the height of the statues from 5½ ft. to 6 ft., whereas Messrs. Goddard's design required an entire remodelling of the base; the statues to be increased from 3 ft. 6 in. to 6 ft.; the canopies to be reduced from 12 ft. high to about 4 ft.; the clock dial to be increased from 2 ft. 6 in. to 4 ft.; and the roof to be reconstructed. Is it too much to assert that the design requiring the least alteration ought to have been selected by the Council?"

CHURCH-BUILDING NEWS.

Ovington.—The church of this little village has just been repaired and resetted throughout. Last year the parishioners determined to put the church into a more seemly condition; and the rector took the opportunity to restore the chancel. Accordingly the stone-work has been cleaned and made good throughout, the windows and the old Norman doorway have been repaired, the tower has been thrown open to the church, the timbers of the roof freed from whitewash, and the walls (inside) replastered and brought to a warm sober tint. The floor has been laid with tiles in ornamental patterns. The nave is furnished with low open benches. All the fittings are of oak. The cost of the work in the nave has been about 250*l.* The whole of the work (except a stove supplied by Mr. Gidney) has been carried out by Mr. Hubbard, of Dereham, builder, under the direction of Mr. E. J. Tarver, of London, architect.

Leigh.—Not content with what has been done in the way of restoration to the parish church, the parishioners recently decided on doing something more towards refitting it, and also that it should take the form of a testimonial to their rector, the Rev. H. B. Cocks. Accordingly a subscription-list was started, which was headed by Earl Somers with 25*l.* and the Countess Somers 20*l.*, and soon a sufficient sum was raised to purchase a redwood, a pulpit, stalls for the choir, and a brass lectern. These articles have now been placed in the church. The redwood is of freestone, having in the centre, over the communion-table, a Greek cross on a diaper ground within a sunk circle, and the passion-flower

carved in the centre of the cross. The pulpit is of oak on stone steps, and has carved on it a representation of the Ascension, &c. The stall-ends are also carved, the whole of the above work being by Mr. Forsyth, of Worcester. Messrs. Hardman, of Birmingham, supplied the brass lectern.

Bedale.—A new church, to replace the old one, has just been erected at Thornton Watlass, four miles from Bedale. The tower of the old edifice, however, has been retained, and forms part of the new edifice, which has been erected from designs and plans of Mr. G. F. Jones, of York, architect. The style of architecture adopted is Early English, and the edifice consists of a nave and north aisle, north and south transepts, and a chancel, the porch being on the south side near to the old tower, which is about 80 ft. in height. The windows are filled with cathedral glass, and have coloured margins, except one window, which is of stained glass. The windows in the north aisle are lancets, and those in the transepts are of three lights. The west window underneath the tower is of three lights, with plate tracery, and has been restored by Lady Milbank. The east window is a triplet, with plate tracery, and Mr. J. Puleine, of Clifton Castle, has had it filled with stained glass. The church will accommodate about 250 persons, for whom in the nave, north aisle, and transepts, open seats of varnished deal are provided. The chancel is fitted up with oak seats, having moulded and carved ends. The cost of the erection of the edifice has been about 1,500*l.*

Hooke.—The small church of Hooke has been opened for divine service. The foundation-stone was laid in the spring of last year, by Earl Grosvenor, M.P., and since that period great difficulties have been experienced in raising the necessary funds. The amount promised having reached the sum of about 2,500*l.*, architects were invited to furnish plans of the same, and Mr. Danke, of London, proved the successful competitor. He estimated the cost at 4,600*l.*, including spire, or 3,500*l.* without. The edifice stands by the side of Hooke-road, in close proximity to Newton-lane. It is in the Transition style, and is built of the red sandstone of the district. It consists of a nave, chancel, and north aisle, with organ-chambers at the east end. The nave is separated from the aisle by a row of pointed arches. There is a tower at the south-west angle of the building (upon which the spire may be placed), the main entrance being from the Hooke-road, through the north porch. The church will accommodate 600 persons, but it is so built as to admit of a south aisle being added.

Miscellaneous.

COMPENSATION.—On the 6th inst. Mr. Humphreys, the Middlesex coroner, presided over a special jury in a compensation case, "Clayton v. The Metropolitan Railway," at the Sheriff's Court, Red Lion-square. The premises were not required by the company, but in making the inner circle the water damaged the plaintiff's oven, and he required the company to take the whole premises. The shop had been closed a month, and the company in possession. It was suggested that the claimant could return, but he declared that his business had been destroyed by the company, and he claimed three years' profits. He made, he said, 12*s.* on a sack of flour. After several witnesses had been called, a verdict was agreed upon for 300*l.*

HEMEL HEMPELSTEAD.—The High Bailiff held a court of pie poudre in the Town-hall, to receive the report of the committee appointed to erect a new market-house, &c. The bailiff produced a coloured drawing of the exterior of the proposed building, and of the Town-hall, with plans of the internal arrangements. The building, he said, would be in architectural conformity with the Town-hall, and would be surmounted by a turret, on which there would be a market hell. The corn-lofts would be 30 ft. by 24 ft. The plans had been unanimously adopted by the committee, and he calculated that the shop, cellarage, &c., would yield an income of about 80*l.* a year. After considerable discussion, the following resolution was agreed to:—

"That the plan proposed be adopted, and that the architect be requested to give his special attention to the possession of the most efficient means for the delivery and discharge of grain to and from the corn-loft, and that the elevation of the shop front should be in accordance with, instead of subordinate to, the designs of the main building."

SELSEY, SUSSEX.—A new chapel, 46 ft. by 31 ft., belonging to the people called "Bible Christians," was opened for divine service on the 26th ult., when a sermon was preached by the Rev. J. Horwill, of Southsea. The proceeds of the opening services are nearly 50*l.* The plans of the above building were prepared by Mr. E. J. Smith, of Portsea, architect. The structure is Gothic, and has flint walls, with white brick quoins.

ROAD ROLLERS.—We observe a patented form of this great desideratum, among many other useful implements, illustrated in a catalogue issued by Messrs. Amies, Barford, & Co., of Peterborough, ironfounders, machinists, and agricultural implement makers. It is a substantial and weighty-looking article certainly. It is made of cast metal cylinders, laid alongside of each other in rings, each 12 in. broad: so that the requirements of road surveyors, contractors, and others who wish to have one very heavy roller can be met to any extent, as to breadth, and the same as to thickness. The outer rim of the one illustrated was about 4 in. thick, of solid iron. It can be fitted with a turntable, which allows the horses to turn with the frame-work without turning the weighty roller. Prices seem to vary from 65*l.* for a 5-ton one to 115*l.* for a 9-ton one. No steam-power is required or used with this road-roller.

FRIENDLY SOCIETIES' ASYLUM.—The annual dinner to the inmates of the Metropolitan Benefit Societies' Asylum, Ball's Pond-road, was given on New Year's day, Mr. W. G. Ledy, trustee, presiding. As we have said before, "this is the only institution in the kingdom for the special benefit of members of friendly societies. To the credit of the metropolis be it said, that a few working men in it founded the asylum in 1829." In proposing success to it, and the health of the inmates, the chairman said that 184 persons had been admitted, of whom 111 had died, and thirty-eight now remained. There was accommodation for sixty-nine married couples, but so many could not be elected until the building debt of over 3,000*l.* was paid off, and it behaved every society and member to aid in making that good, when the Endowment Fund of 7,500*l.* would be available for paying increased annuities to the inmates.

BELL CHIMING AT GREAT BEDWYN.—A simple and ingenious arrangement, of which some account has already been given in the *Builder*, has been adopted for chiming the fine old bells of Great Bedwyn Church. It is that invented by the Rev. H. T. Ellacombe, rector of Glast St. George, Devon, and has been used for some years in various churches in the West of England, but is little known elsewhere. It brings all the hells under control in the body of the church, where they are chimed for service with perfect ease by one man or boy. Being independent of the holly, it interferes in no way with the ringers when a peal is to be rung. The chiming gear being distinct from the clappers, it does away with the destructive practice of "clocking" the bells, or tying the clappers, by which numbers of fine bells are cracked. The apparatus has been put up by Mr. Hooper, of Woodbury, near Exeter, at a cost to the parish of about 1*l.* per bell, and his travelling expenses.

ATROCIOUS ATTEMPT TO BLOW UP THE WORCESTER GUILDHALL.—A meeting of 400 special constables was about to be held in the Town-hall, Worcester, and the hull-keeper, as was most fortunately usual with him, went without any light to turn on the gas, when he found from a hissing noise that something was wrong, and he instantly turned off the gas again. He obtained assistance, and on examining the meter it was ascertained that some dastardly miscreant had removed and taken away the plug of the main service pipe connecting the main with the meter. Workmen were fetched from the gas-works, who gave it as their opinion that whoever had removed the plug had a thorough knowledge of the construction of gas meters. The pipe out of which the plug was taken is an inch pipe, and if its removal had not been found out, sufficient gas would have escaped in five minutes to have blown the front of the hall out. It is presumed that this attempt was made with the intention of stopping the meeting of the special constables, if it were not ignorantly intended to destroy the constables themselves, which, however, it could not have done, as the hall would have been destroyed before they could have assembled.

VICTORIA PARK.—The bathing lake in Victoria Park is to be made about double its present size. The First Commissioner of Public Works has decided to follow the precedent established in Lancashire during the cotton famine and under the Public Works Act. The work will be offered to men who cannot just now find any other employment, and they will be paid according to the amount of work done.

RINGWOOD TOWN HALL.—The old Town Hall, or Market House, which has stood for nearly a century and a half, has been destroyed, and the bricks carted away. The removal of the dingy old building is an improvement to the town. The new Town Hall has been built after plans by Mr. Wyatt. It contains a justice-room, and a corn-exchange, suited for a ball and concert room; while below are two other rooms for general purposes, adapted for reading, club, or lecture rooms.

ST. STEPHEN'S MEMORIAL CHURCH, DELHI.—This little church was consecrated by the Bishop of Calcutta, the Rev. Dr. Milman, on the 17th of October. The building is situated in one of the most populous thoroughfares of the city of Delhi, immediately facing the Queen's garden. The interior is decorated, and the walls are covered with scrolls, symbols, and texts. The inscriptions are in Persian character as well as in English. The service and sermon were in the Oordoo language, which the bishop has qualified himself for reading and preaching in.

ANSON'S "DRAMATIC ALMANACK."—The "Dramatic Almanack" for 1868, by Mr. J. W. Anson, of the Adelphi Theatre, besides containing a very large amount of information of value to those who are connected with the stage or interested in it, includes several amusing articles on Macklin, Astley, and Wohlwell. We have not checked the correctness of the facts given in the various lists, but the intention is excellent. Mr. Anson is the secretary of the Royal Dramatic College; the honorary secretary of the Dramatic, Equestrian, and Musical Sick Fund; and is in other ways honourably known.

THE WORCESTER DIOCESAN ARCHITECTURAL SOCIETY.—The annual meeting of the members of this society has been held in the Council-room of the Natural History Society, Worcester. The chair was occupied by Mr. G. J. A. Walker, and there were also present the Revs. T. G. Curtler, W. W. Douglas, H. G. Pepsy, G. S. Munn, W. Thorn, Messrs. H. Holden, E. Lees, and J. S. Walker. The proceedings having been opened, Mr. Walker proceeded to read the report, which was of considerable length, and commenced by congratulating the members on the appointment of one of their body to the episcopate, and then went on to speak of the excursions of the society, and the architectural doings at Worcester, &c. The report was adopted, and the whole of the officers reappointed. It was agreed that Earl Beauchamp be requested to take the chair at the meeting to be held on the 14th of January, when Mr. Beresford Hope will read a paper on the Cathedral.

THE PENN-SQUARE BUILDINGS, PHILADELPHIA.—A great day has dawned upon Philadelphia, says the *Journal* of the Franklin Institute of Pennsylvania. It is proposed to give to her libraries and museums enlarged space. At the last meeting of the councils of the city, the resolution to ask the Legislature to grant the four small public parks or squares, situated at the corner of Broad and Market Streets, and formerly the site of the waterworks of Philadelphia, to the following named institutions,—The American Philosophical Society, the Philadelphia Academy of Natural Sciences, the Franklin Institute of Pennsylvania, the Philadelphia and Loganian Libraries, and the School of Design,—was agreed to, without deliberation and without debate. Such a cluster of buildings, it is added, with an unequalled library, a vast store-house of specimens in natural history, an immense number of models of mechanical inventions, a complete catalogue of philosophical apparatus, great galleries of paintings and statuary, would afford students in every department of literature, science, and art all the facilities requisite to the most elaborate research. Within a compass of 1,000 ft. square, he will look upon the labours of Andron and Wilson, Benjamin Franklin and Dr. Robert Hare, and of hundreds of others, who spent their lives, retired from public gaze, in building up these great collections of fossils, minerals, shells, plants, and models.

The Builder.

VOL. XXVI.—No. 1302.

English Artisans on Paris Work.



PENING again the volume resulting from the visit of British workmen to Paris,* we light upon a notice of Plasterers' Work by C. Bartlett. The writer of it is better satisfied with the skill possessed by our plasterers than we are. We have reason to fear that the number of artistic plasterers is very small; the great majority are utterly incapable of anything like art. In plasterers' work, as in brickwork, plumbers' work, and other trades, there has been a woeful falling off in England. The speculative builder's six, eight, and ten roomed houses, made to sell, which the reporter speaks of as the rough nursery for many of our plasterers, and "in many cases the starting point of some of our best workmen," have been the ruin of the craft as an art. However, we will keep just now to what he tells us. The French architect, he says, uses plasterers' work sparingly in their first-rate buildings, and in situations where the presence of plastering would not be suspected. For instance, in the new Imperial Library, the coffers of the arch springing from the gigantic piers in the reading-room or hall are plasterers' work of first-rate quality; but from its great height, and the absence of plasterers' work in other parts of the hall, plasterers' work would not be suspected. First-rate plastering is not the rule in Paris, but the exception; more so, he thinks, than with us. In secular buildings, viz., dwelling-houses and hotels, the plasterer has less to do than with us. The ceilings are not enriched so commonly with mouldings as with us—the painter and artistic decorator superseding all others in making blank spaces agreeable to the eye.

"The French artisan has less choice of materials than the English. While the latter has many different cements to work with, the Frenchman has very few indeed, mainly working in that plentiful material plaster (gypsum, or sulphate of lime), the coarse being used for rough floating, and for finishing the plaster is sent through a fine sieve. The plaster setting quickly is a great advantage, as it enables them to finish a room off at once, so that one preparation is enough for, say, one room. With us it is very different, as we have to wait for the drying of the different coats, causing delay, besides keeping more in hand at one time, and finishing nothing right off. The style of work seems rather wasteful to an Englishman."

In cornices, whether inside or out, the Frenchman uses more tools than our men do. We use straight-edges, or joint-rules, of cast steel, with a few small tools; this is all that is required for our intersections or "mitres;" but in Paris the workman uses wooden moulds, made to the shape of the various members of the cornice he is forming, moulds which are akin to those used by our masons. This takes considerably more time than we are in the habit of spending on such work. In plain work they use fewer tools than we do. The principal tool is a rather broad, thick, triangular trowel. They are not so particular as ourselves regarding the colour of their plaster. We look with distrust

upon high-coloured plaster, well knowing it sets too quickly to be worked properly, with the grave defect of "giving" or softening after it has been laid on for a few hours.

The display of plasterers' tools in the Paris Exhibition was very meagre, and the worst was that in the Royal Carriage Department, contributed by England. To show how deceptive such exhibitions may after all be, we may mention that there was a plastering trowel of very old date, nearly out of use, and only to be met with in some very odd nooks and corners of old England.

The plasterers in Paris, like their English brothers, complain of the exceeding difficulty of obtaining lodgings in a central spot, so as to obviate the need of long journeys to and from their work. Most of them reside in the outskirts of the city, the single men in lodgings, paying for a single room about 15 francs per month for the exclusive use of it. When two share the same room, they pay 2 francs or mostly 3 francs more. The married generally rent two or three rooms, on a third or fourth story, at a rental of 250 francs or 300 francs per year, paid by the quarter. In addition to the preceding, when the rent exceeds 250 francs per year, a tax of 9 francs is paid by the tenant. He learns that there are about 1,000 men engaged in the plastering trade of Paris. Many of those coming from the provinces are very indifferent scholars: some few can read, fewer still can read and write. Nearly one-half of the men engaged in the plastering trade attend some school or institution, at the rate of two nights per week. The instruction is free, the schools being supported by a Government grant, and by the donations of private individuals. Often the priest opens a free place of instruction, teaching geometry, drawing, and other branches of education. The two principal educational institutions for them are the Polytechnic Association and the Philotechnic Association.

Wages were paid once a fortnight, and in some cases once a month; but everything getting dearer—provisions and house-rent—there was a general move made by the men for shorter reckonings, and now the practice pretty generally prevails of drawing on account as often as twice a week, viz.—Wednesdays and Saturdays, and settling up once a fortnight or three weeks, sometimes once a month. He states their wages as sixpence per hour for those men who only do plain work; eightpence for those who run mouldings.

The reporter mentions the Conseil des Prudhommes, and says no sane man can doubt that these councils do a great deal towards preventing strikes. "Still, your reporter found the workmen in the building trade of Paris in a rather unsettled frame of mind."

T. W. Hughes and John D. Prior, who write a joint report on carpenters and joiners' work, wisely admit that to do justice to the subject, they should require a much more intimate acquaintance with the French workman than could possibly be acquired during a short visit. They find that carpentry is gradually falling into disuse in Paris, in consequence of the substitution of iron for wood in the erection of buildings. Nearly all the houses now in course of construction are being built fire-proof, with iron lintels and girders, the floors being constructed of iron joists filled in with brickwork, with flat roofs of a similar character. Such specimens of carpentry as they saw were generally of a very rude description. Their partitions are mostly constructed of crooked and rough scantling, which would be condemned by any surveyor in this country. Their joists are placed at very irregular intervals, and appear to have been laid at random by labourers, rather than fixed in their proper positions by mechanics.

"Joiners' work in Paris is, in our opinion, defective in its construction, and roughly finished. French joiners have apparently no idea of wedging up a piece of framing. In framing a room door with stiles $\frac{1}{2}$ in. or $\frac{1}{4}$ in. wide, they

would not carry their tenons through the stiles, and wedge up the frame, as would be done in this country; but their tenons would go only half way through the stiles, and be fastened with pins. This system of pinning, which is a favourite one with the French, is considered very objectionable in this country, as the head of the pin never fails to project beyond the face of the work as it shrinks. In making sashes and other framing with narrow stiles, in which the tenons are carried through the stiles, we saw no attempt to wedge, but everywhere we found even the least of their work disfigured by the unsightly pin."

On the whole, they consider Parisian joiners' work to be far inferior to that done in this country. Their mouldings, as a general rule, are very well designed, they note, and the carving is remarkably well executed; and they can easily understand how an art-student may be attracted by the tasteful and artistic appearance of a piece of joiners' work, and may fancy that he sees in it an evidence of the superiority of French work; but the practical workman will arrive at a very different conclusion. He will at once understand that for the portious of the work which are so attractive to the eye, the joiner is in no way responsible, since he is neither the designer nor the carver; whilst the framing itself would be found to be very defective, both in strength and finish. French workmen, they consider, will require better tools, and an entire revolution in their system of working, to enable them to execute a class of work fit for the English market.

They find in the Belgian oak pulpit and staircase a quantity of very good carving; but his joiners' work presents to them all the objectionable features which characterise French work, with the addition of a few novelties which are peculiarly their own. One of these is to be found in the hand-rail of the stairs, the lengths of which are united by means of a scarf-joint. "We have no very strong objection to a scarf-joint, if properly made, albeit we feel a very decided preference for a good butt-joint, properly doweled and screwed together; what we particularly object to in this instance is that the scarf is made the wrong way, with the sharp edge of the wood in an upward direction. Now, we know that usually a man grasps a rail firmly to assist him in ascending a staircase, and slides his hand over it in descending. Should any incautious stranger pass his hand quickly down over this rail in the way we have indicated, now that the work has been exposed to the action of the sun and air, he will, in all probability, suddenly find some small splinters of the wood imbedded in his flesh,—a sensation which will be more exciting than agreeable."

In Paris the wages, they state, vary from 4 $\frac{1}{2}$ frs. to 6 frs. per day, according to the ability of the workman, or "rather according to the amount of confidence in his own ability which he professes, self-confidence being a quality which naturally enhances the value of a man's labours under such circumstances as these." Six francs per day is the largest amount paid to any working joiner, and this is only paid in very exceptional cases. Ten hours generally constitute a day's work, the working hours being from 7 a.m. to 7 p.m., out of which two hours are allowed for meals. Sunday work is general.

The polite manners of workmen delighted them. They found, too, a great appearance of gaiety; but they were not to be taken in by the tinsel, and state thus energetically their opinion of the life led by Paris workmen:—

"The French people appear to us to be immersed in vain and frivolous pursuits, which hide from them the true purposes of life, to be bound by trammels which they must cast aside ere they can hope to rise to the dignity of a free and independent nation. They want more energy, perseverance, and strength of character; they want to learn that there are aims in life more noble than emptying a wine-bottle, or skipping about a dancing-room; to learn that to spend a life in the service of liberty is even more noble than to die for it. When the French people have learnt to govern themselves, they may expect to be governed wisely and well; and, no longer tools in the hands of ambitious rulers, they may build up for themselves, upon a sure and certain foundation, the edifice which some among them have so long and earnestly desired."

They arrive at the conviction that in their trade they have little or nothing to fear from foreign competition; and if the specimens of

* See p. 21, ante.

work exhibited in the Paris Exhibition may be considered as a fair representation of the workmanship of the various Continental nations, very little indeed to learn from them. They wisely urge upon the carpenters and joiners of this country to become thoroughly acquainted with the principles of geometry, and their practical application to their own trade, as being of the utmost importance; and at the same time, fully acknowledge the necessity of working to appreciate all that is beautiful and noble both in nature and art, and shall induce him to strive after a combination of the ornamental and the useful in the objects by which he is surrounded in his daily life.

Alexander Kay, who also writes on joiners' work, gives a more elaborate report. At starting he says that the price of materials and rates of wages are regulated by the Prefect of the Seine, at his palace, Hôtel de Ville, and that the hook is sold at 12 francs. He appears to have inquired very carefully as to the foreign works, and has a somewhat higher opinion of what is done abroad than Messrs. Hughes & Prior. He nevertheless finds the French joiners' work defective.

British joinery, he thinks, holds its place amongst the nations of the world, although England has to import the materials which are the component parts of joinery from America, Russia, Norway, Sweden, Prussia, Spain, Hindoostan, Australia, &c.

Messrs. Clerihew & Lascelles, of Bunhill-row, Fishery, exhibit various articles of joinery in the testing-house, sashes and sash-frames, doors and furnishings, staircase and mouldings, all worked by machinery, being only put together and cleaned up by hand. The mouldings are without glass-paper or scraper; and, the character and quality of the work, and the prices at which they produce such articles, most convince any French joiner that he is far behind a British joiner, as it convinces me. Persons, when they require joinery-work, wrong themselves when they go to foreign countries for joinery, as there is none to excel, and little to equal, our own.

He found no proper representation of the tools used by British joiners in London and many of the provincial towns. "There are many of our British tool-makers able and willing to risk the enterprise of sending a case of tools properly got up, and of a class far superior in utility to those of the joiners of any nation, but costing the joiner more money than the tools of any other nation, although repaying the British joiner for his outlay, and benefiting the employer by causing a great saving of time and labour, and economy of material."

The following comparison of the price charged for some of the ordinary tools used by joiners is curious:—

	British.	Austrian.	French.
Jack plane.....	2 s. 3 d.	2 s. 3 d.	2 s. 3 d.
Trying plane.....	0 6 .. 0 1 10 ..	0 2 .. 0 2 ..	0 3 2 ..
Smoothing plane 3s. to 4s. ..	1 7 0 .. 0 1 7 ..	0 1 8 .. 0 1 8 ..	0 2 6 .. 0 2 6 ..
Head plane	0 3 0 .. 0 1 10 ..	0 1 10 .. 0 1 10 ..	0 3 0 .. 0 3 0 ..
Brace	0 7 6 .. 0 1 2 ..	0 1 2 .. 0 1 4 ..	0 7 6 .. 0 7 6 ..
Hand saw	0 6 6 .. 0 2 5 ..	0 2 5 .. 0 2 0 ..	0 6 6 .. 0 6 6 ..
Lock saw	0 8 .. 0 8 ..	0 8 .. 0 8 ..	0 8 .. 0 8 ..
Square	0 3 0 .. 0 2 ..	0 2 .. 0 2 ..	0 3 0 .. 0 3 0 ..

He thinks that the foreign tool-makers must be in a very bad plight indeed.

He found that the locksmiths fitted all the locks and hinges on the doors, windows, &c., which in a measure accounted to him for the insufficient and clumsy nature of their fixing throughout the different buildings in Paris. He says, "The locks were all box-locks, and badly made. The hinges were likewise bad, and of ancient design." He has not said, as he might, that these clumsy-looking fastenings answer their purpose for years, while a vast proportion of the neat fastenings put on in England are utterly worthless in a few months.

Being asked in the British Workmen's Hall in the Exposition his opinion of the joinery in the New Imperial Library and Hôtel de Ville, he replied that it was the best joinery he had seen in Paris, but was not equal to the joinery in London Government buildings, such as the Houses of Parliament, British Museum, and the new Indian and Foreign Offices in course of erection, neither for solidity of workmanship nor beauty of finish; for in those buildings all the architraves, &c., were finished without a screw or nail being seen in any way whatever, and well fixed too; such not being the case in the Paris buildings, where the heads were either obviously visible, or punched in and covered with a mastic, like common putty.

He is surprised they do not adopt the mortise lock. He could not find one of French manufacture in the Exposition.

In the building of the Conseil des Prud'hommes the joinery he considers, is truly bad, although re-

cently constructed, being made of unseasoned oak, badly joined together by the French joiners. The work does little credit, he considers, to the workmen or to the contractors, as any person can see through the doors at the mitres of the mouldings, the joinery being far from equal to the masonry; the same is the case in all the other buildings in Paris. He found the joinery manufactured by Messrs. Petit-Jean & Cavet, which the fortifications on the bank of the Seine, well supplied with machinery, cheaply got up, but mostly of rude construction, and the work produced was as rude as the machinery. They had several upright saws for cutting ornaments in wood, such as tracery, bracketing, and so on, the spring for producing the back motion being made of ash, and constructed as British coach-smiths make springs for carriages and wagons. Their moulding and rebating machine is worked on a vertical motion, with vertical cutters, and executes very rough joinery, the feeding motion being of had principle, and not keeping the piece of wood steady to the cutters.

At M. Havel's the interpreter told M. Theodore Canonnet, the staircase-builder there, that Kay considered the workmanship not good.

"He got quite offended, and told the interpreter that he would defy any man to make a better job. I had then to explain to him that his hand-work was good, but the system he adopted was expensive, requiring a great quantity of timber, and a greater amount of labour than was actually necessary, and not making, as strong a staircase, which seemed to take him by surprise. I endeavoured to explain to him the orthogonal or square-cut system, brought to such a state of perfection by William Perry, staircase-builder to Messrs. William Lawrence, & Sons, Lambeth, which he seemed to comprehend a little, and desired the interpreter to thank me, and wished me to call on him again. I then endeavoured to show him how to produce a staircase with a cylinder, and to block and glue his steps to make them more solid, which he seemed to see the great benefit of. He has to cut the string for the whole for his stairs out of a solid block of timber. The string was 3 in. thick, 11 in. deep, with a scroll of diminutive size attached. He told me that the work was mostly done by the piece, he had spent from ten pence, besides the use of the machinery, which I considered was a good price for the work."

The reporter feels quite certain that British joiners could get through more work than they do if they were fairly and civilly treated by employers, which, he says, is not usually the case. He relates, for example, what occurred in the preparation of the quadrangle in the new Indian Offices, for the Sultan's *filie*, a work of great interest to the workmen as well as those who had the management. It was well arranged, and executed by the managers and the workmen in a short space of time; but he knows that had a slight measure of refreshment been meted out to the workmen, especially to those who were labouring on their knees, planing the ball-room floor, with the promise of a reward if they were done by a certain hour, it would have been ready several hours earlier than it was. When they left work for half an hour at a clock p.m., to get some refreshment, they were not allowed to have any money to purchase anything with, and returned to work till midnight without having tasted a morsel from 5.30 p.m., and some from noon; and on the night of the entertainment more than one hundred joiners alone worked from noonday to 10 p.m. without having eaten or tasted a morsel of bread or drunk a cup of tea, and then were grumbled at by some persons who knew not how hard they had worked, and were hustled out of the building by a police-officer.

We agree with him that there was want of good feeling and wisdom shown here, if the statement be correct. The reporter urges strongly the want there is of education in his class, and says he finds that education greatly assists the workman in the execution of his duty, in adopting the speediest and best methods for the construction of his work, both as to time and quality. The educated workman always returns the greatest value to the employer, especially if he is an anti-associate of the *gilt-palace*.

Masonry is written of by George Broughton Forbes and John McKew, who say masons' wages are from 6d. to 8d. per hour in the city. There are three classes of workmen: roughers at 7d., finishers at 6d., finishers at 8d. per hour. On hard stone they have to pay 5d. per day for sharps. On granite, the employers pay for the tools sharpening. The cost of their living is about three francs per day. They work ten hours per day, seven days per week (including Sunday), and, when required, overtime. These reporters appear not to have found much done in Paris that could not be better done in England. "We claim for our countrymen in the trade as masons to be more skilful and systematic in the executing of their work, either

for quality or quantity, than we have yet seen."

Thomas Connolly, stonemason, goes into the same subject at much greater length, and commingles a valuable and readable report. He found Paris a wonderful place; everything on a grand and magnificent scale; and thought they had a better way of managing improvements there than we have at home:—

"In Paris it would appear that the authorities and the architects combine to make a perfect street; in London the Board of Works, the vestries, and the architects agree to differ; and when there has been an opportunity of making a decent street, as in Southwark, a number of buildings are erected in every style of architecture, from Hindoo to Pantonian, and some in no style at all, but each vying with the other in hideous deformity."

In the science of construction, and the judicious use of the materials, stone, wood, and iron, the French architects, he thinks, display great skill. The right material is generally used in the right place. Their buildings being constructed as much as possible fire-proof, were seldom read of a great fire in Paris. They are generally well-built, for the builder and the architect have to insure their stability for ten years, and are held accountable during that period for the expense of any repairs arising from imperfect workmanship or from defective materials. The fronts are all built of large stones, bedded and jointed, which go through the whole thickness of the wall. They are laid dry on each other, and afterwards run with plaster.

There are openings left for the doors and windows, and projections for the cornices, mouldings, and carving. When the walls are carried to their full height, the masons work the front of the building, commencing at the top; they finish and take down their scaffolding as they descend. The back and end walls are built with small squared stones on the outside, and with unsquared or rubble on the inside. They are hedged in plaster: very little care is used in the hedging of this rubble, as the plaster sets soon after the stone is laid. The flues to carry off the smoke are constructed with earthenware pipes built into the walls; and as those walls settle unevenly on the foundations, you observe on every gable-end exposed to view that open joints are left close to the quoins, so that each wall may settle of itself, without drawing the other with it, and causing rents in the building. These open joints may be filled up when the work is seasoned.

He gives a very good account of the mode of performing different sorts of work. He arrives at the conclusion that when a stone has to be worked to a mould, or fitted to a square or a straight edge, no man can do it more workmanlike or to greater perfection than an English mason; but that when the hands have to realise the imagination, the Frenchman's familiarity with art, and his early training in its principles, enable him to outstrip us; and as every building in Paris is more or less decorated with carving, he was at a loss to know at first how they got all their art-workmen.

"But the difficulty would not appear so much if you could read the large placards, in French, which are posted up at the ends of the bridges and other public places, informing workmen where they can be taught drawing and modelling every evening free of expense. That is outstripping the Englishman in this respect does not, I feel certain, arise from the possession of an especial art-genius, but because whatever it is in him is fully developed, and encouragement is given to its practice; and if English workmen are behind in this respect it is not because art-genius is deficient in our nature, but because it is not developed and encouraged sufficiently."

He thinks it impossible to estimate the loss which is entailed upon England through the neglect of art culture in every department of our industry. Through it we are reduced to mere hewers of wood and drawers of water for other nations. The bulk of our able-bodied population is engaged in manufacturing goods to be sold cheap, or in producing raw material for other people to work up; while the more delicate portion have to subsist on their earnings for want of employments suitable to their strength. The streets of London and our large towns, he remarks, are torn up with heavy traffic, which is scarcely perceptible in Paris; for if a ton of iron enters there, for which we may get less than 11., they are sure to put 100l. worth of labour on it before it leaves their hands.

"But 'all is not gold that glitters,' for among all the enjoyments of a Parisian workman, there is nothing to compare with the substantial comfort of an English workman's home, or the quiet repose and respite from labour which the Sabbath brings him. Nothing is more intolerable or repugnant to the mind of an Englishman than the description of this day of rest."

We must hurry on. William Lethers, speaking of hammered iron, says, as far as he is able

to judge, the French excel in taste and effect, but that they are not more skillful as smiths; in fact, he thinks the English excel in hammered iron-work. There is a great difference in the design. The French make their work strong and very effective; the ornamentation, being of this sheet-iron, is light and elegant, but forms a separate part from the other portion of the work, and consequently must decay very soon; another fault is that, being thin iron, recourse must be had to riveting or brazing. To weld iron so thin to a larger substance would be a difficulty, if practicable at all. If iron-work is to last a long time, it must be welded together, or worked from the solid bar; then the leaves can be made sufficiently strong to last for a number of years.

The skill of the smith is displayed in uniting the parts of a piece of iron-work, so that the different leaves and other parts, when completed, form a whole, blending one with another. Then we get use, durability, and ornament combined. This the older smiths made their study, and it should be our aim, he rightly remarks, to excel them; in this class of work, the workman must not only be practical, but have a knowledge of design; we may find many a good smith in England, but, having no knowledge of drawing, he only destroys the good effect intended by the designer. The French have an advantage in this respect; the master of an apprentice is bound by law to give him two hours a day for education; and the class of schools formed for such have a peculiar advantage, inasmuch as the artisan is invited to bring specimens of work of whatever kind, and prizes are awarded, at certain times, to those that excel. In this respect the French, he feels, are far before the English.

Two special reports on the condition and habits of the French working classes, one by Robert Coningsby, the other by Richard Whiteing, occupy fifty pages, and contain much that is interesting and worth examination. It is curious to hear that most of the French workmen with whom Mr. Coningsby spoke, were of opinion that art and handicraft are declining among them. They said that the excessive division of labour had had a tendency to make men more like machines; and the constant breaking up of small workshops has had the effect of disheartening men from attentive study, because they see that, without an enormous capital, it will be impossible for them in the future to improve their position. He says he had heard something of the same sort at home, but, for his own part, believed that the most direct way of producing anything must be the best, and that compensations abound even in the matter of trade ambitions. "If a young man sees the extinction of his hopes in one direction, he will most likely be encouraged by the sight of chances in another."

Mr. Whiteing says that the French workmen do not avail themselves of the means of technical education in the same proportion as they did five-and-twenty or thirty years ago. It is an undoubted fact, testified to by the complaints of all large French manufacturers, that though in numbers the attendance at the various schools is perhaps as great as it has ever been, yet, in proportion to the increase of population, it is smaller than in former years. The reason, as gathered from the testimony of men, seems to be that the work exacted during the day is now so much harder than in former times, that there is no energy left for the evening-school studies. Whatever may have been the alterations—and they are but few—made in the hours, the *rate* of labour has gone on steadily increasing. "More work is now demanded of a man in a given time, and when that work is done, body and mind are so fatigued that relaxation is sought in the *café*, or at the theatre, and none but the most active intellects have the energy for the additional labours of the school."

The reports by the Birmingham artisans are pithy and pregnant, and we can give particular praise to one that ends the volume, that "On Design," by Frank J. Jackson, designer and art-teacher, who sees in the apathy of the British public one great reason for our slow progress in individual art. The general public must be educated in art by familiarizing them with artistic works and an improved street architecture. Museums will have to be multiplied, and every town of any manufacturing importance must have its store-house of art treasures, from which the student and art-workman may gain inspiration. Lastly, he thinks, our schools of art will need re-modelling, and will require

energetic support to relieve them from the half-starved condition in which too many of them are, so that they may be prevented from sinking into mere drawing academies, which is the present tendency, and become what they really should be—schools for the promotion of industrial designs. If this question of decorative art is taken up in the spirit it demands, success will be ours. We believe that if energy be brought to bear upon design as it is in developing the processes of manufacture, we shall yet have a school of art second to none, inasmuch as our national love for the substantial and for correctness of construction will ever prove to us safeguards against that vice of art—prettiness of effect gained by the sacrifice of truth, a vice which disfigures other schools whose good qualities we so much admire.

THE DWELLINGS OF THE LABOURING CLASSES.

The publication of a "revised and augmented edition" of the work by Mr. Henry Roberts, F.S.A., bearing the above title, being the sixth thousand, is of itself so conclusive an evidence of the growing interest in this all-important social question, as to call for some notice in these columns, which have been so often devoted to the furtherance of this object, even did not this new edition also contain a valuable contribution of new matter, dealing with the most recent efforts that have been made to supply the increasing want of suitable dwellings for the labouring classes.

Previous editions of this book have from time to time been noticed in these columns; but it may not be out of place to touch slightly upon a few of the more salient points in the crusade commenced more than twenty years ago against the apathy which permitted the unfit and inadequate housing of our labouring classes so long to remain a hot spot upon our social system. It is more than twenty-three years since the Society for Improving the Condition of the Labouring Classes, which had for its first object the improvement of their dwellings, commenced their labours. Mr. Roberts, now a vice-president of this society, was at first its honorary architect, and the essay which forms the basis of the work under notice was originally published seventeen years ago at the request of Lord Shaftesbury and other gentlemen distinguished for their interest in the social improvement of the labouring classes. The work which was thus begun so long ago has been steadily progressing; and, induced by the rapid growth of large towns, the increasing tendency to encroach upon and demolish portions of the larger cities for railway and warehouse purposes, and so-called improvements, without the erection of even a corresponding number of dwellings in other neighbourhoods, the crying evils of overcrowding have since increased rather than decreased. Apart from the efforts of associations and of private individuals which have recently been greatly multiplied, some measures of a legislative character have been adopted within a short period, which had been long urged in this journal and in other quarters. The most important of these has been the power given under the Act of 1866 to Government to grant loans upon the security of improved dwellings of the working people. Municipal and parish authorities have not at present availed themselves of this Government aid to any considerable extent; but it is to be hoped that the very vastness of the field of labour and the increasing urgency of the need of improvement, will lead to an important increase in the employment of national capital in furthering this object.

The first appendix in the volume before us gives a few of the incidents in the early stages of this important movement which are of general interest. The intimate relation known to exist between the fatality from various epidemics of cholera, typhus, and other zymotic disease, and the overcrowding of our poor in unsuitable dwellings, was one of the earliest means of directing public attention to this subject. The first cholera epidemic in London in 1832, and the wide-spread ravages of typhus in 1837, both of which were most severe in the East of London, led the Poor Law Board, in the latter year, to institute a searching inquiry into the social condition of the working-classes. A second report, published in 1839, threw further light upon the physical and moral degradation of the very classes that had most severely suffered from

those epidemics, and among other evidence it was shown that of 77,000 persons who had received out-door parochial relief in the twelve months ending 25th March, 1838, no less than 14,000 were the subjects of fever. Some of the most distinguished statesmen and philanthropists of the day, with a view to devising remedial measures, established the "Health of Towns Association" in 1839. A committee of the House of Commons followed in 1840; and the earnest exertions of Dr. Blomfield, then Bishop of London, in the House of Lords, led to an Act being passed through that House in 1841, which, however, in consequence of a prorogation of Parliament never reached the Commons. In 1842 the report of "an inquiry into the sanitary condition of the labouring population" was published; this report was alluded to by Lord Stanley in 1857 as the "text-book of sanitary research." In the same year (1842) a Royal Commission was appointed to inquire into the condition of large towns, which was especially directed to inquire "as to how far the condition of the poorer classes of the people, and the salubrity and safety of their dwellings, might be promoted by the amendment of laws, regulations, and usages." Successive reports were published by this Commission in 1844 and 1845, containing an immense mass of evidence conclusively tracing a vast amount of the excessive mortality and sickness in all large towns to the condition of the abodes of a large portion of the inhabitants. Beyond, however, serving the purpose of attracting public attention and interest at the time, no important legislative enactments immediately followed. Almost the only practical results of these official inquiries and reports were the establishment of two societies, having for their object the providing of a remedy for the great social evils arising from the state of the dwellings of the working classes. The earliest, in point of date, of these two societies, was the "Metropolitan Association for Improving the Dwellings of the Industrious Classes," which was founded in 1842, on the sound principle that the investment of capital in furthering its object should make a fair return upon the outlay; on no other principle can this important work ever be effected on anything like a scale commensurate with the necessity. The second society, not founded till 1844, was the one above alluded to, with which the author of the work before us has been so long officially connected; it was started under the immediate patronage of the Queen, with the late Prince Consort as president, and the Earl of Shaftesbury as chairman of the committee, which post he still occupies, in addition to the presidency to which he was elected on the death of the Prince Consort. This society, although two years the junior of the one previously mentioned, was the first to put its objects in practice, by commencing a range of model-houses in the first year of its existence; while the Metropolitan Association did not begin to build until its incorporation by Royal Charter in 1845. Of the labours of these two societies since their foundation to the present day, we shall say a word or two presently; we now pass on to subsequent events relating to the same object, the social and sanitary elevation of the working classes. The Public Health Act of 1848 was the first important legislative result of the different Parliamentary inquiries, followed by the Nuisances Removal and Disease Prevention Act of 1848 and 1849. The Public Health Act has been since frequently amended, and in 1853 the Local Government Act transferred the power of the General Board of Health to the Privy Council, to which was added a medical officer; this Act was further amended in 1860, and again in 1866 by the Sanitary Act, the last, and in many ways the most important of the various sanitary enactments, as it also dealt largely with the Nuisances Removal Act, not only enlarging the definition of nuisances, but considerably increasing the power of the local authorities in dealing with them. As early as 1851 power was given to all parishes and boroughs containing not less than 10,000 inhabitants either to build new houses, or to improve old ones, in order to provide better lodgings for the labouring classes, and also to raise money, and to defray necessary expenses out of the poor-rates, such houses being made as nearly as possible self-supporting. The "Common Lodging-houses Act," passed also in 1851, was in results second only in importance to the Public Health Act; but the almost impossibility of enforcing its clauses in all the town tenements let at low weekly rents to the working population, renders still further

legislation desirable, although the Act of 1851 has been finally amended by the Sanitary Act of 1866. A Bill, entitled "The Labourers' Dwellings Act," was passed in 1855 to facilitate the building of improved dwellings, and the formation of Joint Stock Companies for the same purpose, which has since been amended by more recent enactments, and extended in its operation to Scotland and Ireland. The last, although very far from the least important Act hearing directly upon the subject of labourers' dwellings, was the one of 1866, above alluded to, giving power to the Public Works Loan Commissioners to advance sums of money in furtherance of this object: by this manner the operation of the Act of 1851 was much facilitated. Still further power is thought desirable to enforce owners of unsanitary dwellings to improve their condition, to part with them to those who are able and willing to do so, or to shut them up; but the difficulty of adequately dealing with this question, without infringing too greatly upon the right of private ownership, appears to have hitherto baffled our legislators. In the conclusion of this Appendix the author bears evidence to the "lively interest and wide-spread influence which the example of the late Prince Consort had in promoting this important object."

The new portion of the work before us, which deals with results of the experimental building of Model Lodging-houses and dwellings, both from a sanitary and pecuniary point of view, is, perhaps, on the whole, the most important, as it must be upon a successful fulfilment of these two considerations, that hopes may fairly be founded that the public will be induced to interest any adequate amount of capital to such undertakings. First, as regards the sanitary and social result. As far as it is at present possible to derive reliable statistics of the mortality among the residents in the Improved Dwellings, it is confidently stated that the death-rate has been reduced from 25 per 1,000, the average of the metropolis and other large towns of England, to 17 per 1,000; a similar reduction in the mortality of that large class, for the benefit of which these efforts are particularly directed, would be the means of saving at least 50,000 lives per annum in all the large towns of England. Within ten years of the building of the first model houses—namely, in January, 1855—an official report was made upon the influence of these houses, and laid before Parliament. In this report, relating to buildings which for three years had averaged 450 tenants, congregated in the worst localities of London, and including an unusual proportion of children, it was stated that the mortality had been remarkably lower than in neighbouring tenements; that there had been an almost entire absence of epidemic disease; and moreover that during the cholera visitation of 1854 there had not been a single death from cholera or diarrhoea in any of the houses. A marked improvement in the cleanliness, propriety, and general moral bearing of the tenants was also reported by the superintendents of the different establishments. Since the date of these reports these benefits resulting from the improved dwellings have undoubtedly steadily increased; but it would tend greatly to increase the public interest and confidence in these undertakings if full statistics of the births and deaths in all such buildings, with the proportion of the latter resulting from epidemic diseases, could be made available.

Bearing upon the pecuniary result of the efforts of the two most important pioneer societies having for their object the improvement of labourers' dwellings, some interesting tables are given, which, after taking fully into consideration the difficulties in the way of the earlier ventures, which were more or less experimental, must be considered satisfactory. The Metropolitan Association has expended 94,000. (In round figures) in providing accommodation for nearly 450 families, and about 350 single men. In the year ending March, 1866, the net rental on the whole of this outlay was rather more than 4,000*l.*, sufficient for a dividend exceeding 4 per cent. per annum. The second society in date of establishment, that for Improving the Condition of the Labouring Classes, had up to the 31st December, 1865, expended rather more than 37,000*l.*, and during the year 1865 the net rental was 1,600*l.*, showing a return of nearly 4½ per cent. The Metropolitan Association has recently obtained a Government loan of 18,000*l.*, under the Labouring Classes' Dwelling-house Act of 1866, in order to carry out a project for building at Fenge; the London, Chatham, and Dover Railway having undertaken to carry

the workmen to and fro at a charge of 2s. per head per week. The same Association has undertaken to build and manage an extensive pile of model dwellings in Pimlico, near the new barracks, Chelsea Bridge-road: the Marquis of Westminster finds the capital at a low rate of interest.

Among the various individual efforts which have been made in the same direction as those of the two societies which first set the example, one of the most successful was the rebuilding of Cowley-street, Shadwell, by Mr. W. E. Hilliard, of Gray's-inn, on the general plan of the Prince Consort's Model Houses; these buildings accommodate 112 families, are always fully tenanted, and make a net return of between 6 per cent. and 7 per cent. upon the outlay. Five piles of improved family dwellings in Grosvenor-mews, Berkeley-square, erected by Mr. John Newson, a builder, at a cost of 13,200*l.*, make a return of 5½ per cent. on the outlay.

In the concluding portion of the appendix to the new edition of Mr. Roberts's work, some information is added relating to the employment of Mr. Peabody's princely gift to the city of London of 250,000*l.*, "to ameliorate the condition and augment the comfort of the poor." While leaving the utmost latitude to the trustees in whose names the money was invested, it was suggested by the magnificent donor, "to apply the fund, or a portion of it, in the construction of such improved dwellings for the poor, as may combine, in the utmost possible degree, the essentials of healthfulness, comfort, social enjoyment, and economy." Acting on this suggestion, the trustees determined at first to confine their operations to this special object, "the improvement of dwellings for the poor of the metropolis," and building sites for five different piles have been already purchased, situated respectively at Spitalfields, Islington, Shadwell, Chelsea, and Brompton. The three first blocks of buildings were opened previously to January, 1867, and accommodated more than 400 families: they were erected from the designs of Mr. H. Darbishire. In presenting to the trustees his second gift of 100,000*l.*, in order to enlarge the sphere of usefulness of the fund, power was given to purchase freehold sites in any locality within ten miles from the Royal Exchange, accessible by means of railways.

Mr. Roberts's "Dwellings of the Labouring Classes," as at present revised and enlarged, is a most valuable hand-book to all those interested in this important subject; whether the architect, builder, or the general public, from the support of which alone can be expected any rapid extension of the useful labours of existing associations or the establishment of new ones. The condition of labourers' dwellings, not in London alone, but even more especially in our large provincial towns, cries loudly for more capital to employ in their improvement. The object is national, philanthropic, and fortunately calls for no sacrifice; if the public will only show confidence and subscribe the necessary capital, the object will be attained, and dividends as large and as safe as from money in the Funds will be returned, if only ordinary caution be employed and full use made of past experience. A perusal of Mr. Roberts's book cannot fail to further the interests of the cause in which he and we have laboured for so many years.

THE DRAINAGE OF LAND.

It may be thought that drainage has been so fully discussed and written about that there is no need for anything more to be said on the subject, but old things pass away and all things become new; and the maxim made use of by the politician to his followers, "agitate, agitate, agitate," applies equally to all scientific improvements which require adoption for the purposes of every-day life. And while new generations of men are continually springing up requiring fresh information, old writings and sayings are becoming antiquated and forgotten, and require replacing with fresh thoughts and ideas.

In the following remarks it is not intended to advance anything new, but simply in as concise a form as possible to lay before the readers the theory and practice of the modern system of land drainage as collected from the writings of eminent agriculturists and drainage engineers; and the reports and evidence prepared for parliamentary committees, aided by a practical

knowledge of the subject gained by practice and experience.

Amongst the readers of this paper there may be many who, from the nature of their occupation, may have a thorough knowledge of the principles of the science of drainage, yet who may not have studied the question practically, and to whom these hints may prove acceptable. The architect, in designing a gentleman's mansion or large building for a public institution, may be called upon to give his advice in the laying out of the grounds, involving, as a first requisite, their drainage. The town surveyor has under his care, most probably, the corporate estates, and is often called upon to superintend the drainage of the same. He may have to lay out an undrained farm for sewage irrigation, or to design a public park or pleasure-ground, in both of which cases thorough drainage must be the first operation; and there may be even engineers who may be called upon to advise on questions of drainage, whose engagements may have taken them in other departments of their profession, and who may, therefore, profit by the practical experience of those more intimately acquainted with the subject.

The history of the modern system of drainage dates back only to a time within the memory of the present generation. Mr. Joseph Elkington, a Warwickshire farmer, about the end of the last century, acquired a very considerable reputation by the skill with which he drained wet and boggy land, and converted wastes into fruitful fields. So important was Mr. Elkington's practice considered, that one of the first acts of the then newly organized Board of Agriculture was to use their influence in obtaining from Parliament a grant to Mr. Elkington of the sum of 1,000*l.* as an inducement to him to make known his mode of drainage, and as his health at that time was precarious, and it being considered that there was a risk that the public might lose the benefit of the knowledge he had acquired by the experience of above thirty years, the Board resolved to send Mr. John Elkington, a surveyor, to visit, in company with Mr. Elkington, the principal drainages he was executing, and to learn from him the art and practice, and afterwards to write a full report on the same for the public information (Introduction to "Elkington's Mode of Draining Land," 1814). From this time drainage was no longer confined to the removal of water arising from springs, to which the merits of Mr. Elkington's system chiefly applied, but gradually extended itself to clays and other impervious soils. Mr. Smith of Deanston may be considered the first who reduced the practice to a system and showed the principles upon which its efficiency depends. Through the exertions of this advocate, ably followed by Mr. Parkes, thorough drainage has become a *science and art* in the efficient cultivation of all tenacious soils. In the early stages of the art, turfs, thorns, and straw were used to fill the bottom of the drains; then stones, either broken into small pieces, or laid in the shape of a triangle, or hollow cube; then tiles were used, made in various shapes, the most common being that of a horse-shoe, in some cases laid on a sole, in others without, till, finally, the cylindrical pipe was introduced, and is now universally used, in preference to any other make.

The art of drainage has passed through many stages. Experience has had to be purchased at great cost, but the general result can only be looked upon as one of national importance in the improvement of the climate, the health of the population, the facilities afforded for the use of improved machinery in working the land, and the consequent vast increase of produce.

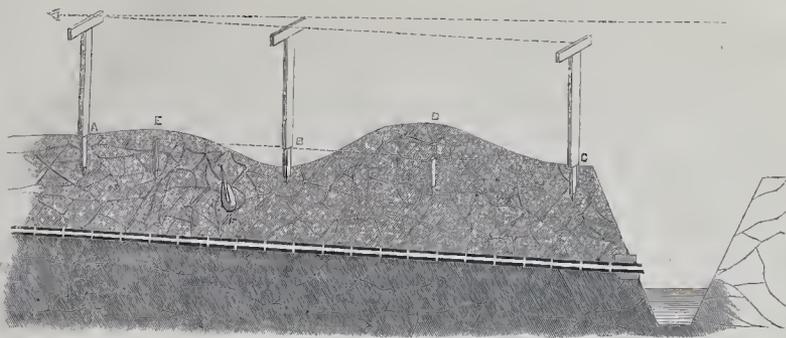
We shall first treat of—
The theory and practice of land drainage, as applied to single fields and small inclosures; and may afterwards speak of—

Arterial or outfall drainage, and the drainage of springs; and give,—

An analysis of the several enactments which have been made for the encouragement of drainage, and for giving greater facilities for procuring outfalls.

Drainage is an art, and only required in an artificial state of society, where the numbers of the population, as compared to the space on which they live, compel them to resort to art to extract from nature the supplies necessary to their existence. It has been remarked by a modern writer "that man's whole time is engaged in a constant struggle in submitting to his purposes the

* Kingsley, "The Roman and the Teuton."



THE DRAINAGE OF LAND.—Section.

laws of nature; and, although nature must be obeyed, she is to be conquered. All human invention is but the conquering of one natural law by another: thus, the first savage conquered the natural law which put wild heats in the forest by killing them; conquered the natural law which makes raw meat wholesome by cooking it; conquered the natural law which made weeds grow at his hut door by rooting them up, and planting corn instead; and his successor has conquered the natural law which saturates his fields with water to the detriment of these corn crops by removing the impediments which prevent this water from obeying nature's law of gravity, by which the water will leave his land and flow away to feed the brooks and rivers.

The man who refuses to acknowledge this law, and to become artificial with the times, and to profit by the genius of his fellow men; who is content to let nature be his lord and not his servant; who leaves his fields in the state in which nature presents them to him, and does not avail himself of the inventions of modern cultivation and drainage, must be content to be left behind in the race.

Air, moisture, and warmth are all absolutely necessary to vegetation. The use of the earth is, to act as the vehicle by means of which a supply of these can be kept up, the object of drainage being not to deprive land of moisture, but to regulate the supply; and while, with drawing the surplus moisture, to admit in its place an adequate supply of air, and so also to increase the temperature of the soil.

All soil consists of a number of particles more or less closely united together, according to its nature; but even in the most compact soils these particles do not form a solid mass, but between each there is a space, so small, indeed, as not to be seen without the assistance of a microscope, but still, sufficient for the admission of air. These small spaces are called pores, and they exist not only between the particles, but in the particles themselves, which consist of decomposed rocks and organic matter. To make this plainer, the above illustration is given, which is not intended to represent exactly the appearance the soil would present if magnified, but only to serve to illustrate the mechanical properties of the soil.

The shaded pieces are intended to represent the particles of which the soil consists, and the small dots in them the pores; the spaces between being the larger pores, which communicate freely with each other so that they form canals. Now, a soil is said to be wet when these interstitial spaces or canals are full of water: it is moist when only the small pores are full of water; and it is dry when both pores and canals are empty of water, and consequently filled with air. If a seed be placed in the ground as shown at F, and both the pores and canals are free from wet, it is evident it has plenty of air but no moisture; and if, on the other hand, both canals and pores are full of water, it has plenty of water and no air,—the two conditions of a very dry and a very wet soil. If the canals are empty of water, and the pores full, the seed is then supplied with both air and water, and is in a condition to undergo that chemical change which is called germination.

When water is first applied to a dry soil from

the rain, it sinks by the law of gravity to the lowest place it can find, flowing downwards through these canals. If the supply be moderate, the water is soon absorbed from the canals into the pores of the particles, the soil becomes moistened, and the canals refill with air. This is a healthy condition of soil. If, however, the rain continues after the pores are full, the water remains in the canals and the ground is completely saturated, and will so remain until the water either soaks away into the ditches or is evaporated by the sun and wind. This is the condition of undrained land, interfering most materially with the process of the germination and growth of vegetation. It is evident, therefore that, in a compact soil, where the interstitial spaces are small and the particles lie close together, it must be a very slow process for the water to find its way by gravitation to the ditches; and in winter, before one shower is thus disposed of, another follows, and the canals are never empty.

The object of drainage is by facilitating the discharge of this surplus water to such a depth from the surface, that while, on the one hand, it is removed so far from the roots of the plants as not injuriously to affect them, yet, on the other, not so deep as to retard, during the dry weather of the summer months, the supply of moisture which will arise from the substratum by the action of capillary attraction. To explain more fully: if the average quantity of rain that falls in a lowland district were to remain on the surface, it would cover it to a depth of 24 in.; but, instead of remaining, it either flows off, or soaks in, according to the texture and condition of the ground. The rain which falls in summer time is nearly all absorbed by the vegetation and the dry soil, or is evaporated, and little or none of it soaks through the ground, and is carried away by the drains to the ditches and outfalls, and provides the supplies that maintain the springs and rivers. Supposing that rain has been falling for some time, that the ground has become thoroughly moist, and that the pores of the particles in fig. 1 are full of water, the rain then percolates through the interstitial spaces, or canals, and, by the law of gravity, proceeds downwards, until its progress is arrested by some impermeable stratum, or soil already fully charged with water. It then accumulates, rising higher and higher, until it arrives at a line level with the drain pipes, beyond which it cannot rise, as obeying the law of gravity the water must flow along them in order to obtain a lower level. In fig. 1 a section is shown of a drain, the soil below being fully saturated with water, as shown by the shading, and above the pipes the canals being free from water. From this explanation it will be seen that it is a mistake to suppose that the water flows in at the top of the pipes. Such is never the case. The water always finds its way in at the sides or bottom. This can easily be proved by a very simple experiment with a common flower-pot, or other similar vessel, filled with soil, and having two holes bored in the sides, one near the top and the other near the bottom, and then after the soil has become well settled in the pot, gently watering it with a

watering-can. It will be found that the soil becomes saturated first at the bottom, the water flowing out freely from the lower hole, while none passes out by the upper, unless so much water is poured in that the lower hole becomes incapable of discharging it.

In properly drained ground, then, while the rains of winter leave the surface soil in a healthy moist condition, that below the drains becomes completely saturated, and this supply of moisture is gradually drawn up, by capillary attraction, to supply moisture to the pores of the upper soil, which had been absorbed by the roots of the plants or evaporated by the summer suns. It is unnecessary here to explain what capillary attraction is, but its action may be explained by the familiar illustration of a piece of lump sugar placed on a damp sponge; the moisture from the sponge quickly spreading itself throughout the pores of the sugar.

Thus it will be seen that, other considerations apart, drains should be laid sufficiently deep to remove the surplus water from the roots of the plants, yet not so deep as to retard the moisture from rising, when wanted, from the supply stored up in the stratum below the drains.

Drainage also acts mechanically on a tenacious soil, and assists in the discharge of the rainfall and the improvement of the texture of the ground by contracting it, and thus increasing the number and size of the larger pores, making more numerous crevices or canals. That this is the case may easily be proved by taking a roll of wet clay, 1 ft. in length, and drying it, when it will be found to shrink in length about half an inch, which, in a drain 100 ft. long, would be equal to increased spaces, which, if added together, would measure 4 ft. 2 in. The value of these crevices and contractions may be more fully realised by examining the appearance of two seeds of barley, the one of which has been sown in well-drained land and the other in a hard, cold soil. In the former case the rootlets are able to travel in all directions in search of food, and the plant is strong and healthy; in the latter, the delicate fibres of the roots are unable to force their way through the hard ground, and the plant, lacking nourishment, is stunted and unhealthy.

Air and Warmth.

Both these are absolutely necessary to the germination of seed and the growth of plants. The admission of air to the soil not only improves its texture, but also raises the temperature, and supplies nourishment to the roots of the plants. The difference between the surface and subsoil, is mainly due to the fact of the former being constantly brought in contact with the atmospheric air by ploughing and harrowing. This is exemplified on lands where steam cultivation and deep ploughing are in operation, the depth of the tilth, or workable soil, being equal to the depth at which the ground is stirred up. Jethro Tull, who is called the father of husbandry, had such strong faith in the advantage to be derived from the beneficial effects to the soil from the atmosphere, that he went the length of saying, that if the ground were only properly cultivated it would always be in a fit condition to support vegetation, without manure; and although this theory has not been supported

in practice, yet there is no doubt that a well-drained, and consequently a well-aerated soil, requires much less manure than one that is sodden with water. There are many mineral and organic substances in all soils which remain dormant, and useless to vegetation, until decomposed by the action of the atmosphere; there are also many salts which are unsatisfied by the water in the ground, but which, on exposure to the air, are immediately set free and dissolved, and carried to the roots of the plants. An excess of water will thus neutralize the chemical decomposition of the substances contained in the manure laid on the fields, and which largely supply food to vegetation. Now drainage is as useful in promoting the circulation of atmospheric air as in removing the superabundance of moisture; for if the canals shown in fig. 1 are emptied of water, it is evident that its place must be supplied with air; and as the effect of drainage is, by mechanically improving the texture of the soil, to increase the number of these crevices or canals, so it also increases the circulation of the air, which passes through the soil to the drains, and along them to their outlets, thus keeping up a constant supply of fresh air, so necessary to the healthy existence of plants as to that of human beings.

The subject of air drainage was very warmly advocated by the late Mr. Hutchinson, of Grant-ham, who advised the tenants on Lord Brownlow's estate, to whom he was agent, to lay out their drains with as much regard to the air as the water. To prove the advantage, he tried several experiments, one of which was on a field at Marnham, near Newark-on-Trent, which consisted of ten acres of strong loamy soil, upon a clay subsoil. The field was drained in 1843 with horse-shoe tiles, laid 2 ft. deep, and 5 yards apart. In the autumn of 1846, Mr. Hutchinson caused the field to be divided into four compartments, each containing five of the drains. The outside and centre compartments were not interfered

with: into the other two were introduced what Mr. Hutchinson called an "air-drain," that is, a drain laid across the upper part of the field, connecting the upper ends of the five drains in each case, the air-drain communicating with the open air at each end, thus establishing a natural current, or circulation of air, through the ordinary drains. The field was sown that year with turnips, followed by wheat. The turnips on the whole field were an indifferent crop, and were therefore condemned, as being too inferior to stand the winter. The produce of the turnips and wheat, in portions of nearly one acre each, of the several divisions, were carefully weighed, the result being as shown in the annexed table.

The quality of the wheat on the air-drained land was judged to be superior, by threepence per bushel, and the straw of a better and brighter description.

The conclusion Mr. Hutchinson drew from these experiments was, that land which has been insufficiently and imperfectly drained, as this field was, may be considerably improved by the system of air-drains he recommended.

Further to prove the important part that air plays in the development of vegetation, the following experiment is copied from Griffith's "Chemistry of the Seasons":—

"Two hundred pounds of earth were dried in an oven, and afterwards put into a large earthen vessel, the earth was then moistened with rainwater, and a willow tree, weighing 5 pounds, was placed therein. During the space of five years, the earth was carefully watered with rainwater. The willow grew and flourished, and to prevent the earth being mixed with fresh earth, or dried blown into it by the wind, it was covered with a metal plate, perforated with a great number of small holes suitable for the admission of air only. After growing in the earth for five years, the willow tree was removed, and found to weigh 109 pounds and 3 ounces: the leaves, which fell from the tree every autumn, were not included in this weight. The earth was then removed from the vessel, again dried in the oven, and afterwards weighed: it was discovered to have lost only about 2 ounces of its original weight; thus 104 pounds of lignum or woody fibre, bark, roots, &c., were certainly produced, but from what source but the air?"

Description.	PRODUCE PER ACRE.								
	Turnips.		Wheat.			Wheat Straw.			
	Tons.	Cwt.	Stones.	lb.	Bushels.	Pecks.	Cwt. qrs. lb.		
Air-drained	26	12	129	4	23	3	27	2	20
Not air-drained	20	8	84	4	21	0	23	3	24
Difference per acre in favour of the air-drains	6	4	35	0	7	3	6	3	24
<i>Second experiment.</i>									
Air-drained land, Potatoes ploughed up succeeded by wheat .....	...	...	158	8	35	0	35	3	16
Not air-drained .....	...	...	131	4	29	3	30	0	10
Difference per acre in favour of air-drains .....	...	...	24	4	5	1	5	3	6

ARCHEOLOGY v. ARCHITECTURE.

As Mr. Pugin is far from being the only person who cannot appreciate the difference between archeology and architecture, let me try if I can express my own view of it in a few words.

An archeologist is a man who, in making the design for a building, tries to imitate the form and details of some bygone age so exactly that it might, but for its newness, be mistaken for a work of an earlier period than that in which it was erected. The term applies equally to Egyptian, Classical, or Medieval reproductions. In many respects the portico of the British Museum is a worse example of archeology than the design for the Law Courts, because besides pretending to reproduce a dead style, it is one wholly unsuited to our climate. On the other hand, however, it may be urged, that as the classical styles attained to a higher and more intellectual development than the Medieval styles, they are therefore more suited to the refinement of the nineteenth century. As examples of archeology usurping the place of architecture, both are equally bad; though, owing to its superior refinement, a new style, based on the Classic, might be more suitable to our wants than one developed out of the Gothic style. Barry, in his design for the Parliament Houses, tried a compromise between the two. He adopted the symmetry and formality of a Classic, or, rather, of an Italian design, especially for his river front, and clothed it in a Gothic garb. Like most compromises, it was only partially successful. Many, no doubt, would, at the present day, prefer a building designed on Pugin's "Principles," with all its variety of light and shade and wild picturesque irregularity. It would, at least, have been more fashionable,

though less dignified and probably less permanently pleasing. The true solution of the difficulty would, probably, have been to throw archeology overboard and try architecture.

An architect I define to be a man who in designing a building thinks only of the purposes and age for and in which it is to be erected; who uses only those constructive means and forms which are best suited to his purposes; who groups the parts thus designed so as to form the most symmetrical and harmonious whole which the other exigencies of his building will admit of; and who then seeks to ornament the whole with the most elegant details he can design, and those best suited to express the purposes of the building on which he is employed; and all this without thinking of the past or any other climate.

Historically the distinction is easily marked out. Down to the end of the fifteenth century in Europe, and in many countries of the East to nearly the present time, archeology was unknown as a principle of design, and all the buildings erected before these periods are more or less successful as designs, many pre-eminently so.

Since the building of St. Peter's, at Rome, archeology has been the ruling principle, and consequently no building erected in Europe since that period is entirely successful. All are, more or less, failures, and are so, nearly in the proportion in which archeology supersedes architecture.

In other words, before the year 1500, architects thought and did not copy. Since then they have copied more than they have thought, and hence the very unsatisfactory state of the art since the period indicated.

* To be continued.

The only remaining question is, if we are to abandon the present system, what are we to do for the future? No man, or set of men, can at once invent a new style. It must be developed out of some previous form, and by a slow and gradual progress of growth. The question is, shall we plant the tree that is to bear our "style of the future" in a Classic or a Gothic soil? Bearing in mind that of the new style, to be worth anything it must be neither Classic nor Gothic: I for one would give my vote for the elegance of the first-named in preference to the picturesqueness of the latter. If we are only to continue to copy, my personal sentiment would be on the side of our national style. But my hope is, that we may yet see true and real architecture, properly so called, again clothing the land with beauty, and the battle of the styles relegated to oblivion as one of the strange aberrations of a bygone age. JAS. FERGUSON.

THE NEWSROOM BALLROOM, LIVERPOOL.

We make a brief allusion to the hall given by the corporation of Liverpool on the 9th inst. to the Princess Helena and her husband, Prince Christian, Prince Arthur, and the Princess Henrietta, simply that we may record the admirable effect of the Newsroom in the New Exchange built from the designs of Mr. T. H. Wyatt, who himself assisted in the arrangement of the decorations. The three drawing-rooms of the Town-hall were used as reception-rooms; the large and small ballrooms as drawing-rooms for the general company; and the small dining-room as a supper-room for the royal party. From the Queen's balcony, at the back of the town-hall, a communication had been established, by a temporary wooden corridor or bridge, with the Exchange Newsroom. This corridor was draped with fluted turlatan, green and white, bordered with flowers, adorned with mirrors, and brilliantly lighted. The floor of the rooms and corridors were carpeted with crimson cloth. By the corridor opening from the Queen's balcony the visitors as they arrived proceeded to the Newsroom, which had been prepared for dancing. The room and dome were flooded with light, which was reflected from the varied and polished marbles extensively employed in the walls. The architectural details of the interior were brought out with photographic minuteness. At the south side of the hall a dais, surmounted by a canopy of purple and gold, had been placed, with chairs of state. At the side of this dais were marble busts of the Queen and the late Prince Consort, with red velvet drapery at the back.

We gave a view, not very long ago, of the very noble room in which the ball took place, and our readers will be able to imagine for themselves the effect that was produced under the new circumstances by its size, fine proportions, and sculptured decorations. Mr. Wyatt has reason to be satisfied with the encomiums that have been bestowed on his work. The visit on Wednesday, as well as the ball on Thursday, appears to have been very satisfactory to the royal guests, and very creditable to the corporation. The Princess Helena, on leaving, said to the mayor, with expressive simplicity, "My Mother will be very much pleased to hear of this."

'ART IN ATHENS.

At the last meeting of the Institute of Architects the following communication was read by Professor Donaldson, being an extract from a letter from Signor Kantangioglou, architect, Athens, dated 26th December, 1867:—

I wish to give you some account of art at Athens, knowing the interest you take in the subject. After the fall of King Otho, art lost a great protector at Athens, and I was myself obliged to resign my appointment as Director of the School of Fine Arts, which is now in the hands of the military engineers. In revenge I was happily charged by the executors of a rich individual to execute my project for a school of the Fine Arts, called Polytechnic, at a cost of 80,000. Four years are passed since it was commenced. The sub-basement, all the columns, the cornices, windows, are of Pentelic marble. The plan of the edifice is divided into three separate blocks; three-fourths are now built, and I hope to cover it in in the course of the year. The

elevation has a length of about 330 ft., English; in fact, it is the largest building now constructing at Athens. Besides the Polytechnic School we are now erecting a Museum for Antiquities after the plan of a German architect, Professor Lange, of Munich. The expense will be met by a rich Greek at Petersburg, M. Tosigon, and a Candiot lady, Mme. Bernardachi. The works also of an Academy of Literature and Science will be soon resumed, after having been suspended for some time: it is being built by Hansen, at the expense of the rich Greek banker, Sina, of Vienna. The Archaeological Society have decided, with the money raised by means of a lottery, upon laying open the remains of the Temple of Apollo at Delphi, which, as you know, are covered by the houses of the village. But unfortunately the money acquired, amounting to 8,000*l.*, is not sufficient to buy up the village. Neither France nor England has yet taken part in this important matter. In the meantime I send you a leaf of laurel, which I plucked on the spot. The day before yesterday a representation took place in the Odeum of Herodes Atticus, of the *Antigone* of Sophocles. Thus, after so many centuries the Theatre of Herodes Atticus again vibrated with the accents of the universal poetry of Sophocles. The rail-road from Athens to Piræus, by an English contractor, is on the point of being commenced. Unfortunately, the line chosen for the station is not favourable either for the antiquities or commercial interests, having been injudiciously selected.

STREET IMPROVEMENTS IN LIVERPOOL: CROSSING A CHURCHYARD.

A SINGULAR arbitration case has been heard at St. George's Hall, Liverpool. The Corporation require 22 ft. of the frontage of St. Peter's parish churchyard for the purpose of widening Church-street. They propose to disinter the bodies and remove them to consecrated ground at either Anfield or Smithdown-road Cemeteries. The inscriptions on the gravestones have long since been obliterated. The Rector of Liverpool, on behalf of his successors, claims 18,000*l.* for the strip of land thus required, the sum originally asked being 26,000*l.* Witnesses on behalf of the Corporation were called to prove that even if used for building purposes the land could not bring more than 9,000*l.*, and their counsel argued that it could not be so used. An intimation was also given that it was intended to appeal to a higher court as to whether the Corporation can be made to pay anything, as they were the original granters of the land for the construction of the churchyard. For the Rector, Mr. Louis Hornblower estimated the value of the property at 40*l.* a yard, making a total of 18,600*l.* Mr. Thomas Wylie gave similar evidence. Mr. Peter Ellis valued the land at from 34*l.* to 35*l.* per square yard. Mr. John Evans, ironmonger, was called to prove that he had offered 45*l.* per square yard to the Corporation for land adjoining the present property, and that the Corporation had refused his offer. Mr. James Holme valued the land at 36*l.* per square yard. Mr. Henry Arthur Hunt estimated the cost at 30*l.* per yard; and Mr. George Pownall gave his estimate at 30*l.* On the part of the Corporation, Mr. Charles Edward McAnlay, C.E., London, said the strip of land to be taken would be useless for building purposes unless one-third of its depth were given to the public for a footpath. He valued the land at 35*l.* per square yard. Taking off 6 feet for a footpath, the value would be 8,995*l.* Mr. J. A. Pictou stated that he thought it was impossible to build on the strip of land in question unless a footpath were provided for the protection of the public. He valued the land at 30*l.* a square yard. Mr. Calshaw gave his valuation as at 34*l.* a square yard. He was also of opinion that one-third of the space should be converted into a footpath. Mr. Clifton, of London, gave similar evidence. The arbitrator, Mr. H. Hannsly, took time to consider his award.

ARCHITECTURAL HISTORY.—The Belgian Academy of Sciences and Arts offer a premium of 1,000 francs (40*l.*) for the best Inquiry respecting the period at which the Architecture in the Low Countries was affected by Italian influence, with indications of the persons to whom such influence is attributable, and citations of works in illustration of the same.

VENTILATION.

In referring to the necessity for floor ventilation in your very liberal notice of the little pamphlet I sent you, you say, "Opinions in these matters supported equally by large experience, strangely differ." I quite agree with you that this is the case; and I think to be so? Does not this strange difference show conclusively that there is a great want of accurate knowledge upon this subject, even among some of these men of large experience?

You refer to the very interesting communication of Dr. Templeton, printed in your issue of September 14, 1867, as illustrating that difference of opinion, compared with the opinions expressed in the pamphlets under discussion. You could scarcely have selected a better article to illustrate that difference. You appear by your approval to have some confidence in the arrangement there illustrated, and, from my own experience, I fully believe that nine-tenths of your readers would one year ago have accepted that illustration as entirely correct, and been quite willing to act upon it.

Yet I will endeavour to explain to you why I think the theories upon which the doctor has based his operations are entirely incorrect, and why I believe the practice is wrong altogether; and the reason for my thinking he has mistaken the results of his work which he supposes to have been so satisfactory.

If I had written a description of what was designed to be expressed by the first diagram on the sheet of lithographs sent you, I could scarcely have expressed it more clearly than your extract from Dr. Templeton's letter referring to the pond in the meadow. By reference to the diagram you can see the revolving motion around its centre caused by the friction of the passing current, and that some of the foul air of the room is being swept out by its becoming entangled in the passing current; and an equal portion of the pure air left in the room, by striking below the opening.

By taking two pieces of ordinary window-glass, and with a strip of rubber and clamps, or a frame of wood, making a little glass house as described in the lecture, with openings on opposite sides, both top and bottom, this whole subject can be illustrated in the most beautiful manner. With both openings at the top, and the stream of air and water (either can be used) flooring across as described, it will be noticed that it requires as much as twenty roomfuls to remove all the originally contained air by mere friction on the plan illustrated; but if by closing the upper outlet, and opening one on a level with the floor, it will be seen that the whole contained air will be removed by displacement, by the introduction of one-and-a-quarter or one-and-a-half times the quantity contained in the room.

The doctor makes no allusions to the variation of temperature or density; and yet this is of great importance, and will, on close investigation, be found to interfere very materially with his theory: for instance, if the external atmosphere should be twenty degrees lower than the room (which must often occur) it would, if allowed to enter in quantities sufficient to effect much good, come tumbling down in "those horrid descending blasts" so bitterly complained of in the barrack-rooms, even if partially protected by the draught-board shown.

But the doctor says this does not occur in practice with his arrangement. Why not? Let us see. 15 in. by 4 in. is the size given for the conduits; these are covered on the outside of the wall by an iron grating punched with $\frac{1}{2}$ -in. holes $\frac{3}{4}$ in. apart. This would admit of about 85 $\frac{1}{2}$ -in. holes, giving an area of about 17 square inches. This again is still more throttled by the zinc plate on the inside of the wall with only $\frac{1}{4}$ in. holes, which according to my experience, and I think the experience of the screens for the fresh-air ducts at the Houses of Parliament, would be almost entirely closed by dust in six months, and those horrid draughts would not occur, because not sufficient air would come in to cause them.

But the doctor says, "since then a most gratifying change has taken place, and this result, both novel and striking can be attributed to no other cause than the thorough ventilation of the above-mentioned rooms."

In each room on the plan is shown a fireplace, with the ordinary flue of 16 in. square would give an opening of 256 in., or $7\frac{1}{2}$ times as much as both of the conduits together. Is it not possible that the fire-boards were removed

without special notice? or the openings of an ordinary window a very small crack, the half of an inch only, would admit as much air as one of those conduits, even before being choked with dust. The habit of closing or leaving the door open into the hall might change the condition of the room probably one hundred times as much as the conduits, and the attention of the attendants being drawn to the subject of ventilation these other favourable conditions would be likely to occur.

I fully believe, if the rooms described were otherwise entirely tight, relying exclusively on the conduits, and were crowded, as were the barrack-rooms of the 95th regiment during the prevalence of the cholera in the East, so graphically described by the doctor, and the external air was warm and calm, as frequently occurs in summer, that the flames of the lantern, when placed below the level of the beds, would not only become small and red, but would soon be entirely extinguished, and the result of continual occupation would be but little more favourable than that of the "Blackhole of Calcutta."

It will be found on careful examination, that these openings do not work just according to theory all the time—probably not more than one day in ten; for instance, if the room was tight in the spring of the year, and the chimney was a little colder than the external atmosphere, both openings would be exits, and the air would enter by tumbling down the chimneys; and again, when the chimney was the hottest, the air would go out there, and both openings would be inlets. But you may say, what difference does it make, so that there is a change of air in the room? I agree with you that it does not make any; but then what becomes of our beautiful dynamic theory?

My opinions are not based on the supposed effect in a few isolated cases; but in the Quartermaster General's office in this city, are plans of the ventilation of hundreds of buildings, in which hundreds of thousands of men have been treated, and the effect of the ventilation watched most critically—because in the early part of the war, when it was proposed to introduce floor ventilation, there was scarcely one surgeon that at first agreed to such a radical innovation upon their long-established practice. It gained favour very rapidly, however, in opposition to their frequent formal protests, and by the pamphlet which is herewith sent you, in which has been printed a few of the letters received, you will see how heartily it is now endorsed by the most eminent sanitarians, and men of the most extensive practical experience, in this country.

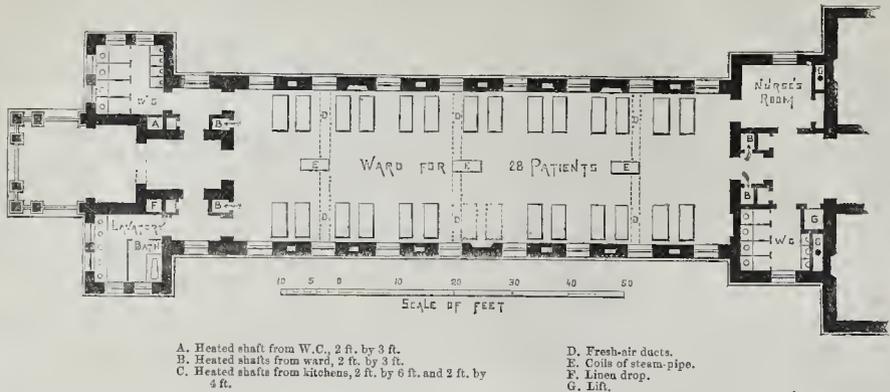
I consider all theories for the direct and uncontrolled introduction of fresh air into a house, incorrect. I am by no means certain, that if the inhabitants of London could have sufficient blankets and external fires to preserve a comfortable warmth, and every one of their present dwellings should be destroyed, so that they would have to live in the open air, that they would be more unhealthy: upon the contrary, I believe it would add greatly to their health and strength. Yet I am not willing to admit that it is impossible to build houses that may be made perfectly air-tight, when desired by the occupants, and in which may be maintained a uniform temperature, irrespective of the many sudden changes of the external atmosphere, and which shall be entirely comfortable and wholesome for the occupants: and we "builders" are the ones to teach the people how to do it.

Through the kindness of Mr. A. B. Mallett, Supervising Architect of the Treasury Department, I have been permitted to make a sketch of a ward of the Marine Hospital now being erected by the department at Chicago, Illinois, which I enclose.

The four heated shafts (two at each end of the ward) apply equally to the three wards, one in each story. The area of the four flues being 24 ft., would give 8-ft. for each ward. In addition to this, there are ventilating flues in the exterior walls, one for each two beds; these flues are each 5 in. by 16 in., and a separate one for each story. There are fourteen of these flues from each story, each ward being designed for 28 beds: this gives 2,944 square inches for permanent openings for exits for 28 beds—that is, while I have 105 in. to a bed, he has only $4\frac{1}{2}$ in. The openings into these flues at the floor will merely have light screens over them, as there is no necessity of closing them at any time.

There are three fireplaces shown in each ward, either or all of which may be used if necessary, or when not in use the beds will stand in front,

VENTILATION U.S. MARINE HOSPITAL, CHICAGO, ILLINOIS.



fireplace acting merely as a ventilating flue, heated flue in the water-closets acts as a ventilator for the closets only, in this case, as great care has been taken to isolate them from the wards by the vestibules and thorough cross draughts; but where they communicate directly with the ward, I fasten the sash in the closet, and put Venetian blinds in the communicating doors, so as to cause a constant draught from the wards into the closets. There is no direct opening into the shaft from the room, but it is drawn down around the seats to below the floor in each story; the ceiling of the story below being fired down 3 ft. (leaving the ceiling in the water-closet 11 ft., the wards being 14 ft.), and from this space the opening is made into the heated shaft.

These shafts will be heated by a steam coil at the bottom, not at the top, of each one, and are designed for summer ventilation also, as we believe this is a much better application of power for forced ventilation than is made by the use of the fan.

Now if these exhaust shafts were permitted to act freely in exhausting the air, and if fresh air to supply the place thereof was permitted to snok in at window cracks, and flow unwarmed across the room to the heaters, the cold draughts over the feet and backs of those sitting near the windows would be unbearable, and the system would be condemned at once. To avoid such a calamity, all the air is conducted between the joists in each story, through the centre to the top of the steam coil, and all obliged to enter the room through it, and be partially warmed by steam in winter and cooled by ice-water in the pipes or ice in the evaporating pans in summer, if desired. These openings will be about five square feet to each coil, the outer rows of pipes being left entirely exposed for direct radiation into the rooms. I decidedly prefer having the coils for heating in the rooms, instead of in chambers in the cellar, because it is absolutely necessary to have some direct radiation to make a comfortable room; for even when the air is heated by pipes filled with warm water, if it is all made warmer than the required temperature of the room, it causes a languid, debilitating feeling. The most perfect arrangement is to have walls, ceiling, floor, and all solid bodies in the room heated to about 98°, the temperature of the body, and then the fresh air may be 50° or 55°. My office is thus heated before entering in the morning. The gas-burners will be placed in front of the flues, with a special opening directly above them for their exclusive ventilation.

And now you may ask—Where is your provision for flue ventilation from the ceiling? My answer is—I have made none. You say I am "quite right in urging the value of the open fireplace; but this must by no means be taken to mean that exits for foul air in the upper part of apartments are not absolutely required."

Do you find in those lectures any want of earnestness or vigour in urging that every window should be made to lower from the top for summer ventilation, or whenever the room is warm enough to admit of it?

Now as this upper ventilation must be regulated according to the temperature of the room, what means have we that can be so easily understood by every one, and that will be likely to be used judiciously and whenever necessary as lowering a window or opening a door? In connexion with the window ventilation, the Venetian blinds, so common with us, which direct the inflowing current toward the ceiling, allowing it to fall gently and well diffused, are very useful.

I admit that there are times when ceiling ventilation through the heated flues would be desirable; yet with the exclusive ventilation in connexion with the gas-burners for carrying off immediately all products of combustion, the additional advantage to be gained by more openings, I fear would scarcely compensate for the harm resulting from their abuse. Less fuel will maintain a uniform and agreeable temperature in the lower and occupied portions of the room, even with this very liberal ventilation from the floor, than is often used where only one quarter the amount of air passes through the room, and ceiling ventilation only is relied upon.

I must really beg your pardon for troubling you with this very long communication, pleading as my excuse my extreme anxiety to convince the *Builder* of the correctness of my views, hoping to secure its strong and powerful influence in dispelling the strange difference of opinion upon this very important subject now existing among men of large experience.

Washington.

LEWIS W. LEEDS.

GATES, CASTLE ASHBY, NORTHAMPTON-SHIRE.

CASTLE ASHBY, our readers will little require to be reminded, is the fine old seat of the Comptons, in Northamptonshire. This family is one of the most ancient in the country, and has occupied from time immemorial large estates in Warwickshire, upon which the celebrated Sir William Compton, the friend and companion-at-arms of Henry VIII., built the beautiful old mansion of Compton Wynates, which has been recently, in a great measure, restored by the architect of the work which we now illustrate, Mr. Digby Wyatt.

The estate of Ashby was purchased with others by Sir William Compton from Richard, the third Earl of Kent.

Sir William's great-grandson, the second Lord Compton, married the daughter and heiress of Sir John Spenser, alderman of London, proverbially called "Rich Spenser," who was not only the owner of a vast real estate, including Canonbury House, Islington, and Crosby Hall, in

London, but who died possessed of an enormous personality, estimated at half a million sterling at least. There is no doubt that the existing mansion at Castle Ashby owes much of its splendour to the lavish outlay of funds derived from the "rich" Spenser.

The house is well known to architects, from the fact of its complete illustration in Robinson's sequel to the "Vitruvius Britannicus."

The mansion is of two periods, the older portion built in Queen Elizabeth's reign by Henry, first Baron Compton, consisting of a middle and two projecting wings, enclosing a square courtyard, and a facade containing a chapel, long gallery, and series of rooms subsequently added from designs by Inigo Jones, forming a fourth side to the square courtyard, which it now entirely encloses.

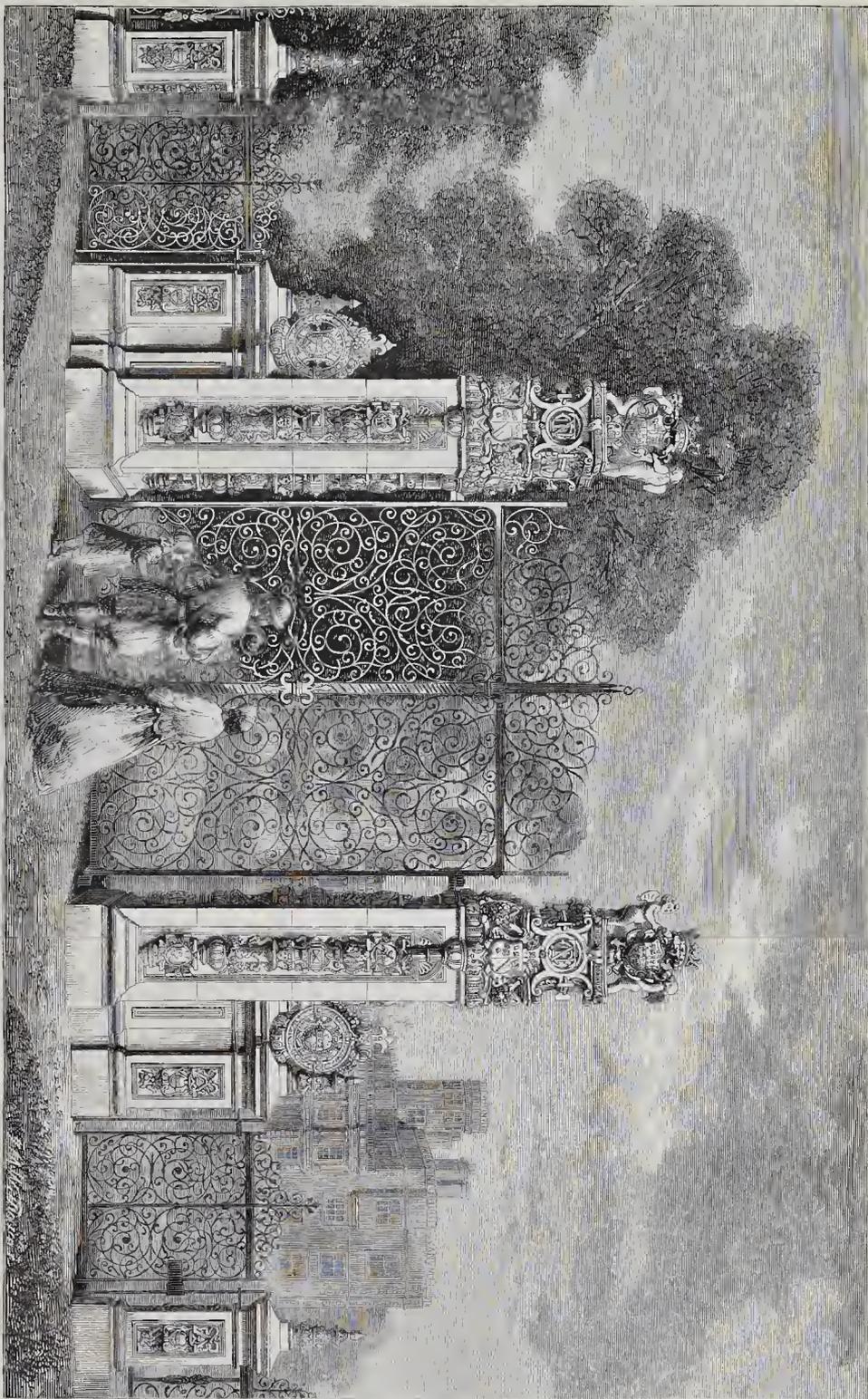
Some idea of the extent of this grand old building may be formed from the knowledge of the fact that it covers an area equal to about the square of 170 ft.

Until within the last few years the garden and approaches have not been worthy of the fine old structure; but now, thanks to the taste and liberality of the present Marquis of Northampton, a worthy Compton in his love for and proficiency in the arts, a fitting balance has been restored. Mr. Thomas has ably seconded his lordship's views as landscape gardener, and Mr. Wyatt, as architect. Under the latter and from his designs Mr. Blashfield has thoroughly vindicated a truth we are just beginning to fully realize, *videlicet*, the admirable capabilities for such works of the long comparatively neglected material, terra-cotta.

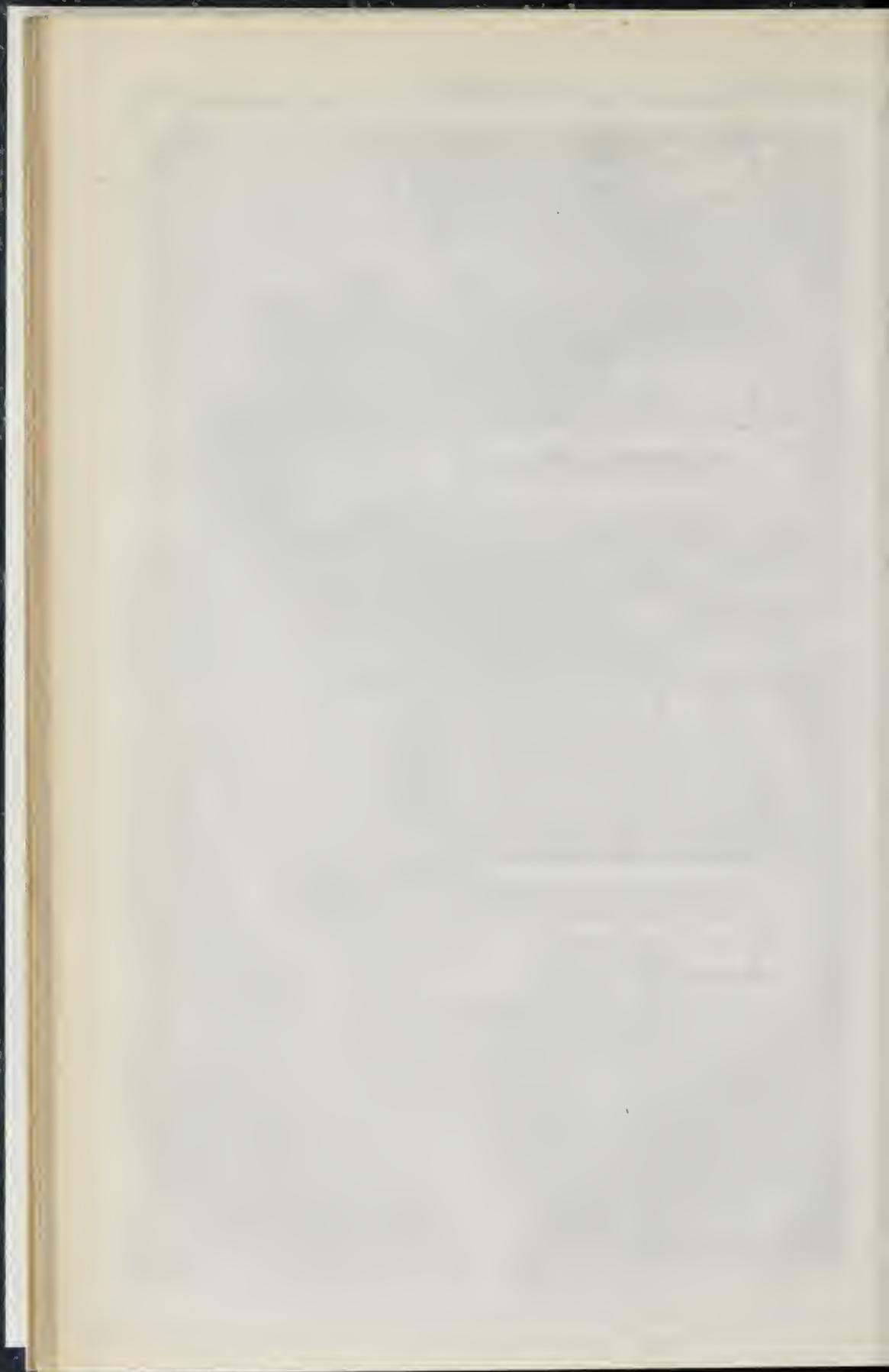
The grounds are now laid out in a series of terraces, inclosing sunk gardens at various levels, connected by flights of steps. Nothing can exceed the sharpness and artistic spirit with which the terra-cotta has brought out the mass of elaborate decoration displayed on the various pedestals, balustrades, bastions, and fountains.

These works are of great extent, and have occupied several years in erection. Their effect is greatly heightened by the masses of flowers arranged under Lord Northampton's personal direction in the most elegant patterns, and in a succession of contrasts of colour such as one might fancy a Persian alone could have elaborated in the all but fabulous gardens of the East.

Some time ago Lord Northampton purchased a number of fragments of ancient iron-work. These it fell to Mr. Wyatt's duty to combine and supplement, and, having done so, to design fitting piers to which they might be hung. In the first part of his task he called Mr. Potter, of South Molton-street, to his assistance, and in the last Mr. Blashfield. The result is before our readers, who can, however, form but an imperfect idea from our engraving of the effect the gates present as seen with the ancestral trees of the beautiful park surrounding the noble old mansion.



GATES, CASTLE ASHBY, NORTHAMPTONSHIRE.—MR. M. DIGBY WYAT, ARCHITECT.



BUILDING IN CONCRETE.

A special meeting of the Architectural Association was held on the 8th inst., at the House in Adnuit-street, for the purpose of resuming the discussion on concrete dwellings. Mr. R. Phadgers, who presided, observed that, accompanied by several members, he had a few days before visited East Sheen, to inspect a concrete house in course of construction there, from designs by J. B. Blomfield. Here the apparatus patented by Mr. Tall was seen at work, and the various methods of construction in concrete were examined, and afforded much satisfaction to the members.

Mr. J. D. Mathews (hon. secretary) observed that, in discussing the subject of concrete dwellings, it would be desirable to consider, not so much the material itself as the application of it to different buildings. Concrete had been used as a building material from the earliest times, and the ruins of the abbey at Reading showed very strong was the core, which, after the lapse of several centuries, was perfect, although the stones with which it was originally faced had been picked out. In our own day, too, concrete had been used in the construction of Dover harbour and breakwater; in works at Brighton and other places; and abundant evidence had been given that it could stand the assaults of both sea and weather. The strength of the material had been tested in that room on the 6th of December, when a small block of concrete, 3 ft. in length, 6 in. deep, and 4½ in. in thickness, had borne 100 cwt. without breaking. It seemed to him that the introduction of concrete as a building material was entirely a question of expense; for, unless it could be shown that the cost was much less than that of brickwork, considerable difficulty would have to be encountered in any attempt that might be made to substitute it for that material. Two essentials appeared to be necessary in dealing with concrete: the first, to put the foundations right (always an important consideration in every building, but especially so in concrete dwellings), and secondly, to see that the material was mixed in the proper proportions. He believed that both difficulties might be got over in the erection of new buildings were deputed to competent persons. Concrete floors, when practically made, were very desirable, but he confessed he would be afraid to trust to a cement or concrete roof. With regard to the architectural treatment of them, there were difficulties no doubt in the way; but he could not for a moment suppose that the architects of the United Kingdom would take account finally of dealing with a new material if it had solid advantages in other respects to recommend it. A concrete wall looked undoubtedly very rough, but in the country that drawback might be met by the introduction of creepers and other forms of vegetation, while in towns the surface might be ornamented by introducing horizontal and vertical lines, tiles, or possibly terra-cotta.

Mr. Blashill remarked, that as wood, brick, stone, and iron now entered so largely into the construction of buildings, there was no reason to suppose that a fifth material might not also with advantage be pressed into the service. He could not, however, ascertain, from the consideration which he had been able to give to the subject, that there would be so great a saving in the use of concrete as compared with brick as to warrant any general substitution of the former for the latter. He feared that the cost of the apparatus (which appeared to be considerable), would be a great drawback to its use, as builders would not like to add the machinery to their ordinary plant unless they saw a reasonable prospect of making it remunerative. The next difficulty which occurred to his mind would be to get competent workmen to carry out the instructions of the architect in reference to mixing the concrete, or unless this were properly attended to failure would be the result. This objection might, however, be got over if Mr. Tall were himself to supply the concrete, and contract with workmen to do the labour. He (Mr. Blashill) was satisfied that Mr. Tall could not construct concrete buildings at half the cost of brickwork, and this conclusion he had arrived at by the figures quoted by that gentleman himself. If, however, the materials were economically supplied and the materials mixed in the proper proportions, a considerable saving might be effected by the use of concrete. The concrete walls and floors might be dry and warm. This he did not dispute, but he could not agree with Mr. Tall that a solid wall was more impervious to sound than an ordinary one, as it was well known that in the

case of prison cells the inmates were able to communicate with each other by tapping the wall even though an empty cell might intervene. This proved that solid walls were conducive and not antagonistic to the transmission of sound.

Mr. Potter expressed himself generally favourable to the use of concrete, and asked a number of questions with the view of eliciting explanations. He had himself contemplated building some houses at Wimbledon of either brick or concrete, and he found that the estimates for the latter material were higher than for the former. He wished to obtain some reliable information as to the cost of the apparatus.

Mr. Tall said it was not to be presumed that a separate apparatus would have to be made for every house. The apparatus once made would build 100 six-roomed houses; so that its cost, divided over this whole, would be too insignificant to be appreciable. When people came to him and said they wanted to build only one or two concrete houses, his answer was, "Do not build with concrete; but if you want to build a number of houses, you will save the cost of the apparatus on the first two or three." He was prepared to say that in any clay country, with bricks even as low as 20s. per 1,000, he would build concrete houses at half the expense of brick. If, on the other hand, there was no clay, but gravel, stone chippings, clinkers, or any thing of that sort, he would undertake to crush the stuff and use it up with the concrete at much less cost than brickwork. If, however, brickwork could be done at 8s. a rod, he confessed himself beaten.

Mr. Blashill.—I am doing it myself now, in the West of England, at 7s. 10s. the rod.

Mr. Tall said if that were so he would undertake to put up concrete in the locality named for half what Mr. Blashill was paying. There was no portion of the country in which concrete buildings could not be put up; and, as an illustration, he might mention that a nobleman had written to him to say that he could not use it because he had not a yard of gravel on his estate. The reply he made was, "That is so; but you don't want gravel, for you have a material ten times better,—you have sandstone, which, if crushed, will make the best concrete in the world." All that was required to get the concrete was to have the proper machine to crush it; for there was no place so situated that suitable material could not be obtained within four or five miles of the building site. He contended that concrete properly prepared (and none other should be used) was not only stronger than brick, but would bear ten times the weight of brick, and ten times the pressure of wind. This was proved in the case of some houses built at Gravesend. While in course of construction, some bricklayers employed on some adjoining houses said to the men engaged on the concrete work, "Look out, or you will have your houses blown up by Windmill-hill." Strangely enough, a great storm blew that night, and so powerful was the wind that it blew the scaffold-planks off the concrete houses into an adjoining field, but the houses themselves were uninjured, while the brick houses in the neighbourhood were levelled to the ground.

A member pointed out that as the wood used in concrete dwellings would absorb moisture and eventually cause the concrete to crack, it might be desirable to set, in the first instance, patterns or moulds in iron, which could be removed when the concrete was set and wooden plugs introduced. Another speaker also pointed out the difficulty among unskilled labourers of getting the materials mixed in the proper proportions.

Mr. Tall replied, that if wooden joists were put in, and the interstices filled up with cement, the timber would swell, and the concrete would undoubtedly be cracked. This, however, could not occur if common mortar were used, and not cement. The suggestion made to introduce iron patterns in the first instance, was however a good one. The iron banding, in the shape of hoop-iron, 2 in. wide, was used merely to bear the weight of the joists until the concrete became hard. With regard to stone steps, they could be put in either on the splay or a simple riser and step. As for the proper admixture of the concrete, it was presumed that the foreman would be responsible for this. A foreman was necessary, whether the material used was brick or concrete, and he saw no reason why the foreman should not see to the matter with respect to concrete roofs. He had not patented them, but he would undertake to build cottages with such coverings no thicker than 2 in., and to warrant them waterproof for seven years.

Concrete roofs had not, he frankly admitted answered at Bexley, simply because at that time he had not had sufficient experience as to the mode of laying them. As for the exterior appearance of concrete, he did not consider that in small dwellings or cottages any architectural ornamentation was necessary; and in the case of the cottages built at Maidstone, for Mr. Whatman, M.P., that gentleman declined to have them stuccoed, although he did give them a coat of colour. In reply to a question, he said that he had carefully examined the concrete ruins at Reading, which he found to be composed simply of lime and gravel. There was, however, plenty of "packing" in it; and with regard to the latter, he was quite prepared to recommend 75 per cent. of "packing" to 25 per cent. of concrete. He repeated that it would not answer a builder's purpose to buy the apparatus for one or two houses; but that he was quite willing to take it back from any builder who might have built a dozen houses with it, at a reduction of 50 per cent. on the cost price. It was a mistake to suppose that skilled workmen were required to build concrete dwellings; any ordinary carpenter could fix the frame; and when once made level, it was absolutely impossible for it to go wrong. It would not even be necessary to plumb it. In the hands of a competent foreman, the work would go on with great rapidity; but in order to remove all objection on the score of want of experience by third parties, he was quite prepared, in all cases where the apparatus was purchased, to see the first two houses carried out.

The chairman observed, with reference to the absorption of water by a concrete wall, that in exposed situations it might be desirable to use stucco or tile, to prevent the penetration of a driving rain from the south-west. With regard to the hardness and solidity of the material, it struck him, as a drawback to the use of concrete, that it would be difficult, if not impossible, to make those subsequent alterations, which every architect knew that clients were always anxious to make, so long as they could be carried out without expense. When he saw the building at East Sheen, he was persuaded that some exterior ornamentation would be necessary, as not only was the concrete not all the same colour, but there were (so to speak) strata of unequal degrees of smoothness, some being rougher than others. He hoped, however, that in cases where stucco might be employed to improve the front, stone-joints would not be introduced, and that the system of covering the whole building with glazed tiles would not receive any countenance.

Mr. Tall said, that if the concrete was mixed in the proportion of one of cement to eight of other material, the absorption of rain would be impossible. With regard to the objection to the use of concrete, on the score that subsequent alterations would be difficult, if not impossible, a greater fallacy did not exist, as he would undertake to knock away a hole—say, to admit a door or window—in a concrete wall, in less time than a similar aperture could be made in brickwork. He would not cut away anything, but he would simply make a hole, and then the concrete would crumble away without difficulty.

THE TECHNICAL EDUCATION MOVEMENT.

The public are being awakened to the importance of this subject, which is being brought before them continually in addresses, speeches, reports, and letters.

Professor Leone Levi, of King's College, London, has delivered an address on the subject in the Chamber of Commerce, New Exchange, Bradford. The Council of the Chamber had given a general invitation to all interested in the question to hear the Professor. In the course of his address, Professor Levi said he had attended the International Statistical Congress at Florence, and had visited in Italy, Switzerland, Belgium, and Germany, those technical institutes which were so numerous, and which had been productive of such beneficial results on the Continent. He had been desired by the Privy Council to prepare a report on these institutions; that report had already been laid before Parliament by Lord Robert Montagu; and it was with a view of maturing this report, especially as regarded the suggestions contained in it, that he had asked the Chambers of Commerce to favour him with an interview for the purpose of consulting them on the subject. By technical instruction was meant instruction in the sciences

and arts which entered into the various industries carried on in different localities, and whether it was the science of chemistry, botany, or mineralogy that was adapted to the interests of the locality, that particular science was made the subject of study in the technical school there. Technical schools were not exactly industrial schools, because industrial schools implied the teaching of the industries themselves, whereas technical schools were particularly applied to instruction in the sciences which were technical or appropriate to various branches of industry. In considering the subject of education abroad it must be taken into account that elementary or primary education was much more extensive there than in this country; and, as he should show in his report, whereas in this country the state of education in the manufacturing districts was worse than the state of education in the country as a whole, in the manufacturing districts of France the state of education was considerably in advance of the state of education in France as a whole.

The peculiarity of the technical institutes was that they did not give instruction in several branches without any reference to one another, but they had courses of study extending over two or three years; and a student entered for the whole term, and had to follow the system established. He commenced at the commencement and ended at the end. It was not as in the mechanics' institutes in this country, where a student might enter for three months or so, and change about from one study to another; if he entered the technical school, he must go through the whole course of study. Then there were many museums, where lectures explanatory of the objects exhibited were delivered. These seemed to be the general appliances scattered extensively throughout the Continent for improving the instruction of all persons connected with industry; and there could be no doubt that, to a great extent, owing to these means and the circumstances already alluded to, foreign manufacturers had not only succeeded in meeting the necessities of the times, and in coming up to what had been done in this country, but that in many respects they had excelled us.

It had been suggested whether, in addition to the central university in London, there should not be similar institutions, say, in Lancashire, Yorkshire, Cornwall, or the agricultural districts; for if there were only one it would be inconvenient for the students from the country to attend in London. But it was quite evident that it was not sufficient to have institutions for teaching the teachers; there must be institutions for teaching workmen, foremen, and those who intended to be at the heads of workshops or in mercantile houses, which would, of course, be of a much more local character. These institutions would have to be established in agricultural, shipping, manufacturing, and industrial towns, in each of which there ought to be a school for teaching the sciences appropriate to the localities.

In order to form such institutions, he thought Chambers of Commerce and other public bodies might form themselves into committees to see what could be done. Of course he thought it extremely desirable that in such institutions there should be museums, libraries, laboratories, and workshops, with tools and instruments. He thought the more we could teach by the eye and the more extended we made the practical illustration of what was taught, the better it would be for the student. He did not think abstract science was what was wanted so much as science exhibited and expounded in its practical application to industrial pursuits. A free library should also be connected with the institution. As to museums, it would be desirable that they should be open at night, for many, unable to go in the daytime, would derive great advantage from being able to go in the evening. He thought the British Museum would be of tenfold utility and benefit to the community were it open in the evening. Then lectures, explanatory of the objects exhibited, should be given at these museums. The want of such lectures made the valuable exhibition of patents at South Kensington as a dead letter to the nation.

In conclusion, he remarked that the subject was altogether one of great importance, but it was one in which all parties could and should combine on a common platform. A question had arisen as to how technical schools should be supported. The opinion of some people was that there should be an educational rate,—of others, that grants should be given from the Consolidated Fund; but it seemed to him that action should be taken, in the first place, in the

large towns themselves. Much greater loss would be sustained in having a comparatively bad description of manufactures than would be sustained in the expenditure of a few thousand pounds in the establishment of schools for the training of our workmen. The matter was purely one of investment, and be trusted traders and manufacturers would look at it in this light. The Government, he had no doubt, was ready to assist if the people would take the initiative themselves. If Britain was to continue to maintain her industrial and manufacturing superiority, it would depend very much upon what was done to improve and extend the means necessary for advancement in science and art. We could not force people to take our manufactures unless they were at least equal in quality to what could be obtained from other countries.

The Council of the Birmingham Chamber of Commerce having received an application from the Government to furnish information on the subject of technical education, a meeting has been held at the Exchange there. Mr. George Dixon, M.P., presided. The chairman explained that the movement on the subject of technical education originated with the Associated Chambers of Commerce, who, at their meeting at Westminster, in November last, discussed the matter, and brought it under the notice of Lord Robert Montagu, the Vice-President of the Committee of Council on Education. His lordship desired to be informed—

1. What trades are now being injured by the want of a technical education?
2. How, and in what particulars, are they being injured?
3. How do other countries, from their greater attention to technical instruction, absorb our trade? (Give instances and, if possible, statistics.)
4. What plan of technical education would remedy the evil?

Mr. Mundella, president of the Nottingham Chamber, introduced the subject at the meeting of the Associated Chambers, and, on behalf of the Association, laid it before Lord Robert Montagu. Various gentlemen besides Mr. Mundella addressed the meeting, which was adjourned. There was a good attendance, and Mr. Samuelson, M.P., was present, at the adjourned meeting, and in his address said that his recent mission to inquire into the state of education, as applied to manufactures abroad, was not made by the authority of the Government, and was a private undertaking, in which he received what assistance the Government could give him. With respect to scientific education in Birmingham, he thought the shortest and easiest way was for the local manufacturers to support the Midland Institute. In the country generally, he thought the Government should assist all localities that, by the efforts they made, showed plainly that they desired scientific or technical education. It was evident, however, that the aid given to science schools was insufficient. Every child should be taught geography, and something of physics and drawing, the Government giving aid according to the results in these different departments of education. The following resolution was proposed:—

"That the Council be instructed to request the Associated Chambers of Commerce to inform Lord Robert Montagu, that in the opinion of the Chambers it is of the utmost importance that Government schools of science should be established in the great centres of industry, for the purpose of giving technical instruction to the middle and working classes."

After a long and animated discussion, the resolution was carried by a large majority.

A speech, partly on technical education, was delivered by Lord Edward Clinton in distributing the prizes at the Nottingham School of Art. His lordship said,—With reference to technical education, it had been stated with truth that we were losing ground in comparison with our foreign competitors. Belgium, France, Switzerland, and Germany were all going ahead of us,—though that was scarcely the right term, because we were not exactly standing still. We were making progress ourselves, but letting them go too fast. To his mind a good deal of this had been caused by the unfortunate strikes which had occurred in many trades, and the extent to which trades unionism had been carried. A very interesting letter on that subject had recently been published by Mr. Samuelson, M.P., which was addressed to the Vice-President of the Council of Education. Now it appeared to him (Lord Clinton) that the extent to which trades unions had been carried struck at the very root of this matter. The tendency was to crush all talent; everybody was to be put on a level; and therefore those who wished to rise were crushed, and could not rise at any

rate beyond mediocrity. Trades unions said the business of the employed was to look after their own interests, leaving the employers and the rest of society to look after theirs, and support themselves as best they could; that it was the interest of the masters to get labour at the lowest possible rate, and the interest of the servants to get the highest rate of wages they could. They looked at the masters as seeking the utmost profit they could get out of their capital, and that they must get the utmost profit for their own labour, and get as much as they could. These principles were given in the evidence before the Trades Unions Commission, and whilst such a feeling existed, he was afraid they would never surpass foreign countries. Mr. Samuelson referred to that. The noble lord then read an extract from Mr. Samuelson's letter, referring to the great importance of attending to foreign competition and the injury caused by strikes. He added that it was very satisfactory to know that the arbitration system had begun in Nottingham.

Mr. James Ford, the head master of the Macclesfield School of Art, is writing a series of instructive letters on technical education, especially abroad, in the columns of the *Macclesfield Courier*. These letters give a clear idea of the large amount of technical education and special training abroad, and especially in France. Even classical colleges are there being turned into technical schools; and, not yet satisfied, adds Mr. Ford, "the Emperor has just caused to be set on foot a most rigorous examination into the condition of professional institutions in France. May no revolution again occur to break the neck of such a profound system of consummate wisdom."

A minute has recently been passed by the Committee of the Privy Council on Education, on scientific instruction, wherein their lordships announce their resolution to assist artian classes by aiding local efforts to found scholarships and exhibitions. They will make grants of 5*l.* and 10*l.* towards each scholarship, and 25*l.* towards each local exhibition at some college or school for scientific instruction, under certain conditions as to local subscriptions and maintenance of the students, which are detailed in the minute.

An address on technical education was delivered by Mr. Baines, M.P., at the annual distribution of prizes in the Leeds School of Art. In the course of his address, Mr. Baines said he had that day received the report of Mr. Samuelson on technical education on the Continent, and in that report he was assured that there were things stated concerning Leeds which ought to make the inhabitants look about them. Leeds was in some branches of industry very eminent, but there were other branches which seemed to be neglected, so as to run in one groove, and to be incapable of improvement or extension, and especially so in the staple branch of the woollen manufacture; and he did not understand how they could allow Belgians, French, and Prussians to pass them and beat them hollow in their own staple manufacture. The suggestion that he would make was that first of all we should endeavour to perfect, as far as we could, all the present appliances for art and scientific education in Leeds. We had institutions and classes for teaching art and science to the great body of the mechanics and artisans of England, and they and the night schools, the classes for art and science instruction, ought to be perfected as far as possible, and we ought to make them infinitely more perfect than they are. That was one important matter in which they at Leeds were especially concerned; then we ought to have such schools and colleges for the imparting of technical education as existed in very great perfection on the Continent, and in which there should be professors in art and science, and connected with which there should be museums, models, laboratories, all apparatus, and all the means for carrying on every kind of instruction, and a gallery of art. These ought to be established in Yorkshire, Lancashire, Nottinghamshire, Warwickshire, Glasgow, and a college should be established in London upon the basis of the College of Science in Jermyn-street, London, the College of Chemistry in Oxford-street, and the South Kensington Museum. If these expedients were adopted, he believed he should be in the way to make satisfactory progress, and redeem the character we might have lost in regard to our industry, and put the industry of England upon a footing from which we could never afterwards be removed.

BUILDERS' PRICE BOOKS.

We have two before us for 1868, one "The Builder's and Contractor's Price Book," revised by G. R. Burnell (Lockwood); the other, "Atchley's New Builder's Price Book," by P. Atchley. If either had reached us alone, look at the mass of prices furnished, and the care evidently taken, we should probably have contented ourselves with recommending it as being the best of the kind. But we have now before us two, and we are led to pause before recommending either. Beginning with the Bricklayers' Price Book, we find, in Lockwood's publication, place-work put at 11l. 10s. per rod, and stock-work at 13l. per rod; while in Atchley's the same items stand at 13l. 13s. and 15l. 15s.; and if we rectify them as directed, to allow for extra price per thousand at which the bricks were calculated in the latter, 13l. 3s. and 15l. 3s. the charge allowed for a bricklayer in Lockwood's is 6d. per hour (6s. 8d. per day), and for the mason 5d. an hour; while in Atchley's the mason is put at 9d. an hour, and the bricklayer at 6d. In carpenter's work the differences are on the other side, Lockwood's book giving per foot cube for fir in round timber, walls, &c., 3s. 4d., and for fir wrought one side, 2s. 6d.; while in Atchley's these items are put respectively 2s. 6d. and 3s. 4d. Milled timber in the former is put at 30s. per cwt., and in the latter at 28s. For a painter, in Lockwood's, 6d. a day is allowed, while, according to Atchley's, 7s. 6d. may be charged; and, so far as material as putty is put down in the former at 3d. per lb., while the latter allows for it at 2d. For ordinary painting, Lockwood's has 10s. 3d., 2 oils, 6d.; 3 oils, 8d.; and 4 oils, 10s.; while in the other we have these priced at 11s. 7d., 10d., and 12d. We might carry this comparison much further with similar unsatisfactory results, but we have said quite enough to justify our hesitation.

LABOURERS' COTTAGES.

There have been lately erected in many parts of the country cottages for the labouring classes, and plans and particulars of which were designed by Mr. Birch, architect, to whom the Society of Arts awarded the Denton prize for the best design. Mr. Birch's plans have been approved of by the Inclosure Commissioners, and have been adopted in the erection of cottages for the Earl of Warwick, at Witham and Ringmer, in Sussex; Mr. J. H. Arkwright, in Herefordshire, for Mr. G. Calthorp in Surrey, for Earl Spencer in Buckinghamshire, Mr. S. Carter at Battle, and the Rev. C. Allington at St. Neot's, and others. The cottages include three bed-rooms, a living-room, and scullery, with offices and out-houses. The internal fixtures and fittings include stoves, ranges, ovens, washing-coppers, plate-rack, &c., with hard and soft water supply to a cottage. The walls are built of brick, the roofs being covered with plain tiles, with projecting eaves and gables. The cottages are estimated, and the average cost of their erection is about 250l. a pair. A group of four cottages, recently erected by the Salisbury and Yeovil Railway Company from Mr. Birch's plans, differed slightly in design from those mentioned—the bed-room being placed on the ground-floor. The total cost of this group was 610l.

The Liverpool Health Committee have recommended—"That the council be recommended to the sum of 100l. to Messrs. Redmond & Skelthorpe, for the plan of labourers' dwellings adopted by them, in consideration of their making complete drawings of them and supplying specifications to the satisfaction of the committee, and that the council be requested to erect dwellings on the site between Ashfield-street and Sylter-street." The mover of the resolution said he might remark that 5 per cent. was the usual amount in such cases, and if they got the plan and specifications for 100l. they would get on at one-fifth of the ordinary price, and the engineer's department would be saved a large amount of work. [Cool, certainly.] With regard to the plan not being strictly in accordance with the by-laws, he mentioned that under the authority of the council had a discretionary power, and in such a case a sufficient equivalent was given for the plan not being literally in compliance with the by-laws which would justify them in exercising

that discretion. The chairman said there were 146 houses proposed in the plan. A resolution recommending that the council be requested to erect labourers' dwellings on a site in Tallock-street, on plans prepared by Messrs. Culshaw & Summers, and presented to the committee, was postponed.

COMPETITIONS.

Bracebridge (Lincolnshire).—Schools being desired for this place three architects, Messrs. Bellamy & Hardy, Mr. Michael Drury, and Mr. William Watkins, were invited to compete for the arrangement of the buildings, and in accordance with the instructions issued the designs were sent in to the committee last week. Mr. Watkins sent one set of designs, with an alternative plan, and Messrs. Bellamy & Hardy and Mr. M. Drury two sets each. The committee selected those by Mr. Watkins as being most suited to their requirements. The design selected comprises a schoolroom, 31 ft. by 16 ft.; class-room, 12 ft. by 11 ft.; and a separate entrance for boys and girls. The master's residence is placed at the extremity of the land nearest Lincoln, and consists of recessed porch, entrance, and staircase, on the left-hand of which is a parlour, and on the right a kitchen; at the back of the staircase are placed the pantry and scullery.

Burton-on-Trent.—Several thousand pounds have already been raised towards the purchase of land and erection of buildings for an infirmary and dispensary at Burton-on-Trent. A site has been secured, and the building committee have selected the design of Mr. Edward Holmes, which was submitted in limited competition.

THE CROYDON WATERWORKS.

The new waterworks in Surrey-street have been thrown open for public inspection. The new Cornish engine, which was constructed and erected by the Kirkstall Forge Company, is of 90-horse power nominal. The beam connecting the piston with the plunger or pump weighs 27 tons, and the balance box 20 tons. They are of wrought-iron. The engine is worked with a surface condenser, and the steam, after having done its work, is conveyed intact back to the boilers, thus saving fuel. The piston has a working stroke of 10 ft. 6 in., and the diameter of the cylinder is 60 in., the diameter of the plunger being 2 ft. The engine is registered to work ten strokes per minute, but the speed is regulated to eight strokes, and these are correctly registered by a counter, patented by Messrs. J. Richmond & Sons, which indicates the number up to ten millions. Supposing the engine to be kept working day and night without intermission for one week, the number of strokes given will be 80,640, and as with each stroke 220 gallons of water are pumped, it would give a weekly supply of water equal to 17,740,800 gallons, or a daily supply of 2,534,400 gallons; but the estimate is, of course, a maximum one. An average daily supply of two million gallons is, however, afforded, and this ought to be more than sufficient for the requirements of the town, providing that no improper use is made of the water. The bright portions of the machinery are relieved with dark blue and red tints, which harmonize with the colored brickwork and decorations of the internal portions of the new engine-house. Since the new engine has been at work the water-level in the well, instead of falling, has risen 2 ft. higher than it was before.

ACCIDENTS.

EXPLOSIONS and theatre accidents seldom or never come single: there is generally a series of them. The last theatrical accident we have heard of was a lime-light explosion in the Royal Albert Theatre, Middlesborough, while the house was crowded. The report when the bags connected with the lime-light exploded, was like that of a cannon, and it produced great confusion, but no one was injured by the crash or escape, although two persons were somewhat injured by the explosion itself. The manager succeeded in restoring order, and announced that, for the future, he would use the magnesium light during the time light. Lighting holiday time an escape of gas accu-

mulated in the safe-room of the Hereford Branch of the National Provincial Bank of England, in Broad-street, Hereford; and the instant the room was opened an explosion took place and blew out the skylights in the roof of the building. A tap had been carelessly and imperfectly turned off.

Nackington Church has been injured by fire. Smoke was first noticed issuing from the roof where a fire was carried through, and the rafters were partially burnt, damage being done to the extent of 100l. to 150l. before the fire was got under. The overheating of the fire, as usual, on Sunday, was the cause of the fire.

In the Blackness-road, Dundee, at some houses in course of erection, a rafter, while being put in, loosened a stone, which fell upon the head of a mason below, who was polishing a stone. The skull was fractured, and the poor fellow died the same day.

About fifty persons have been killed while in transit by train from Cleveland, on the Lake Shore-road, to New York. Near Angola the two rear cars got off the line and fell down an embankment. Strange to say, it was chiefly by fire that the passengers were destroyed, the car containing them having taken fire, from the overturning of the stoves in them, and only two escaped, while others were wounded. It seems probable, however, that the charred remains spoken of were the bodies of those who were disabled from making their escape, at least, if not killed, before the fire affected them.

The roof of a house near the Fisherman's Inn, Liverpool, has fallen in. Three persons were in bed beneath the roof at the time, but were protected by the timbers. The block of buildings to which the fallen roof belonged is more than 100 years old, and is made on the old principle of a wooden framework filled in with bricks and stone. They are in an unsafe state generally.

At Swansea one of the railway arches near Pailley's quay has fallen into the quay: no one was injured.

THE DEATH-PLACE OF GIBBON.

SIR,—Your correspondent who signs with a star is under a wrong impression when he states that Gibbon died in Sussex. In December, 1793, he left London, to make what proved to be his last visit to Sheffield, the seat of his friend, Lord Sheffield; but, owing to a serious attack of illness, he returned to St. James's-street earlier than he had intended, and here he died January 16, 1794. His remains were removed from London and deposited in Lord Sheffield's mausoleum in Fletching Church, Sussex, on which is inscribed a Latin epitaph written by Dr. Parr. These facts, on the authority of Lord Sheffield, will be found in the first volume of Gibbon's Miscellaneous Works, where is also a copy of the epitaph. HENRY B. WHEATLEY.

THE CONDITION OF ARCHITECTURAL SCULPTURE.

SIR,—Any one with a true love and feeling for architecture cannot help feeling grieved, in walking through London, to find carving generally carried out in such an artistic manner, as is the case. I should much like to know how it is that carvers and architects do not work more hand-in-hand with each other, so that the employers of carvers should receive a thorough knowledge of the style and character of work to be done; and then for the art-workmen to have every opportunity in carrying it out: so that when the building is completed, it shall show how all employed have laboured and studied together in a meritorious work.

Surely there are men who, by propere encouragement and opportunity, could carry out these ideas, and I feel certain are grieved in not having that opportunity of studying a piece of work sufficiently, and time given to develop it into excellence; for it is a daily occurrence for carving to be done in one-half the time that is just and consistent. The carver is brought to feel that a certain work must be done in a certain time, and he naturally loses in such a case all other interest.

There seems to be a want of more confidence between architects and carvers; and, be it said, there is a class of carvers who feel deeply that for some reason or other they are not looked

upon as art-loving men, as a great many of them really are. Did they receive more confidence and encouragement from those from whom such is naturally expected, I feel certain of the results being much more satisfactory, and the condition of architectural sculpture more worthy. Sincerely thanking you, Mr. Editor, for your energy and ever-ready encouragement in this question, and all others tending towards advancement, I remain,

A WORKING CARVER.

THE ARCHITECT OF THE PARLIAMENT HOUSES.

SIR,—I am not at all concerned to defend Mr. Ferguson, who is fully able to take care of himself, nor to endorse either his criticisms or his inferences as to the New Palace.

But I would remark, that neither he nor any one else can give a verdict on the facts now at issue without hearing both sides of the case. If Mr. Pugin had acted on the suggestion of a reference of his statements to the Institute, all the evidence would have been long ago discussed and sifted. As it is, Mr. Murray will publish, in a very few days, a statement of facts, which I trust will be sufficient to set the question at rest. We shall leave the whole matter, in perfect confidence, to the judgment of the architectural profession and the public.

ALFRED BARRY.

TO HEAT A BATH.

I SEE in your last week's issue a "POOR VALETTINARIAN" inquiring the manner in which baths may be heated where it is inconvenient to have the ordinary and proper appliances.

The only method that I am aware of, and which is, I believe, the best, is to have a Gas Stove, of the ordinary size and shape, with a small boiler in the inside, the same to be connected with the bath by means of two pipes from the boiler, one from the upper end and the other from the lower end of it, both pipes going into the end of the bath. The water is then put into the bath and the gas lighted in the stove, and the water then freely circulates till hot enough for use.

If gas cannot be applied, have the stove made to contain a small grate for coals.

A PLUMBER.

SNOW AND THE SEWERS.

SEVERAL correspondents deny Mr. Phillips's right to any claim to priority in the suggested use of the sewers for the removal of snow. Thus Mr. Lovegrove, surveyor to the Hackney Board of Works, says that twenty-four days before the publication of Mr. Phillips's suggestion in our pages he employed the roadmen with their trucks, and the cartmen with their carts, to collect the snow from the several leading thoroughfares of Hackney, and had it shot down the side entrance shafts: thence the sewer-men shovelled the snow direct into the sewers.

"Several workmen were also instructed to pass along the sewers to observe the result, and it was found that each shaftwell was carried away by the stream and quickly dissolved.

Another thought has occurred to me to have a tank with an open furnace bottom and tank over it, so that the exposed fire beneath the tank should thaw the snow; the tank also to be filled with snow; then, as the snow in the tank is melted, the water could be drawn off into the channels or discharged down the nearest gully-hole."

Mr. Gadd, too, road surveyor, of Croydon, says,—

"Without having ever read or heard of the plan, I had a large quantity of snow cast into the main sewer in Brighton on the first heavy fall of snow last winter. The idea suggested itself to me from knowing the great warmth of the sewers, and it needed nothing to thaw it, for long before it had reached the next man-hole it had melted."

Another writer, E. J. Dudman, says,—

"On reading the article headed 'No Thoroughfare' in the *Builder* of January 12th last year, the thought occurred to me that, by using plenty of water to wash it away, the snow might be put down the street gullies by simply opening the gratings; and, on looking over the next number, January 19th, I there saw the idea made public by Mr. Phillips, only that he proposed to make special shafts; following which is a note to the effect that a communication had been received from Mr. Jennings also, proposing to use the sewers for the purpose, so that both ideas were made public at one time; but in the number for January 26th, a letter from Mr. Lovegrove appeared stating that he actually had put the plan into practical use on the Saturday following the snow storm (or January 6th), so that Mr. Phillips can neither claim entirely the original idea, nor of being the means of putting it into practical use."

HERNE BAY PIER.

FOR some years past this landing-place or jetty has been closed, and this former inconvenience pronounced shut to the general public, steamers no longer deposit passengers, and the whole wears an aspect of desolation and decay. Want of funds is the plea, but surely this difficulty might be overcome, and some contractor from the north, great in iron, led to put up a similar structure to the one at Margate, or replace the damage by wooden piling as before. The tolls and general undertaking might be assigned as security, and an amount raised by 15,000 shares giving free passage, so as to reimburse the necessary outlay.

PATLAIN.

AN ARCHITECT'S ACTION TO RECOVER PAYMENT FOR PLANS.

At the Manchester City Court of Record, in the case of *Waddington v. The Rev. Joseph Steinthal*, the plaintiff was an architect in Manchester, and the defendant the minister of the German church there. This was an action to recover 15*l.*, which the plaintiff alleged was due to him on account of work he had done in preparing plans, &c., of a church and schools which it was once the intention of the defendant to build in Park-street, Manchester. It was understood that plaintiff was to receive 5 per cent. commission on the cost of the buildings. In June last an interview took place between the parties, in course of which defendant stated, that owing to the German war, contributions which he expected were not forthcoming, in consequence of which he would be obliged to abandon the idea of building the church for some time to come. Plaintiff replied, that he would not press for payment of his commission if the erection of the church was postponed with a reasonable time. It had not yet been commenced. The defence was, that the plaintiff had not taken to supply the plans, on the understanding that if they were approved by the committee who had charge of the building arrangements, he would be paid a certain per centage; but in the event of their not being approved there was to be no charge made. The committee did not approve of the plan of the church, which they regarded as clumsy, and it was not finally approved. It was also urged for the defence, that the idea of building the church was not abandoned, but simply deferred, in consequence of the want of money. The jury returned a verdict for the defendant.

CHURCH-BUILDING NEWS.

Brentford.—The foundation-stone of the new church of St. Paul, Old Brentford, was laid on the 80th ult., by H.R.H. the Princess Mary of Teck, in the presence of the Prince of Teck, the Right Hon. Spencer Walpole, M.P., and the principal clergy and gentry of the neighbourhood. The Bishop of Tennessee was present, and took part in the ceremony. The new church consists of nave, north and south aisles, porch, chancel, chancel aisle (used as an organ-chamber), vestry, and tower and spire, at south-west angle, rising to a height of about 150 ft., and suitable for a good peal of bells. The total length of the church, internally, including chancel, is 118 ft., and the width, 58 ft. The chancel is 34 ft. 6 in. long, by 22 ft. wide. The nave is divided into five bays, the piers and arches being of Bath stone, with carved capitals. The material used for the exterior will be Kentish ragstone, with Bath-stone dressings; and for the interior, pale marbles, with coloured bricks in pattern. The roofs will be of Memel, hoarded and felted, and will be stained, but not varnished. The seats will be uniform throughout, and without doors, the majority being iron and unsapropriated. The chancel is arranged with stalls and desks, a credence-table, and other fittings, the altar being raised about 4 ft. above the level of the church. The east wall, should funds permit, will be decorated with a handsome reredos, in alabaster and coloured marbles. The works are being executed by Mr. T. Nye, of Ealing Green, builder, under the superintendance of the architects, Messrs. Francis, of Upper Bedford-place.

Mistley (Essex).—At a recent vestry meeting, convened for the purpose, the plans of an intended new church were submitted, when a subscription was set on foot, and sums exceeding altogether 2,600*l.*, were at once put down. The cost of the new building is estimated at 5,000*l.*, so that much still remains to be done; but it is fully anticipated that the amount required will be forthcoming.

Westhampton.—The parish church of Westhampton, near Chichester, has just been reopened for divine service, after restoration and enlargement. The whole cost of the restoration has been about 1,000*l.* Of this the chief share has fallen on the rector, and the Duke of Richmond, who has restored the chancel and rebuilt the chancel-arch; the rest of the expense has been defrayed by the incumbent and parishioners, with little extraneous aid. A new pavement has been laid down in the chancel; a stone reredos has been erected; a new aisle has been added; a gallery has been abolished, and open seats have been placed throughout the church.

Urmston.—St. Clement's Church, Urmston, the foundation-stone of which was laid in March of last year, has been consecrated by the Bishop of Manchester. It is picturesque situated in the country village of Urmston, distant about two miles from Stretford. On approaching the church from the latter place, the chancel-gable with its traceried three-lighted window, is seen standing out well among the trees. On the left appears part of the roof and the east window of the children's chapel; and on the right, the gable and three-lighted window of the vestry. The bell-turret springs up in the angle formed by the west wall of the vestry and the north wall of the nave, at the junction of nave and chancel. It contains a good sounding bell, by Mears, of London, and is capped by a six-sided slender-slatted spirelet, terminating with a movable gilt vane. The church is built in the Geometrical Decorated style. The external walls are faced with stone, three colours being employed for variety and relief. The roof is covered with slates in two colours. Accommodation is provided for 360 persons, with an arrangement for a future north aisle to hold 200 more. The plan, as now carried out, consists of a chancel, with the usual provision for seating a choir; a south chancel-aisle, devoted to the use of the school children; and a north chancel-aisle to serve as organ-chamber and vestry. The body of the church, comprising a nave and south aisle, divided from each other by an arcade of four arches, resting on pillars, with moulded and floriated capitals, increasing in richness of carving as they approach the east end. In the easternmost capital are introduced the evangelistic symbols. The main entrance is through the north porch. The reredos is of Can stone, relieved with marble. It occupies the whole space between the Lord's table and the east window. The rest of the eastern wall of the chancel, and some other parts of the church, are decorated in colour with various devices and symbols. This work, as well as the reredos, is given by Mr. Joseph Deakin. There are three large windows on the north side,—one of three and two of two lights; one gabled clearestory window on the south side, and three tall windows in the west gable, the centre one being of two lights, flanked by a single light on each side. The windows are all traceried, and of different designs; repetition, either in the general elevations or in the details of the different parts, having been avoided. The tracery in the tracery of the windows has all been drawn out to suit the various forms of the stonework. The chancel fittings were originally intended to be in red deal, but Mr. J. E. Cockrell (a non-parishioner) offered to bear the extra cost of oak, and also of additional ornamentation. This will amount to upwards of 50*l.* The heating apparatus is by Messrs. G. Blake & Co., of Coventry, and is contained in the basement. The warm air passes into the chancel by gratings in the floor. Messrs. G. Blake & Co. have guaranteed the success and efficiency of their apparatus. The general contract was taken by Mr. M. Foggett, of Manchester, for 2,125*l.*, but there have also been employed,—for the font, reredos, and pulpit, Messrs. T. R. & E. Williams; for the gasfittings and lectern, Messrs. Thomson; for the carving of the pillars, &c., Mr. Green; for the coloured decoration, Mr. R. Park. All these have worked from the designs, and under the direction of the architect, Mr. J. Medland Taylor, of Manchester.

Dinnington (Yorkshire).—A new church is about to be erected in this village, replacing the present structure, which has no pretensions to beauty or antiquity. Mr. R. C. Sutton, of Nottingham, is the architect, and Mr. Canthorpe, of Retford, the builder.

Chesham (Ducks).—The church of Latimer, near Chesham, having become inadequate to the increasing requirements of the neighbourhood, has been enlarged and improved at the cost of the present Lord Chesham from the designs of Mr. G. G. Scott. The architectural pretensions of the original church were not of the highest order, but in its present condition it may fairly claim a higher place among the churches of the county. The improvements which have been effected consist in the addition of a north and south transept, a new chancel with an arcuated apsidal termination, a vestry, organ-chamber, chancel and sacristy arches, and an extension to the nave westward. The chancel and the sanctuary are paved with encaustic tiles. The windows in the apse are filled with memorial stained glass. The window of the south transept is filled with stained glass from the old east window. The chancel is fitted with new

als, and the nave and transepts with new open
ants, all of pitch pine, and polished. The heat-
y, performed by hot water. The local mate-
red brick, moulded where required, and with
h stone dressings, &c., has been used. The
orks have been carried out by the contractors,
Messrs. Fassnidge & Son, of Uxbridge. The
ifice has been re-opened.

Books Received.

FROM another bundle of almanacs for 1868
very interest, almost every Company, now
ublishes its almanack, we name "The Rail-
y, Banking, and Commercial Almanack"
ited by W. Page Smith), as containing a large
ount of information on economical and com-
ercial subjects.—"The Post Magazine Al-
manack" gives special information as to insur-
ce companies.—"Deane's Illustrated
almanack" has some pleasant chatty matter
ixed up with it.—"The Engineer's and
ntractor's Office Sheet and Engineering
almanack" is well adapted to its purpose.—
id we may say the same for "The Engineer's,
hitect's, and Contractor's Pocket-Book,"
ock-wood) but it chiefly addressed to engi-
ners.—Taylor & Son's "Northamptonshire
handbook and Almanack" is intended for that
ounty, and is noticeable for a sketch of "The
mpower Treason," and some particulars of
The Triangular Lodge at Rushton," long ago
ustrated in our pages.—"The Bombay Builder,
sider the head "Adjutor Memoria," gives refer-
nces to the page in which, in our own and other
emporary journals, papers or information
ertain subjects may be found. In the
umber for December there is an article on the
ombay Black-wood Furniture, mentioning with
egret the falling off apparent in the manufac-
ere. The specimens in the Paris Exhibition
ere purchased by the committee from the house
a private gentleman, the specimens obtainable
at the maker's being very inferior. Even what
as sent to Paris seemed to us very badly made,
and we are not surprised that the jury would
y nothing to it.

Miscellaneous.

THE ABYSSINIAN EXPEDITION.—Four locomo-
tives will be shortly at work in Abyssinia upon
the railway formed in connexion with the Eng-
lish expeditionary force now in that country.

A POLITICAL MONUMENT NEAR ROME.—The Pope
is erecting at Monte Rotondo a monument to the
military soldiers killed in that town and at
Monte Rotondo, and has entrusted the work to Count
Cespi gnani, one of the best architects in Rome.

THE ANCIENT CHURCH OF MONKWEARMOUTH.
We are told that the old tower of this well-
known interesting structure is in so bad a state
that it can scarcely be expected to remain up-
right longer, unless something be done to
strengthen and preserve it. The income is only
£500l. per annum. The Bishop of Durham, we
understand, inspected the church a few weeks
ago. Let us hope that he will institute some
improvement in its favour.

FREEHOLD GROUND-RENTS, LONDON.—The
ground-rents created in Garrick-street, Covent-
garden, by the Metropolitan Board of Works, were
sold by auction by Messrs. Foster, at the following
prices:—No. 1, Garrick-street, ground-rent 108l.,
sold for 2,700l.; Nos. 3 and 5, ditto, ground-rent
166l. 10s., sold for 1,220l.; No. 7, ditto, ground-
rent 20l., sold for 530l.; Nos. 9 and 11, ditto,
ground-rent 37l., sold for 960l.; Nos. 13 and 15,
ditto, ground-rent 90l., sold for 2,400l.; Garrick
street, ground-rent 289l., sold for 7,350l.; Nos. 19
and 21, Garrick-street, ground-rent 96l., sold for
2,440l.; No. 23, ditto, ground-rent 55l., sold for
1,460l.; No. 25, ditto, ground-rent 25l., sold for
440l., &c. Nos. 10 and 12, ground-rent 15l.,
sold for 450l.; No. 8, ditto, ground-rent 12l.,
sold for 400l.; No. 6, ditto, ground-rent 30l., sold
for 500l.; No. 4, ditto, ground-rent 45l., sold for
1,240l.; No. 2, ditto, ground-rent 12l., sold for
400l.; No. 3, Long-acre, ground-rent 40l., sold
for 1,070l. Also the following rack-rents:—No. 18,
New-street, Covent-garden, let at 180l., sold for
2,000l.; No. 63, St. Martin's-lane, let at 200l.,
sold for 4,000l.; Nos. 64, 65, and 66, ditto, let to
several tenants at 220l., sold for 4,000l.; total,
332,770l.

HONOUR TO SCIENCE.—We are glad to hear
that Wheatstone is knighted in testimony to the
value of his labours in telegraphy. Mr. Fox
Talbot should be made a baronet for his inven-
tions on which rest all that we now do in photo-
graphy.

FEVER AT TERLING.—The *Chelmsford Chronicle*
speaking of the fever prevailing at Terling,
says there have been 180 cases, and sixteen
deaths. Bad water is believed to be the
chief cause, and the privy Council have pressed
this upon the local authorities, but as yet without
avail.

THE ROYAL EXCHANGE CHIMES.—Messrs.
Moore, of Clerkenwell, write to us to say that the
clock and chimes of the Royal Exchange, which
have been in their hands for repairs, are now all
right again, and that the clock is going, chiming
the quarters, striking the hours, and playing a
tune at 9 a.m. and 9 p.m. each day.

AN ARCHITECT KNIGHT.—It is stated that the
honour of knighthood will be conferred by the
Lord Lieutenant on Mr. Charles Lanyon, M.P.
for Belfast, and President of the Royal Institute
of the Architects of Ireland. There will then be
three architects knights in Ireland, while the
architects of England have not a Sir amongst
them. We must call out, "Justice to England!"

"GAS SUPERSEDED."—An improved method of
lighting the streets, invented by Messrs. Tessie
dn Motay & Marechal, and one of their assist-
ants, has just been tested in Paris, and, it
is said, has proved successful. The light is
described as being intense. The mode of apply-
ing oxygen to the flame is the principal secret of
the process. A small cylinder of magnesium,
placed in the centre of a jet in combustion, be-
comes luminous, and produces sixty times as
much light as ordinary gas, or about 2l. 3s. 2d.
worth of light for 7d.; at least, it is said so.

INDUSTRIAL SCHOOLS FOR BIRMINGHAM.—At a
recent meeting of the Birmingham town council
the Mayor submitted a letter from Mr. T. C. S.
Kynnersley, stating that the magistrates of
Warwickshire had for some time been anxious
to establish an industrial school for the county,
but had not been able to agree to a site. At length
it was recommended that application should be
made to the town council of Birmingham, who
were understood to have a similar establishment
in contemplation, with a view to ascertain
whether they would be willing to admit boys
from the county, and also on what terms. The
letter was referred to the General Purposes
Committee, with power to appoint a deputation,
if necessary. The committee have ascertained
from the Rev. Sydney Turner, the Government
Inspector of Schools, that if properly and
economically managed, a school for forty boys
should cost, over and above the Government
allowance, not more than 208l. a year. The
committee recommended that 250l. be provided
for this purpose. The committee have been
authorised to take a lease of a farm, and to ap-
point officers and servants, and take the neces-
sary measures for the establishment of an in-
dustrial school.

"THE WHEEL OF LIFE."—A lively wheel, at
any rate, and very amusing. The notion is not
a new one. Every one has seen that a lighted
stick swung round quickly and continuously
produces the effect to the eye of a circle of fire,
one impression succeeding another so quickly on
the retina that they all remain there. There was
an optical illusion founded on this principle
exhibited at the Polytechnic Institution long ago,
but the Wheel of Life, as issued by the London
Stereoscopic and Photographic Company, is a new
and very satisfactory application of it. It consists
of a topless metal drum with thirteen upright
slits in it, having around its inner circumference
certain sketches of figures, and made to rotate
at a pin. The result is that the figures are
seen through the apertures in a remark-
able manner. Amongst the best of the dozen
strips of subjects already prepared are the
man jumping through a hoop, the acrobat
spinning a ball with his feet, and a little old
gentleman walking with his umbrella while
it is "raining pitchforks." Some of the subjects
are very comical when turned upside down, and
other combinations may be obtained by pitting
in two slides at a time; so that a great deal
of fun may be got out of this toy, and any particu-
larly clever gentleman who happens to be present
when it is shown may improve the occasion and
deliver a neat lecture on optics. New subjects
may, of course, be constantly supplied.

OPENING OF A CHURCH AT PAU.—A new
Russian church, built by the liberality of various
members of the Russian nobility, has just been
consecrated at Pau. Rev. Father Prilejoleff, of
Paris, officiated at the ceremony. The interior
is handsomely decorated. The paintings, on
cedar, on a gold ground, framed in the icono-
stasis, were executed by an artist of St. Peters-
burg.

TELEGRAMS.—The receiver of a telegram can-
not maintain an action for a mistake which has
caused him damage. The person who pays for
the transmission of a message is the only person
who has a right of action in case he is damaged
by the negligence of the company or its servants.
The Court of Queen's Bench thus held, in the
case of Playford v. The United Kingdom Electric
Telegraph Company, which was an action
brought by a person to whom a telegram had
been sent from one of the stations of the com-
pany, and who, in consequence of a mistake in
the transmission of it, was so misled that he was
damaged.

THE LONDON ASSOCIATION OF FOREMEN EN-
GINEERS.—The fifteenth annual meeting of mem-
bers of this society took place on the 4th inst., at
its rooms, Aldermanbury. The number of ordi-
nary and honorary members on the books is 163,
and the funds invested for all purposes amount to
1,264l. 10s. The president, Mr. Joseph Newton,
J.M. Mint, delivered an address. He reviewed
at much length the progress of mechanical en-
gineering at home and abroad during 1867, and
contrasted the educational machinery of the
Continent with that of this country. The com-
parison was not flattering to our national pride,
and it went to account for the superiority of
foreign workmen in certain branches of manu-
facturing industry over those of Great Britain.
The evil was patent, and the remedy should be
speedily applied. Comprehensive systems of
technical schools for each branch of science and
art must be established forthwith. Defective
legislation had impeded national progress, at all
events in regard to manufacturing industry, and
we had now to cure a disease which ought never
to have existed.

BATH OF THE ROMANS.—Excavations now being
made on the site of the old White Hart Hotel,
Bath, have opened up the basement of a large
building, and the continuation of the frieze of the
great Roman temple dedicated to Minerva, a
portion of which is preserved in the museum of
the Bath Literary and Scientific Institution.
The temple stood on the eastern side of the
great Pusey-road, running through the city from
north to south, and nearly midway between the
Porta Decumana, North Gate, and the Porta
Flumentana, South Gate, leading to the river.
Its front was towards the west, and consisted
of a portico supported by very large fluted columns
of the Corinthian order, crowned with rich
sculptured capitals. Behind this temple, towards
the east, stood the Roman baths, the foundations
of which were discovered in 1755, at the depth
of 20 ft. beneath the surface of the ground.
The recent excavations have laid bare a kind
of concrete pavement, leading to the inference that
there had been a large area of parade-ground
adjoining the temple. Other discoveries show
that the Roman Forum extended considerably
beyond the east end of the present abbey church-
yard.

NUISANCE FROM SMOKE, EFFLUVIA, OR NOISE.—
The Lord Chancellor has finally decided, on
appeal, the case of Crump v. Lambert. The
plaintiff was the owner of two houses at Wal-
sall, and he was the occupier of one of them.
The defendants were iron bedstead manufac-
turers, and had recently erected a factory on
land adjoining the plaintiff's property, where
they smelted iron for the purpose of their busi-
ness, and also employed a considerable number
of men in hammering iron bars. The plaintiff
alleged that the smoke and effluvia issuing from
the chimney of the manufactory, and the sound
proceeding therefrom, were a nuisance, and he
instituted this suit to restrain it. The Lord
Chancellor held (affirming the decision of the
Master of the Rolls) that nuisance arising from
smoke alone, unaccompanied by noise, or from
noise alone, or effluvia alone, might be the sub-
ject of substantial damages to a plaintiff in an
action at law; and that wherever a jury would
give substantial damages at law in respect of
any such cause of action, the Court of Chan-
cery would grant an injunction to restrain a
continuance of them. The injunction in this
case was, therefore, made perpetual.

GOOD NEWS FOR THE VERY POOR.—The guardians of the Holborn union have had "evidence laid before them," that married couples, with or without children, and widowers and widows with children, do not, as a rule, wish to become inmates of the workhouse, and frequently struggle on and on with insufficient allowance until their homes are entirely broken up by parting with their furniture and effects to maintain themselves. "The home when once broken up can rarely be renewed, and these persons of necessity then become inmates of the workhouse, and thus add greatly to the expense of the union." How often have we used these very words! The Board, therefore, have resolved that a more liberal system of outdoor relief shall be adopted according to the necessities of each case, and that an additional officer be appointed to inquire into and report on every case.

TENDERS.

For alterations and additions to Sylvan Lodge, Brighton, Mr. T. Simpson, architect. Quantities applied:—
 Jackson & Shaw £1,310 0 0
 Nightingale 4,203 0 0
 Anson & Newham 4,195 0 0
 Bruton 4,147 0 0
 Cheesman & Co. 3,850 0 0
 Steddy 3,697 0 0
 Chappell 3,687 0 0
 Sawyer 3,669 0 0
 Farr 3,490 0 0

For a new warehouse in rear of 21, Coventry street, Haymarket, for Messrs. Charles Lloyd & Son, Mr. W. P. Griffith, architect.
 Patman & Fotheringham £1,064 0 0
 Clemence 1,047 0 0
 Webb & Sons 895 0 0
 Macey 676 0 0
 Dunsdale (accepted) 626 0 0

For two houses, to be built at Dover, for Mr. S. Finnis, Quantities applied:—
 Page £3,367 0 0
 Datus 3,175 0 0
 Featherstone & Co. 2,879 0 0
 Adcock 2,862 35 0
 Cozens, Brothers 2,850 0 0
 Tunbridge 2,810 0 0
 Stiff & Co. (accepted) 2,750 0 0

For a house, offices, and conservatory near Ascot, for Mr. William Chapell, Mr. Alfred Smith, architect.—
 Longmire & Burge £2,983 0 0
 Lawrence 2,877 10 0
 Norris 2,718 0 0
 Patten (accepted) 2,650 0 0

For Leytonstone main drainage. Mr. John T. Bressay, surveyor to the Committee:—

	Contract No. 1.	Contract No. 2.
	£ s. d.	£ s. d.
J. Porter	4,329 0 0	3,759 0 0
Pound	4,070 0 0	
Bellamy	3,800 0 0	3,300 0 0
P. Porter	3,759 0 0	
Clark	3,688 0 0	3,210 0 0
Beard	3,636 0 0	3,179 0 0
Adamson & Taylor	3,597 0 0	3,144 0 0
Wood	3,550 0 0	2,983 0 0
Nicholson	3,570 0 0	3,120 0 0
Munday & Hutchinson	3,550 0 0	3,159 0 0
Potter	3,487 0 0	3,100 0 0
Kent	3,449 0 0	2,989 0 0
Hubbard	3,347 0 0	2,993 0 0
Williamson	3,330 0 0	2,800 0 0
Bloomfield	3,253 0 0	2,793 0 0
Wainwright	3,240 0 0	2,700 0 0
Tushack	3,100 0 0	2,690 0 0
Smith	2,825 0 0	
Brewer & Stigges	2,827 0 0	2,515 0 0
Harris	2,875 0 0	
Dickenson & Oliver	2,860 0 0	2,570 0 0
Knight & Son	2,833 0 0	
Tinsley	2,824 0 0	2,510 0 0
Moxon	2,810 0 0	2,450 0 0
Jackson	2,790 0 0	

For the erection of a public-house at Wapping. Mr. C. Dunch, architect:—
 Moreland & Burton £2,289 0 0
 Newman & Mann 2,150 0 0
 Kilby 2,115 0 0
 Hill & Keddell 2,060 0 0
 Piper & Wheeler 2,068 0 0
 Heale 2,065 0 0
 Kennor 1,981 0 0
 H. & J. Johnston 1,912 0 0

For alterations and additions at Cambridge Lodge, Harrow. Mr. J. H. Howley, architect:—
 Woodbridge £650 0 0
 Crabbe & Vaughan 668 0 0
 Shurmer 665 0 0
 Sharpington & Cole 655 0 0
 Sales 493 0 0
 Fole 473 0 0
 Chapman 445 0 0

For alterations and repairs to Warleigh Cottage, Thurloe Park-road, Lower Norwood, for Mr. Davis, Mr. Jewhurst, architect. Quantities by Messrs. Birdseye & Storey:—
 Taylor £1,047 0 0
 Vickers & Harding 1,049 5 3
 Thompson 949 0 0
 Galls & Son 874 0 0
 Perkins 853 0 0
 Gollub 874 0 0
 Godbolt 795 0 0
 Labey 795 0 0
 Gillott & Winstley 765 0 0

For the erection and completion of three dwelling-houses at Bedford, for the Moravian Trustees. Mr. John Taylor, architect, 44, High-street, Bedford:
 Wian & Foster £1,589 0 0
 Day 1,386 0 0
 Hill 1,353 0 0
 Lawson & Son 1,346 0 0
 Young & Son 1,300 0 0
 Hobson & Taylor 1,300 0 0
 Cavain 1,299 0 0
 Lawson 1,292 13 0
 Dickens 1,285 0 0
 Richards 1,246 13 0
 Haines 1,244 4 0

For the finishing of three cottages in Croft-street, Depford, S.E. Mr. Robt. A. Potts, architect:—
 Dover £399 0 0
 Nightingale 357 0 0
 Chaplin 318 18 0
 Machin 303 19 0
 Lyle 297 0 0
 Shurmer 285 0 0
 Surridge & Co. 275 0 0
 Stuart & Bennett 268 0 0
 Selie 249 15 0
 Leman & Co. 238 17 0
 Gordon & Prosser 225 0 0
 C. Neale 224 10 0
 Pooley 223 10 0
 Holdsworth 219 0 0
 Frabbie, Broth. 215 10 0
 G. Neale 215 10 0
 Russel (accepted) * 215 0 0

* With a deduction for old materials.
 For the erection of an assembly-room, &c., at the Town Hall, Ryde, for the Ryde Commissioners. Mr. Francis Newman, architect. Quantities applied:—
 Newman £2,989 0 0
 Bell 2,900 18 4
 Lee 2,777 0 0
 Gordon & Prosser 2,750 0 0
 Barton 2,720 0 0
 Denham 2,711 0 0
 Parsons & Saunders (accepted) 2,490 0 0

For the erection of a villa residence at West Cowes, Isle of Wight, for Mrs. Venning. Mr. Francis Newman, architect. Quantities applied:—
 Chinchin £1,474 0 0
 Wheeler 1,464 0 0
 Ashby & Stone 1,450 0 0
 Sibley 1,427 0 0
 Debnam 1,399 0 0
 Thomas 1,379 0 0
 Barton 1,369 0 0
 Ball (accepted) 1,348 4 0

For erecting warehouse in Isola-lane, for Messrs. Smith, Harrison, & Crossfield. Messrs. John Young & Son, architects:—
 Jackson & Shaw £3,500 0 0
 Ashby & Stone 3,450 0 0
 Mansfield & Price 3,303 0 0
 Browne & Robinson 3,124 0 0
 Hincham 3,060 0 0
 Ashby & Horner 3,049 0 0
 Conder 3,475 0 0

TO CORRESPONDENTS.

Note from York (last week).—Edinburgh (ditto).—K. B. (should give name of the spot: admission might be effected by circumstances not mentioned).—J. M. (thanks: not desired).—D. V. (except of Hibernia was acknowledged at the time. We cannot write letters).—P. W. (we are unable to comply).—S. A. (thanks).—A. J. M. (ditto).—J. R. C. K. W. J. S. N. A. H. T. O. R. E. S. H. A. (ditto).—J. R. J. D. F. J. T. B. J. F. H. & J. J. R. P. J. D. A. R. H. I. E. L. D. O. J. L. E. R. E. W. H. Captain T. C. R. M. E. L. T. M. J. M. M. R. E. A. P. A. R. J. (ditto).

We are compelled to decline putting out books and giving addresses.
 All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

TO SUBSCRIBERS.

An INDEX and Title-page to Volume of last year, and a COLOURED TITLE-PAGE, can be had on application.

The TWENTY-FIFTH VOLUME of "THE BUILDER" (bound), for the year 1867, will shortly be published, price One Guinea.

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NOTICE.—All Communications respecting Advertisements, Subscriptions, &c., should be addressed to "The Publisher of the Builder," No. 1, York-street, Covent Garden. All other Communications should be addressed to the "Editor," and NOT to the "Publisher."

[ADVERTISEMENTS.]

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BUENOS AYRES GOVERNMENT CERTIFICATE.—TRANSLATION. We, the undersigned, at the request of Messrs. Jas. G. Thompson & Co. certify that the IRON SAFES of Messrs. CHUBB & SONS, London, of which these gentlemen are agents, were exposed for several hours to the fire that took place in the offices of the National Government on the evening of the 26th inst.; that in our presence they were easily opened with their respective keys; that the moneys and important documents they contained were found in perfect order; and that these safes are now in use in the National Treasury Office.—(Signed) J. M. DRAGO (Treasurer of the National Government), JOSE TOMAS ROJO, JUAN M. ALVAREZ. A true copy—A. M. BELL.—Buenos Ayres, July 31, 1867. CHUBB & SONS, makers to the Queen and the Bank of England, 57, St. Paul's churchyard, London; 68, Cross-street, Manchester; 28, Lord-street, Liverpool; and Horsley-fields, Wolverhampton.

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 Small folio, handsomely bound crimson cloth, gilt edges. Price 41s.

From the *Observer* of the 27th. "Does persons who have been accustomed to look at the ordinary Chinese patterns that may be seen copied upon some of our China ware will be perfectly astonished at the appearance of such a book as this. Many of the designs are new, and some are of a walking amidst their blue and white and blue and white, and their specimens of the last and initiative art throughout the country. We may say at once, in our pride of observation, that we could not equal a half-dozen of these books like the Chinese in ornamental design; but Mr. Owen Jones has done quite enough to take down our national pride. . . . We have here no fewer than one hundred large-sized plates, executed in admirable style, taken from the most perfect specimens of the art of ornamentation. The volume is set up in decorative style, and is in all respects one of the most beautiful works we have ever met with. It is not only a splendid book to possess, but it is one that will be in our hands that must of necessity improve the art of design in this country in all branches."
 Although copied from china and porcelain ornaments, these designs are well adapted to numerous other articles, such as beds' dresses, perforating machines, and other articles, and, in fact, we may anticipate seeing, in a very short space of time, every species of ornamentation copied from this book of Mr. Owen Jones, who will doubtless feel pride in having, by his talented enterprise, introduced an entirely new and "celestial" order of design into this country.

Published by B. & T. CLIBBERT, 4, Cross-hill-buildings (back of the Bank of England), London, E.C.

In the press, New Engineering Work, demy 8vo. cloth, 29s. Subscribers, until Feb. 1, 1868.
ON WATERWORKS, SEWERAGE, IRRIGATION, TRAFFIC, SURVEYING, &c.—The Second Volume of Engineering Fieldwork.
 By W. DAVIS HASKELL, C.E.
 London: ARCHLEY & CO., Engineering Publishers.

THE EDINBURGH REVIEW.
 NO. CCCLX. JANUARY, as published on WEDNESDAY last.
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 I. GARDIENS DON CARLOS AND PHILIP II. OSTER, AND THE OSTER FIFTEEN.
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 III. LYONALD LECTURE ON GOVIND.
 IV. LITERARY EDUCATION IN ENGLAND.
 V. MEMOIRS OF SIR PHILIP FRANCES.
 VI. THE FEZZAN, OR RECOLLECTIONS OF THE GRAND ARMY.
 VII. THE FRENCH CENT.
 VIII. THE QUEEN'S HIGHLAND JOURNAL.
 London: LONGMANS, GREEN, & CO. Edinburgh: A. & C. BLACK.

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 London: LONGMANS, GREEN, & CO. Paternoster-row.

The Builder.

VOL. XXVI.—No. 1303.

The Education of the Craftsman.

HE general problem of education, to employ the language of one of the most original thinkers of the present century, is to lead, in a few years, a single understanding of moderate capacity to the same stage of development which has been attained, during a long course of years, by the successive labours of a great number of men of genius, who have devoted their entire energy during their whole lives to the study of a single subject. Without attempting in any way

to discuss the subject of the positive philosophy of M. Comte, or to indicate how boldly this great thinker at times takes the well-known step which separates the sublime from the ridiculous, we think it impossible to read the above statement without admiration of its comprehensive truth.

The problem thus stated, regarded both in its most general aspect, and in its separate cases or subdivisions, is one that assumes at the present moment an importance which has never before been so distinctly recognized. Turn where we may, we find indications that the great task of 1868, and of its successors, consists in finding the solution of the above problem. To say that the human mind is becoming impatient of empiricism is perhaps to mistake partial for general symptoms. But it can scarcely be denied that there is a movement in that direction. Nostrums are at a discount. The commercial shocks of the last two years have only formed a portion of the causes of the wide-spread uneasiness and want of faith that become manifest, from day to day, in almost every direction. A period of agitation and of alarm has been entered on in the moral and intellectual world, as marked and as portentous as is that season of volcanic activity, earthquake in unnumbered localities, storm and fire and unreasoning human violence, which disfigure the physical world at this present period of its existence. Political throes and struggles for the last twenty years have had such unintended and unexpected results that all men, except the professional agitators, look with doubt on projects of change. Forms of thought that were once regarded as essential to the very name of Christianity have been rudely and perseveringly assailed, and ancient formulae and dogmas have been supported by nominal defenders who have proved far more damaging than their fiercest assailants. The central form of absolute power, the relic of the Holy Roman Empire, has dissolved

into a constitutional rule. The party of action has been for the time extinguished by M. Chassepot. The calm of metropolitan security, the regularity of respectable fathers of families, who never miss the morning train or omnibus that bears them to their daily duties, have been shaken by the portentous meteor of Fenianism. In every corner is to be detected some menacing shadow. The most novel, and certainly the most hopeful, sign of the times is, that men, instead of rushing to the empiric for a remedy, shake their heads and say that, whatever palliations may be available for the moment, the only hope of permanent peace and prosperity for the future lies in the comprehensive and adequate education of the entire people.

It is not for the first time that we have admitted this fact. But if we can imagine the demons of misrule to watch the actions and to listen to the words of the members of that society on which they prey, we may well depict them in the language of the fable of the lark and her young ones. We have talked very much of the necessity of education, but we have found so many difficulties in the way that our neighbours—some of them, at least—have got their work done before us. They have cut their corn, it may be, with sickles of our own manufacture; but while we have been talking of the great reaping-machine that is to garner all the harvest in a week, they have got their little patches of oats and rye, and wheat too, under cover. In a word, in the special branches of technical education we have been told more than once, many foreigners are much in advance of ourselves. All honour to their efforts and to their energy; we wish it every success, save one, that of leaving England behind, and of securing not only an actual, but a comparative advantage. But we can afford to loosen our tongue in the matter. There are two distinct sounds of warning in the air, which none but the wilfully deaf can neglect. One is the improvement which is so rapidly taking place over a large portion of the Continent in the soundest organisation of labour, the educational formation and development of the workman. Instead of a struggle between the churchman and the dissenter to control the polemics of the schoolmaster, and to make use of his services chiefly to give an ecclesiastical or a political bias to an education which is comparatively useless, because it is exclusively general, we find the very opposite system pursued abroad, and that with its natural result. The primary instruction once given, the general elements of all sound education once secured, the second step is the special education appropriate to the future occupation of the child. A person who can devote twelve or fourteen years to the grounding of his own education may attain a very high degree of general proficiency. But even with those whom wealth and leisure enable to avail themselves of our best opportunities for study, the time always arrives, sooner or later, when education must become special, if the man looks to support himself by his own exertions. His course of study will, or at least ought to, be very different, accordingly as he seeks to enter the church, the bar, or the army. To attain eminence in the higher and more certain branches of military service, for instance, mathematical study must be carried to a point unnecessary, perhaps even not advantageous, to the harriester or to the divine. Geometric and free-hand drawing, which to the man of the robe would be only valuable aids, are necessary attainments to the Engineer officer. The dry and painful study of the vast library in which Englishmen are ironically bidden to discover the laws of England would be pure waste of time to the clergyman, unless on such a limited scale as may enable him to discharge the somewhat incongruous duties of a county magistrate. If this speciality of education be so necessary for men who can devote twelve or fourteen years to the pursuit, what

must be the case with children to whom every year given to the school is an expense supported with difficulty by their parents. "Given a certain number of years, how to make the best of them." That is our most practical and important problem. At present we must look for its solution abroad rather than at home.

While we find, as matter of fact, that the special and well-considered education of youth is becoming an essential feature of the chief centres of Continental labour, we have proof that the result is as practically advantageous as the sound theorist might anticipate. Have any of our readers amused themselves of late by reading the London signboards? An hour or two so spent is not without its lesson. Look at some of the most important streets. Look, for instance, at the fine line of Cannon-street—a line of warehouses and shops befitting a great commercial capital. We will not refer to the Post-office Directory—our readers may do so for themselves,—but if a person took down at random the names engraved on the brass plates that catch the eye as designating the occupants of the most imposing buildings in this locality, we question whether he would draw the inference that he was walking through an English city. The number of foreign names strikes one as being preponderant. The indication is not to be neglected with safety. A similar lesson is to be drawn from the increasing employment of foreign servants by English principals. The trade of the dyer has been pointed to as an example. The facility of producing a given tint, or even of matching a given tint from among a number of shades, is said to be so much greater in the German workman or shopman, educated to that business, than it is in the generally (i.e. imperfectly) educated Englishman, that the former is gradually, but surely, displacing the latter. We have here an effect—we have a cause assigned—can we doubt the inference?

The constant change in social habit, that change which men call, and which good men strive to believe to be, progress, is not by any means uniform, constant, and unvarying. We know of few things that are so. The rise of the tide, in many localities, appears to be capricious. Wind, local obstacles, approach of neaps or of springs, give to the daily influx a variety which seems due rather to intelligent volition than to mechanical law. The history of modern civilization shows similar apparent vagaries. Within the present century an immense revolution has been effected in the education of the craftsman. We have broken in upon his old course—we have not supplied its place. We have gradually learned to discontinue the seven years' apprenticeship, to neglect the gradation of apprentice, journeyman, and master, to despise the slow and cumbersome methods by which the younger members of a craft became gradually and unconsciously imbued with the practical knowledge of their predecessors. The spirit of the age has been hostile to these relics of the old guild system; but, while destroying the old method, we have failed to replace it by a better. We have introduced more of the element of chance into the daily life of the great mass of the productive classes. Symptoms which attract little attention from day to day, or from year to year, assume far greater importance if compared at more distant intervals of time. Take a single instance of the apparent change of a craft, properly so called, into a trade, of the replacement of the small manufacturer by the large higger. Ten or a dozen years ago, if you required a pair of boots in London, or in a country town, you found a hootmaker close at hand, you entered his shop, and described the article of which you were in need. If you happened to be in urgent need you *might* be fitted with a ready-made pair. But this was the exception, not the rule. The bootmaker always prepared to take your mea-

sure. Both you and he were better pleased when he did so. It was the usual course.

What is the case now? You may remember your old shop, and, if so, you may keep up your old custom. But the chances are ten to one against it. You may look, in many localities, in favor of a *bonâ fide* hootmaker. Hootmakers you may find in abundance, and from their ready-made wares they will urge you to make the selection they recommend. But these shops will not care to take your orders if they involve the further trouble of taking your measure. They will sell their wares if they can, but they will not study your convenience. The tradesman has replaced the craftsman. The man of money, or of knowledge rather of the world than of the *last*, has come in between the manufacturer and the consumer, and that, we venture to think, to the manifest detriment of both. The tender care that the old-fashioned hootmaker had of your feet—his respectful provision for the obdurate corn—his solicitousness if the last pair of soles had worn out ten days sooner than their predecessors—his representation that, in your excellent state of health, you were so far increasing in weight as to throw more stress on the very best of leather—all these are, to a great extent, things of the past—and thus we are at the same time worse shod and more separated from a class of men with whom we were wont, in other years, to have a sort of occasional confidential intercourse that was naturally beneficial to us both, and was one of the useful and inartificial bonds of the body politic. The replacement of the hootmaker by the hootseller tends to loosen a social tie of extreme antiquity. It is a feature of the time which would, we conclude, have never appeared had the special education of the hootmaker replaced the earlier regulations under which no man would have been applied to for boots who had not passed his apprenticeship in learning how to make them. We will not further ask how many of the boots sold are made out of England.

The above is a familiar instance of what is taking place all around. The tendency to replace the manufacturer by the salesman is a sign, we think there can be little doubt, of the declivity of the quality of manufactures. In many instances, indeed, the salesman is a necessary intermediary between producer and consumer. No one would go to Manchester to buy a cotton gown. No one would go to Lyons to select a piece of silk. In all these manufactures which are carried on in great bulk and a large supply of simultaneous labour, and especially by the aid of the steam engine, production and distribution are naturally, and beneficially separated, and room remains for the old and rapidly becoming obsolete distinction of wholesale and retail. But in those numerous crafts in which human handwork is still unrivalled, all that tends to keep the consumer at a distance from the actual workman tends also to deteriorate the quality of work, to destroy the proper pride which a good craftsman takes in the execution of his work, to substitute the cheap for the good, and thus to cause the disappearance of the excellent.

If the craftsman is thus losing the position which he has maintained from the earliest date at which his craft was known, if kept from his customer, and screwed into a false and uneasy position between an employer who is not a fellow-craftsman on the one hand, and the trades union on the other, he has not come to the end of his troubles. As his inducements to work *well* are replaced by inducements to work *cheap*, the relative advantage of the foreign workman will increase. With the abrogation of import duties, and with the increased facilities of transport, the Continental workman is brought very close to his English fellow-craftsman. A very small difference in price will be sufficient to transfer the custom of the salesman from one to the other. We have had numerous instances of this late. Of course, there is the usual conflict of opinion as to fact. One competent judge will tell you that he can and does procure castings in Belgium, because he can do so cheaper than he can in England. Another may tell you that, if French manufacturers had supplied locomotives to English railways, they have done so at a loss. It is not by any means necessary to wait till this point is settled. The fact that the question can be raised at all ought to be enough for us. Who would have believed it possible twenty years ago? What would have been thought of the contractor who, to supply the Menai suspension chains of Telford, or the

Menai tubes of Robert Stephenson, had thought of asking for prices from a foreign house? He would as soon have thought of seeking them from the moon! At present, sharp competition exists, to say the least of it. That least is ample.

We trace then in our own industries a change of system, and a consequent defect. We have lost the old teaching, and we have not replaced it by new. We can trace, in many instances, positive deterioration of produce. We can trace, in almost every instance, comparative deterioration. While we have been standing still, or advancing slowly, or even actually receding, our neighbours have been getting well to the front. We cannot doubt the fact. Nor can we doubt that they have taken, in very many instances, the right course—a course which has been attended by the predicted results. They have provided special education, of a technical or quasi-technical kind. They have endeavoured to educate the young weaver to understand design, the young smith to understand metallurgy. And they have found the attempt to answer.

Let those of us who have any interest in education, any interest in handicraft, any interest in the stability of our welfare or the hope of our future greatness, ponder well over these facts. Is it only the ostrich that seeks to shun danger by shutting its eyes? Naturalists, indeed, say so; but they say so in error, for we cannot pass a day without encountering many a biped that shares the improvidence, though destitute both of the speed and of the plumage, of the great two-toed haunter of the desert.

THE DRAINAGE OF LAND.*

Warmth.

The wonderful and mysterious ways of nature are shown more and more by every step we take to investigate the laws that govern the operations which are daily going on around us, and in none is this displayed to a greater degree than in the processes of vegetation. The beautiful action of capillary attraction, by which the surplus of moisture of winter, stored up in the ground, is drawn up to supply the loss occasioned by the summer drought, has been already alluded to; and as warmth is as necessary to vegetation as moisture, so nature has provided for a regular supply of heat to be stored up in the earth, to be given out when required.

It need scarcely be said that the temperature of the atmosphere attains a maximum in summer; and from observations made by meteorologists, extending over a series of thirteen years, the average time is placed on the 21st of July; the cold period attaining its maximum on the 20th of January. The heat that is given out in the summer is absorbed by the earth, and gradually finds its way downwards until it reaches a depth, beyond which, speaking as an average, the temperature of the soil is not affected by the heat of summer or the cold of winter. This depth is found to vary from 50 ft. to 100 ft. below the surface, the variation of temperature between winter and summer being only 3 degrees at 24 ft. below the surface, the mean variation of the atmosphere being, on the surface, nearly 30 degrees. The heat travels through the soil at a rate proportionate to the depth, as will be seen from the following table:—

Situation of Thermometer.	Middle of Warm Period.	Middle of Cold Period.	Mean Range.
In the air	Month. July 21	Month. January 20	Degrees. 29.8
Sunk one inch in ground	July 28	January 24	25.4
Sunk 3 ft. do.	August 9	February 8	21.7
Do. 6 ft. do.	August 25	February 24	18.4
Do. 12 ft. do.	September 25	March 27	9.5
Do. 24 ft. do.	November 30	June 1	3.4

Thus it will be seen that it takes six months for the alterations of heat and cold to affect the soil at a depth of 24 ft., and when it is coldest above ground, the subsoil at this depth below the ground is the warmest, and the heat of the summer sun is gradually ascending through the soil during the winter and early spring months to assist the germination of the seeds sown and to keep warm the roots of the plants during the snows and frosts of winter. When we are hardly able to keep life in some of the plants above ground, those beneath are luxuriating in a temperature many degrees warmer, provided they have fair play and are not over-supplied with

moisture, the excess of which makes land cold and ungenial to vegetation.*

The effect of judicious drainage is to warm the land; that is to say, in point of fact, to increase its capacity for absorbing heat, and also to enable it to keep up the temperature of the soil during cold weather.

Water is a better conductor of heat than air, and thus in cold weather, and when the ground is covered with snow, undrained land, having the crevices or spaces between its particles filled with water instead of air, on the one hand parts with its supply of heat more rapidly than drained land; and, on the other hand, is less calculated to take in as large a supply in the warm period of the year.

To prove the effect of drainage in raising the temperature of the earth, a premium was offered by the Marquis of Tweeddale, about five years ago, for observations and experiments to be made on soils of a similar character, growing the same crops, and situated in the same locality; the result of which was a collection of carefully prepared and thoroughly reliable observations, from which the following results are culled:— That during a long-continued frost, the mean temperature of drained land at 90 in. below the surface was nearly 1½ degrees warmer than the undrained. That showers of sleet and cold rains lowered the temperature of drained lands 2 degrees, and undrained land 4 degrees. That in every instance drainage gave a decided advantage in an increase of temperature, except only in summer, when a heavy fall of rain was found to lower the temperature of the drained land 1 degree more than the undrained,—an evident advantage to a hot, parched soil.

Experiments also made by Dr. Madden led him to the conclusion that an excess of water in the soil reduced its temperature in summer 6½°, which amount he considered equivalent to an elevation above the level of the sea of 1,959 ft. So that, supposing two fields, lying side by side, the one drained, the other undrained, and supposing them both equally well cultivated, there would be nearly as much difference in the amount and value of their respective crops as if the drained one was situated at the level of the sea, and the other on an elevation as high as the Pentland Hills.† Dr. Madden also, in order to dispel the idea, where it existed, that the interstitial spaces or canals, being so minute, that their contents could be of no consequence, quotes the fact that in moderately well pulverised soil they amount to no less than one-fourth of the whole bulk of the soil itself; for example, 100 cubic inches of moist soil contain no less than 25 cubic inches of air. According to this calculation, in a field pulverised to the depth of 8 in., a depth perfectly attainable on most soils by careful tillage, every acre will retain beneath its surface no less than 12,345,280 cubic inches; and for every extra inch in depth the ground is cultivated 235 tons of additional soil are called into activity and rendered capable of retaining beneath its surface 1,568,160 additional cubic inches of air.

It has been already stated that undrained ground is less calculated to take in a store of heat in summer than drained land. To explain this more fully, the summer sun is wasted in drying up, by evaporation, the water rain from the soil, and in the process cooling down the land. In illustration of this, it is only necessary to refer to the practice often pursued in hot climates for cooling wines and other liquids, by wrapping a wet cloth round the bottles and exposing them to the sun, the evaporation of the moisture rendering the liquid as cool as if it had been iced. A very simple way of testing the effect of the evaporation is to take two thermometers and to place them side by side, and to cover the bulb of one with a piece of muslin kept constantly wet by allowing it to communicate with a small vessel containing water. The thermometer with the wet bulb will be found to be several degrees lower than its companion, the difference varying with the weather; the greater the heat and dryness, the greater will be the difference, and the moister the state of the atmosphere the more nearly they will coincide; and when the air is completely saturated as when heavy rain or heavy mists are falling, the two thermometers will read alike. When such is the case in fine weather it is a sure sign of approaching rain. This instrument is termed by meteorologists an hygrometer, and is a most valuable assistant to every one interested in the various changes of the weather. It is only

* See p. 49, ante.

* Steinmetz, "Sunshine and Showers."
† Lecture on Agricultural Science by Dr. Madden.

necessary to compare a wet and dry soil to the wet and dry ball thermometer to have a clear perception of the effect of the sun and wind in cooling down the wet soil by evaporation, and that at a time when warmth is most necessary to the proper development of vegetation.

Having thus explained the theory of drainage, the next thing for consideration is the practical part of the question. The advantages of drainage will be the better understood from the following vivid description of an undrained soil by one of the most eminent and practical writers on agriculture.

"The injury done by stagnant water to arable soil may be estimated by these effects. While hidden water remains, manure, whether present or absent, imparts no fertility to the soil; the plough, the harrow, and even the roller, cannot pulverize it; new grass that it contains little nutriment for live stock; when old, the sward sours and disappears, and are succeeded by coarse sub-aquatic plants. The stock never receives a hearty meal of grass, hay, or straw, nor land in that state; they are always hungry and dissatisfied, and of course in low condition. Trees acquire a hard bark and stiffened branches, and become a prey to parasitic plants. The woods in the neighbourhood are constantly soft, and apt to become rotted; while ditches and furrows are either plashy, or like a wet sponge, ready to absorb water. The air always feels damp and chilly, and from early autumn to late in spring the hoar-frost meets the face like a damp cloth. In winter the slightest frost enravens every furrow and plant with ice, not strong enough to bear one's weight, but just weak enough to give way at every step, while snow lies long lurking behind the sun in corners and crevices; and in summer mosquitoes, green flies, midges, gnats, and gadflies torment the cattle, and the ploughman and his horses, from morning to night; whilst in autumn the sheep get scalded heads, and are eaten up by maggots during the hot links of sunshine."

The opposite picture shall be drawn partly from the more prosaic source of a Blue Book, a work belonging to a class generally considered as the driest of the dry; but which, as a rule, contain the most valuable information on the subjects to which they refer to be found anywhere. The advantages may be thus set out:—

1st. That when properly executed, drainage always proves remunerative:—

The actual increased return from drainage cannot vary a great deal according to circumstances and the nature of the soil. Numerous cases were given in evidence before Parliamentary committees of rents being raised from 50 to 100 per cent. after drainage, and the average of several different classes of soils showed a net return of 10 per cent. on the outlay. As a fair average it may be taken that on clay soils a wheat crop will yield one quarter to the acre more on drained than on undrained land, and this without any additional seed or labour. In wet cold seasons the increase will be much greater, and the drainage is often paid for by the increased produce of a single season.

2nd. That after a series of years the ensouling of a thorough-drained field changes into the nature of soil as far down as the level of the water in the drains. This change is accounted for,—

1. By the ameliorating effects of air and water producing healthy decomposition of the organic and inorganic constituents, and thereby eliminating substances which constitute the food of plants.

2. By the washing out of the deleterious ingredients.

3. By loosening its texture. When the working of the land and the treading of the horses is considered, a treading which in the case of a pair of horses leaves more than 200,000 foot-prints when cutting a 9-in. furrow over an acre of land, the effect of this in puddling a wet clay soil and injuring its texture, and the advantage of freeing such a soil from surplus water may more fully be estimated.

4. By the penetration of roots, and by their ultimate decay in the subsoil.

5. By the penetration of earth-worms and insects. The drainer has not a better assistant than the worm. These insects work their way down through dry soil to great depths. The author has seen worm-holes at depths of 10 ft. and 12 ft. below the surface; and in a drained soil their burrows always extend as low as the

pipes, the cavities made in their progress acting most effectually as feeders to the drains.

3rd. That by thorough drainage and subsoiling, the quality, as well as the amount, of the crops is improved.

4th. That clay lands, which in the raised ridge form could produce only wheat, beans, and clover, have, when thoroughly drained, been found capable of producing root crops, such as turnips, mangold wurtzel, and potatoes, thus enabling the naked fallow to be dispensed with, and permitting the adoption of a much safer and more profitable system of farming, in which the rearing and feeding of stock are combined with the growth of valuable grain crops.

5th. The thorough-drained fields stand wet and drought better than undrained fields of the same sort of soil. From the principles already laid down, it is evident that this should be the case. It is well known by those who have paid attention to the matter, how, during protracted droughts, the thorough-drained fields call attention to themselves by their superior verdure. By their improved texture they are not liable to become baked, and the free soil is in a condition to take in a supply of moisture from the dews of the summer night, which the hard dry skin of the undrained land is incapable of doing.

6th. Thorough-drained fields are more easily tilled, and are in a fit state for the operation of tillage a much greater number of days in a year.

7th. All manures produce a much greater effect on drained fields than on undrained ones.

8th. Drainage has also a most beneficial effect in improving the climate, by removing stagnant water; the air is freed from those noxious vapours which hover over all damp land, to the injury of the health of both plants and animals. Ague, rheumatism, and low fever, which prevailed extensively in low wet situations, have died before the drainer, and are now unknown in situations where once they ruled paramount.

W. H. W.

ART-WORKMANSHIP: SOCIETY OF ARTS.

There is so much going on just now at the Society of Arts that a commensurate report would occupy a large proportion of our space. We have elsewhere given a brief account of a paper on a mode of supplying cheap food in a metropolitan, read to the Society last week. On Wednesday evening last Mr. William Hawes discoursed upon the workmen's reports from Paris, to which we have already drawn attention at some length; and on Thursday a conference on Technical Education was opened, and will, we trust, be productive of good results. This conference, we may mention, relates to,—

1. The necessity of improved national education for the working classes generally.
2. The necessity for the establishment of schools for technical and industrial education in relation to science and art, in which pupils after leaving the primary schools may obtain instruction suited to the special industries with which they may be connected, as workmen, foremen, or managers.
3. The best measures for securing that object.
4. How far technical education can be promoted by the aid of existing educational endowments.
5. The appointment of a standing committee to take whatever steps may be required to advance the objects approved by the Conference, and to send deputations to the Government to support such applications as may seem desirable.

Dr. Lyon Playfair moved the first Resolution, and Earl Russell seconded it.

In addition to these matters, the council have under consideration the various specimens of art-workmanship which have been sent in competition for the prizes offered last year. These are ninety-four in number, and come under three heads,—works in accordance with prescribed designs, 46; works sent without prescribed designs, 16; and specimens of wood carving without prescribed designs, 32. The majority of the latter profess to be designed as well as executed by the competitor. In this division, as in the other two, the chief weakness shown is in want of mastery over the human figure. Two of the specimens sent in might have come from the Sandwich Islands. There are two or three very delicately carved heads, a decent Gothic panel in oak, H. G. Price (91); two pretty frames (76 and 81), some fruit and flowers in the style of Gibbons (R. A. Brangan, 84), a dead hawk (75), an allegorical clock-case (63), and some other creditable works. Part of

a frieze (J. M. Leach), the subject from "Midsummer Night's Dream" (the craftsmen flying from the transfigured Bottom), is spirited and vigorous, but can only be regarded as a sketch. It leaves in doubt the artist's power to carry it out to completion.

Amongst the miscellaneous works without prescribed designs, is a whole dessert service, painted in majolica style, by Miss Lolia Hawkins. This includes a considerable number of pieces, and is priced at 100 guineas. The signs of the Zodiac form the subjects of the plates, the Seasons and the Masos are given to the dishes. The heads display a great deal of nice feeling, and the whole work shows much thought. Repoussé work in metal (Gwillim), hammered work in metal (Bush & Winstanley), Henry Brownsword's tazza, and the engraved jug and two goblets, by Oppitz, deserve and will doubtless receive due consideration from the adjudicators, whose decision on this occasion we are not seeking to forestall.

In the first division, works from stipulated designs, some of the carvings in stone and oak, repoussé work, and hammered work in iron, are very good, though not better than has been before sent. An engraving on metal, by G. W. Hindley, may be mentioned as the work of a lad of eighteen. A piece of decorative painting, by C. P.; a female head in mosaics, for a wall, and two specimens of bookbinding, by Louis Gentz, have claims. It was very satisfactory to see on the day of our visit a considerable number of workmen examining the specimens with care and interest.

WESTMINSTER HALL.

In the course of a few days five marble statues of kings will have been erected in Westminster Hall. They are being placed on the east side of the Hall, near the members' private entrance to the House of Commons, and will stand on temporary wooden pedestals. Two, James I. and Charles I., are by Mr. Thornycroft; another couple, George IV. and William IV., are by Mr. Theed; and the fifth is of William III., by Mr. Woolner. It was originally intended that these statues, with three others not yet completed, should occupy the niches in the Royal Gallery of the new palace at Westminster; but Mr. E. M. Barry having represented their unsuitableness for this position by reason of their size, has obtained permission from Lord J. Mansfield to place them as an experiment on temporary pedestals in Westminster Hall. Mr. Barry has proposed that the Hall should contain a complete series of statues of our monarchs from William the Conqueror to her present Most Gracious Majesty. He suggests that they should be placed near the side walls, on pedestals under each principal of the roof and on the steps. He further proposes that the walls should be ornamented with bas-reliefs in panels, each bas-relief representing the principal event in the reign of the king whose statue occupies the adjoining pedestal. By this means, additional historical interest would be acquired by the old Hall of Rufus. The site proposed for the statue of her Majesty is the centre of the wall under the great window of St. Stephen's Porch, at the top of the flight of steps leading from Westminster Hall. The present five statues are not placed in the positions which they would permanently occupy under this scheme, as this is as yet merely proposed for consideration.

Outside the Hall, on the west side of New Palace Yard, the statue of Sir Robert Peel, by the late Baron Marochetti, has been placed on its pedestal. The latter is of red Aberdeen granite, polished, on a plinth of grey granite ranging with the plinth of the wrought-iron railings which have been recently erected. The statue of Sir Robert Peel is exactly opposite to that of Mr. Canning in its new position.

INDUSTRIAL DWELLINGS COMPANY.—The report of the Improved Industrial Dwellings Company (Limited) has been issued. It states that the total subscribed capital is now 88,350*l.*, of which 7,122*l.* have come in since the date of last report, and that the operations of the society with their various blocks of buildings have been successful. The revenue account shows a sum to credit of 1,795*l.* 14*s.* 11*d.*, and the directors propose the usual dividend of 5 per cent., carrying forward a balance of 327*l.* 7*s.*

* Stephens, "Book of the Farm,"

* To be continued.

THE ARCHITECTURE OF RUSSIA.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the ordinary general meeting of the Institute, held on Monday evening last, M. Constantine Thon, of St. Petersburg, Government architect, and author of the work on "The Palace of the Cæsars, Rome," was unanimously elected as honorary and corresponding member. Mr. Wm. Fogarty, of Dublin, and Mr. G. Judge, jun., of London, were elected as fellows; and Mr. H. Vale, of Liverpool, and Mr. Samuel Brooks, of London, were elected associates of the Institute. Professor Donaldson (hon. sec. for foreign correspondence) announced the decease, in November last, of M. Baudirector Fischer, architect, of Carlsruhe, honorary and corresponding member, and read a necrological notice of that gentleman.

The subject of the proposed new Building Act was introduced by Mr. Chatfield Clark, with a view to inquire whether the attention of the council had been directed to some of the provisions which tended to hamper the profession in the execution of works, more especially in the neighbourhood of London. He thought it most desirable that the stringent provisions he referred to should be watched by the council.

Professor Donaldson stated that the Bill in question had been examined by the Association of District Surveyors, of which he was a member, who had made some emendations and had submitted them to the Metropolitan Board of Works. The proposed prohibition of the use of stone in staircases, &c., he believed resulted from the recommendations of Captain Shaw, with a view to the prevention of accidents at fires; but there were other parts of the Bill which required to be considered.

Mr. Charles Fowler considered an expression of opinion by the Institute on this subject highly desirable, and the Chairman promised that the matter should have their consideration.

The paper read was, "On the Kremlin of Moscow," by Mr. Edward P'Anson, who said that he trusted the subject he had chosen for his paper, contained a sufficiently complete and rich collection of buildings to enable his audience to understand something of the architecture of Russia before it merged into the prevailing architecture of modern Europe. He would make a few allusions only to the architecture which he had the opportunity of seeing in other parts of the empire. After describing the imposing view which Moscow presented as first seen from the eminence of the Sparrow hills, some 3 or 4 miles from the city, the reader dwelt at considerable length, on the vast aggregation of buildings, especially of churches, there being no fewer than thirty-two churches, and 170 chapels, cupolas, and towers, within the walls of the Kremlin. Situated in the centre of the town the Kremlin, he said, is, as it were, the kernel of the whole city, and is wrapped round with the other portions of Moscow, and is the oldest part of the town. It is nearly triangular in form, the base of the triangle next the river Moscowa, by which it is bounded on the south side, being as measured from the map in Dr. Clarke's "Russia," about 2,000 ft. The greatest width on the north-east side is also about 2,000 ft. The total circumference of the walls is 7,280 ft., within which are the numerous churches, chapels, and public buildings already mentioned. The walls are chiefly of brick, as indeed are almost all the buildings incorporated with or contained within them. The finest range of towers is on the river-side, where they are seven in number. Beyond the long vista of towers on the river-side, is a modern church, much larger in size than the churches of the Kremlin, viz.—the Church of St. Saviour, still in progress, the interior of which is being finished, as he was informed, for he did not visit it himself, with the richest mosaics, and coloured decorations.

Externally, the bulb-shaped domes are remarkably elegant in their contour. On the north side there are five towers, the most ornamental being the Trinity tower. After giving a description of this and the succeeding towers, Mr. P'Anson proceeded to point out the leading characteristics of the various gateways forming the entrances to the Kremlin. Having described the Kremlin walls, he then entered the interior. As the heart of Moscow is the Kremlin, so the heart of the Kremlin is the patriarchal Cathedral of the Assumption or Repose of the Virgin. This, one of the oldest and most interesting churches in the Kremlin, is in dimensions what in the West would be called a chapel rather than a cathedral, but the smallness of space is forgotten

in the fulness of its contents. On the platform of its nave, from Ivan the Terrible to this day, the Czars have been crowned, and along its altar-screens are deposited the most sacred pictures of Russia. Round the walls are buried the primates of the church, and at the four corners lie those most highly venerated. The floor is paved with slabs of polished steel. Hieroglyphics and pictures constituted more than half the education of those grown-up children of the ancient world, and they still constitute more than half the education of these grown-up children of the modern world.

Notwithstanding various alterations and repairs at various epochs, the Cathedral of the Assumption probably retains much of its primitive form, and is therefore one of the most interesting church monuments in Russia. Next to this in situation and size is the Church of the Archangel Michael, where lie each in his place, the coffins ranged round the wall, the long succession of Czars, from the founder of Moscow to the predecessor of the founder of Petersburg, and twice a year a funeral service is performed "for the sins of all of them." Near to the two churches above-named is the third most important church in the Kremlin, and completing the group of those intimately connected with the history of the Czars. This is the Cathedral of the Annunciation, in which the Czars are baptised and married. It is the smallest of this group of three monumental churches of the Kremlin. The arrangements and decorations of this cathedral were described in detail. Amongst the other objects of interest in the Kremlin is the lofty tower or belfry of Ivan Veleiki—John the Great—erected in the year 1600. The cross on the summit is about 18 ft. high, and the total height about 270 ft. It is one of the buildings injured by the French during their occupation of Moscow, all traces of which at the time of Mr. P'Anson's visit were concealed by plaster and whitewash. In the lower part is a chapel dedicated to St. John, the tower being, in fact, its campanile. Above this are suspended thirty-four bells, the largest of which weighs no less than 61 tons, or about 140,000 lb. The celebrated Great Bell of Moscow lies at the foot of this tower. Its weight at present is 440,000 lb., its height 19 ft. 6 in. and the circumference 60 ft. 9 in.

In size no building in the Kremlin approaches that of the Palace and Treasury combined. Within the palace itself, in addition to numerous magnificent rooms appropriated to state occasions, is also a labyrinth of fourteen chapels, multiplied by sovereign after sovereign, till the palace has become more like the dwelling-house of the Pope than of the Emperor. These chapels, crabbled-ribbed, low-browed, painted within and without in the old barbaric grotesqueness of Mediaeval Russia, are encased with the external magnificence of modern civilization and European grandeur. The Treasury, which adjoins the palace, contains a vast collection of trophies and standards, coronation chairs, state robes, crowns, imperial orbs, plate, &c. In addition to these there is still another palace; a small church; the sacristy of the Holy Synod; the Miracle Monastery, the Ascension Convent, the High Court of Appeal, and several Government buildings. That which he would last allude to—the Arsenal, which stands close to the Nicholas Gate—is a building of the date of 1713, where are deposited the cannon taken by the Russians to the large number of 875, of which no fewer than 365 are the cannon taken during the retreat of the French, and, as the least honourable place, they lie prostrate on the ground; the Austrian, Italian, and other trophies, lying tier above tier over the French pieces below. He next proceeded to describe the church outside the Kremlin known as the Church of St. Basil. This, he said, is the name given to one church in the general structure; still, it is only one of twenty-one churches which are there co-existent,—the whole together being known to the natives as the Cathedral of the Protection. Although styled a cathedral, the building is circumscribed probably within 150 ft. square on the ground, agreeably spire in form, with nearly a dozen domes grouped around a central summit, like a close-clustering grove of young pine trees. There is harmony among them, yet with variety infinite. The titles of each of the coalesced churches, as given by Lyall, were enumerated in the paper. Immediately adjoining the Kremlin, to the north-east, is the Chinese quarter of the city—the mercantile part—which is walled round like the Kremlin. This also has its ancient gates, and several ancient (for Russia) buildings within its walls. One of them is a small church, "The Mother of

God of Georgia," which is a perfectly typical church, nearly square in form, from the roof of which rise elongated octagonal spires, crowned with five bulbous-shaped gilt domes, terminated by the usual iron cross standing over the present. In this quarter of the city are also the Corn Magazine, the Custom House, the Fish Market, and an establishment peculiar to Russia resembling the bazaars of Constantinople, or the French passages. The reader then went on to remark that the modern churches of Moscow and all the others he saw in Russia are in the Italian style, generally of the worst character; from which remark, however, he excepted one great church, the work of a French architect, the St. Isaac's Church, which he described as a grand and imposing building, having the usual central dome and the four small surrounding domes common to all the Russian churches. The great ribbed dome is covered, it is said, with actual plates of gold, and the imperial records have never revealed the cost of this church. It is a great, but not a Russian work. The domes of the various churches were described as being for the most part more graceful than those of Constantinople, and approaching nearer to the four used in the tombs of the caliphs at Cairo.

A striking feature in the neighbourhood of Moscow is the number of important monasteries which stand the plain in many directions, most of them very extensive, for they contain within their walls the conventional buildings, and many chapels, bell-towers, and burial-places. Mr. P'Anson next proceeded to speak of the great extent to which public veneration is carried by all classes throughout the whole of the empire. These, he said, in public and in private, constitute the consecrating element. Sacred pictures are to be seen in the corner of every room, at the corner of every street; in offices, in steamers, and in taverns, with the lamp burning before them. It is against the canons of the church to have any grown images in the churches, and therefore the decoration of them is confined to pictorial representations; but the strict rule is often departed from by embossing the background to the pictures, and the jewelled crowns with which they are surrounded are in full relief. St. Isaac's Church at St. Petersburg was the only one in which he recollects this rigid rule was departed from; the general rule being that the edifices themselves are as simple and undecorated as possible. The apical termination, as far as he saw, was a constant feature in all the churches. Another subject of remark was the marvellous value of the decorations of gold and silver and precious stones in the churches and upon the shrines and tombs, and the priests themselves, often men of great stature, being clad in heavy gold and pearl embroidered robes; and all this took place in a country where there is hardly any metallic currency in circulation. He alluded also to the large bequests made by the wealthy portion of the population to the funds for the repair and preservation of the churches, more especially to meet the large cost of gilding the domes, which, with the other parts of the building, suffered much from the extreme severity of the climate; and in conclusion, he remarked, that the source whence the architecture of Moscow was derived was, he thought, clearly Constantinople. The historical evidence on this point appeared to him conclusive. Any observer who had seen the architecture of Constantinople could not doubt as to its being the parent of that of Russia. As regarded the towers, there is a more complete Italian feeling than in the churches. No doubt the plan was precisely defined by the tradition and usages of the Greek Church; but the whole treatment is traditional, just as we in England now cling to the older form practised in church building. There could not be a more suggestive type of the architecture of the Kremlin than several of the fine fountains at Constantinople. Although the relation between the two nations has, from political causes in modern times, not been always preserved, yet in earlier times, and in ecclesiastical matters, the relations between the two were always preserved with filial fidelity, the more remarkable from the reversal of their respective positions in everything else. It was said generally, that Russian architecture is not original, and that it is only a coarse and rude imitation of other works; but he asserted that all the three principal churches of the Kremlin, to which he had referred, more particularly in detail, bore a distinct and special character, and on the whole he felt that the Russians might fairly lay claim

to very considerable ingenuity, good taste, and artistic power.

A brief conversation, in which Professor Donaldson, Mr. W. Haywood, Mr. Basil White, and Mr. Charles Barry, took part, followed the reading of the paper, in the course of which it was sought to elicit from the author of it a more definite opinion with regard to the distinctive features to which Russian architecture could lay claim; but on that point Mr. F'Anson said he could give no further opinion than that which he had already expressed upon it.

EDINBURGH: WORKS IN PROGRESS AND IN PROSPECT.

The number of important buildings erected each year in this city is comparatively few, but from the nature of its site and plan they tell more upon its aspect than in other cities where greater activity prevails: the buildings are generally seen from many points of view; and then, being situated within a limited area brings more of them into groups than would otherwise be the case, and they are thus made to form part of a *tout ensemble*.

Of works in progress, the Bank of Scotland, both on account of its isolated and elevated position in the centre of the city, and the highly ornate character of the building, challenges attention. It differs entirely from any other structure here in the style adopted, which is Late Renaissance. The sky-line is broken by a central dome, open lantern, and sculptured groups. The elevation towards Princes-street is completed, and that towards the south nearly so, and operations are being actively pushed forward on the roof and accessories above the cornice-line. Although this is merely an addition to an old building, the alterations are such as to give it an entirely new character. The sum to be expended is said to be about 50,000.*

The Fettes College, a large structure in the Late French Gothic style,—as seen in the well-known example of the Palais de Justice at Ronen,—is ready for the roof, with the exception of the central tower: the grouping is very picturesque, and it is profusely ornamented with carving, which strikes us as very unequal in execution.

The foundations of Free St. George's Church have been laid. It is to cost 15,000*l.*, exclusive of the site, upon which an equal sum has been expended. In style it is to be Palladian, and is hardly the kind of church we look for in the present day.

The Chalmers Memorial Church has had a tower, turret, and cloister added to it, as originally intended; but one spire is to be left unfinished till additional funds are forthcoming.

The Roseburn Free Church will soon be ready for occupation. It is Early English in style, and has a well-proportioned broach spire, but is otherwise far from being satisfactory in design. The finial of the main gable consists of a pedestal more suited for supporting a vase than the light iron cross which surmounts it, and the necessity for the clump of ugly buttresses around the slender octagonal turret flanking the spire, is not at all obvious.

All Saints', Brougham-street, is in use, but the west elevation is incomplete, and it has not a prepossessing appearance.

New poor-houses are in progress for the West Church and City parishes. The latter is being erected on the estate of Craiglockhart, within three miles of the city, which was purchased by the Board. It is to embrace all that modern science has discovered in the construction of such establishments. The former occupies a commanding site to the north-west of the city, and architectural effect has been sought after by the adoption of *louvre* roofs.

In Victoria-street a large and highly-ornate block of offices, in the Scottish style, are nearly ready for roofing in. They add greatly to the effect of this picturesque street; but this effect is unhappily marred, to some extent, by the erection of a clumsy mass of buildings on Johnston-terrace, the back elevation of which fills up the vista. This is much to be regretted, as by the introduction of a few gables, and the grouping of chimneys, it might have been brought into harmony with the surroundings, at little or no additional expense; in fact, the back elevation of this terrace is the most important

one, as it is seen from many points of view, in combination with the Castle and group of buildings on the ridge of the High-street.

Within the garden enclosure at the angle of North Charlotte-street and St. Colms-street a cross is being erected to the memory of the late Miss Catherine Sinclair.

At the west end new terraces and crescents are springing up, comfortable residences doubtless, but with nothing outwardly attractive. To the north-west of the meadows we notice in Lonsdale-terrace a praiseworthy effort to break through the stereotyped style of elevation hitherto adopted for house fronts; the elevation is of the usual sort where oriels are used, but it has been enlivened by a judicious use of incised ornament of a Greek character; the effect is pleasing and the expense moderate,—not more, we should think, than that spent on the ordinary moulded architraves, &c.

The last work in progress we shall notice is a large brewery to the west of the ancient Palace of Holyrood in the *castellated style*!

As to work in prospect the most important is the City Improvement Scheme, the Act authorising which passed last Session. Operations are to be commenced upon one of the worst of those dense blocks of buildings between the High-street and the Cowgate, through which a street is to be driven, admitting light and air to a locality which is a hotbed of fever and immorality. It is also proposed to run a broad and handsome street along the north side of the University and Industrial Museum, and in connection therewith to clear away certain buildings surrounding the Infirmary, which latter, being antiquated and ill-adapted for its purpose, is to be replaced by a new one.

The restoration of St. Giles's Cathedral is in contemplation, but we fear it will not be carried out in the thorough manner which will alone be satisfactory.

A large space of ground has been cleared at the junction of Rutland-street and the Lothian-road, for the proposed Caledonian Railway Station. The site is a good one, and the building promises to be highly ornamental: a large hotel, as at Charing-cross and Cannon-street, is to form the chief feature.

The directors of the North British Railway procured an Act some time ago, securing the Green Market for an extension of their station. This necessitates, in the first place, the construction of a new market, but there is no sign of movement in that direction.

A site has been secured at the Grange for the erection of the Robertson Memorial Church, which is intended to be a handsome structure.

The sculptors are busy with the Albert memorial, which our readers are aware is to take the shape of an equestrian statue, on an elevated pedestal, with accompanying groups. We still entertain a hope that the question of site will be re-considered.

A commencement has been made to the south end of Castle-terrace, which is to be an exception to the usual rule, as to elevation in domestic street architecture, and will be striking in effect.

The large plot of vacant ground between the Protestant Institute and the Cowgate, on the west side of George IV.'s Bridge, has been secured for the erection of warehouses and offices, which are to be carried out on an imposing scale, and in handsome style.

UPSALL CASTLE, YORKSHIRE.

For above 200 years the Lords Scroopes, of Upsall and Masham, numbering in their ranks earls, ambassadors, archbishops, chief justices, and knights of the Garter, lived at their castle of Upsall, three miles from Thirsk. The last authentic resident we have proof of, who lived at Upsall Castle, was John Constable, a firm Royalist during the Commonwealth, when, in his exile, the castle is supposed to have fallen into ruins. In the present memory of man, backed by local histories, that castle, with very slight exceptions, has remained a mass of incongruous ruins. Under the superintendence of Mr. G. Goldie, Captain Turton, the owner, has built a large range of farmsteads, bailiffs' and labourers' houses, gardens, hot-houses, and vinerias. The workmen are now engaged upon clearing away the mass of rubbish, preparatory to a new mansion being erected on the site of the old castle. In doing this, even so far, the workmen have laid bare part of an old wall, of large-sized dressed blocks. Each block has its

"mason's mark" different and various. A Gothic-headed carved doorway has also been found. Whether the joints were mortared is doubtful, but a strong, heavy iron lead, bedded inside the joints, and run with clamp, is to every stone. Parts of a fine tracery window have been found; also several coins,—a sixpence of Queen Elizabeth, a penny of George I., a bodle of Charles I., a silver penny of Edward III., and several copper coins of Carausius, the founder of the British fleet. Weather permitting, the excavations will proceed, and doubtless other antiquarian relics will be turned up. The castle has formerly covered a vast area. The Scroopes, of Danby, are now asserting their claims before the House of Lords, for the title of Lords Scroopes, of Bolton, with its earldom, &c. These Scroopes of Bolton were a senior branch of the Scroopes of Upsall.

THE LIVERPOOL DWELLINGS COMPETITION.

THE town council at their last meeting confirmed the recommendation of the health committee, that the offered premium for the best labourers' dwellings be awarded to the designer of plan marked "John E. Reeve," and numbered 47.

Mr. Bowring, in moving the confirmation, said that the committee, with reference to doubts that had been expressed at the attention paid by competitors to the by-laws, considered the fairest plan was to be guided by the natural legal adviser of the corporation, namely, the town-clerk. The report of the town-clerk was, that all the twelve plans selected from those submitted were admissible under the first paragraph of the terms of competition, which requires conformity with the local Act and by-laws of the council. The medical officer prefixed to his report on each separate plan a statement that in his opinion every house with four rooms ought to contain a living-room of at least 1,200 cubical feet, and with three rooms a living-room of at least 1,100, and with two rooms a living-room with at least 1,000 cubical feet; and that every dwelling should have one parents' bedroom with at least 900 cubical feet. The borough engineer made a financial analysis of the twelve plans by estimating their cost and gross rentals upon a common basis, and then deducting from such gross rentals 20 per cent. to cover landlords' taxes, repairs, losses by bad debts and upset houses, collectors' commission, and fire insurance. The particulars of the twelve plans selected upon and financial results are as follows, arranged in the order of their financial results:—

No. of Design.	Name or Motto.	Established Cost.	Gross Rental.	Net Rental.	Interest per Cent.
64	John Birch.....	£. 33,730	£. s. 2028 16	£. s. 1623 1	6 17 0
62	Redman & Hesketh & Keth.....	17,797	1280 12	1031 14	5 18 0
69	W. R. Duckworth.....	17,992	1146 12	917 6	5 6 0
47	John Reeve.....	12,935	803 0	642 8	5 0 0
38 B	Pro Bono Publico.....	6,778	1019 4	815 7	4 17 2
5	J. B. L.....	8,420	1078 8	861 3	4 13 6
6	C. E. Grayson.....	15,760	870 16	718 13	4 13 0
32	W. G. Habershon.....	24,984	1248 0	988 4	4 7 0
68	H.....	19,854	1055 12	814 10	4 5 0
26	W. L. Moffatt.....	14,198	707 12	586 2	4 0 0
24	P. Thompson.....	15,463	860 12	680 0	4 0 0
50 & 53	J. C. Crofts.....	24,483	884 0	787 4	3 4 0

It will be seen from this analysis that the most economical designs are No. 64, signed by John Birch; but this result is obtained by making a large number of the rooms very small, much smaller than the moderate size considered by the medical officer essential to health; and these designs were therefore rejected on sanitary grounds. The designs are in many respects extremely meritorious, and are upon the principle so common in London of making the blocks five stories high, exclusive of the shops on the ground floor. The designs which showed the next best financial results were No. 52, unsigned, which were much admired, and on the arrangement of which the borough engineer reported very favourably; but these plans were inadmissible on the same grounds as No. 64, namely, the inadequate size of the rooms. The designs which were next in financial merits are those numbered 59, exhibited by Messrs. W. & R. Duckworth. These designs, though not without defects, had much to recommend them; but they were inadmissible on the grounds of the architects not having sent in proper specifications. The designs which come next in economy are those recommended for the prize by the Health Committee, No. 47, signed John Reeve. On these plans the medical officer reported that "The ventilation of the water-closets and rooms is very good. The blocks admit of thorough circulation of air, and there does not appear to be any sanitary objection to this plan." The borough engineer's report is,—"This design is simple and good, and the masses of buildings well arranged for aeration." The remainder of the twelve designs are all too expensive in proportion to the accommodation they would provide; and some of those which are the most attractive on a cursory examination, prove on closer analysis to have serious defects.

The council, after a long discussion, also confirmed, by 27 to 13, the recommendation we mentioned last week, "to give the sum of 100*l.* to Messrs. Redman & Hesketh, for plans of labourers' dwellings signed by them, in consideration of their making complete working drawings of them, and supplying specifications

* Views and a plan will be found in our Volume for 1865, pp. 572, 573.

to the satisfaction of the health committee, and that the council erect labourers' dwellings in accordance with such plans, on the site between Ashfield-street and Sylvester-street." It was stated that the return would be at the rate of 6 per cent.; that the estimated cost was 17,500*l.*, and deductions had been allowed at the rate of 20 per cent.

The reason given by the committee for awarding the premium to one competitor and selecting the plan of another to be carried out, was, that the prize was offered by the council under certain conditions, and the plan to which the premium was awarded was the best plan under those conditions. In the opinion of the officers of the health committee, however, a better building could be deduced from Messrs. Redman & Hesketh's plan, by making certain alterations in it; and, therefore, the committee made the recommendation which has been adopted by the council.

Sir,—You will have noticed the report of council meeting in reference to labourers' dwellings. You see they give the prize to one competitor, adopt the plans of another, and will carry them out, if they build them, with the corporate staff, I am told. You have been a true prophet so far. No. 52 in the altered plans submitted to the council has the bed-rooms enlarged by contracting the sculleries. The size 9 ft. by 8 ft. 4 in. was the original size aimed adverted upon in the *Builder*. Mr. Pictou was quite right in his objection as to the requirement of 150 ft. of area for each house by the Act, and the town clerk got out of the matter badly. The affair is unsatisfactory.

ONE ON THE SPOT.

THE EDUCATION CONFERENCE AT MANCHESTER.

This Conference was convened by the Manchester Educational Committee, who promoted the bill introduced last session by Mr. Bruce, Mr. Forster, and Mr. A. Egerton. The committee, having come to the conclusion that the hon. members should be requested to re-introduce the bill or to support any measure of the Government based on similar principles, invited the Conference together for the purpose of aiding them in the consideration of matters of detail. Numerous gentlemen, Members of Parliament, and others, attended the Conference.

The proceedings were opened by a preliminary meeting of the Education Bill Committee, at which the following report was presented explanatory of the purposes of the Conference:—

That, in the opinion of this committee, it is expedient to make greater provision for the education of the poorer classes, and to provide funds for that purpose by means of local rates under local administration.

That the union of existing schools, either as free schools or aided schools, should form the basis of operation, subject to the conditions laid down in the minutes of the Committee of Council on Education in force for the time being, as reported to Parliament from time to time, and the provision of a concourse clause, but without further interference with the instruction, discipline, or management of such schools.

That power should be given to establish new schools out of the rates, where there is insufficient school accommodation in the schools in union in any locality, if, after due notice, voluntary effort fails to support the deficiency.

That Messrs. Bruce, Forster, and A. Egerton be earnestly requested to re-introduce the bill of last session, or to support any measure brought forward by the Government, if based upon similar principles.

That, with the view of aiding the Education Bill Committee in matters of detail, the opinion of the Conference be invited on the following questions:—

1. The relative advantages of a permissive Bill, and one based on compulsory rating.
2. If the Bill be based on compulsory rating, would it be desirable to make it applicable at once to the whole country, or applicable only by Order in Council, on the report of her Majesty's school inspectors?
3. Is there anything peculiar in the condition of rural parishes which renders it needful to make special regulations on their behalf, or to exempt them from the operations of the Bill?
4. To what extent is it desirable to modify the Minutes of Council so as to include purely secular schools?

After numerous letters, from Earl Russell, Lord Stanley, Mr. J. S. Mill, Mr. T. P. King Shute, and various others, had been read at the committee meeting, the Dean of Manchester moved—

"That the Conference be now opened, and that the Right Hon. H. Austin Bruce, M.P., and Mr. W. E. Forster, M.P., be elected presidents; and that Professor Christie, Dr. John Watts, Mr. Herbert Phillips, Mr. John E. Mayson, and Mr. J. H. Bremner, be requested to act as honorary secretaries."

The motion having passed, the conference was formally opened in the town-hall, where the preliminary meeting was also held.

We cannot give even an abstract report of the conference proceedings, but we may state that, Mr. Bruce having taken the chair, Dr. Watts presented the report of an educational inquiry at Manchester, and the chairman then addressed the meeting, and afterwards a discussion took place on compulsory rating and attendance. Earl de Grey and Ripon then moved the following resolution:—

"That this conference respectfully requests the Right Hon. H. A. Bruce, Mr. W. E. Forster, and Mr. A. Egerton, either to re-introduce the Bill of last session, with such modifications as may be deemed desirable in conference with the Education Bill Committee, to render it more complete, or to lend their support to any Government measure based on similar principles."

This resolution was agreed to, with one dissentient,—the Rev. Mr. Conder.

The special condition of the rural districts was next discussed, after which the subject of secular schools was taken up, and the chairman announced that, in accordance with the wish of the committee, the naming up proposed in the programme would be reserved to the close of the Conference, which was then adjourned till next day, under the chairmanship of Mr. W. E. Forster, M.P.

On the second day there was also a large attendance. The chairman addressed the meeting, and the first two points discussed were—"The Operation of the Industrial Schools Act," and "The Extension of the Factory Act."

After an adjournment, the subject of compulsory school attendance was discussed, and the affirmative was strongly urged and maintained, and the resolution finally adopted and unanimously passed was—

"That the Education Bill Committee be requested, in conjunction with Mr. Besley, to prepare such clauses as they may consider practicable to enforce the attendance of school of neglected children, and to request Mr. Besley to give notice, before any Education Bill that is brought into Parliament arrives at a second reading, that he will introduce such clauses in it."

The Chairman then summed up the principal points of the day's discussion; and Mr. Bruce summed up the principal points of the discussion of the previous day.

A vote of thanks having been passed to Mr. Le Mare, Mr. Bruce, and Mr. Forster, for presiding over the Conference, the proceedings terminated.

THE CO-OPERATIVE MOVEMENT.

The united committees appointed by the operatives in the various branches of the London building trades, for the purpose of establishing a Co-operative Building Company, are at work. At a meeting recently held at the Brown Bear Tavern, Broad-street, Bloomsbury, there were ten committee-men in attendance from the masons, and the same number from the painters, both being elected at meetings of shareholders,—five from the plasterers and five from the carpenters, the two latter bodies not yet having appointed the full number. The bricklayers were not represented, but a communication was received from that body to the effect that their representative would be in attendance at the next meeting. A mason occupied the chair. Several speeches were made, and the details of the plans discussed, together with the draught of the prospectus to be issued; but it was not thought desirable to come to any decisive resolutions until the whole of the five branches were fully represented on the committee. It was stated that nearly 500 members had already joined, the great majority being from the masons and painters. From the reports given in it was estimated that 5,000 shares of 1*l.* each would be taken up in a few weeks, and that the company would be prepared to undertake building operations by the commencement of the season, in March next. No one but operatives will be admitted as shareholders, or to take part in the management of the company. Is this wise?

"A Plumber," writing us from Hyde, draws attention to the circumstance that Mr. Walton, the architect who lately addressed the various branches of the London building trades in favour of co-operative building companies, forgot the plumbers, who, as one correspondent remarks, form a very essential class in house building of the better order. He feels confident that the plumbers would be ready to take shares, and offers to do so himself.

We must suggest caution in the establishment of such a company, or the money subscribed will be lost: everything will depend on the sort of management set up.

A co-operative meeting has been recently held in Birmingham. It appears from the speech of Mr. Dixon, M.P., who presided, that co-operation has not yet struck so deep a root in that town as might have been anticipated. Archdeacon Sandford, who warmly supported the movement, candidly admitted that he had learned political science from Mr. Holyoake, and only wished that, in return, Mr. Holyoake would allow him to give him some lessons in theology. Mr. Hughes stated that there were at present no fewer than 752 societies in this country, with 173,000 members—heads of families, representing a million of population. Mr. Hughes was not satisfied with proving the great financial success of the co-operative system, but showed how greatly the development of that system would tend to improve the moral and social condition of the working classes, and therefore the happiness and prosperity of the nation.

THE INSTITUTION OF CIVIL ENGINEERS.

On the 14th inst., Mr. C. Hutton Gregory, on taking the chair for the first time after his election as president, delivered an address.

He remarked, that when the Institution was founded, fifty years ago, on the 2nd of January, 1818, the members were six in number. Two years later, Thomas Telford became the first president; and the Royal Charter of Incorporation was obtained on the 3rd of June, 1823, by which the Institution was firmly established as the recognized representative body of the engineering profession in the United Kingdom. There were now on the register 1,472 members of all classes, besides ninety-five students. The present condition and prospects of the profession were briefly alluded to, and it was observed, that the railway system of this country had, by economy of transport alone, been productive of direct saving to the public of 15 per cent. on the capital expended.

A reference to the past records of the Institution had brought to light one document, which, Mr. Gregory believed, would be interesting to every engineer. This was a description of the Nature and Objects of Civil Engineering, by Thomas Tredgold, some of the expressions in which had been embodied in the charter; but as it had never yet been printed in a complete form, the president gave it unabridged. After defining the duties required of the civil engineer, Mr. Tredgold concluded by saying that,—

"The real extent to which civil engineering may be applied is limited only by the progress of science; its scope and utility will be increased with every discovery in philosophy, and its resources with every invention in mechanical or chemical art, since its bounds are unlimited, and equally so must be the researches of its professors."

It could hardly, however, have been foreseen that the attention of the civil engineer would have been directed to aid in constructions for defence from hostile attack, and even to the improvement of weapons of war; but as, more than 2,000 years ago, Archimedes, distinguished first in mathematical science, after carrying out the great work of the embankment of the Nile, devoted the last efforts of his genius to engineering appliances for the defence of Syracuse against Marcellus, so now, less directly and less prominently, but with marked success, the combined labours of modern engineers had been applied to the purposes of national defence, and to this subject the president devoted his address.

The Small Arms Factory at Enfield was set to work in January, 1857, under the direction of Colonel Manley Dixon, R.A., the present superintendent. Up to December 26th, 1867, the total number of new arms made at Enfield was 616,828; while the number converted to breech-loaders on Snider's plan to the same date was 175,550. The long Enfield rifle consisted of fifty-three parts, and passed through about 740 processes of manufacture. The machines used were to a great extent varieties of copying-machines, where a standard model was reproduced by a revolving cutter, in wood or metal as might be required. The different pieces, as produced, were checked with the templates and gauges, and, finally, the stock, lock, barrel, bands, bayonet, plates, screws, &c., and their way in numbers to an "assembler," who, furnished only with a screw-driver and a chisel, took up the pieces indiscriminately and fitted them together; and so entirely interchangeable were the parts found to be, that a payment of 3-29 pence for each rifle put together, gave the workman wages

of about fifty shillings per week. It was stated that the average cost of the long Enfield rifles, made at the Government factory, including an allowance of 5 per cent. on the cost of buildings and machinery, for depreciation, had been about 2*l.* each, and of the short Enfields complete, 2*l.* 14*s.* each. The cost of converting to the Snider breech-loader, including 10,000*l.* for the alteration of old machines and the supply of new ones, as well as 5 per cent. for depreciation on buildings and plant, was said to be about 16*s.* 3*d.* per arm.

As a *resumé*, Mr. Gregory admitted, that while it was advisable to maintain the efficiency of the Government establishments, yet that it would be a mistake to extend them so far as to cripple individual enterprise. In the next place he referred to the comparatively unprotected state of the Thames, the Mersey, the Clyde, the Tyne, and other rivers leading to rich towns, docks, and shipping; and he suggested the inquiry, whether if forts were thought to be desirable at such places, they might not be of small size, and capable simply of offering resistance to a sudden attack.

THE PACKET STATION IN THE WEST INDIES.

It is thought that the small barren island Virgin Gorda, will be selected for the station, which will not bear the slightest comparison with Falmouth, Antigua. In the first place, it does not possess the conveniences of the latter; it is more like an open roadstead than a harbour, is equally exposed to the destructive influences that so fatally affect St. Thomas's, and it is in perilous proximity to the dangerous Anegada reef, on which the Royal Mail Company lost one of their most splendid vessels, the *Paramatta*, and on which reef sixty-seven vessels have been wrecked between the years 1811 and 1830, and many others subsequently. It is very remarkable that the Royal Mail Company should cling so tenaciously to the Virgin Islands as their central depot, after the sacrifices they have made, and the heavy losses that have fallen on their shareholders; and this fatal infatuation and preference will seriously injure that company, as at the present moment the French Packet Company are reaping the advantages of this ruinous policy, as who will run the dangerous risk that appears to envelope the Virgin Islands, when he can take a safer and more southerly course.

COOKED FOOD FOR THE PEOPLE.

At the Society of Arts, Adelphi, last week, Mr. S. Teulon in the chair, Mr. W. Riddle, civil engineer, read "The details of a project for the preparation and distribution of hot food, by delivery service, at the homes of the people in cities and towns."

Mr. Riddle proposed to raise a capital of 7,000*l.* to hire a piece of ground, and erect on it a building of iron and glass, 160 ft. long by 40 ft. deep, in sixteen squares of 20 by 20 ft. each, and about 18 ft. high, with louver ventilators. The building, he continued, should be of interchangeable parts, a plain cheap rectangular, probably ridge and furrow-roofed, structure, like a section of the Crystal Palace of 1851. This building would cost, he had been told, from 1,500*l.* to 1,800*l.*; and the district he proposed to work in the first instance was Holloway and its neighbourhood.

One great object he had in view was to show that in small families there was an enormous amount of waste which might be avoided, and his desire was to remedy this evil by cooking plain food on a large scale by a fuel-saving apparatus. With such apparatus they would be enabled to roast, boil, and bake meat, vegetables, and puddings of a plain description, to have the meat carved from the joints by skilful carvers, to have it weighed by assistants, and then placed, with gravy, in tin cases or in covered cylindrical jars. These jars were at once to be placed hot or japanned iron cases, or enchaînés, mounted on a tramway in a room; these cases to be 4 ft. in 5 ft. square, and about 2 ft. 6 in. high, and each to form the separated interior of a cart, about the size of a parcels delivery cart. The vehicle, being thus loaded, and closed behind by a panel, in which there would be as many doors as compartments of jars, would then be driven off to deliver the goods.

After giving an explanation of the system which he suggested should be carried out with regard to the distribution of tickets, and to the general regulation of the carts, &c., Mr. Riddle proceeded to show that the required building should be such as to make it convenient to carry on the various operations of storing, trimming, cooking, carving, weighing, &c. The remains of provisions might be sold to the soup-kitchens of the poor; and it was believed that if this undertaking were carried out in a respectable manner, and on an efficient scale, great public economy of fuel and food would be the result. But if time were money, there would be a saving in thousands of households for the better education, nursing, or general care of children.

Thereafter went on to urge, in favour of his project, that the Glasgow system had proved a paying system, and that if Mr. Corbett, the promoter of that undertaking, could give, as he said, a good dinner for 4*d.*, it was only reasonable to believe that he (Mr. Riddle) could supply a similar benefit, superior in character, and to a somewhat higher class of persons, for 6*d.*—the meal consisting of meat, potatoes, greens, pudding, all of the best quality, and thoroughly hot. He saw no reason why eventually soup should not be provided for the poor and delivered in the poorest districts in common earthen jars carried in carts; and the system of what he denominated (perhaps erroneously), a "civil commissariat" might extend upwards, so that at one-half the prices charged by the great purveyors known in London, elaborate dishes of French or other cookery might find a large sale—the demand arising from the reduction of price, and the public becoming used to the system.

In the discussion which ensued an opinion appeared to prevail that, while there could be no doubt about the feasibility and expediency of providing food for the people, a difficulty suggested itself in regard to the means of conveying cooked food to their homes under such circumstances as would insure the timely attendance of some one to receive it. Mr. Riddle proposed to give only 45 seconds (measured by sand-glass), at each door to answer the dinner knock. This difficulty might not apply to cases where a large number of persons engaged in a manufacture were in the habit of dining together at a regular period, but under an ordinary condition of things the system might prove to be less practicable than was now supposed. However, arrangements were provided by Mr. Riddle for pouring boiling water round the tins, and so keeping the dinner hot even though it were delivered at eleven o'clock, a.m.

THE POLLUTION OF RIVERS COMMISSION.

At Liverpool, the Royal Commission inquiring as to the pollution of rivers, namely, Mr. R. Rawlinson, C.B., as chairman, Mr. J. T. Harrison, C.E., and Professor J. T. Way, have been holding their usual meetings, with, however, a somewhat unusual result. At Liverpool, the great question, water-closets *versus* middens and cesspools, has, as our readers know, been for some few years in process of settlement, by the conversion of thousands of privies by the corporation into thousands of water-closets, with the result, already, of assisting to reduce the previous mortality of 33 in 1,000, in 1863, down to 22·4 in 1867, although, in the interim (as at Croydon, till the new drainage was finally completed), with an increase of mortality and an intervening epidemic. This intervening rise of mortality, as at Croydon, was seized upon by the dirt and midden interest at Liverpool, as against the somewhat expensive water-closet system, and was, in fact, attributed to that system, just as the fever epidemic at Croydon was attributed to the new drainage. Now, it appears that one of the commissioners, Mr. Harrison, seems to have been got hold of by the midden upholders, and was induced to put unanticipated questions on that subject, in the midden interest, to Dr. Trench, who has done so much for the sanitary improvement of Liverpool; and for which unanticipated questions, of course, he did not come prepared, although a single day's previous notice, he said, would have sufficed. The retrogressive tendencies of the opponents of water-closets were materially served by this rise, and serious injury done, as Dr. Trench conceives, to sanitary progress in Liverpool; while, no doubt, the instigators are chuckling at the use to which they have put the

royal commissioner, as well as at the disadvantage to which they have put the local sanitary reformers.

Mr. Rawlinson, with his twenty years' experience as a sanitary reformer, amongst whom he is a leader, felt indignant and annoyed that a fellow-commissioner should have been so green as to allow himself thus to be made a tool of, and expressed himself, in his place as chairman of the commission, rather strongly, on the subject of Mr. Harrison's ignorance of sanitary science; declaring that he could no longer continue the inquiries which the commission were appointed to make, and must submit the matter to the Home Secretary.

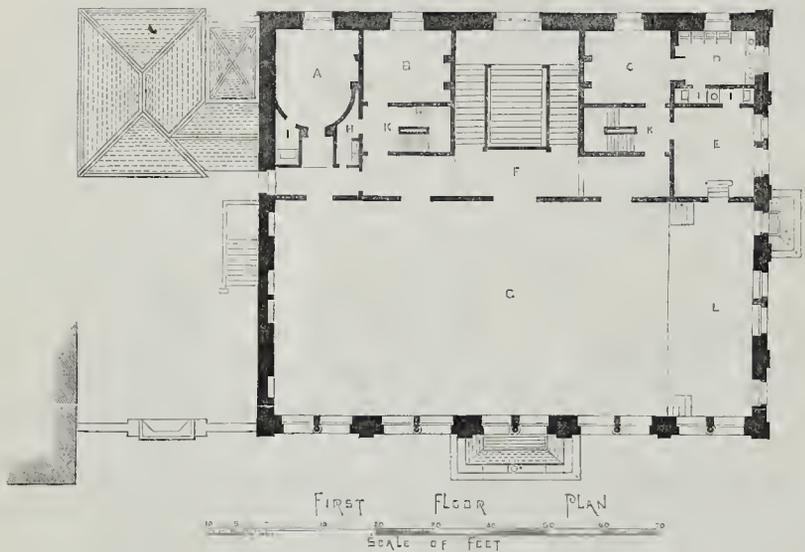
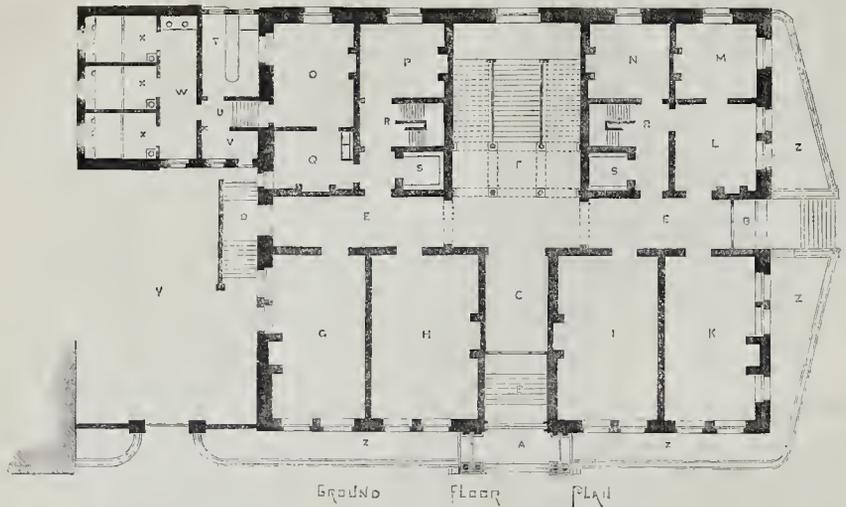
PENDLETON TOWN-HALL, CORPORATION OF SALFORD.

The new Town-hall for Pendleton is now completed, and arrangements will shortly be made for a formal opening of it. It has been erected from the designs of Mr. Alfred Darbyshire, architect. The first stone was laid on the 22nd of November, 1865, on which occasion the Mayor, Mr. Wright Turner, gave some interesting particulars of the progress of the district. In looking back to what Pendleton was half a century ago, he found, he said, that in 1801, that district was but a small suburban village of Manchester or Salford. It contained at that time 3,611 inhabitants, and in 1831, 8,455, the number of people having more than doubled in the course of thirty-one years. But in 1861 Pendleton had increased threefold in this respect, as in that year it contained 20,900 inhabitants, or, including a sub-district now incorporated with Pendleton, a total of 25,448. However great the increase of inhabitants might have been, the property in the district had increased in a greater degree. He could find no record of the assessable property in 1801; but in 1831 the property assessable to poor rates amounted to 16,542*l.*, while in 1861 the total was 107,308*l.* Thus, it would appear that the population had increased sevenfold in sixty years, and the property sevenfold in thirty years. Under those circumstances, the conclusion must be arrived at that the Finance Committee of the Salford Town Council had not gone far wrong in determining to erect a town-hall of the dimensions proposed, especially as, according to the past increase, the number of inhabitants would, in the course of thirty years, equal the population of Bolton, namely, 100,000, and would have property of the rateable value of a million of money. If in Bolton 80,000*l.* were to be spent in the erection of a new town-hall, surely, he said, the Pendleton people ought not to be blamed for contemplating the expenditure of 9,400*l.* in a town-hall for a district which would before long be as large as Bolton was.

The style of the building has been termed French Italian, having, however, a Mediaeval character introduced into the details. The two fronts to Broughton-road and Broad-street are faced with stone from the Halifax quarries, with bands of gray introduced. The portico in Broughton-road contains in the pediment the arms of the Duchy of Lancaster, and the keystone over the doorway is carved with a head of "Time-honour'd Lancaster," with the rose underneath. The pediment under the dome contains, surrounded by scrollwork, the arms of the borough of Salford, and the arms of the corporate towns of the county are introduced in medallions on each side of the assembly-room windows. The pediment is crowned by a figure of Civic Dignity, holding the corporate mace. Between the ground-floor windows are large medallion heads, representing Conquest, Monarchy, Commerce, and the Laws.

On the ground-floor are the offices for the transaction of the district business, such as for the overseers and collectors, surveyor, and two large committee-rooms. The police department contains a dwelling for the inspector, police-office, charge-room, parade-room, and three cells. The whole of the building is clad, and here are the heating apparatus, kitchens, lamp-glasser's room, lavatories, and conveniences for the offices above.

The principal staircase is lighted by a large semi-circular-headed window of stained glass, by Messrs. Edmundson & Son, of Manchester. The centre compartment contains a figure of the Queen, in the robes of the Garter, as Lady of the Manor of Salford and Duchess of Lancaster. In the semicircle above are the Royal arms and



PENDLETON TOWN-HALL.

supporters, and under the figure are the arms of the duchy. In compartments running round the window are the seals of the corporate towns of the county, as also those of the late Prince Consort and the Prince of Wales.

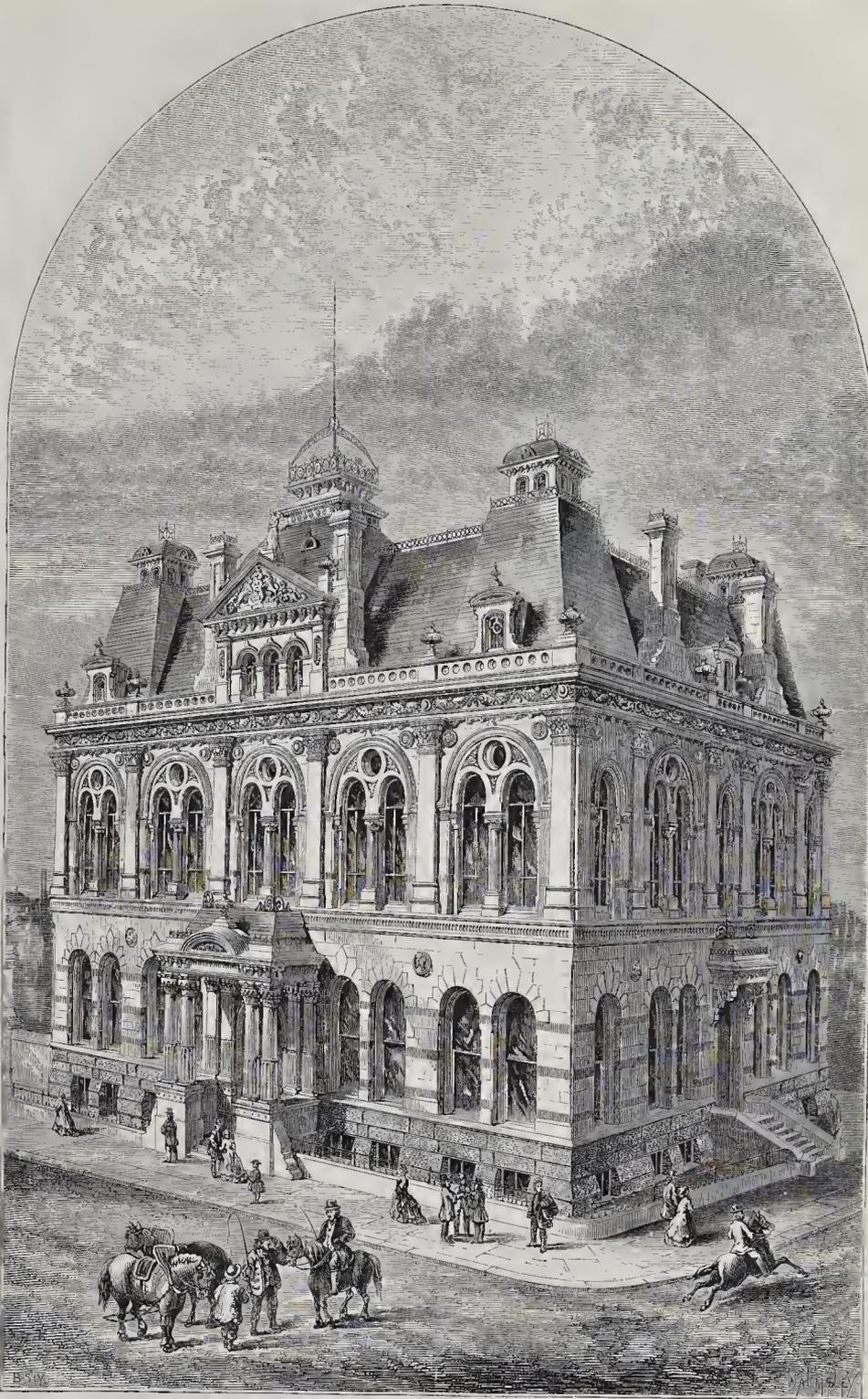
On the first-floor is an assembly-room, 85 ft. 4 in. by 39 ft. 5 in., and 29 ft. 6 in. high. The ceiling is divided into bays, richly panelled, and laid on Nickson & Waddingham's patent slate ground. Attached to this room are retiring-rooms for ladies, gentlemen, and performers. On the second-floor is a lecture-room, 29 ft. by 21 ft. 6 in., and several spare rooms. The roof of the building is so constructed that additional accommodation can be obtained with ease at any future time.

The contract was let to Cochran & Co., of

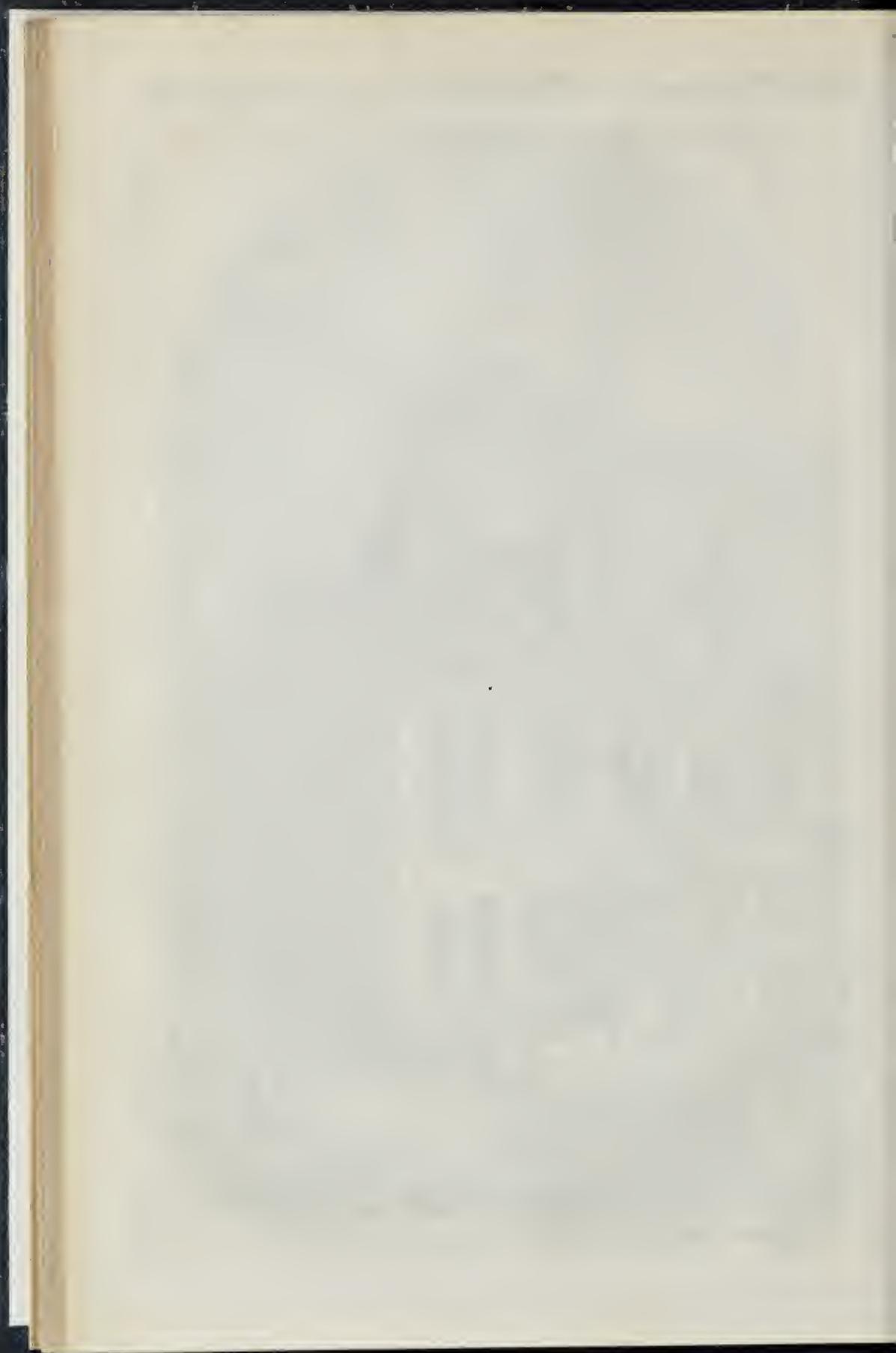
Manchester, for 9,245*l.*; the total cost, however, by improvements and additions, will exceed 10,000*l.*, exclusive of fittings and furniture. The stonework has been executed by Mr. G. Sanders; the brickwork by Griffiths & Johnson; the plastering by Mr. Jelly, of Pendleton, assisted by Mr. H. George; the heating apparatus was supplied by Mr. Cowell, of Salford; and the carving, sculpture, and plaster enrichments have been executed by Mr. T. Gregory. The floor and wall tiles are by Godwin, of Hereford, laid by Mr. D. Conway; the crests and ornamental ironwork were supplied by Macfarlane & Co., of Glasgow. Mr. R. Riding was the clerk of works. We may add that the whole of the works have been executed under the immediate superintendance of the architect.

REFERENCES.

GROUND FLOOR.	U. Stairs.
A. Porch.	V. Back entrance to
B. Vestibules.	Police office.
C. Entrance-hall.	W. Corridor to cells.
D. Back entrance, yard.	X X X. Cells.
E. Corridor.	Y. Yards.
F. Grand staircase.	Z Z. Atrium.
G. Surveyor's office.	FIRST FLOOR.
H. Committee-room.	A. Ladies retiring-room.
I. Ditto ditto	B. Bed-room.
K. Collector's office.	C. Gentlemen's retiring-
L. Waiting-room.	room.
M. Overseer's office.	D. Lavatory, urinals, &c.
N. Overseer's Clerk's	E. Retiring-room from
office.	platform.
O. Inspector's office.	F. Staircase landing.
P. Living-room.	G. Assembly-room.
Q. Police store-room.	H. Hoist.
R. Private stairs.	I. I. W.C.s.
S. Fire-proof safe.	K. Private stairs.
T. Police office.	L. Platform.



PENDLETON TOWN-HALL, CORPORATION OF SALFORD.—MR. ALFRED DARBYSHIRE, ARCHITECT.



WARRINGTON SCHOOL OF ART.

The annual meeting of subscribers, and distribution of prizes to the successful students of this Institution during the past year, took place in the reading-room of the Museum, Bold-street. The Right Hon. Col. J. Wilson-Pattin, M.P., occupied the chair, and there was a very large attendance of students and their friends. The chairman, in the course of his address, said he thought the circumstance on which they ought to prize themselves most was this:—The number of gold medals awarded to the whole of England had been 10; of these Birmingham, with 1,009 students on its books, got 1; Glasgow, with 771 students, got 1; Bloomsbury, with 123 students, got 1; Lambeth, with 372 students, got 3; South Kensington, with 839 students, got 2; while Warrington, with only 131 students, got 2 gold medals. This was against the whole of England, and out of ten gold medals Warrington succeeded in getting two. That was very good proof that the School of Art was doing its work well in that town. He believed that it was the same throughout, and that there was more interest taken in the subject here than in any other town in England. Their object was a national one; and as Britons it was not only their interest but their duty to promote institutions of this kind to the utmost of their ability. The mayor and Mr. Rylands had referred to the difficulties under which the country was at present labouring. One of the difficulties was financial, as they could not according to the present regulations afford an instructor in the School of Art to assist their able master, Mr. Thompson. He could only say that his best endeavours and influence would be at their disposal to provide a remedy.

A WORKING MAN'S OPINIONS ON EQUAL WAGES, PIECEWORK, AND EDUCATION.

SIR,—At the present time the British workmen are in great disgrace; all sorts of people have lately taken to giving them advice. It is said that trade is leaving the country, and British goods are losing their place in the markets of the world. Various causes are assigned for it, the principal being deficient education and the action of trades unions, and their opposition to piecework; "and their attempt to reduce wages to a uniform standard, to make all men equal, to bring the good workman down to the level, if not of the worst, of the middling workman." I suppose all, or nearly all, workmen have, at some time or other, cogitated and thought over this matter; and what is more, many of us have had practical experience of an unequal standard of wages, or, as some are pleased to term it, the paying of men according to their abilities, and have found that system anything but satisfactory.

It requires some practical knowledge of the working of different trades before any one is in a position to condemn their system of working. And I think those engaged in the trades are the best able to understand which system is the most workable and advantageous for them; and therefore it is evident that those—he they little or great—who have spoken and condemned us have done so for what they know nothing about. It appears the building operatives are the greatest transgressors in this matter. Now, supposing the advantages of every man working in a shop or on a farm are equal, and that they possess various degrees of efficiency. Even then the best workman has a great advantage over the inferior one, as he is sure of the best work, which, as a rule, is the lightest, so far as physical exertion is concerned; and, of course, the best workman under the equal wage system is the one who would be longest, or even constantly employed, whilst the inferior would suffer from short jobs and precarious employment. It is well known that in the building trade there is a great deal of jobbing and repairs, the greater portion of it being day-work; and among the small builders this is to a large extent done by cheap and inferior workmen. And if the advocates of the unequal wage system want to see it in operation, there is a first-rate opportunity among the small builders of London, and they would find their theory entirely upset, as it is the cheap and inferior workmen that are kept in, and the superior one who is discharged; and thus the clever public is doubly defrauded. But suppose the better class men were willing to make the same rate as the men who stop in it:

would be a wholesale lowering of wages, as the others would be willing to go still lower. And I think it is evident that the best system for the superior workmen is that of a standard rate of wages.

It has often been said that working men object to piecework. As most trades now work piecework, and do not appear anxious for a change, this charge especially applies to the building and allied trades. I have had some little experience of that system, and I believe the objection is greatly exaggerated. The reason why we now object to it is, because it is not carried on in a systematic manner. It is now a system of extortion and imposition. A short time ago I was working in a shop, rules were hung up, stating that all work was to be paid for according to the prices given in "Laxton's Price-Book." No one in the shop objected to it. But we soon found it was a mere hoax, and from the time the rules were hung up till we left, the employer shuffled out of his agreement and proposal.

His method was, where a workman had earned above his usual wages, to pretend the work was wanted, and two or three others would be sent on to help him, and make day-work of it. Another method of the piece-master is to give so much for a job, and then, if a man make more than day-work price, to cut down the next job, so that a man could not earn day-work wages. I might go on adding cases like the above; and I would ask, if the employers are anxious to introduce the piecework system, why do they not issue a fixed price-list, which shall be general throughout the trade? And if it happens that here and there, one man can, by extra skill or over-physical exertion, make more money than the rest, let not that be made a plea for reducing the prices till men cannot earn day-wages.

It is a well-known scientific fact, that great workers, as a rule, are short-lived, the loss of force which the extra and over-physical exertion entails has more than counter-balanced the pecuniary benefits. It has induced disease of their system, and brought them to an early grave. I have known men in small towns who have been pointed at as those who by over-work had brought themselves to Death's door; and if such cases are to be found in villages and small towns, it appears to me that the dictates of reason and the well-being of society demand that such trades as require both physical and mental labour should be regulated by those concerned, so as not to bring ill upon them which time cannot repair.

Education is all the cry; and I think the intelligent workman, the capitalist, and philanthropist will call it a very good cry. I think it has long been apparent to many of the leading minds of this country that the system of education in every branch of knowledge, whether of the school or the workshop, was miserably deficient, and required great reform. I believe there is not an intelligent workman but feels that, in spite of the many advantages which a cheap press and the works which have been issued from the press of the ever-to-be-honoured Knight, Cassell, Chambers, and others, much is still wanted; but still a great deal more might have been done had working men thirsted for knowledge. And it appears to me that, in all the discussions which have lately taken place on that important question, one fact is entirely lost sight of, and that is, that a large portion of the employing class are hardly one degree removed in technical knowledge from their workmen; many of their businesses are carried on, not by their knowledge or intelligence, but by those whom they appoint as foremen; and unless something is done for that class, their selfishness and ignorance will go far to mar the progress of the other.

A master now takes an apprentice, and agrees to teach him a trade; but experience proves that in so doing there is no well-defined system; he is left to catch it up in a haphazard manner. The process is rarely scientifically explained, nor are works upon the various manipulations required to perfect him in his art within his reach. The employer does not provide anything of the sort, although common sense would suppose it would be in his interest to make such provision; and I believe there is not in London, with all its pretended enlightenment, a public scientific library that is within the reach of the working man; and, what is more, the employers as a class do not support educational institutes when established. Three or four years ago much noise was made about establishing working men's clubs, and it was sup-

posed that the movement would have received a large share of the employer's support; but time has proved that effort has been nil. And it is a lamentable fact that many of these social and intellectual institutions are entirely closed, and many others are in a sickly condition. I have been a member from the first starting of the Clerkenwell club, and of all places it was supposed that an institute upon the club system would flourish there. Clerkenwell is noted for watch-making and other fancy and artistic trades. But the public spirit of the employers is at the lowest ebb; and I believe I am justified in saying that, not since the club commenced, three years ago, has it received the support of even three or four of the employers, either pecuniary or otherwise. The consequence of their neglect has been that the club is a failure: the lectures have failed; the classes, for want of funds and efficient teachers, have not been attended. Although the club is not closed, it has only been kept open by the efforts and pecuniary sacrifice of its secretary, who is an enlightened and patriotic working man. It may in this case be truly said, like master like man, as both parties are sadly deficient of those qualities which constitute the progress and well-being of the nation. There are many other questions which form a part of the great social problem, and I think a moment's reflection will convince the public that the workman is not the only transgressor, and that he can, whether agreeing or disagreeing with trades unions, show that there are two sides, and both must be considered before a satisfactory issue can be arrived at. I hope you will think a working man's opinions worthy of insertion in the columns of the *Builder*.

JACK PLANE.

PIECEWORK.

SIR,—In reading your interesting review of the reports of the artisans who visited the Paris Exhibition, I am pleased to find a few of them are in favour of piecework. I hope soon to see it the general rule throughout the building trade. I am sure it would be beneficial to both employer and employed. I will give you a proof from my own experience. Some time ago, my wife's health being delicate, change of air became necessary. I resolved to leave London for a time, and got a job in a joiner's shop in the country, some fifty miles from town, at 61d. per hour. I soon began to feel the effect of the reduction from 8d. per hour, as provisions were in excess of London prices. As the firm was busy I applied for piecework, and obtained it, at a price which may be termed moderate. I was then able to earn, instead of 61d., 9d., per hour, and I may add, my employer gained an extra profit of about 17 per cent. The piecework system is, I believe, rather objected to by the trade union. Now, I am not an enemy to trade societies, if based upon a sound and reasonable principle; but I cannot see the justice of first, second, and third ability receiving an equal remuneration.

I once questioned the justice of this system to a chief member of one of the lodges (I was then a member myself). His answer was, that the good must make up for the bad, which, as I understand it, amounts to this:—Supposing myself to be a good workman, and with me is put an inferior one. To work out the above rule, I must exert myself to the best of my strength and ability, so that my employer may not be a loser, by paying a bad or lazy workman more than he is able or willing to earn. That this is right and just is believed by thousands. Hitherto I am one of the unconverted. I think that every man, before being admitted a member, should prove that he is qualified to demand the highest sum paid; or otherwise, every man should be allowed to carry his labour to the highest market.

I remember, in the summer of 1862, I had charge of a job at the West-end. Being in want of hands, I called at one of the lodges, and left my address, for two good workmen to come as soon as possible. The next day two brought their tools and started work. A worse pair I never met with; and one, in particular, was perfectly useless. I took him from a job I could see he was totally ignorant of, and put him to one more simple: that was still worse.

I recollect he remarked, at starting, that there would not be much of it done for 7d.; he was quite right, for I found at the end of the week he had earned about 2s. a day. On the

Saturday I paid him at the rate of 7d. per hour, and told him for the future I could not give him more than 6d. At that he began to abuse, demanding his back day. His mate stepped forward, saying he would have his, too, for they had both come together, and they would both go together: so away they went,—I have no doubt to their lodges, to place their names again upon the books. I afterwards found that both of them had been discharged from seven different jobs, in about twelve months, for either drunkenness or laziness. These are the class of men who, sheltering themselves under the protection of a trade society, do so much injury to social society. Should piecework become general, the next ten years would produce a better class of men in every respect, as each would stand upon his individual merit, and receive a fair remuneration according to his ability. I am afraid, Mr. Editor, I have trespassed too far upon your valuable space, but this is a question of great importance to the mechanic in whatever branch, and I know you are ever ready to assist in promoting the welfare of the working class.

F. D., a Working Man.

WORKING-MEN, HELP YOURSELVES.

Sir,—The reports by the working-men who visited Paris, to which you have given prominence, are exceedingly interesting. It seems to me, though, that they insist too much on the necessity of having museums and schools provided for them. Doubtless, these are a want; but since the wanters have grown so independent of the moneyed classes, who alone supply all these things in England, they ought to put their own shoulders to the wheel and leave their own cars out of the mire of ignorance. They seem not to remember that here everything has to be done by private benevolence, whereas on the Continent the Government (which means taxation on rich and poor alike) supplies education and educational exhibitions. The best help is,—

SELF-HELP.

MORE SCHOOLS FOR SCIENCE AND ART.

In the *Builder* of January 11th, is an article, entitled "More Schools of Science and Art," which contains a statement that needs explanation. The payments made on results, of sums varying from 1l. to 5l. per pupil, are for Science Schools only; and, I regret to say that Art-Schools have to thrive as best they may on a much lower scale of payment on results. The sums paid to Schools of Art, are 10s. for every paper passed in either of the five subjects of examination, viz.—Free-hand drawing, model drawing, practical geometry, perspective, and mechanical drawing; 15s. for every student who sends to London a satisfactory set of studies in the earlier stages of instruction; and 20s. for satisfactory sets in the advanced stages. So that when once a student has passed in his four or five papers (the mechanical examination being only passed by machinists, &c.), the highest amount which can be received according to present regulations is the 1l. for advanced works, or the 15s. for elementary works, the latter, including the most elaborate drawings of machinery, made from actual measurement. I know that there are two classes of higher payments offered; 5l. for national scholarships; and 10l. for a student who can gain an "Art-Master's certificate!" These high payments sound very well, but are so rarely obtained by schools, as to preclude them being looked forward to as Government help.

All the above-mentioned amounts are paid on those only who are *artisans*, the Department definition for an "artisan student" being one who belongs to the working-classes, or is a clerk, &c., but who does not pay income-tax. So directly an artisan gets his 2l. per week, the Government aid on him is cut off; and the artisan, with his increased wages, does not seem inclined to pay higher fees for his art-instruction. Thus, what with this "income-tax" regulation, and the very unsatisfactory construction which the Department puts upon "satisfactory" results, the Government aid to art-schools is in many cases hardly worth receiving.

Science schools get a much greater amount of aid from Government than art schools. I do not consider that the former get too much, or even enough; but I do think that art should not re-

ceive less encouragement than science, especially when we take into consideration the fact that, in most cases, a science class meets only for some thirty or forty lectures during the year, perhaps in a national school-room or mechanics institute; whereas a school of art is a special building set apart for one specific purpose. It has to be fitted with valuable art-examples, and is kept open for ten months for three or five days and nights a week (with expensive gas-bills, &c.). The masters, too, are especially devoted to their particular duties as art-teachers, and are not, as in the case of the great majority of science-masters, otherwise professionally occupied as national school-masters, or medical men, &c.

I give the following tabulated statement, comparing the aid given to science and art schools. The figures speak for themselves, and, for their correctness I beg to refer your readers to the "Fourteenth Report of the Science and Art Department," at pages vi, vii, 153, and 159:—

	Science Schools.	Art Schools.
For the year 1868.		
Total number of Schools	153	112
Total number under Instruction	6,535	18,139
Number of Successful Students	3,562	6,301
Payments on Results	£5,002 7 6	£4,192 0 0
Average amount of Government aid per Student	18s. 6d.	4s. 7d.

In conclusion I must state that, if the country wish to secure the services of efficient masters for art-schools, the Government aid must be greatly increased. I know several masters who intend giving up their connexion with the Department if masters are not speedily metted: I, for one, will follow their example.

Q., Art-Master.

HERNE BAY PIER.

Sir,—I very much hope that the suggestion offered by "Paulatin" in your last week's number will be earnestly taken up, and that Herne Bay Pier may once more be a favourite promenade and landing-place. I should be most happy to render assistance in the matter; and if the requisite funds were raised, I would cheerfully give my professional services in carrying out a substantial reconstruction; this would, of course, be equivalent to a subscription. I hope "Paulatin" will not let the matter rest; there are many who, I am sure, would cordially cooperate.

C. E.

OUR DAILY WATER.

Sir,—In our establishment there are two hall-locks, which have long been out of order. I every day hear the water gurgling down the overflow-pipes. None are inconvenienced, so no one cares; and the water goes on wasting daily (more than is used), till turned off at the main. Why not a constant supply of turning it on and off twice a day? Let there be periodical inspections of hall-locks, cisterns, &c.; it would be an improvement without objection, and a decided gain to all. None of our men remaining down a "visitation" of the water "vigilants"; their dangerous grations amidst vehicles ought to be discontinued.

R. T.

SNOW AND THE SEWERS.

Sir,—There can be no doubt that the plan of using the sewers for the removal of snow from the streets is not only the quickest and cheapest, but the most efficient that can be adopted. Those who are in the habit of entering the sewers know that the temperature of the sewer air, and also of the sewage-currents, ranges, at all seasons, from 70° to 80°; so that if the snow in the streets be thrown or washed down the air-shafts, the gutters, or the side-entrances, which communicate with the main sewers, the currents there are not only warm enough to melt it, but strong enough to carry it away. This is the idea originally occurred to me. Subsequently I proposed, in the *Builder*, that snow-shafts, with tanks at bottom, and gratings near the top, should be built at convenient situations at the sides of the main sewers; and that the snow should be thrown down the shafts, and washed into the sewers by forcible jets of water directed upon it from hose screwed to stand-pipes in the streets. This process, I believe, would be found far more expeditious and efficacious than that of melting the snow by complicated and expensive "gas-jet" or "steam-jet" arrangements, however applied. This, however, can best be ascertained by properly-conducted experiments.

As to the original idea of using the sewers for receiving the snow from the streets, I may observe that when the first heavy fall of snow occurred in January last year,

* That the comparison may be perfectly fair, this item is 500s. more than it actually was, so as to bring it up to our present scale of results for Art-teaching, which are in advance of those that existed in 1866.

I suggested the plan to one of the metropolitan district surveyors, who immediately put it into operation with successful results. I also at the same time wrote a letter to the *Times*, making the same suggestion; which, however, they did not publish. I first proposed the plan on the 2nd or 3rd of the month, which would be some two or three days before Mr. Lovegrove, or any one, other than the gentleman referred to, used the sewers for the purpose. My letter, written from the Isle of Wight on the 7th or 8th, did not appear in the *Builder* until the 19th, more than a fortnight after I first made the suggestion.* Mr. Lovegrove was close on my heels, and perhaps he, as also your other correspondents, but upon the plan without knowing that it had been already proposed and acted upon. The priority in the suggestion, therefore, still remains with me. I should not have said so in the *Builder*, the week before last, had I not known that such was the fact.

JOHN PHILLIPS.

* Mr. Phillips has done so much in respect of drainage that we are unwilling to refuse insertion of this note. In truth, however, many must have said, when the snow was in the way, "Why not throw it into the sewers?" And many did say it, though without knowing whether it would have fast enough to get away or not.

HEATING A BATH.

Sir,—I do not agree with the Plumber whose letter appeared in your journal of the 18th. At present, in an ordinary house, there is no better plan than to let the kitchen fire warm the water. If you do not wish the trouble or expense of carrying hot-water pipes to your bath-room, place your moveable bath before the kitchen fire, and draw hot water from the boiler, which need not be large, as much cold may be added. If you object to make your kitchen or adjoining room a bath-room, affix a boiler to a fire-place in another room, or even a moveable boiler placed on the fire would be less troublesome than a fire attached to a bath.

C. E. B.

MARKS ON DEALS.

Sir,—I would advise "A Young Beginner" not to enter a timber yard until he has obtained a sufficient knowledge of the material to understand its nature and value; for, should he buy on his own account, he will be apt to deceive himself; or if purchasing for another, probably injure his employer, especially if he will not believe the word of foremen and others, whose employers are generally a respectable and substantial class of traders, who would be liable to an action for fraud and misrepresentation.

A YARD FOREMAN.

A LIGHT AND AIR CASE.

Cooke v. Fowler.—This was an injunction suit in the Vice-Chancellors' Court, to restrain the defendant from interfering by the raising of a certain building, with the plaintiff's light and air. The plaintiff's premises were at Bristol; and, till the interference complained of, he had been in the enjoyment of an extended view over the country. The defendant's new building which he proposed to raise was to be 6 ft. above the plaintiff's window site, obstructing nearly two-thirds of the window itself, and 6 ft. nearer to it than the old building. The plaintiff had offered to compromise the suit by allowing a certain portion of the defendant's new structure to be built; but that offer was refused.

The Vice-Chancellor, after referring to the evidence in the case, which he saw in great instances, contradictory, granted an injunction, as prayed by the bill in the suit, and ordered the defendant to reduce his building to its original proportions, or, if he had refused the offer made by the plaintiff to compromise the suit, he must pay the costs.

THE EPITAPH ON GIBBON.

ONE correspondent having been at the trouble of transcribing the inscription by Dr. Parr to the memory of Gibbon on the Mansoleum erected by the Earl of Sheffield in Fletching Church, Sussex, and two or three having expressed a desire to have it as complementary to what has been said in our pages on the subject of his death-place, we print it:—

EDWARDUS GIBBON

Criticus ac ingenio et multiplo doctriinis ornatus
idemque historicorum qui fortissimus
vel latentis et inludat vel eversi et funditus delati
litteris mandaverit
omnium facile princeps
cujus in mortuis erat modesto animi
cum liberali quadam specie conjuncta
in sermone
multa gravitate comitas suaviter adspersa
in scriptis
copiosum splendidum
concinnum breve verborum
et summo artificio distinctum
oratiois genus
recomendat exquisitae sententiae
et in summo rerum politico
sentis et perspicue prudentis
vixit annos LVI. mens. VII. dies XXVIII.
decessit XVII. cal. Febr. anno aetate
M. D. C. C. LXXV.
et in hoc mansoleo sepultus est
ex voluntate Johannis Domini Sheffield
qui amico bene merenti et fovitori humanissimo
H. TAB. P. C.

* Mr. Lovegrove had already written—"In my letter to the *Times* and to the *Surveyors*, twenty days should be allowed for the snow to be melted. Will you kindly correct this in your next."—Ed.

METROPOLITAN BOARD OF WORKS.

SOUTHWARK PARK.

At the meeting of the Metropolitan Board of Works on Friday, the 17th inst., Mr. Cyrus Legg, the member for Bermondsey, drew the attention of the Board to the slow progress of the works in this park, and moved, "That a special committee be appointed to lay out and superintend the planting of Southwark Park, and that they be instructed to open the same at the earliest possible period for the use of the public." This was seconded, and upon a division negatived, the numbers (49) being equal. Mr. Freeman, the chairman of the works and general purposes committee (which has the management of the park), remarking that "the matter was being pushed on as speedily as was advisable." Mr. Collinson then moved, "That the works and general purposes committee be requested to report to this Board at the earliest opportunity the present condition of Southwark and Finsbury Parks, and the earliest date at which they can be opened." Agreed to.

NEW STREET IN LIMEHOUSE.

It is proposed to cut through the notorious St. Ann's Rookery, Limehouse, a vile quarter lying between Limehouse Church and Limehouse-cut, by a broad new street. The length of the street will be about 190 yards, and it will run in a straight line, in continuation westward of Dod-street, Bardett-road, to the gateway at the north side of the churchyard. The inhabitants generally of this extremely backward parish seem much pleased at the prospect. The expense will be trifling, considering the great good to be effected.

At the last weekly meeting of this Board, Mr. Shaw moved that all future inquiries regarding the matter of security given by Mr. Furness, the contractor, he held at an open board; and that copies of all proceedings already printed by the Board be forwarded to the several vestries, &c.

The chairman asked the solicitor to state whether in his opinion they would be justified in publishing, as proposed, the evidence received by the committee.

The solicitor of the Board intimated that he had put his opinion in writing, and begged to read it for the Board. He saw no reason why the Board should not create a division amongst themselves, for their own private use, any paper hearing upon any matter before them; but he considered that great care should be taken in publishing any matter of the making public of which would injure another, or in publishing papers or documents that would have the effect of exposing the concerns of others.

Mr. Weston moved as an amendment, "That, as the inquiry into the statements of Mr. Furness by a committee of the whole Board, has been hitherto conducted by the members of that committee as all other business of this Board is transacted, and as the inquiry is still in progress, it is inadvisable to take the course proposed by Mr. S. Shaw."

The motion being seconded, Mr. Thompson said he was one of those who had supported the proposition that this evidence should be taken in public; but, having heard the opinion of the solicitor of the Board, he must vote against it. The motion of Mr. Shaw, because it was premature and inefficient, the committee not having yet made up a report.

After an animated discussion a division took place on the amendment, with the following result:—

Table with 2 columns: Motion/Amendment and Count. For the amendment: 25. Against: 7. Majorly for the amendment: 18.

The original motion was accordingly lost. Mr. Doulton, M.P., and two other members did not vote.

COMPENSATION CASE: HOUSES IN THE POULTRY.

Wheeler v. The Metropolitan Board of Works.—In this case, tried in the Lord Mayor's Court, Guildhall, the claimant, Mr. Wheeler (according to his counsel, Mr. H. Hawkins) carried on business as a hosier, glove-maker, &c. in No. 24, the new street in the Poultry, and the removal of the Blackfriars to the Mansion House, would have the effect of utterly and entirely destroying a business which had been carried on for many years in the premises. The claimant held the property under two leases, the first of which was granted in July, 1852, which comprised the whole of the front part of the shop, which lease he took from his landlord, Mr. H. under the Clothworkers' Company, and for which the claimant paid a premium of 2,000*l.*, and was obligated to pay a rental of 65*l.* per annum. He also held out a considerable sum of money upon this property. In the rear part of the shop, there were 15 years unexpired, and of the second 18 years, giving an average of 10 years purchase. He should call three witnesses of long and unimpaired experience, who would say that first premium should be deducted the reserved rent of 65*l.*, leaving a profit of 47*l.*, which, at 10 years purchase, gave a sum of 470*l.* The annual value of the back portion was

estimated at 230*l.*, giving a profit rental of 103*l.*, and that, at 10-25 years purchase, gave a sum of 1,057*l.* To these two sums he added 10 per cent. for compulsory sale, making the value of the leasehold interest 6,774*l.* The fixtures had been valued at 800*l.* The next question to be considered was, as to what sum the claimant was entitled in respect of the loss and destruction of a business which had been established for more than forty years. The profits were estimated at 4,000*l.* per annum, from which amount they must deduct whatever they found to be the amount of the profit rental, and then he should confidently ask the jury to award Mr. Wheeler three years' profits. The remaining items of claim were depreciation of stock, 3,078*l.*, and 100*l.* for personal inconvenience and removal.

The total amount of the claim as set in was 21,600*l.* Mr. Clerk (Farebrother, Clark, & Co.), Mr. Edwin Fox (Fox & Bousfield), and Mr. Farmer (Debenham, Tesson, & Farmer), gave evidence as to the value of the leasehold interest; and Messrs. Hillebrand, Markin, Vining, Hong, Head, and Lewis, as to the trade claim.

The witnesses for the Board of Works were Mr. Trist (Norton, Trist, & Co.), Mr. St. Quintin (St. Quintin & Nott), and Mr. Marsh, who severely valued the leasehold interest very much below that of the claimant's witnesses, although the latter witness admitted that property had doubled in value in the city.

The jury, after a lengthened consultation, awarded the claimant 10,200*l.*

SOCIETY OF ENGINEERS.

At the first ordinary meeting for this session, held on Monday, the 20th inst., Mr. W. H. Le Feuvre in the chair, premiums for papers read during 1867 were presented to Messrs. S. W. Worssam, jun., for his paper on "Mechanical Saws;" A. Riggs, jun., for his paper on "Heavy Guns;" J. Gresham, for his paper on "The Injector;" Ewing Matheson, for his paper on "The Quality of Iron." Mr. Baldwin Latham, president for 1868, delivered his inaugural address. A vote of thanks to the retiring president was passed.

The following candidates were balloted for, and duly elected as members:—R. F. Fairlie, J. F. Chappell, Henry Groe, Lieut.-colonel Henry Wray, R. E., George Spencer. As associates, James Knox, Edward Harlock, C. W. Salmon.

TRADES UNIONS AND ANTI-TRADES UNIONS.

The Cheshire and South Lancashire Branch of the General Builders' Association held their last monthly meeting at the Blossoms Hotel, Chester, when there were present, from Warrington, Alderman Hepher (in the chair), Councillor Whittle, and Mr. Gibson; from St. Helena, Messrs. William Harrison (president of this branch), Harris, and Belsler; from Northwich, Messrs. R. Beckett, W. Leicester, W. Cross, J. Holland, J. Bostock, C. Shaw, W. Chadwick (secretary); there were also Messrs. Brazendale (Lynn); Penington (Earlstown); Cochrane (Knuttsford); Clay (Manchester), and about twenty others from different parts of Cheshire and Lancashire.

At the conclusion of the usual routine business of the association, an animated discussion took place on the registration scheme, now established in various towns, the object of which the following notice will best explain:—

"To Workmen of the various Branches of the Building Trades in

Operative bricklayers, carpenters and joiners, labourers, masons, painters, plasterers, plumbers and glaziers, and slaters, who are not members of any trades union, are hereby requested to register their names with ——. This registration office has been opened for the purpose of enabling non-society workmen to obtain work when they are out, and employers to obtain non-society men when requiring them. It is in connexion with other offices in all parts of the country. Men who register their names will be informed what masters in their own or other towns require men, and who will, as far as possible, protect them from intimidation or interference. But every man will be at perfect liberty to go, or refrain from going, to any place as he may think fit. There will be no payment required whatever. It is proposed, as soon as arrangements can be made, to establish a benefit society in connexion with this registration, but no one who registers his name will be required to join this benefit society unless he wishes. For the present, the only purpose is to enable non-society men, who are for the time unemployed, to obtain work, and to know each other, and to get support in their endeavour to keep free from societies whose acts and objects they do not approve. The office is situated in ——. It is open from ten till seven daily; and there all further particulars may be obtained. Master builders, and other masters connected with the trade requiring workmen, are requested to apply as above."

It being hinted that some intimidation was intended towards the registrars appointed under this scheme, a resolution was passed pledging the support of the association to these officials in case of any illegal interference.

The entire company then adjourned to the Groevoren Hotel, where they were met by a number of the builders of Chester, who had

been specially invited to be present to hear an exposition of the objects and aims of the association by Mr. A. Manly, of Birmingham, the general secretary, with a view to the formation of a local society at Chester.

Several members from Manchester and other places also gave their opinions of the value of such an association, at the conclusion of which the Chester gentlemen present gave in their names as members.

The Edge-tool Trade-union of Sheffield have returned to Mr. David Ward, of the firm of Ward & Payne, edge-tool manufacturers, the sum of 30*l.*, which was extorted from them by the union in August, 1865, under the following circumstances:—Messrs. Ward & Payne brought from London a first-class maker of graving tools, named Addis, who, having some acquaintance with engraving, was able to make tools better adapted for engravers than any which mere ordinary workmen could make. The Edge-tool Union objected to Addis being employed, and refused his offer to pay 15*l.* and join the union. Eventually they fined Ward & Payne 30*l.* for employing the man, and in the then condition of affairs, with rival manufacturers waiting to make their market out of the dispute, the firm paid the money under protest.

IS WESTMINSTER ABBEY A ROYAL PALACE?

The Dean and Chapter say it is, and that the District Surveyor has no jurisdiction there. The surveyor, backed by the Board of Works, thinks otherwise; and shows he has good reason for interfering, whatever may be his right, by the statement that a pipe for heating part of the Abbey has been placed so close to the roof of the Jerusalem Chamber that the venerable pile is endangered by it. Last week the question was argued before Mr. Arnold at the Westminster Police Court. Mr. Vaughan Richards, for the Chapter, referred to the *Gazette* of April 13, 1838, in which in the royal proclamation the coronation is appointed to be held in "our Palace of Westminster." In the time of Edward the Confessor the Palace of Westminster and the royal chapel were closely adjacent, as illustrated in a piece of the Bayeux tapestry, in which a man is represented standing on the roof of the chapel holding on by the weathercock of the chapel and the tower of the palace. Further, he referred to a work lately published by the Rev. Dean Stanley, entitled "Memorials of Westminster Abbey," in which was said:—"The monastery and church of Westminster were, as we have seen, enclosed within the precincts of the Palace of Westminster as completely as the Abbey of Holyrood and the convent of the Escorial were united with those palaces of the Scottish and Spanish sovereigns; the abbey was, in fact, a royal chapel on a gigantic scale. The king had a private entrance to it from the south transept, almost direct from the Confessor's Hall. Even to this day, in official language, the coronations are said to take place in our Palace of Westminster, though the sovereign never sets foot strictly in the palace so called; the whole ceremony is confined to the abbey, which for the time passes entirely into possession of the Crown and its officers." He mentioned instances in which the Crown showed its entire control over the abbey at coronations, and amongst other arguments spoke of the Pix Chamber, where the standard coins and measures of the realm are kept, and of that chamber the Dean and Chapter never has the key, but it is in the safe custody of an officer of her Majesty's Treasury. Finally, he quoted the case of "Say v. Hammond," in which it was held that a place where the arms of the militia were kept was held to be a place for the use and service of her Majesty.

Mr. Philbrick, on the part of the district surveyor, contended that the freehold having passed by charter from the Crown to the dean and chapter, it could not be considered a royal palace, or one intended for the use and service of the sovereign. It was a place of public worship, and therefore was included in the Act of Parliament under discussion as a place not exempt from the operations of the Act.

Mr. Arnold said, in adjoining the matter *sine die*, that so important a question should rather form the subject matter of proceedings in a superior than in a police court.

CHURCH-BUILDING NEWS.

Wapley (near Yale, Gloucestershire).—Wapley Church has been re-opened. The edifice is very small, not exceeding the size of many a village school-room. Being very old, the interior was found some time ago to want improving, and it has been closed for several weeks while the work was being carried on. It was found that there were no repairs wanted to the main fabric, and the walls of which are at least 2 ft. thick, and in a good state of preservation; and in the alterations effected it was resolved to leave the interior of the church in its plain and unadorned state; but a variety of alterations and improvements have been effected in the church and churchyard, at a cost of about 600l. In the work of restoring the church, and building a new school, the vicar has been largely helped by the farmers, and by many personal friends. A high wall which surrounded the burial-ground has been removed, and a sunken fence made all round. The whole of the churchyard has been drained, in some places as deep as 8 ft.; and new iron entrance-gates have been fixed. The old high-back seats in the church have been taken out, and low stained deal seats substituted. A new flooring has been laid. On the south side of the chancel there was, until recently, "The Codrington Chapel," a part screened off from the body of the church; the screen has been removed, and the "chapel" is added to the church, by which a gain of nearly fifty seats has been made. The church altogether will seat only about 150 persons. The heltry was originally on the stone floor of the tower; a ringing-loft has now been erected, and the stone floor having given way to a timber one, the base of the tower will in future be used as a vestry, instead of the Codrington Chapel. In this latter place—the chapel—a window, with colored glass, designed by Messrs. Foster & Wood, has replaced the old plain glass window, as a memorial of the late Sir C. W. Codrington, who was lord of the manor. This makes the third stained window in the church, there being one over the reredos and one in the west window, which was placed there during the period Canon Girdlestone was vicar.

Lower Heyford.—The Parish Church of St. Mary, Lower Heyford, has been re-opened for divine service after a restoration and renovation at a cost of about 1,240l., of which 350l. have been borrowed from the Public Works Commissioners. The works just completed are for the most part restorations, and do not in any way alter the general character of the building. The roofs of the south aisle and chancel have been repaired. The plaster ceiling having been removed from the latter, the old oaken timbers are once more exposed to view. New oak boarding has also been introduced into this portion of the edifice, where it seemed requisite. A complete clearance has been made of the old floor and seats, and new ones substituted. The floor is hoarded under the seats, but the passage-ways and chancel are laid with encaustic tiles from the works of Mr. Godwin, of Lugwardine. The seats are all of oak, the parts next to the passage-ways being of panelled tracery. The chancel stalls, altar, altar-rail, pulpit, and lectern, are likewise of oak. The windows have been glazed with tinted glass, and the walls inside replastered. The church is heated by a system of iron stoves placed beneath the floor, by Messrs. Remington, of Bolton. The five bells have been rehung, and the large tenor bell recast by Messrs. Myers & Stainbank, London. Mr. Buckeridge, of Oxford, was the architect employed, and Messrs. Jos. Castle & Co., of that city, the builders.

Weymouth.—For some considerable time the accommodation afforded by St. John's Church has been felt to be inadequate to the requirements of the district and the increasing population of the neighborhood. In consequence it has been at length determined to enlarge the church, and a sufficient amount of funds having been obtained to justify the commencement of the work, the initiatory proceeding of laying the corner stone of the new buildings has just taken place. The contemplated extension consists in taking down the existing chancel, chancel arch, vestry, transepts, &c., and prolonging the nave 15 ft., extending the transepts 6 ft., at the same time doubling the width, and dividing the centre by arches and piers to support the roofs, which are to be constructed double, thus making two gables to each transept. It will, of course, be necessary to rebuild the chancel, which will have an additional length of 9 ft., having a

chancel-chapel and porch facing the Preston-road, with vestries for the clergy and choristers abutting on the Dorchester-road. It is intended that the style of the new work shall be in conformity with the style of the existing building. It is calculated that the enlargement will give extra accommodation for about 320 persons. The architect is Mr. T. Bennett, of Weymouth; and the contract for the completion of the works has been obtained by Mr. T. Dodson.

Lichfield.—It is proposed to restore St. Mary's Church, Lichfield, as a memorial of Bishop Lonsdale. At a recent vestry meeting of the parishioners the vicar stated that the private friends of the late bishop had promised substantial help towards meeting the expense of rebuilding the body of the church, and he should be glad to hear whether the parishioners would co-operate in the work. A committee was appointed to obtain drawings and estimates for rebuilding the body of the church, and, after laying them before the friends of the late bishop, to submit the same to a future meeting. A meeting of committee was subsequently held, at which it was decided to advertise for plans and estimates (the cost of the work not to exceed 6,000l.), and to open a subscription. The vicar has guaranteed the sum of 4,000l.

Leeds.—A new church and churchyard, called St. Chad's, have been consecrated at Headingley, near Leeds. The church is built at the joint expense of Mr. Edmund Denison, of Doncaster, and his son, Mr. E. B. Denison, Q.C., and endowed by the former with 200l. a year, Sir Thomas Beckett, the elder brother of Mr. Denison, giving the land. Mr. Crossland was the architect. It has a tower 28 ft. square, and spire 186 ft. high, at the west end of a nave of six bays, with a five-sided apse and periscope, or aisle carried round the apse, in which are the vestry and organ-chamber, and an entrance to the church. The internal length is 126 ft.; the width of nave and aisles 52 ft.; and the total area within the walls 5,500 square feet. Local stone has been used throughout, with the exception of the reredos, pulpit, font, and all foliated capitals, for which a finer stone has been employed. The roofs and seats are of deal, slightly stained; and polished flags have been used for the floors, with the exception of the sacrum, which is tiled. The tradesmen employed in the work were,—Messrs. Sutcliffe & Deareley, Huddersfield, masons; Mr. James Sykes, joiner, Huddersfield; Mr. G. Walsh, plumber, Halifax; and Messrs. Knight, Hardy, & Jackson, painters, Huddersfield. The gisittings, of a style in harmony with the architecture (fourteenth century), are by Mr. Skidmore; and the three helts have been cast by Mr. Taylor, of Loughborough, from designs by Mr. Denison. The sittings in the church, although free in one sense, are not in another. The residents in the parish have the first choice, and their applications for two-thirds of the sittings have to be made to the recently-appointed incumbent. The remainder of the sittings will be free and unappropriated. This is the third church built by the Beckett family within the old parish of Leeds.

SCHOOL-BUILDING NEWS.

Newcastle-upon-Tyne.—The chief stone of national schools for the villages of Woodhorn and Newhiggin-by-the-Sea has been laid. The contract for building the schools (a mixed school and an infants' school) and a house for the master amounts to 820l., and that amount has already been obtained. The ground on which the schools are being built is the gift of Mr. Baker Cresswell, of Cresswell Hall.

Aston.—The foundation-stone of St. Mary's Schools, Aston, has been laid. The building will be a Gothic structure, with bell-tower and spire, in the same style as the church, and when complete will consist of an infant school, 60 ft. by 20 ft., and boys' and girls' schoolrooms, each 64 ft. by 20 ft. Mr. Chatwin, of Birmingham, is the architect, and Mr. Wm. Partridge, the builder.

Frimley.—The new National Schools here are completed, and have been formally opened by the Bishop of Winchester. They are on the Government system, and were assisted by a grant from the Privy Council. They contain a school for sixty boys, one for fifty girls, and another connected with the girls' school for seventy infants. There is also a teachers' residence. The materials used were red bricks, with white brick arches, quoins, &c., and the

total cost was under 1,000l. The site was presented by Mr. J. F. Barrill, J.P. The architect was Mr. T. Goodchild, of London; and the builders were Messrs. Swayne, of Guildford.

Doncaster.—The foundation of the new building for the Doncaster Grammar School has been laid. Mr. Scott is the architect, and Mr. John Athron, of Doncaster, the builder.—The new national schools, in connexion with the parish church, have been opened by the Archbishop of York. They have been built from designs by Mr. J. F. Teale, architect, Doncaster, at a cost of nearly 5,000l.

Idle.—The sum of 1,050l. has been raised, and a school-room has been erected at a cost (including the site) of about 1,350l. The new buildings comprise a day and Sunday school. The Sunday school forms the principal feature in the group, and is 66 ft. long and 36 ft. wide, by about 17 ft. high. One end of it is formed into three small class-rooms, which on occasion requires it, he thrown open to the main room. The day school (which is also used as an infants' Sunday school) is simply the old school-house rebuilt at right angles to one end of the Sunday school, with which it communicates by a moveable partition, so that both the rooms are available at once for any large meeting; the size of it is 49 ft. by 21 ft. 10 in. (outside walls), and 16 ft. high. Both schools are warmed with hot water, by Mr. Jas. Pearson, of Shipley. The contractors were,—Mr. Jahez Myers, mason; Mr. Jas. Naylor, joiner; Mr. Jas. Garth, plumber and painter; Mr. Nathan Baxter, plasterer; Mr. H. Thornton, slater—all of Idle. Messrs. Milnes & France, of Bradford, were the architects.

Rhayader (Radnorshire).—The new schools were opened on Tuesday, the 31st ult. The large room, which accommodates 120 children, is spanned by an open timber roof, covered with Major's patent dau-colored tiles. The walls are of red brick, relieved with bands of firebrick. The general style of the structure is Gothic, of a Continental type, the grouping of which is assisted by a bell spirette. Monie's dry-earth closets have been supplied, and a fair trial will be given them. The works have been carried out by Mr. William Evans, of Rhayader, from the designs of Mr. E. H. Lingen Barker, architect.

Alderley.—St. Philip's Infant School, Alderley, has been completed and opened. The school is 40 ft. by 20 ft., with two class-rooms, library, &c. The roofs are open, and the windows are glazed with geometrical panes. All the works have been executed by Messrs. Royle & Mellor, builders, Wilmslow, from designs furnished by and under the superintendence of Mr. John Lowe, architect, Manchester, at a cost of 750l.

Cotes Heath.—A new National schoolroom, capable of holding fifty children, with a master's house, has been built at Cotes Heath, near the railway station at Stanton Bridge. The former school was at Cranberry, at the edge of the parish. The new school is near the church, and the site of the building, with a large master's garden on one side and the play-yard on the other, occupying upwards of a quarter of an acre, was given by the 'Squire of the parish, Mr. Cotes, of Woodcote, near Newport. The total cost of the building is about 430l. Mr. Thomas Espley, of Eccleshall, was the builder.

STAINED GLASS.

St. Mark's Church, Dewsbury.—This church has been enriched by the addition of three painted windows. The first (a memorial) is in the east window, which is of considerable size, having five main openings with stone tracery above. The subject in the base of these lights is the "Resurrection," and in the centre light above, the "Ascension" with the mother of Jesus and groups of the Apostles placed in the side lights. In the tracery above is our Lord in glory, surrounded by attending angels, some playing instruments and others bearing palm-branches. The subjects represented are divided by a conventional treatment of ornament, founded on the passion flower and leaf. The second is the west window; the subject is the "Crucifixion," on a ground of mosaic diaper, varied in tones and by the vine. The figures stand out in simple relief, our Lord on the cross, attended by adoring angels, and beneath are the holy women, with St. John and Simon the Cyrenian. The third is a small window in the north aisle, opposite the south porch. It is of three lights, and, being near the font, represents the

appropriate subject of our Lord Jesus's little children, in the centre, with groups of the Apostles and women and children on each side. The artists were Messrs. A. & W. F. O'Connor of London, by whom all the windows have been designed and executed.

St. Michael's, Coventry.—A stained glass window, by Messrs. Heaton, Butler, & Bayne, of London, has been placed over the south-eastern entrance to this church, in memory of the late Mr. Thomas Sharp, formerly of Coventry, an antiquary, and author of the volume entitled "The Coventry Mysteries." The subjects in the window are "The Faithful Servant," "The Good Samaritan," "The Publican and the Pharisee," and "Giving up the Talents." A window, by the same artists, to the memory of the late Earl of Craven, will shortly be placed in St. Michael's.

Church of Our Lady (R.C.), Kentish Town.—A stained glass two-light window, in memory of the late Mr. Edmund Kelly, architect, has just been placed in this church. The work was designed and executed by Mr. A. J. Mingaye. The subjects are the "Raising of Lazarus," and the "Healing of the Son of the Widow of Naim."

St. James's, Plymouth.—A window has just been erected in this church, to the memory of the late Colonel C. Owen, C.B., who for some time before his death was the Engineer commanding officer of this district. The design includes four subjects—"The taking down from the Cross," "the Resurrection," "the Holy Women on their Way to the Sepulchre," and "Their Arrival at the empty Tomb." The window was executed by Messrs. Clayton & Bell.

Books Received.

Workmen and Wages, at Home and Abroad; or the Effects of Strikes, Combinations, and Trades Unions. By J. WARD. London. Longmans, Green, & Co. 1868.

THOUGH rather extreme in some of his views, the author has made good use of much useful information, gleaned from various sources, on the important subject of workmen and wages, at home and abroad. His volume treats of the various strikes, of more or less importance, which have taken place in this country of late years, including those of the building trades. It then goes into the subject of workmen and wages abroad, and makes comparisons between foreign and British labour; trades unions, both at home and abroad; and other correlative subjects are also discussed, the work concluding with the author's opinion of what trades unions really are.

On the question of taste and skill as between English and foreign workmen, the author is not at all inclined to despair: he says,—

"It has been and is said, that the rude energy of the English workman will, in the long run, prove no match for the exquisite taste of his foreign competitor. Now, if it were a necessary—*a law of nature*, in fact—that things should for ever continue as they are now; that the Englishman was ordained to excel in what is useful only, and the Frenchman in what is ornamental only, we would not exchange the Englishman's lot for that of the Frenchman. The useful is for the many, and in a very great measure for all; the ornamental is only for a few, and we would much rather have the supplying of the former than that of the latter. But there is no such necessity, no such law, no reason whatever, why the Englishman should not acquire the Frenchman's taste, although there would be much more difficulty in the Frenchman acquiring the Englishman's energy."

As to the comparative energy and activity of English and foreign workmen there is thus full faith in the Englishman, and not much respect for the so-called cheap labour of the Continent:—

"Several years ago, there was a general impression that it would be impossible for us to sustain our manufacturing pre-eminence against the cheap labour of the Continent, and this was supposed to be cheap simply because it was, in comparison with English labour, cheaply fed. Our capital and machinery, it was said, had alone enabled us to carry on the contest so far, and that we had better abandon it in the future. It should come to pass that the foreigner should depend on us in respect of capital and machinery, on an equal footing with us. The cheap labour of the foreigner, it was positively concluded, would then decide in our favour, and we should be enabled to compete with the best of our own manufacturing capitalists affected with this apprehension, that some of the most noted for forecast and enterprise withdrew themselves and their capital to those countries where they could do with them the best advantage. It was positively concluded, to instruct and to encourage the English who could obtain, to instruct and to encourage them. Amongst others who thus (wisely, as it was thought) anticipated the shipwreck of our native manufacturers, Mr. Cockerill, a gentleman of vast capacity and resources, was the foremost. He took into partnership with himself no less a personage than a foreign capitalist. It was principally the Belgian cheap labour—cheap in name only, and also we have endeavoured to show, in reality twice as dear as English labour—which he aimed the concern. Mr. Cockerill and his royal partner did not lack capital to give the experiment a fair trial; they staked themselves of the best English manufacturing

machinery—a subject upon which no man living was better informed than Mr. Cockerill himself,—of the best English processes, and of the best English skill to be procured for directing them; and yet, from the first to last, their competition with English labour was ruinous one. English capital, English machinery, English system, English knowledge—they had every element, as far as manufacturing is concerned, of English success but one—the energy and activity of the English workman. This establishment fell to the ground because Mr. Cockerill found, by experience, that English labour was in reality the cheap labour after all, inasmuch as the English workman proved that he did more than three times the work of a Belgian workman for less than twice as much pay."

Mr. Ward is severe upon trades unions as they are, apart from their theoretical merits and demerits:—

"Instead of being a benefit to the working class, they are an injury, for they can only be carried on by means fatal to every right that a free people respects. They are destructive, also, to the legitimate ambition of industry and merit, and in their practical operation they are simply a premium upon incapacity. These unions vary considerably in character, conduct, and spirit; but they all contain within them the germs and elements of injustice, if not of crime, inasmuch as they are founded upon the right of the many to coerce the few, and the employment of such means as may be deemed necessary to give effect to these dangerous and delusive principles."

As to strikes, he says:—

"The working man who feels conscious of his superior skill, or manual dexterity, ought to depend upon his own work as a labourer, and act upon his own judgment, and not permit himself to swerve from the straight line of his own interest, by the suggestions of the cunning, the clever, and the unscrupulous who belong to the same body. Let him abandon strikes and combinations; they are the premium upon incapacity. Examine minutely their various workings, and mark their inevitable and uniform results: the able hand, who could always obtain work at good wages, is sacrificed to his comparatively feeble and inefficient colleague. All strikes, therefore, with scarcely a single exception, are the sacrifice of the skilled few, to the presumed advantage of the indolent, ignorant, and indifferently honest many. Let the workman wish to derive its condition, must eschew combinations and strikes; it must endeavour to establish itself upon the same conditions as capital, and submit to the healthy and invigorating influence of competition, by which alone it can realise its best and most permanent interests."

Miscellanea.

MARKETS FOR LONDON.—We understand that the question of proper market accommodation will shortly be brought to the consideration of the Court of Common Council.

REDUCTION OF IRONWORKERS' WAGES.—The ironworkers of South Yorkshire have come to the conclusion "that it is injurious to their interests to carry on a hopeless opposition to the proposed reduction in their wages, and that, considering the present dulness of trade, the widespread poverty through working on half-time, and the time of the year, it is advisable to accept the terms of the employers." They have, therefore, agreed to resume work at a reduction of 10 per cent. for millmen, and 1s. per ton for puddlers.

HERALDS' COLLEGE.—A paragraph in some of the papers, to the effect that the Metropolitan Board of Works has paid 7,500l. into court as purchase-money for the Herald's College with the intention of pulling it down in order to form the new street from Blackfriars to the Mansion House; and that as compensation for removal Nory King-at-Arms has received 70l.; York Herald, 70l.; Portcullis Pursuivant, 25l., and so on, is calculated to give a wrong impression. The fact is, the college remains; it is merely a small part that has been taken down, and the sums given to certain of the officers are for the cost incurred by the removal from one part of the building to another.

BURSTING OF A CISTERN AT CARLISE.—A large cistern at the top of the new buildings recently erected by the County Hotel Company in Botchergate, Carlisle, has lately given way. The cistern, which was 10 ft. square, was placed on the south-east side of the new County-hall, and its height would be about 60 ft. from the ground. It was constructed of Memel planks 2 in. in thickness, with cast-iron struts built in the cill, and tied with wrought-iron ties. It was lined with lead, and outside but not quite touching it, was a brick wall. The cistern contained upwards of 6,000 gallons of water, which inundated the adjoining premises. Two of the sides had apparently given way. The damage to the restoration of the cistern, which, by the architect's estimate, will cost only 15l. or 20l. more. The architects attribute the accident to flaws in the cast-iron struts, caused by the frost having so weakened them, that they were unable to resist the pressure of some 25 tons, which the four sides of the cistern would have to bear when it was full of water.

THE VALUE OF SEWAGE.—Among the topics which receive attention in the current number of the *English Agricultural Society's Journal*, is the agricultural value of town sewage. It appears that nitrogen, equal to 200 ounces of ammonia, passes annually from every average individual of a general population, and this being mixed with the usual annual water-supply to our towns of 40, 60, or 80 tons per head, gives only 9½, 6½, or 4½ grains to every gallon of the resultant sewage. If the average be taken at 7 grains to every gallon, which is equal to 1 in every 10,000 parts of the drainage water, then that is worth about as much as half a ton of Peruvian guano for every 1,000 tons, or between 1½d. and 1½d. per ton. Nothing like this valuation has, however, yet been realized in agricultural experience. The large quantity of water with which the guano in sewage is diluted interferes its fitness for our more valuable crops.

WORCESTER DIOCESAN ARCHITECTURAL SOCIETY. An evening meeting and *conversations* of this Society has been held at the Natural History Society's Rooms, Worcester, to hear Mr. Beresford Hope, M.P., deliver a lecture "On Cathedrals and their arrangements." A discussion on this subject, with special reference to the contemplated re-arrangement of Worcester Cathedral, was also invited. Earl Beauchamp presided. Mr. Beresford Hope, in introducing the subject of his lecture, said that he would not detain the company by any lengthened prologue, but at once enter on the subject of "Cathedrals and their Arrangement." As the fine old Cathedral of Worcester was now undergoing restoration, and various opinions were entertained as to that restoration, he should say as little upon that matter as possible, or else he might put his head into a wasp's nest; and therefore he spoke on the general question only. After the lecture the company took tea, coffee, and other refreshments; and on resuming his chair, Earl Beauchamp proceeded to read a paper from Mr. Freeman, also on Cathedral Arrangements.

THE RESTORATIONS AT GLOUCESTER CATHEDRAL.—The restoration of the Eastern Chapel of the transept, dedicated to St. Andrew, may now be regarded as complete, with the exception of the fixing of the three windows, which are not expected from Messrs. Hardman's until the spring. This restoration has been made chiefly at the cost of Mr. T. Marling, under the direction of Mr. Gambier Parry, as a memorial of Mrs. Marling. The paintings on the walls are illustrative of incidents in the life and of the martyrdom of St. Andrew. The exterior of the chapel has been renewed, under Mr. Gilbert Scott's directions: new stone has been employed where the walls were crumbling into decay. This gives the building a patchy appearance till the new material tone down in colour. A scaffolding has been erected against the great window and east end of the south transept. The dean and chapter, according to the local *Chronicle*, have arranged to defray the renovating of the stonework, at an estimated expense of 750l., and Mr. Marling has undertaken to defray the cost of filling the window with glass. The outlay will, it is said, amount to about 800l. The glass will be supplied by Messrs. Hardman. Workmen are also employed at the chapel eastward of that of St. Andrew, which is to be restored as a memorial of the late Sir William Codrington, bart., M.P. Only one window in the south aisle now contains plain glass, and this is shortly to be replaced by painted glass, the gift of the Rev. Sir Lionel Darrell, bart., of Fetherne. The chapel in the north transept, corresponding to that of St. Andrew in the south, and dedicated to St. Paul, is being restored, at the expense of the Earl of Ellenborough. Skilled workmen are restoring the canopies, &c., of the reareds, and remains of the ancient decoration in gilding and colour have been found under the limewash. It is expected that the vaulting will be coloured. Mr. Redfern, of London, has been instructed to supply models for the three chief figures, and also for the statuettes, to be placed in the reareds. The three windows over the reareds will be filled with painted glass by Messrs. Hardman. The windows in the East Walk of the cloisters will also shortly be completed, the last of the series of ten being about to be erected in memory of Canon Banks. The subjects, in accordance with the plan for the whole series arranged by Bishop Jeune when Treasurer of Gloucester, will be the Samaritan Woman, Jairus's Daughter, and the Transfiguration.

THE BIRMINGHAM SOCIETY OF ARTISTS' EXHIBITION.—The Exhibition of Pictures at the rooms of the Birmingham Society of Arts has been closed, after a successful season. The number of visitors was 28,054, including 3,263 admitted by Art-Union tickets. The sales of pictures were even more satisfactory, having amounted to a total of 3,135l. 19s., of which sum 625l. were spent by the Art-Union.

SEYTON PARK, LIVERPOOL.—At a special meeting of the Improvement Committee of the Corporation, the tenders sent in for making the roads, sewers, and lakes, and the general formation of the Seyton Park, with the exception of the buildings, were examined. There were eleven tenders, all by Liverpool contractors. The amounts ranged from 75,000l., to about 85,000l., and the difference between eight of them did not exceed 4,000l., but one tender was nearly 10,000l. more than that which the committee ultimately accepted. It was resolved to recommend for adoption the tender of Mr. Campbell, of Liverpool, which was the lowest, the amount being 75,000l., and to ask the mayor to convene a special meeting of the council, for the purpose of confirming the recommendation.

THE SOUTH NORWOOD BUILDING FRACAS.—At the Surrey Sessions, on Friday, Saunders, Cooper, and Neal, charged with willfully demolishing some houses at Enmore Park, in the course of erection, were acquitted on the charge. It will be remembered that the defendants held some plots of land in Enmore Park, under a building lease from a Mr. Jones, the prosecutor, who was to advance money on certificates of work done and value placed on the land. The mode of building did not please Mr. Jones, who stopped the supply; and the defendants, not having the means to complete the building, and seeing that the work they had done would probably fall into Mr. Jones's hands, took on themselves to pull the buildings down, for which they were brought before the Croydon magistrates and committed for trial at the sessions. The criminal charge having failed, Mr. Jones is, we hear, about to commence proceedings in a civil court.

A NEW OPERA HOUSE IN NEW YORK.—Mr. Pike, a successful trader in New York, has erected an Opera House, in Twenty-third and Eighth Avenue. According to a correspondent, it is built of white marble, and its architecture is Italian. One of its fronts is 120 ft., and the other 112 ft. wide, and the building is 325 ft. long. The entrances, which are very wide and handsome, lead into a vestibule, which is 40 ft. wide, 80 ft. long, and 30 ft. high. From this ante-room a staircase leads to the dress circle of the house. From the front row of the dress circle it is 185 ft. to the footlights. Above is the family circle, below the parquet, and the house will seat 2,600 people. From the floor to the ceiling is 70 ft.; the stage is 70 ft. deep, 80 ft. wide, and 50 ft. high. Beneath the stage is a room 23 ft. high for the traps and lower machinery of the stage. For the interior decorations of the house the prevailing colours are white and gold; the curtains of the private boxes are white and blue; the seats in the body of the house are crimson; and there is a profusion of stately, chandeliers, candelabras, and paintings.

FATAL EFFECTS OF IMPURE WATER.—Eight or nine men of the Plymouth division of Royal Marine Light Infantry, stationed at Stonehouse Barracks, died lately within a short interval of each other from fever of a typhoid character. A medical court of inquiry was held, and the six medical gentlemen connected with the division found that the deceased men had been living in the recently-erected wing of the barracks, the men in which were supplied with water by a pump connected with a large reservoir or well beneath a portion of the barrack-yard. This water has been so highly prized that it was supplied to the officers' mess. The court of inquiry, however, came to the conclusion that this water contains organic matter and gases detrimental to health, and ordered that the pump in question should not for the future be used. Since this order has been in force there has not been any case of typhoid fever in the barracks. The *Western Morning News* states that when the houses were first erected in Stonehouse, some of the buildings compensated for the absence of any system of sewers by making openings and draining into subterranean chasms or caves in the lime-stone rock into which wells have been sunk, and it is believed that to this day some houses in that manner dispose of their sewage.

THE WALLS OF HER MAJESTY'S THEATRE.—A correspondent says he was nearly killed last Saturday by the sudden fall of a portion of the wall of the Opera House while he was passing along the arcade.

OPENING OF NEW WING OF SOUTHAMPTON INFIRMARY.—The Royal South Hans Infirmary at Southampton has had a new wing erected, at the sole expense of Mrs. Eyre Crabbe, one of the lady patronesses of the institution, at an expenditure of upwards of 3,600l. The committee have named it "The Eyre Crabbe Wing." It comprises two wards, each 81 ft. long by 24 ft. wide, and 13 ft. high, making up a total of thirty-six beds, and giving about 1,300 cubic feet of air to each patient. The wards are to be devoted specially to cases of accident, where free and pure air is especially required. The floors are of polished English oak, to prevent absorption, and the walls finished with polished Parian cement, to resist the intrusion of damp. They are ventilated on improved principles, and have been approved by Dr. Parkes, professor of hygiene at the Royal Victoria Military Hospital at Netley. The new wing was designed by Mr. Robert Critchlow, architect, and erected by Mr. Christopher Martin.

IMPROVED LABOURERS' DWELLINGS FOR CROYDON.—New buildings have just been completed in a poor district of this town, and are now open to receive tenants. They have less of the barrack character than usual. There are ninety-two rooms, the tenements consisting of from one to three rooms, to meet the requirements of all; and, so far as can be ascertained at the outset, the single rooms are much in request by those who are unable to pay for more, and whose families do not require more. Each living-room is provided with an oven and large cupboard, and every room has a fire-place. Provision is made for the tenants to place flowers in the windows. Every landing has a large sink and water-tap, and all is well lighted with gas. A wash-house, with six boilers, has been erected in the yard for the free use of the tenants, and a large drying-ground has been provided. There is also a room in the centre of the building where various agencies for the benefit of the poor may be carried on.

CONFERENCE ON TECHNICAL EDUCATION.—The council of the Union of Lancashire and Cheshire Institutes have held a conference, at the Trevelyan Hotel, Corporation-street, Manchester, with Mr. B. Samuelson, M.P. for Banbury, on the subject of technical education. Mr. Alderman Rumney occupied the chair. The council had invited Mr. Samuelson to attend the conference, so that they might be able to discuss the question with him. At the close of the discussion Mr. Samuelson said that he intended to move for a commission of inquiry into the subject of education; but he thought it would be some time before he would be prepared to agitate the question. He would like to see given by schools of art a more direct bearing upon the trades of the district. He thought this was a subject which might be taken up advantageously by Chambers of Commerce. In the evening a meeting was held at the Athenæum, to hear an address from Mr. Samuelson upon technical education, with special reference to its state and operations upon the Continent, (as evidenced by his own recent personal observations. The chair was taken by Mr. Jacob Bright, M.P.

NEW PROMENADE AND SEA-WALL AT REDCAR. The property owners and ratepayers of the township of Redcar have adopted a report on this subject, by Mr. Fowler, the engineer to the Tees Conservancy Committee, and the work has been entrusted to a committee to carry it out. The committee consists of twelve responsible townsmen, six to look after the work and six to collect and disburse the money. At the meeting deciding on these measures, it was resolved that each section of the work be done to the satisfaction of Mr. Crabtree, the planner of the work. Mr. Pickett asked if they meant Mr. Crabtree to be clerk of the works. He was surveyor, and it would need some one to be there from six a.m. to six p.m. every day. Mr. Lennard said Mr. Crabtree was the servant of the town, and would have to ask leave of the Board of Health to attend to this. The promenade will be an additional attraction to the numerous visitors who spend a part of the summer months at Redcar. It will afford them a fine promenade at all states of the tide, and open a carriage-way to the houses on the beach, which at present does not exist.

SOCIETY OF FEMALE ARTISTS.—The private view of the works of the Society of Female Artists will take place on (this) Saturday, the 25th inst.

DAMAGE TO WELLS CATHEDRAL.—It is stated that, during a violent wind on Saturday last, a quantity of the ornamental work was blown from the northern tower of the west front.

TENDERS.

For Turkish bath, Brighton. Messrs. Gontly & Gibbins, architects. Quantities supplied by Mr. Lansdowne:—

Patman & Fotheringham	.....	£8,697 0 0
Lockyer	.....	8,653 0 0
Piper & Wheeler	.....	8,600 0 0
Nightingale	.....	7,633 0 0
Chappell	.....	7,470 0 0
Hal	.....	7,363 0 0
Cheesman (accepted)	.....	7,263 0 0
J. Sawyer	.....	6,953 0 0

For alterations and additions to warehouse, Monkwell-street. Mr. H. H. Collins, architect:—

Sale	.....	£313 0 0
Cohen	.....	478 0 0
Pearse	.....	381 0 0

For the erection of one and two villa residences at Pinner, Middlesex, for Mr. L. Green. Messrs. Walford & Dakin, architects. Quantities not supplied:—

One Villa.		Two Villas.
Kemp	.....	£2,100 0 0
Ward	.....	2,100 0 0
Shurmer	.....	1,915 0 0
Fish	.....	1,890 0 0
Stanger	.....	1,630 0 0
Mundy & Hutchinson	.....	1,600 0 0
Kent	.....	1,650 0 0
Sharlington & Cole*	.....	1,497 0 0

* Accepted.

For residences at Isleworth, for Mr. A. H. Johnson. Mr. C. Jones, architect. Quantities furnished by Messrs. Richardson & Waghorn:—

Hiscock	.....	£3,250 0 0
Mitchell	.....	3,021 0 0
Nye	.....	2,867 0 0
Kilby	.....	2,867 0 0
Gibson, Brothers	.....	2,737 0 0
Waters	.....	2,765 0 0
Adams & Sons	.....	2,668 0 0

For the lodges, bridges, fountains, colonnades, and other architectural works at Stanley Park, Liverpool (exclusive of boundary railings), for the Corporation of Liverpool. Mr. E. R. Robson, architect:—

Robson & Sons	.....	£24,460 0 0
Wells	.....	18,700 0 0
Lee	.....	18,250 0 0
Hughes	.....	18,239 0 0
Burroughes & Son	.....	16,968 0 0
Tomkinson	.....	15,700 0 0
Jones & Son	.....	15,538 0 0
Urmson	.....	15,415 0 0
Hugh & Co.	.....	15,413 0 0
Mellin	.....	15,363 0 0
Campbell (accepted)	.....	13,456 0 0

For alterations and additions at No. 29, Porchester-terrace. Mr. Charles Innes, architect:—

Fish	.....	£1,280 0 0
Macey	.....	1,232 0 0

For building tavern and stables at Richmond, for Mr. John Peck. Mr. J. I. Stewart, architect. Quantities supplied:—

Keay	.....	£1,405 0 0
Skinner	.....	1,371 0 0
Mundy & Hutchinson	.....	1,352 0 0
Shurmer	.....	1,295 0 0
Adams & Son	.....	1,184 0 0
Nutt & Co.	.....	1,149 0 0
Parson & Smith	.....	1,089 0 0
Girdling & Son	.....	1,020 0 0
Hookham (accepted)	.....	1,011 0 0

TO CORRESPONDENTS.

R. M.—W. T. C.—G. L.—J. D. P.—E. H. M.—E. J. R.—Dr. F. G.—Coroner.—J. D. D.—Q.—J. C. T.—W. F. M.—F. G.—F. R. C.—M. V.—F. L.—C. P.—J. R. (write to the Museum).—F. L. N. F. (safe. Will be put in hand).—Waiting Rustic (look to the Adm.).—Notes from York in Arts.

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

TO SUBSCRIBERS.

The TWENTY-FIFTH VOLUME of "THE BUILDER" (bound), for the year 1867, will shortly be published, price One Guinea.

CLOTH CASES for binding the Numbers are NOW READY, price Two Shillings and Ninepence.

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The Builder.

VOL. XXVI.—No. 1304.

The Sculptured Stones of Eastern Scotland.



RECENTLY there have been submitted for consideration two readings of the meanings of the curious symbols engraved upon the numerous ancient memorial stones found in eastern and lowland Scotland, identified as the Picts' land mentioned by Bede. The first of these is that given by Mr. Stuart in the sumptuously illustrated volume he has recently published under the auspices of the Spalding Club. The second emanates from a northern philologist, Mr. Ralph Carr, in the form of a pamphlet, recently issued, and was first given by him to an archaeological circle at St. Andrew's, in the present year. The two interpretations are quite of a different character; but before we proceed to record them, we must give a few particulars of the stones on which the symbols occur. The sculptured stones, to which we refer must be confounded with the rocks *in situ* and down stones, bearing the concentric circular designs, with central dots, first observed in Cumberland, and since found in the highland district of Scotland, and in Ireland and Wales. In the land of the Picts, that is to say that portion of the eastern coast, or lowland of Scotland, that lies north of the Forth, there are found a large number of sculptured stones, on which are sometimes incised, and sometimes carved in relief, a set of symbols found elsewhere; accompanied, however, we may add, in some instances, by a few others which have been found in various parts of the island. Some of these stones are much richer than others, being carved with the elaborate designs of lines with which the initials in Saxon MSS. are ingeniously depicted, which leads to the inference that they belong to a more advanced age than that which contented itself with the mere incision of a symbol. This contains, moreover, certain representations of scenes and transactions that it is believed to be the work of men endeavouring to indicate similar passages in Scripture. These, therefore, are assigned to the Christian era; but whether the symbols marked upon the ruder, and apparently earlier stones, are Christian or Pagan, is a question. Elephants, with upturned trunks, like those on the sides of the caves in the Alps, with a Z or N like mark crossing the trunk folds; birds, fishes, animals' heads; and a crescent something like a double eye-glass; a circle with a central dot in it; an angle combined with another figure, which is called a crescent and a square figure, something like an altar, among the signs; and besides these, there are delineations of mirrors, and combs, which have, however, been found elsewhere. Mr. Stuart refers them all to be personal distinctions, or badges, and that they were placed on the memorial stone of departed persons in much the

same spirit as men of the Middle Ages indicated the trade or occupation of deceased friends on their grave covers. It is not, however, with Mr. Stuart's interpretation of the meaning and use of the symbols that we are about to concern ourselves, except so far as to show in a few words the view that he has taken of them. His laboriously got up volume places all the stones under the eye in a group, and therefore has done real service towards an accurate conception of their signification. It is, indeed, the facility thus given to scholars that has placed it in Mr. Carr's power to give his new reading. We may here state that this gentleman is an Anglo-Saxon student of considerable experience, and that his knowledge of this department of literature has led him to believe that some of the hitherto undeciphered inscriptions on the stones are in Saxon words. It was the inscribed stone at Newton Insh, in Aberdeenshire, that first made this apparent to him, and the next stone he examined, that of St. Vigean, confirmed his conviction. The first mentioned exhibits, he considers, just such peculiarities of orthography as enable him to assert that the work is Saxon, as distinguished from Anglo-Saxon. In his hands this "wall-cry" from those who have preceded us says,—

"To Ella (or Elle),
(or Eita or Eite),
(his or her) grand-daughters,
on stone wrought
a lamentation—
(namely) this Gaelic wall-cry."

The threnody, or chant of sorrow, thus indicated, is believed to be what is inscribed in a chain of writing in ogham, which, beginning below the Saxon inscription, runs up the whole length of the margin of the stone on one side. The writing on the St. Vigean stone, as read by Mr. Carr, merely tells us that it is a family monument, impictured or embellished to the memory of an honoured kith-man or relative. What he considered the indisputably Saxon authorship of these stones brought them into his department of scholarship, and induced him to examine the others minutely, which, as we have said, Mr. Stuart's book renders an easy task. The result of his scrutiny is, that he attributes to the Saxon Church and clergy a system of symbolism, some traces of which are handed down to us on the pillar-stones in question. Not to make the undertaking too niggardly or abstruse, he first studied the most highly finished and, probably, least ancient of the monoliths, and, guided by the clues he obtained from them, has managed, he considers, to unravel much of the mystery of more ancient ones. The first item of explanation thus suggested appears to have been that some of the richest ornamentation is no more nor less than alphabetical letters fancifully and flowingly wrought into patterns, only requiring, in fine, a little colour to make their presence seen at a glance, which colour, it is deemed possible, they may have been decorated with when first set up. In two or three instances these characters follow each other and form a word, which, according to Mr. Carr, is also in the same Saxon speech. Thus, in the fine battle-cross at Aberlemno, once attributed to the Danes, but now repudiated by the leading Scandinavian antiquaries of the present day, there occur the letters G B D in an elaborately ornamental monogram, which Mr. Carr reads GEDED, or, Pray ye. The second conclusion at which he arrives is, that the Saxon Saxons wrote also with ciphers, as, indeed, ancient Scottish historians affirm they did; that is to say, used the same sort of word painting that when practised by us we call a rebus. And the third conclusion he is nearly sure of is, that the other marks not falling under either of these heads must be studied as Christian monograms belonging to a peculiar school of ecclesiastics,—the school, in fine, that had for its field the land of the Picts.

The first sculptured stones that Mr. Carr reads by the light of this discovery are the richly-carved slabs which were exhumed in the cathedral-yard at St. Andrew's a few years ago, and may probably have once occupied a conspicuous position within the cathedral. On one of these slabs are delineated three figures, by common acceptance believed to be the Israelitish king David represented in three stages of his history; but by Mr. Carr concluded, also, to mark another David, namely, the first king of Scotland of that name. Between the three pictures of this monarch there is a stiff and stilted representation of a wolf destroying a foal, standing on its back, and crushing it down on its nose and knees. The outline of this extraordinary attitude forms the letter D or P, corroborating the supposition that David is the person sought to be honoured. The other slab is divided into four quadrangular panels arranged around a central boss. These panels are full of figures of cats or monkeys, locked in one another's arms, or otherwise, nondescript embryos of eels, all of which our author believes to be merely instrumental in forming elaborately ornate characters. He makes out these letters to form the word KIUNG,—a semi-Saxon rendering of the Saxon *cyning*—king. The interpretation seems to suggest that these remains belonged to a cenotaphic monument, raised with all the magnificence, cunning, and skill then available in the cathedral church to the memory of the great Scottish sovereign who was one of the most munificent patrons that the early Church could boast.

The next stone read by the aid of these views is that now reposing at Abbotsford, which was found at Woodray, in the parish of Aberlemno, in Forfarshire. Here we have again six groups of animated creatures placed in strained attitudes, as though with the intention of forming fantastical letters by the aid of their outlines. There is also upon the slab a cross, upon the defaced surface of which is to be made out the characteristic wickerwork ornamentation. A broad margin of the same ornament runs across the summit of the stone and down each side. The first letter Mr. Carr decipheres as B; it is formed by two serpents knotted together. A rampant dragon swallowing a boy is so posed as to suggest the letter E. Two long-bodied dog-like creatures, locked together in combat form the vowel A. In a hind or giraffe Mr. Carr sees the converse outlines of the letter H. Another dog-fight may be read C or G; and a dog or griffin carrying another animal in its mouth, represents the letter N with a sign of elision. BEAH'CN, is thus made out, a word met with on Saxon tombstones, and signifying monument.

A similar picturing of letters has been made out on another stone found in the burying-ground of an old church at Aldhar, near Aberlemno. A cross is depicted on one side, having two accessory figures; and the supposed letters, formed of fantastic groups of animals and other objects, are on the reverse. Two female figures, seated on a settle, first occur. Below them is the figure of a man, playing with an animal, in such a posture as to suggest to Mr. Carr the letter H. A staff or club is read I; and is, perhaps, hints our ingenious author, an intimation to the beholder of the double character of the inscription, as *staf* in Saxon means also a letter. The Saxon W, which is nearly harp-shaped, is next suggested as the rendering of one of those instruments. So far we have H I W, the Saxon term for a family or household, which we still retain for our bees in the word hive. Besides this, the epigraph contains the figure of a sheep, *scop*, with which Mr. Carr completes the word H I W S C E P, family circle, or relationship. *Scop*, like *hive*, we may here remark, is a word applied to bees even now in Scotland. *Bee-scop*, or simply *scop*, is *bee-hut*. If this interpretation be accepted, it must be confessed that the Saxon-Saxon stone cutters were as clever at riddles and

rebuses as many of our contemporaries. At the bottom of all this stand two wolves, one behind the other, so stiffly as only to suggest to Mr. Carr the idea of plurality, or rather not wolf but *truffles* in the genitive or possessive singular. This device is used, our author doubts not, to indicate the ending of one of the many Saxon names terminating in *wulf*.

On the grand cross at Aherlemuo, once regarded as Danish, because tradition handed down a belief that it was erected to commemorate the death of a Danish leader and the discomfiture of his host, there are, again, as Mr. Carr states, Saxon words to be made out, disguised in a similarly far-fetched and elaborate manner. In the monogram in the middle of the cross be entwined the letters G E B E D, pray ye; and below them are the representations of two seals or sea-calves, which Mr. Carr takes to be a sort of pun upon the word *sool*, as seal was pronounced in nearly the same manner, *soel*; and more especially because another clue is given in the shape of human feet (soles?) as tips to the tails of the seals. Their snail, as in the case of the wolves before mentioned on the previous stone, is supposed to represent plurality. Thus, with the monogram of Jesus at the head of the stone, Mr. Carr reads,—

"To Jesu
Pray ye
for the soles."

We give one more example of this section of Mr. Carr's interpretations. At Largo House there is a sculptured monolith which has a human figure on it looking up at a cross carved above its head, and two of the metagraphic seals, which have been deciphered as indicating the word *sool* in plurality, not necessarily two departed persons only. On the other side, there are three men on horseback. The figure placed in the most important position has a swan represented behind him, and a mystic knot in front of him. "Was the name of this stately leader Swegn Canute?" asks our author. "Canute was written Knut, Canut, that is Knot; and swan might stand for Swegn, though a different word."

In his attempt to interpret the apparently still more mysterious and ancient diagrams or symbols with which he next proceeds to deal, Mr. Carr does not seem to us to make out so feasible a case as he ingeniously does with the probably less ancient ones. As he retreats into what he himself regards as the more ancient, he admittedly gets "beyond his depth," and explanations which he gave at St. Andrew's he now renounces, and explanations which now appear clear to him he could not at all see when he read his paper there. The N or Z symbol especially is the *pons asinorum* where the break-down occurs. This symbol, according to Mr. Carr, is the Saxon S, or seal, which "meant primarily a small ornamental sign or device of distinction, such as an ornamented brooch or clasp, a collar, or armet;" and accordingly it is often combined with another form which is usually called "the spectacle ornament," but which Mr. Carr regards as a circle for the arm "laid out flat," but is it not rather odd that a circle should be spread out flat to show that it is a circle? The whole was intended, he considers, to signify a seal, and for the meaning of that he refers us to the book of Revelations, chapter vii., and other Scriptural passages in respect to those "that were sealed."

Had Mr. Carr's knowledge of the N symbol been a little more extensive, he never could have rested content with such an interpretation as this. Was it likely that the pre-Christian N symbol on the Carthaginian tablet which was brought under the notice of the Society of Antiquaries by Mr. Godwin, and engraved in the *Archæologia*, was a Saxon alphabetical letter, or had any such significance as Seal? Was it likely that the pre-Christian N symbol of ancient Persia, brought under notice in the *Builder*, of 6th June, 1863, by Mr. Dove, was Saxon, or had any relation to "the sealed" of the Revelations? Is it even likely that the multitude of N symbols, cut in all their varied forms, and amidst a host of others, upon various foreign as well as British churches, as *masons' marks*, adused by Mr. Godwin in the *Archæologia* and elsewhere, were all (if any of them were) the Saxon S? Some far more universal, and far more recondite, original meaning must be given to this remarkable symbol.

In the paper read at St. Andrew's, Mr. Carr's interpretation of the "broken sceptre" and "spectacle ornament," as the Scottish archaeologists commonly call the N symbol and the double and united circles, was quite different.

He took the N simply for the Saxon S, and the double circle for "that form of the omega where it is composed of two omicrons," the whole denoting "the syllable SO, which [he adds], I conceived might be the initial one of Soter, Saviour."

In another example of what is clearly just still a form of the N symbol also, on an altar-like object, he suggests its resemblance to "the Saxon capital H, which had its transverse line so much sloped as almost to resemble a Roman N. If the letter be H, as is perhaps the most likely [he adds, not we], it stands in all likelihood for Hostia, the host. . . . If instead of H the letter he read S, then it would stand for Sacramentum." There is not much, we fear, to be expected from this style of interpretation. Nevertheless, there is no little ingenuity in some of Mr. Carr's guesses and explanations.

At the close of his paper he says,—

"Such of the sculptured stones as merely mark the graves of private persons or families are assuredly the enduring evidence of friendly international mingling. They are Picto-Saxon and Soto-Saxon tombstones, showing how the Saxons came and settled and intermingled with the Picts, but left Saxon records over their dead."

The common tradition of Scotland itself connects these sculptured stones with the times of the Danes, though, as works of the native inhabitants, not of those invaders, whose defeat certain of them were said to commemorate. This, as related by old Boece, appears to Mr. Carr, in respect of chronology at least, no small approximation to the truth. He has the support of Buchanan; and Boece tells us, in "The New Manneris and auld of Scottis," that

"In all their secret business they used not to write with common letters, but among other things, ever with sifers, and figures of beasts made in manner of letters; sic as their epitaphs and superscription above their sepulchris aches: nocht the less this crafty manner of writing, he gabat slecht I can not say, is perit, and yet they have certain letters propir among themselves, quilk was some time vulgar and common."

As an archaeologist Mr. Carr holds by this old school, and with its worthies is content, he says, to wait till the tide turn.

PROFESSOR G. G. SCOTT ON EARLY ARCHITECTURE IN BRITAIN.

IN commencing a series of lectures in my capacity as the official occupant of this professorial chair,* I feel in some degree shackled by the circumstance that, though the office is new to me, its duties (so far as the lectures go) are not so: inasmuch as during the latter years of the tenure of this office by the venerated Professor Cockerell, I was, in conjunction with Mr. Smirke, called upon to occupy the place from which ill health and infirmity compelled him to be absent; and at a later time I have done the same for my immediate predecessor, Mr. Smirke, when circumstances interfered, for one season, with his lectures. I have, consequently, already given seven lectures from this chair without being its rightful occupant; and, now that I commence officially, I find the novelty of anything I might have had to say in a great degree worn off by anticipation. I have consequently been puzzled whether to begin afresh or to go on from the point I had reached. The former would, perhaps, be the most correct course; but, after long uncertainty, I feel it to be too artificial to sever what I said out of office from what I have to say in office, and I have determined to link my future lectures on to those which have preceded them. I shall also for the present limit myself to Mediæval architecture as the subject on which I have been engaged.

In my previous lectures, I have given an outline of the development of Pointed architecture from the preceding round-arched style, and followed on with some practical suggestions as to the study of these phases of architecture. In this, I have treated equally of foreign and English buildings, or have, perhaps, dwelt more at length on the former, and have carefully traced the connexion of English with French architecture as they grew up, side by side, from the common germ, each to its glorious perfection.

I purpose now to fall back upon the commencement of this series of developments, and, while I go more in detail into the varied features of the architecture of these periods, to limit myself, during the present session at least, very much to its English productions.

* At the Royal Academy, January 23.

My reason for this is, that we have of late been directing our attention too exclusively to foreign buildings, greatly to the neglect of our own,—so much so, that many of our architectural students seem to be as little acquainted with the Mediæval works of their own country as if they were brought up in Italy or France.

I hold the study of the contemporary buildings of neighbouring countries especially those of France, to be essential to the due understanding of our own, and of the style as a whole; but this affords no excuse for the neglect of English architecture, to which, beyond all question, we are bound, as English architects, to direct our primary attention, and which will repay our study by a series of special beauties of its own, which have of late years been almost wholly overlooked.

In reviewing the changes in the architecture of our own country, it may be wholesome to begin early—to "look at the rock whence we were hewn, and to the hole of the pit whence we were digged." A retrospect such as this gives rise to some curious reflections. At one time we feel perplexed by the depth of antiquity into which we are directing our view, and at another with the very reverse of this.

How beyond the Norman Conquest,—beyond the destructive ravages of the Danes,—through the half-mythic times of the Ioptarchy and the heroic age of the Pagan Saxons; and, again, beyond the destruction of the Roman arts through the mystic and hazy age which intervened between the withdrawal of the Roman and the conquest by the Saxon; again, through the four centuries of Roman domination into the unknown abyss of prehistoric Britain, what a vast lapse of time does it represent! Yet the earliest period we thus reach is, nevertheless, some four centuries subsequent to the close of the Old Testament history and the period of Pericles and Phidias, and perhaps fifteen centuries subsequent to many of the great monuments of Egypt!

Archaic art seems to have the power of reproducing itself; and even the ages of heroic and barbaric myth may re-occur after periods in which society and civilization may appear to have worn themselves out by over-refinement and thus, when we attempt to trace out the early Christian architectural arts of the nation of Northern Europe, we find ourselves as much in the mist of antiquity as if we were prying into that which preceded the Pyramids or the earliest palace of Nimrod, though we are in reality examining works subsequent to the time when the empire of Rome fell to pieces from sheer old age.

In taking an enlarged view of Mediæval architecture, we must view it in two distinct but at the same time united aspects: we must view it as the architecture indigenous to the modern as distinguished from the ancient civilization; but we must also view it as having been developed upon an antique nucleus.

There are also two other separate, though united, views which we ought to take of it. We should view it, on the one hand, as the work of men elaborating, as from the beginning, a new system of art on the mere reminiscences of a old and defunct system,—absolutely defunct as relates to the northern races,—but we should view it also as, all the while, aided by the living art of the Eastern Empire and by the smouldering embers of that of Rome itself.

In some districts there may have been tradition remaining of some old method of building which had prevailed among the Pagan, Celtic, or Teutonic tribes; but the germ was generally said to have been Roman or Byzantine,—founded on reminiscences, and aided from time to time, by direct communication.

The two great divisions of Mediæval architecture are, firstly, that which preceded, and secondly, that which followed the great transition of the latter half of the twelfth century. The whole may be viewed as the one great development of arcuated construction into style of art, and its two great divisions are the round-arched and the pointed-arched styles.

It is my purpose during the present session to limit myself very much to the former; but, viewing it, not only in its own bearings, but also as the precursor of the latter. Though I intend to choose my illustrations almost wholly from buildings in our own country, it would be taking a very narrow view of our subject if I were to consider the great round-arched style otherwise than as a whole, and our own portion of it other than as a branch of that magnificent tree whose boughs, whether growing

from its eastern or its western stem, spread themselves over the whole civilised world.

It has been well remarked by Mr. Freeman, in his "History of Architecture," that the ancient Roman manner of building was essentially an *arcuated* style, though its true character was artificially overlaid by the features belonging to the purely *trabeated* style of Greece; and that the whole course of change through which it, in after ages, passed, may be described as the gradual throwing off the trabeated overlaidings and the perfecting into an architectural style its vital germ,—the *arcuated system*.

This process was carried on equally in the East as in the West, though under circumstances accidentally differing. The two great metropolises of the Christian Roman empire, commencing with the same architecture, gradually changed it into two distinct branches, though clearly belonging to the same great trunk. In both the changes or developments took for their starting-point the architecture, not of Greece, but of Rome. In the West, they continue to follow the natural suggestions of that style, influenced deeply by the changed religion, and subsequently curbed and held down, first by the removal of the seat of government to Constantinople, and then by the continuous waves of the northern invaders who gradually brought down to a very low ebb the civilization and arts of the Western empire.

In the East, the influence of the Christian worship was at least equally deep; while the presence of the imperial court and government offered greater advantages to development, and the accidental preference for *domed* construction gradually gave a wholly new tone to the general character of the architecture, while the proximity of ancient Greece remains had a very strong influence on the ornamentation.

Different, however, as is the general aspect of a Byzantine and Romanesque building,—especially when the former assumes its crowning feature, the dome,—it cannot be denied that they are, nevertheless, the same style in two phases; and that there is no such contradiction between them as to forbid their amalgamation to any extent. In proof of this, we have the not inconspicuous character of the Crusaders' buildings in the East, in which the dome was not forbidden; the similarity to Romanesque of such of the Byzantine buildings as do not happen to have domes; the introduction into France of the domed architecture by a colony of Greeks; the admission of much that is Byzantine into the Romanesque buildings of Germany; and finally, the very extensive use of purely Byzantine foliage and other forms of ornamentation into the buildings of Western Europe in the twelfth century. This last-named circumstance I have dwelt upon at length in one of my former lectures, and I shall, no doubt, have frequent occasions again to allude to it. The fact is, that the ornamentation of the later examples of the Romanesque style is for the most part rather Byzantine than Roman in its origin: even the acanthus-leaves in the capitals and cornices more resembling those of the monument of Lysicrates than those of any Roman building; while the surface-ornaments—so profusely used—are often traceable to the patterns of the various manufactures of the East, so largely imported into Western Europe.

Much light has recently been thrown upon the Byzantine style, especially in respect of its secular productions, through the discovery by the Count de Vogüé of a vast number of ruined towns in the mountains towards the north of Syria, which have remained almost untouched (except by time and earthquakes) just as they were deserted in the seventh century on the approach of the first Mahomedan invaders. These remarkable remains give us the connecting link between Classic and Mediæval art, though greatly influenced by the traditional mode of building belonging to Syria. It is a subject which would need a separate lecture to deal with it as it deserves, and I only mention it here for the sake of saying that the carved ornamentation of these remarkable buildings is Greek in its feeling, and not Roman, and that it is evidently allied to that imported at a much later period into Western Europe; and which especially characterizes the buildings of the twelfth century in France, and (though less constantly) in England: all tending to establish the essential unity of the round-arched architecture of the early Middle Ages, and the fact that the East and the West were much more united in artistic affinity than has generally been admitted.

My main object at the present time is to trace the history, and investigate the character of those branches of this great round-arched style which have developed themselves in our own country: and my purpose in the foregoing remarks has been to lead you to view our own architecture, not as an essentially separate style, but as a part of that which pervaded Christian Europe, and extended till the Mahomedan invasion, far both into Asia and Africa, which was the nucleus even of the Mahomedan styles, and which in Sicily (as in the Holy Land and in Spain), again met and coalesced with its infidel offshoot, and produced by this reunion the noble architecture of Palermo, and other cities of Norman Sicily.

Among all the races of northern Europe, who were either conquered by Rome, or aided in the overthrow of her empire, I do not know that any has left a vestige of what may be viewed as indicating, in any intelligible manner, the existence among them of a distinctive style of architecture. Stonehenge and the cromlechs can hardly be viewed as exceptions; and, when the Angles and Saxons invaded Britain, they found, so far as we know, no architecture but the Roman, nor brought with them any of their own; while, to make matters worse, they seem to have devoted themselves to the destruction of what they found.

What was the character of their buildings while they continued Pagan, we have no means of judging. We have proofs that timber was their most customary material, though it would be unreasonable to suppose that they were unable to build in stone. It is likely enough that their houses were generally of wood, but such was the case throughout the Middle Ages, and continues to be so to this day, where timber is abundant. Many of the churches afterwards were of the same material; but such also has at all periods been the case when dictated by local circumstances, and is still frequent in our colonies, so that it is insufficient to disprove the contemporary use of stone.

There is a curious parallelism in this respect between the buildings of ancient Greece, of Etruria, and of England. In Greece we find clear proofs of the architectural style having been founded on timber construction, though the Cyclopean walls, &c., of the primeval cities (whether the works of the same or a different race) forbid the thought that the use of stone was ever unknown. In Etruria we find no less gigantic walls, though we learn from Vitruvius that timber entered largely even into the construction of their temples, and suggested the peculiarities of the Tuscan order. If, then, in Saxon England we find the words "*to build*" to be derived from *timber*;—if we learn from early writers that the majority of their buildings were of wood; and if we find in their stone buildings indications of their imitating the construction of timber framing, we need no more conclude that our forefathers were ignorant of stone building, where it was useful, than that the early Greeks or Etrurians used timber from ignorance of the use of stone.

They were colonists, though conquerors. They were, no doubt, but very partially civilized; and, settling down as strangers in a country from which they had driven out the old inhabitants, and whose towns they had in great measure destroyed, they were likely (as colonists do in our own day) to make the largest use of the material most ready to their hand, and to permit to more settled times the use of a more permanent manner of building.

The paucity of remains of buildings of the period between the dissolution of the Roman Empire in the West and the eleventh century, is by no means peculiar to our own country. Throughout Northern Europe the same fact prevails. The earlier waves of northern invaders were absorbed in the old civilization, but each successive wave made a deeper and a deeper inroad into the remaining arts of the old world. It was natural then, that, on the return of art and civilization, the works of this dark period should be deemed unworthy of preservation, and were replaced by new erections. In our own country the Roman had not been overcome, but had simply withdrawn, so that the dissolution of art was a more rapid work than in most other parts of the old empire, while the early efforts of the Saxons were over and over again destroyed by the yet uncivilized and unchristianized Scandinavians, from the last of whose devastations there was hardly time to recover before the Anglo-Saxon monarchy was overthrown by the Normans. No wonder, then, that the conquerors,

though but then become adepts in architecture themselves, should disdainfully reconstruct nearly all the churches and greater edifices of their predecessors in that new manner of building in which they had been so recently instructed, and for the carrying out of which their conquest had supplied them with such ample means.

It would be a curious and interesting investigation to trace out the history of what may be styled the Primitive Romanesque architecture of Northern Europe; or, in other words, to examine into the style of building which prevailed during the long interval between the overthrow of the Roman power in the fifth century and the final establishment of that family of nations which for the last eight or nine centuries has been the embodied representative of Europe.

The thousandth year of our era seems as if it were the beginning of a new state of things: as if what succeeded it were in the open daylight, while the six preceding centuries could only be viewed by the glimmer of twilight. This is especially the case as regards our own art. How little do we know of the architecture of Western Europe, north of the Alps, during that long interval! Only here and there a building equally obscure in character and date,—a dull ray of light only just sufficing to render the darkness visible. No doubt a careful investigation would increase the number of known examples on the Continent. At present they are but few, such as the *Basée-courve* at Beauvais; the Church of St. Jean at Poitiers; that of Quenouville in Normandy; the church at Lorsch, on the Rhine, and the older parts of St. Pantaleon at Cologne; all of which possess a character so distinct from that which prevails among the buildings of succeeding times as quite to sever from all which followed the architecture of these primitive ages,—this gulf which divides the ancient from the modern world. Our business, however, at present, is not with the Continent, but with the sister islands of Britain.

The circumstances of the various portions of the British isles differed in those early times so much that it is difficult to view them at all systematically. South Britain, early overspread with Roman art, civilized and Christianized while Scotland and Ireland were yet barbarous and Pagan, became again, in its turn, both Pagan and barbarous when Ireland and Scotland had received the light of Christianity and civilization.

Early in the fifth century these blessings were conveyed to Ireland from then Christian Britain, and in the next century South Britain was sunk in almost impenetrable darkness, and was subsequently held out to Ireland and the Irish race dwelling in Scotland, from the one side, and to missionaries from Rome from the other, for rekindling the extinguished lamp of religion and knowledge.

Of all the churches which must have existed in what is now England when inhabited by the old Britons, I am not sure that we possess a single relic; nor is there any certainty that even in Wales or Cornwall, where they were comparatively undisturbed, the case is much better. More curious still is the scarcity of early buildings in Scotland; though I shall be able to show you that some exceptions exist. Bede speaks of timber building as the "*Mos Scotorum*," and of stone building as "*Mos Britannicus insolitus*," which may account for this dearth of objects of high antiquity. However this may be, we have to look mainly to Ireland for relics of the early modes of building among the British races; and here we happily find much to gratify our curiosity.

It was early in the fifth century that Patrius, or St. Patrick (who describes himself as at once a Briton and a Roman), went from the northern parts of Roman Britain to instruct the then Pagan Irish, or, as they were more generally called, Scots. It was about the time when the invasion of Alaric had compelled the Emperor Honorius to withdraw his legions from Britain; and was, consequently, at the precise moment when our country was about to pass from the age of Roman subjection into that of mythic confusion,—beginning with the frightful devastations of the Picts and Scots, and subsequently of the Saxons; passing on through the semi-fabulous days of Vortigern, King Arthur, and Merlin, and ending with the flight of Cadwallader from desolated Britain; the driving out of the ancient inhabitants; the destruction of Christian churches and Roman cities, and the re-establishment of Paganism.

As there seems good reason to believe that,

among the existing remains in Ireland, some are actually of the age of St. Patrick, it follows that in them we possess remains two centuries earlier than any left us by our own Anglo-Saxon forefathers, and that their type may be founded on that of the lost British buildings, though no doubt far humbler in scale and mode of building than those erected in South Britain with Roman aid. The Early Irish remains are mainly of three classes: the cells and other domestic buildings of the monks; the oratories and churches; and the round towers. The former class are of the rudest and most ascetic description, and seem to be founded on the customary dwellings of the Pagan inhabitants. The monks evidently eschewed all pretensions to personal comfort, and took up at once with the scale of dwelling common among their flock. They lived in stone huts, built without mortar and vaulted over;—more like ovens than human habitations, and so small as only to be sufficient for one person. With these they surrounded their churches, adding a few buildings, similar in character but somewhat larger, for more general purposes. Some, even of their oratories, were almost as pristine in their construction; and the churches themselves, though less rude, were of the most severe simplicity.

The form of dwelling indicated by the Cells or "Kills" which I have alluded to is not wholly alien to that still existing (or at least in use at the commencement of the present century) in the distant island of St. Kilda, excepting that the cells were for one person while the St. Kilda houses are for a family. Dr. Edward Daniel Clarke thus describes these houses in 1797:—

"The construction of their dwelling-houses differs from that of all the western islands. They consist of a pile of stones without cement, raised about 3 ft. or 4 ft. from the ground, forming a small oblong inclosure, over which is raised a covering of straw, bound together with three or four ropes of bent. . . . Round the walls of their huts are one or more arched apertures, according to the number of the family, leading to a vault, like an oven, arched with stone, and defended strongly from the inclemency of the weather; in this they sleep. I crawled on all-fours, with a lamp, into one of these, and found the bottom covered with heath; in this, I was informed, four persons slept. There is not sufficient space in them for all men to sit upright, though the dimensions of these vaulted dormitories varied in each hut, according to the number it was required to contain, or the industry of the owners."

The central apartment he describes as without either chimney or window, but with two holes, some 7 in. square, to let out a little of the peat smoke.

There exists in the greater Island of Arran, in the Bay of Galway, among many primeval antiquities, a house, supposed to be of the Pagan period, which is thus described by Mr. Petrie, in his admirable work on the "Ancient Architecture of Ireland."

"It is in its internal measurement 19 ft. long, 7 ft. 6 in. broad, and 8 ft. high, and its walls are about 4 ft. thick. Its doorway is but 3 ft. high, and 2 ft. 6 in. wide on the outside, but narrows to 2 ft. on the inside. The roof is formed, as in all buildings of this class, by a gradual approximation of stones laid horizontally, till it is closed at the top by a single stone; and two apertures in the centre served the double purpose of a window and a chimney."

The cells of the monks differed but little from this, excepting in being quadrangular within, though round or oval without. It would appear that some of the Irish monasteries had whole towns of such insulated cells, and it was from the great number of these erected by St. Columba that his name received the affix of "Kill," and which caused his famous foundation in Iona to be called "I Colmkill."

The earlier oratories seem frequently to have been a development of the construction of these cells, "built of uncemented stones admirably fitted to each other, and their lateral walls converging from the base to their apex in curved lines."

These pristine oratories are surrounded by the cells and the graves of their founders, the latter inscribed with the cross. I give, from Mr. Petrie, a sketch of the oratory galleries, which he describes as externally, 25 ft. long by 10 ft. broad, and 16 ft. high to the external apex. It has a small doorway in the west end, and is lighted by a single window in the east end, which east gable was finished by a cross. Of very similar construction are several in Scotland and the Western Isles. Of these I have been enabled to give some illustrations, which are, in one respect, more complete than Mr. Petrie's drawings, inasmuch as they are furnished with plans.

"The early Irish churches are of two very simple types, being either oblong, with a door at the west end and a window at the east end,—a mere development, with upright walls, of the oratory just described,—or a double oblong, forming a nave and chancel, and united by a chancel arch,

—the distinct prototypes of the simplest forms of an English church. The one doorway is always west, and one the windows to the east, though side windows are also introduced, all apparently without glass; the doorway usually square-headed, the windows round-arched or triangular-headed." "In all cases the sides of doorways and windows incline, like the doorways in the oldest remains of Cyclopean buildings, to which they bear a singularly striking resemblance." "In the smaller churches the roofs were frequently formed of stone, but in the larger ones were always of wood."

The doorways are, however, sometimes arched. The apsidal termination is, I believe, wholly unknown in these churches; and it would appear from this fact that the square end of the majority of English chancels is a tradition from the ancient British churches: the apse, which so frequently made its appearance and was again so frequently removed, being a foreign importation, against which the national feeling rebelled, as opposed to the local tradition. Of a piece with this feeling was the indignant protest of an Irishman against the intention of one St. Malachy to erect a church in an unaccustomed style. "Good man, what has induced you to introduce this novelty into these regions? We are Scots not Gauls; why this levity? Was ever work so superfluous, so proud! This feeling, rather than the poverty of the country, may have occasioned the rigid severity of these early churches in Ireland, the largest of which rarely exceeded 60 ft. in length,—the very length prescribed by St. Patrick for one of his churches, and which Mr. Petrie thinks was his usual dimension for churches of the largest class. This was also the length of the original church at Glastonbury, probably the first erected in Great Britain, while it differs but slightly from that of the nave of Brixworth Church, Worth Church, and that on the Castle Hill at Dover, three of our oldest remaining Pre-Norman English churches.

The difficulty naturally arising from the limited size of the churches and the unlimited number of the monks, appears to have been met by multiplying the number of the former. Thus we find several—up to seven—chiroches continually forming a single group. Just as at Glastonbury, there were at one time three in immediate proximity, though subsequently united into one.

Besides the more or less numerous cells which surrounded the churches, or groups of churches, there were usually houses for the abbots, hardly less ascetic in their construction than the cells of the monks; halls for strangers, refectories, and kitchens. Of the abbots' houses we have several remaining, especially those of St. Columba at Kells, and of St. Kelvin at Glendalough, for sketches of which I am indebted to Mr. Barchett. These were single rooms, about 18 ft. to 25 ft. long, by 15 ft. or 16 ft. wide, vaulted and covered by a stone roof, with a window and a door of very small size, all perfectly plain, but skillfully constructed.

All such groups of buildings were surrounded by a high and thick wall of defence, with strong gateways, and somewhere at hand was often erected a round tower, at once the bell tower of the monastery and the place of refuge in case of attack.

We know nothing of the internal arrangement of the churches, excepting that in some cases there is a stone bench across the east end, the altar standing a little in advance; a square version of the Basilican arrangement; for, be it remembered, the apse possibly only came into use when secular Basilice were converted into churches, while those under consideration were probably founded upon the traditions of chiroches which existed in Britain before the time of Constantine, so that our English square east-end may after all be the more primitive type, though, if such were the case, it would appear that the seats of the clergy were at first along the eastern wall and behind the altar, as in the apsidal churches. To these views, however, I will not pledge myself, as we do not know how soon apses came into use.

This system, too, of erecting monasteries, not with general dormitories, but with numerous private cells, seems to have been founded on the early Eastern form, of which so many existed in the deserts of the Thebaid, and of which many ancient notices exist. The most perfect remaining specimen of this kind of monastery in Ireland is one on a most minute scale founded by St. Fechin, in the seventh century, in the almost inaccessible island of Ardillon, off the coast of Conemara, which, excepting only that all its buildings are vaulted, agrees almost precisely with Bede's description of that founded about the same time in the island of Farne, on the

Northumbrian coast, by St. Cuthbert, himself a Scot or perhaps an Irishman. Those in the north of Ireland and in Scotland seem to have been usually of timber, "*more Scotorum*," as Bede says, and have consequently perished; and in the south and west of Ireland they were of stone, and remain, in many instances, in a more or less complete state to our own day.

Some, however, in Scotland were of stone, like those of Ireland.

It was in these establishments,—so severely simple in their architecture,—that the lamp of piety and learning was preserved during the darkest period of our history; emitted its light not only among the British islands but to Continental Europe; and here were followed up even the decorative arts,—as illumination, embroidery, and jewelry. Such, no doubt, was the famous monastery of Iona, which, as an able historian, says,—

"Soon became morally and religiously a spectacle as glorious as any that Christendom could afford. . . . The school, of whatever knowledge, sacred or profane, was then within the reach of its northern people,—the nursery of many arts, the centre of a Christian colour, and the mother of priests and missionaries."

It was on landing here that Dr. Johnson exclaimed,—

"We are now treading the illustrious island which was once the luminary of the Caledonian regions, whence savage clans and roving barbarians derived the benefits of knowledge and the blessing of religion. . . . But man is little to be envied whose patriotism would not gain force upon the plain of Marathon, whose piety would not grow warmer among the ruins of Iona."

At somewhat later periods the severity of the Irish architecture became gradually relieved, while its leading types remained unaltered. As the dates of the more decorative buildings are unsettled, I will not enter upon the discussion how far their ornamentation was indigenous, and how far derived from other countries. Towards the Norman period, we find features agreeing with the details of that style united with Irish forms and mixed with ornamental details,—such as those which decorate the well-known Irish crosses, and are common on the monumental slabs in the monastic cemeteries. We also find the jambs of doorways, and chancel arches, losing the square form extending through the thickness of the walls which characterises the earlier examples (like those of our own Anglo-Saxon buildings), and becoming divided into separate orders, with decorative mouldings, shafts with caps and bases, and thus exhibiting the most important elements of the advanced Romanesque and "Gothic" styles. These features increase in distinctness till we reach examples known to be contemporary with our own Norman works, and culminate in the charming Chapel of St. Cormac at Cashel, which, though in outline, evincing an adherence to Irish tradition, is in all its details distinctly Norman, and is known to have been erected in the twelfth century. Mr. Petrie thinks that these decorative features are in many instances of very early date. I can quite agree with him when he says that Norman details appear; for, though a system of ornamentation may appear early in a particular county, it is impossible that it should anticipate the precise forms elaborated much later by a regular course of progression elsewhere.

There is in Scotland, at least one specimen of parallel character to these later of the old Irish churches. I allude to the church of St. Regulus, which stands side-by-side with the cathedral of St. Andrew's; just as that of St. Cormac does with the cathedral of Cashel.

Mr. Billings has given a good view of this interesting, and, I may say, beautiful, remnant; and I am enabled, by the kindness of a friend (Mr. R. Anderson, of Edinburgh), to show you detail drawings of it. It consists either of a nave (with chancel arch) and a western tower, or of a chancel with apse arch and a central tower, in which latter case it would be parallel to the remains of Jarro Church. In the other case, it may have had a lofty western porch as had those of Wearmouth and Barton-upon-Humber. The large western arch or the tower must have opened into either a nave or a porch; and, as this is actually larger than the chancel arch, and the mark of the roof of equal height, it certainly suggests a nave. Its workmanship is of a very superior character; and its details, though plain and archaic, are very good. The tower is of great height, evidently, like many other early towers in Scotland, founded on the idea of the early campaniles of Italy. The capitals of shafts closely resemble those of St. Pantoleon at Cologne, which are of

the tenth century. I find it difficult to conceive the age of this church; but, I imagine it to be anterior in its date to the introduction of Norman architecture into England. It is said that when the surrounding ground was excavated the foundations of an apse were found.

I will not dwell on the Irish crosses, and the round towers,—time not permitting,—though they are among the most remarkable features of Irish art. The towers agree precisely in their architectural details with the churches, and never appear but in connexion with them. They are known in the Irish language by a name signifying a belfry, and were no doubt the companions of the monasteries; their unique type showing the originality of invention of these early architects. Their doors were placed at a considerable height for the sake of security; they were divided into several stories, each with a single window except the upper one which had two or more,—all pointing out their double object of bell towers and places of defence. Two similar towers remain in Scotland.

The Irish and Iona crosses are works of extreme beauty, and of very decorative detail. I shall have to allude to their anti-types in England when speaking of Anglo-Saxon architecture, to the consideration of which I will now proceed.*

THE PROPOSED ENLARGEMENT OF NEWGATE.

THE public will learn, with extreme surprise, that it is intended by the City authorities to enlarge Newgate to nearly double its present size. During the whole lifetime of a generation, the prison of Newgate has been condemned as a public nuisance by every intelligent man; and now, when its presence has become more unbearable than ever, the "statesmanship" of the Guildhall proposes to enlarge it! Newgate-street is already almost crowded to impassability during business hours, whilst Ludgate-hill, a confined neighbour, is in a condition of traffic-jam the greater portion of every day. "Newgate" itself is able to be extended. Newgate, which, with the Old Bailey, may be taken as the obstructive barrier between the two great arterial thoroughfares, ought to have been carted out of the public way half a century ago. Common-sense, at this time of day, might have suggested a "clean sweep" to give more elbow-room to the public. The Holborn Viaduct, one of the historic building-works of modern London, is being constructed at a cost of something over one million sterling; Middle-row has been cleared away at an expenditure of more than 50,000*l.*, to give full effect to the western approach of the new high-level roadway; whilst the eastern end of the same roadway is doomed to open out upon—what? The felon's door, from which the condemned wretch marches forth to be hanged. Then, there is the new meat-market, raising its cheerful-looking eyes in Smithfield. Its main north and south roadway will pass at right angles to the viaduct, directly over the spot where the gallows stands. What, Newgate must be enlarged! The admirer of the viaduct, when going Citywise, will have something to "season" his admiration with, when he finds the eastern terminal faced by the bloody corner of the old prison.

In 1857, when the interior of Newgate was reconstructed at an outlay of between 12,000*l.* and 15,000*l.*, land were the cries against either the expenditure of the money, or the continuance of the prison. The cries died out, as such senseless wallings had often done before, and Newgate still stands, awaiting a yet further enlargement.

It is proposed to take in the best part of Warwick-square, some of Tylor's Market—which many people think is part of Newgate Market—and some courts and alleys adjacent. If this is done, of course the present proprietors of the required premises will have to be bought out bandedly. As they are mostly publishers, or connected with the commercial department of literature in some shape or other, they cannot be "improved" out of the way without money. When there will be the freeholders to settle with, and, after that, the old buildings to be pulled down and the new ones put up. Rumour ascribes the project to Mr. Hardy; but the Home Secretary would hardly of himself be hardy enough for that. It was stated, years ago, on every credible authority, that the space occu-

ped for each prisoner was equivalent to more than 150*l.* per annum ground-rent! It must be remembered that the site is within a stone's throw of the General Post-office, and within pistol-shot of the Bank of England and the Royal Exchange, the very heart of the City. The frontage of the prison in the Old Bailey is 300 ft., with a back extension line of 192 ft. The net area is, however, much less, being only 124 ft. by 46 ft. for prisoners' use. In the reconstruction already mentioned, 130 modern cells were built, and accommodation can be given to nearly 200 prisoners; but the average is hardly ever over 100,—sometimes not more than forty at once. The grim walls which we see on passing every day are not a century old, having been built by George Dance, the then City architect, between the years 1776 and 1782, the Gordon riots having destroyed the old prison.

Newgate has been a prison since the thirteenth century, and the time has come when it ought to be removed for the purpose of public convenience. Were Newgate-prison and Newgate-market gone, there would then be ample room for the glories of "the Row" to expand. A fine, broad street might lead off from the eastern part of the viaduct, cross the end of the Old Bailey, and cut through, in a right oblique direction, to the north-eastern corner of St. Paul's Churchyard. Once there, the rest is all plain sailing. It has long been "on the carpet" to remove St. Paul's school beyond the metropolitan barriers, and widen the street right through. Were the plan here sketched carried out to fulfilment, all the Holborn and Smithfield traffic for London Bridge could branch off direct south-east to Cannon-street, and so relieve the whole day-block of Newgate-street, Cheapside, and King William-street. This Newgate enlargement scheme has been taken for joint incubation, beneath the aldermanic feathers of Mr. Lush, the liberal member for Finsbury, and Mr. Warren Hale. The more than average enlightened character of these gentlemen, in conjunction with their proposal, has created a source of unusual surprise, as expressed within the sound of Bow-hells. The folks say there, that this is progressing as the crab goes—backwards. Surely, there must be some men beneath the shadow of "Pan's Cross," who have the souls of earnest, onward hurghers in them? If such are in the land of their fathers let them hestir themselves; let them raise their voices in a firm, determined tone, to sweep away this blot from their famed—and justly famed—city, or ever after bold their peace. Let them "buckle on their armour," for the onemy is already within the gates.

THE NORFOLK SEAT OF H.R.H. THE PRINCE OF WALES.

THE transformation that has been effected at Sandringham within the last six years is very remarkable, and we have reason to know that what has been done has been in great measure the result of that practical interest in such matters which the Prince of Wales largely inherits from the late Prince Consort.

The estate is called *Sant Dersingham* in Domesday-book, and was held by a freeman under Harold Earl Godwin, for a brief period of England. It was purchased, as is pretty well known, by the Prince of Wales in 1862, since which time works have been in progress to render the estate suitable for a royal residence. A large portion of these works has only recently been completed. The Norwich Gates, royal gardens, pheasantry, comptrollers' and equerries' residences, labourers' cottages, and new roads, have been previously described, and it is no part of our intention to farther allude to them now. The completion of the model farm premises marks the fact that the Prince of Wales has become a practical agriculturist, and some few particulars respecting the farm will be read with interest. The estate consists of about 7,000 acres, 2,000 of which are heaths and plantations, and about 500 acres of these are planted. The park is only about 200 acres in extent, and a portion produces useful herbage, but some of it was very inferior till improved by drainage and moulding, with top dressing and sprinkling with seeds. For many years a small piece of freehold land, belonging to another owner, about 3 acres in extent, abutted into the park; but this has recently been purchased by the Prince, and has been thrown into the park, and all the cottages on this (the West Newton) side of the park are being removed. The farm, which the

Prince has taken into his own hands, is about 450 acres in extent, and includes the Home farm at Sandringham and that which was formerly Cork's farm at West Newton. Of this we find there are 365 acres of arable land and 47 acres of grass, besides about 70 acres of marshes at Wolferton and Babingley. The Wolferton portion of the estate has recently been considerably added to by the reclamation of the Norfolk Estuary Company. About 100 acres of the Prince's arable land consist of good and productive land; about the same quantity is a fair soil, on a chalk subsoil; and the remaining 165 acres are poor or sandy light land, resting upon the carr and gravel on the West Newton heath. The poorest of this land is prolific of building and road-making materials. It will be seen from what is stated above that, including the park, His Royal Highness farms about an equal quantity of arable and pasture land. The Prince's flock is made up of about 10 score of pure South Downs, and about 11 score of half-bred and Down hoggets, and Down shearlings, the ewes being from the celebrated flocks of Lord Sondes and Sir Willoughby Jones. The herd of stock numbers 77 head, including a dairy of 10 Alderney cows, with their yearling produce and calves. Twelve Devons occupy the stalls of the fattening boxes, and 31 Highlanders are in the park, as well as an Azore bull, 2 cows, and a calf, which have been presented to the Prince. The Highlanders are being fed on cake and hay, &c., and will be fat by May or June, when they will be disposed of, and a fresh importation will be received at Michaelmas direct from the Highlands. The park also contains 200 deer.

The model farm-buildings have been erected at the rear of the royal gardens, and face the south, being well sheltered on the north and west. They are built with the native carr, with stone and brick facings, and slate roofs. The square block of buildings contains two open yards, and this block is 168 ft. in width and 113 ft. deep. Each of the open yards contains in the centre an iron water-tank, 13 ft. 6 in. by 6 ft. 6 in., underneath which is a cistern, into which the liquid manure drains, and is afterwards carted on to the land. Each yard is surrounded by a pavement 6 ft. or 7 ft. wide. The north end of the east yard is a hospital-stable, and the east side consists of a twelve-stalled stable for the farm-horses, but at present is occupied by the Prince's horses which cannot be accommodated at the royal mews. A large straw-larn, 60 ft. long by 20 ft. wide, with sliding doors, and asphaltic flooring, occupies the centre of the north range of buildings. The yards are separated by the calves' boxes and piggeries, the latter being fitted up with Crosskill & Son's patent troughs, and tenanted with some exceedingly pretty little members of the porcine species. At the south end is the meal-room and hoiling-house. The west and part of the north side of the second yard consists of the cow-stalls and fattening-boxes. The Alderney cows are brought here to be milked, and the fattening-boxes are occupied by twelve Devons. These boxes are supplied with Cottam's patent feeding-troughs. The windows are fitted with sliding shutters, and oak panels separate the stalls. At the south end is a capably fitted-up slaughter-house, in which beef, mutton, and pork, for consumption at the table, is slaughtered and dressed. All these premises are lighted with gas. Beyond the north end of this block is a roadway, 41 ft. wide, on the other side of which is a range of buildings, 168 ft. long by 26 ft. 4 in. wide, at each end of which is a three-storied octagonal tower. The east tower contains a large cistern, to supply the whole range of buildings with water, which is conveyed to the cistern, by means of a force-pump, from a well which has been sunk contiguous, the water being found 27 ft. below the level of the soil. The other tower is used as a granary, and the range of buildings comprises cart-sheds, implement-houses, machine-rooms for cutting, thrashing, and dressing, and the large granary-chamber, capable of holding 400 combs of corn. They have sliding doors; and the machinery is supplied by Mr. Dodman, of King's Lynn.

The gas works have been constructed on the north side of the farm premises by Messrs. Walker, of Donington, in Shropshire. The retort-house contains three D iron retorts 9 ft. long, and a space has been left for another retort, 12,000 ft. or 14,000 ft. of gas are produced every twenty-four hours. Adjoining is the condenser, and in the next room the purifier, connected with which is the workshop. The gasometer is 25 ft. in diameter, and 12 ft. deep, and holds about

* To be continued.

4,000 ft. of gas. The works are under the care of Mr. Robert Borne, from the Crystal Palace district works. The shaft of the gasworks is 41 ft. high, and octagonal in shape, with a square base. The various rooms in Sandringham House, the Norwich gates, the several drives and walks, the royal mews, the offices, and the farm premises are lighted with gas, and the appearance presented in the park after dark is exceedingly picturesque owing to the undulating nature of the land. We lately mentioned the new offices, billiard-room, and howling alley, and need not again refer to them.

ARCHÆOLOGICAL ITEMS FROM ROME.

Though alarm in high places and extraordinary precautions against political dangers be still the order of the day in Rome, we are happy to report the progress of undertakings that may interest the antiquarian, and that afford proof of the attention paid by the Papal Government, even amidst exceptional circumstances, to things apart from the diplomatic and ecclesiastical. The excavations on the Palatine, as well in that region where the Roman as in that where French authorities are carrying on such works, proceed with something like alacrity, and have led to important results at various points on the Imperial Mosaic's acclivities. In the Catacombs of St. Calixtus labourers are daily engaged. In the *Thermae* of Caracalla, the diggings commenced in the last spring, and soon rewarded by the discovery of a fine male torso in Greek marble (conjectured to be a Hercules), are also continuing, though but few hands are employed; and at the southern side, just beyond the walls of the vast ruin, we see still in progress the works that led, about two years ago, to the opening of chambers, with mosaic floors and painted walls, and (most interesting) a domestic lararium, with its altar *in situ*, and bright-hued frescoes of deities, priests, &c., colouring its walls,—identified as the palace of the well-known Asinius Pollio, the friend of Augustus and patron of Virgil. In Trastevere we find like activity at the spot where (as already reported by us), some two years ago, were found the remains of a military station of the Vigiles (or Fire-brigade), and the most noticeable detail among which ruins is a beautiful porch, with terra-cotta ornamentation, in truly Classic style, leading into a painted chamber, not yet quite disencumbered of soil, supposed to be another lararium. Other wall-surfaces have been alike adorned with painting, the character of which is Pompeian. A treasure-trove of uncommon value was obtained, a few weeks ago, through works of excavation below the garden of the convent attached to SS. *Cosmo Damiano*, the church on the Forum. Here have been found, at considerable depth, eight additional fragments of the famous *Pianta Capitolina*, the plan of Rome incised on marble, referred to the times of Septimius Severus or Antoninus Caracalla, and believed to have formed the pavement of that temple; other principal portions, brought to light near the same spot in the sixteenth century, being now in the Capitoline Museum (hence the conventional name), where they occupy twenty-six compartments set into the walls of the chief staircase. Of these newly-discovered fragments two are large, comparatively speaking; among the smallest and most valuable of the others is one on which we see the well-nigh complete plan of the Portico of Livia on the Esquiline Hill, an oblong parallelogram surrounded with a double colonnade, and containing, at its centre, what seems a small temple within its sacred enclosure, also parallelogram, the name "Porticus Liviae," preserved in large letters on the surface. The fragment next in importance presents an edifice recognisable as a basilica, divided into three aisles by colonnades, and with a hemicycle at one extremity, but no name here preserved; as alike are the other portions wanting in respect to names, but on one are the letters A I, on another N alone left. These marbles have been lithographed, and will be eventually placed beside their companion-pieces in the Capitol. The same diggings behind the church on the Forum brought to light considerable masses of brickwork, and remains of a corkscrew staircase, that obviously pertain to the adjacent basilica, called after Constantine, though built by Maxentius, the three enormous arcades of which are so grandly conspicuous. The German Archaeological Institute com-

menced, about a month ago, its sessions for the winter at the well-stored library, belonging to that association, on the Tarpeian Rock. Most interesting among papers read at that inaugural meeting was one on the representations of Venus in Classic art, illustrated by a very precious and original specimen, a marble bust of the Cyprian goddess, for this occasion exhibited; the story of which is that, about twelve years ago, it was found beside the street ascending the Colian towards the Lateran church (*Stradone di S. Giovanni*), in laying foundations for walls to a garden, the property of Cardinal Tosti; that till that Cardinal's death it remained in his keeping, little known, and seen by few, as we understand, afterwards passed to his eminence's heirs, who soon sold it; and thus did this Classic treasure eventually reach the hands of a person named Milani, who collects objects of *virtu* with a view to their sale in case liberal offers be not wanting. The notion entertained, and which that collector himself advances with some reasoning, is that the head in question either belongs to the Medicean Venus, and ought to be on the shoulders where another has been fitted by mistake, or that it is one of several copies from a highly-prized original, the Medicean statue being another. However this question may be regarded, there can be no doubt as to the analogy between the two, with some slight difference of pose indeed, and a rather more downward cast in the Roman than in the Florentine antique; whilst, at the same time, we must notice a more serious, intellectual, and (as it impressed us), more *morally* beautiful character in the bust thus found within recent years. As set on its neck, it is evident that the latter head belongs to a statue no other portion of which was found in the Colian, together with this most lovely representation of the goddess.

On the 27th December, the English archæologists met for the opening of their winter sessions, at our Consulate, in the Palazzo Poli, after two preliminary committee meetings. At that first public assemblage, Mr. J. H. Parker read a paper of about an hour's length, on the methods of construction in Rome's ancient buildings, taking up his theme from the earliest, and bringing it down to the latest period in the city's history, before the empire had fallen. We need not add that so able an authority as the above-named gentleman proved himself fully equal to cope with, and to present in attractive form such a subject, on this occasion rendered more appreciable to his hearers by the several spirited coloured drawings, on the exact scale of the originals, the work of Mr. Charles Wood (brother to the honorary secretary of the Association), hung round the walls of the lecture-room. Before Mr. Parker began, the chairman (Mr. Lecky, one of the committee), said a few words respecting the Society's actual circumstances (not at present favourable), and the intention formed of creating a fund, through subscriptions among co-nationals at home and abroad, for undertaking works with the object, either to excavate or explore, on sites where Rome's soil is not yet exhausted. Next day ensued an open-air meeting for the visit to different ruins, within the walls, on the Palatine and Aventine, under the conduct of Mr. Parker, who now resumed his account of the antiques in face of extant examples of such characteristics in Roman building as his lecture had dwelt on.

Among losses to the antique, matter for regret, and a consequence of the late troubles in this region, is the ruin of the Sularian Bridge, which was blown up, too hastily indeed, by Roman soldiers, under a false alarm of Garibaldian attack. As all visitors here know, that picturesque bridge (still picturesque in ruins), was thrown across the Anio, about two miles from Rome, in a period of remote antiquity, and restored by Narses, after being demolished by Totila during the Gothic siege. We hear of no intention for a second restoration.

FALL OF A PINNACLE FROM A CHURCH.—One of the pinnacles on the east end of St. Mary's Church, Shrewsbury, has been blown down. A portion of the falling masonry struck the iron railings which surround the church, and the iron work for two or three yards was smashed to pieces. The pinnacle itself was broken up. Some of the carved work on the end of the church was slightly damaged; but, fortunately, the stained glass window in the chancel escaped without injury.

WORKS ON GEOMETRY.

THE very useful work before us* is compiled for the use of land-surveyors, architects, and engineers, and its author (formerly an *élève* of the Quebec Seminary) has put into a concise form most of the geometrical problems which the members of those professions have to work out in their daily avocations. The amount of originality which it displays is rather in the arrangement and simplification of the propositions, than in any really "new" information which it affords.

M. Baillairgé considers (preface) that, to the student who has many other subjects to learn, the study of the first six books of Euclid is rather a sacrifice of time, owing to that geometer's minute attention to detail in his demonstrations; most eminent mathematicians are, however, of opinion that it is this very exactness in Euclid's reasoning that makes the "Elements" so valuable as the student's first book of geometry, whereby he is compelled, step by step, to admit the truth of the propositions. It is therefore to be hoped that the old Greek author will continue to maintain his position in our schools and universities, in spite of all that any "new" treatises on geometry may say to the contrary.

Our author defines geometry (1) to be a science having for its object the *measurement* of space. This is what modern geometers generally term "measurement," with which science, in fact, M. Baillairgé principally deals. The work is divided into seven books, in the first of which we find the problems and theorems treated in the first six books of Euclid, but arranged in a different order and their demonstration shortened and often simplified. We must, however, take exception to the placing of the 2nd and 3rd propositions of Euclid's 1st book among the "postulates" (220, 221), as they are problems requiring solution, and not to be taken for granted. The plan adopted of generalizing the propositions so as to make one demonstration include a number of particular cases of the same problem might have been considerably extended; for instance, the 47th of Euclid's 1st book, and the 12th and 13th of his 2nd book, are all particular cases of one general theorem, but the author has followed Euclid in treating them as separate propositions.

In the 2nd and 3rd books the subject of solid geometry is treated so as to render it easily understood, and the lengthy demonstrations of Euclid (Books 11 and 12) much simplified. There exist five, and *only* five, "regular" solids, namely—(1) Tetrahedron, formed by uniting four equilateral triangles; (2) Cube, formed of six squares; (3) Octahedron, of eight triangles; (4) Dodecahedron, of twelve pentagons; (5) Icosahedron, of twenty triangles. The measurement of the solidity of each is, the area of the surface multiplied by one-third of the radius of the inscribed sphere; which rule may be considered as a generalization of that for the solidity of a sphere.

Spherical geometry is described in the 4th book; this relates to figures drawn on the surface of a sphere, and is preliminary to the study of spherical trigonometry.

The 5th book is devoted to plane trigonometry, or the relations existing between the sides and angles of triangles drawn on a plane surface. In a treatise that is called "new" we are surprised to find the old-fashioned system adopted, in which the angle is taken at the centre of a circle of radius R, and certain lines which are then drawn are called the *sine*, *cosine*, *tangent*, &c., of that angle. In the modern system a right-angled triangle is substituted for the circle, and the names *sine*, &c., given to six ratios which the sides have to one another. When R is made *unity* the functions in the two systems agree in value. It is very confusing to the student to have to learn two different methods, and we therefore hope to see no more "new" treatises on trigonometry that keep to the "old" system, now universally discarded by mathematicians. The author has omitted to notice the *circular* measure of angles found in all modern works on trigonometry, in which the *unit* is the angle subtending an arc of the circle equal to its radius, or nearly 57'29"; this number is the divisor whereby degrees are turned into *circular* units.

The usual modes of calculating triangles are

* *Nouveau Traité de Géométrie et de Trigonométrie Rectiligne et Sphérique*, &c. Par Chs. Baillairgé. Québec, 1868.

ven, and the use of logarithms explained, excellent tables of which will be found, together with tables of natural sines, cosines, tangents, areas of circular segments, length of arcs and chords of circles; also a useful table of multipliers and reciprocal divisors for every integer from 1 to 1000.

The 6th book treats of spherical trigonometry, the application of plane trigonometry to the solution of triangles whose sides are arcs of great circles drawn on the surface of a sphere: this is a branch of mathematics chiefly used in astronomical and nautical calculations.

The seventh book, or appendix, contains various rules for measuring the surface and solidity of various figures, without employing the processes of the integral calculus to which this subject especially belongs. The quadrature of all surfaces is based on that of the rectangle or its half the right-angled triangle; the area of the surface being divided into a number of rectangles or triangles whose sum makes up the whole surface. When the surface is bounded by curves, the area can only be obtained approximately, but the error may be made as small as we please by increasing the number of rectangles. In measuring the length of a curved line we really measure a large number of small chords of the curve, and the greater the number the less will be our error. Thus, $2\pi r$ represents the circumference of a circle whose radius is r ; but this is in reality the perimeter of a polygon either outside or inside the circle, and approaching very closely to it; the amount of error depends on the accuracy with which π is determined; for ordinary calculations $\pi = 3.1416$. . . , but where great nicety is demanded its value must be found to a larger number of decimal places. The circumference of an ellipse can be approximately found, and with sufficient accuracy for practical use; but as the rule given in the work (M61) requires the extraction of the square root, the following will be found easier of calculation as well as more accurate (a and b being semi-

axes); circumference of ellipse = $\pi \frac{3a^2 + b^2}{2a}$.

The rule which the author gives (1651) for finding the area of a spherical triangle is wanting in simplicity, and the following will be found easier of calculation:—

Area of spherical triangle = $\frac{A + B + C - 180^\circ}{57.296} r^2$

where A , B , and C are the angles of the triangle in degrees, and r the radius of the sphere.

The rules given for measuring the contents of solid figures of various shapes, regular or irregular, will be found of great practical utility.

The following general rule (1621) will apply to a large number of solids:—"The volume is equivalent to the sum of the area of the base if it has only one, or of its parallel bases if it has two, and four times the area of a section at half-distance between the bases, between base and summit, or between the opposite summits, as the case may be, multiplied by one-sixth of the height of the solid."

The second book on the subject of Geometry before us is a small work by Major Rouse,* the object of which is to simplify the study, and to induce an interest in it which may bring about a desire to obtain further knowledge. We recommend the mastering of this little volume to those who have not time to tackle Euclid.

SOME NOTES FROM YORK.

THE church of St. Michael le Belfre has just been new fronted, in the Tudor style of Henry VII. It now has a projecting porch, which is ornamented with the Tudor badge of the portcullis, derived from the House of Somerset, and some crosses, probably to represent the White Rose of York. A large window in the centre, above the porch, replaces the old one, in which were two roundels of ancient painted glass, which I hope will be replaced in the new window, or otherwise preserved in some other window of the church. Above each of the side windows is an inclined parapet, battlemented, with a Gothic pinnacle, on each side of a belfry of open Gothic work, which was put up before this renovation was carried out. The style of this, before the latest repair, is shown in an old book which I have now before me, entitled "A List or Catalogue of

all the Mayors, and Bayliffs, Lord Mayors, and Sheriffs, of the most ancient, honourable, noble, and loyal City of York, from the Time of King Edward I. to the Year 1664, being the 16th Year of the most happy Reign of King Charles the Second. Together with many and sundry remarkable Passages, which happened in their several Years. Printed in the Year 1664; and now reprinted.

Published by a true Lover of Antiquity, and a Well-wisher to the Prosperity of the City; together with his hearty Desire of the Restoration of its former Glory, Splendour, and Magnificence. London: printed for W. B., and sold by Jonas Browne, at the Blak [sic] Swan, without Temple Bar." Small 8vo. In a plate in this curious work is shown, by the side of the Minster, Belfry Church; and in this representation it appears to have a plain parapet, with a plain embattled belfry, but does not show any tower at the right corner, but a tower probably then existed, embedded in the wall of one of the buildings known to have been built against the church, and which are shown in this curious plate. The tower which was taken down before the building of the present seemed to have been a restoration of recent years. The present tower is in shape hexagon, with moulded base and string-course joining heraldic string-course, which goes round three sides of the church. The side doorways of this church are now Gothic, to replace plain doorways; but the Gothic crockets come in front of the windows, which is a defect; and the quatrefoils and form of heraldic shields do not correspond with the rest in the string-course, which goes on each side of the church. In this church was baptized Guido or Guy Faux (he was born in the hamlet of St. Marygate, in which is situated St. Olive's Church). A very excellent account of Guy Faux has been written by Mr. Davis, late town clerk of the city of York, and now President of the Subscription Library in St. Leonard's-place, in this city. Guy Faux is a singular instance of that political fanaticism which we see displayed in the death of Henry IV. of France, and the attempt upon the life of King Charles II. by Lord William Russell in the case of the Rye House Plot. As regards the minster, the south door,—a very beautiful work in oak, as old probably as the minster, that is, the time of Edward III., and which, till it was oiled, retained its ancient vermilion colour,—has been sawn through, in order that it may admit persons to a sort of enclosed screen of oak with doors next to protect the minster from cold; but a screen might have been contrived of the same height as the ancient door without sawing this remarkably fine old door in two halves. A very bad piece of taste is said to be projected,—to take down the altar-screen and throw the lady-chapel into the choir, making the floor of the same level as the altar floor, and having a recess against the wall under the great east window. I hope the citizens of York will prevent this project, if it is attempted, as it would spoil the beautiful aerial effect produced by the high altar-screen as it is at present. The ancient chair which used to be within the altar-rails, and in which King James I. sat (on his progress to London from Scotland to take possession of the English crown) has been removed to the vestry. In this same vestry is preserved the three silver-gilt crowns which were carried before this king on his entrance into the city of York. And in mentioning King James I., I cannot help noticing the ancient palace of the manor (that old Stuart palace, as Mr. Canon Harcourt called it), the interesting history of which is as follows:—It was erected by Henry VIII. out of the materials of St. Mary's Abbey, and there was established in it a council, called the Council of the North, at the head of which was placed the Earl of Somerset. In this palace were taken the depositions for the trial of Mary Queen of Scots. The next circumstance worthy of notice was her son, King James I., taking up his residence on his way to London, as before narrated; it then became the residence of King Charles I., in the time of the great rebellion, when he came down to Yorkshire to assemble his forces in the Forest of Galtres (called the Forest of Gawtries in the old work before cited). Then, on the Earl of Stafford's trial, one of the counts in the indictment mentions the earl having put up his arms in the king's palace [of the manor]. The restored fac-simile is in the second count; and, lastly, it was the abode of King James II. when Duke of York and Lord High Admiral, in the time of his brother King Charles II., in the Dutch war, when the Duke of York went thence to join the fleet at Hull.

And I cannot close this account of the old palace without mentioning the circumstance that the clerk to the Council of the North was the founder of the estate of Heslington Hall, which is now vested in the family of Yarborough; the singular tenure of which estate is that it shall remain in the family as long as the present portion of the old Hall is preserved, and which was consequently replaced on the renovation of the Hall. In Heslington Hall is preserved a fine portrait of Lady Derwentwater, wife of James, Earl of Derwentwater, who suffered death for his support of the Stuarts in 1715; also a very interesting portrait by some foreign artist of Prince Charles Edward Stuart when a boy. I saw lately in York copies of portraits of the Earl of Derwentwater (James, who died in 1715), Mary, Lady Petre (married to Lord Petre), and of Charles Ratcliffe, brother to the Earl of Derwentwater, who suffered for adherence to the House of Stuart in 1745. I think this letter of Charles Ratcliffe, from the Tower of London the night before his death, is one of the most beautiful letters which the English language contains:—

"From the Tower, the 7th of December, 1746. The best of friends takes his leave of you. He has made his will: he is resigned. To-morrow is the day. Lore his memory. Let his Friends join with you in prayer. 'Tis no misfortune to die prepared. Let's love our enemies and pray for them. Let my sons be men like me: let my daughters be virtuous women like you. My blessing to them all. My love to Fanny, that other tender mother of my dear children.—Adieu, dear friend."

DERWENTWATER."

This letter was addressed to the Countess of Newburgh (in her own right), his wife. To return to Heslington Hall. The Yarboroughs were Barons de Terrie, in the county of Lincoln, and obtained the Heslington estate by matching, I believe, with a descendant of the old clerk of the Council of the North. One of this honourable family was page to King James II. Of the present possessor of Heslington Hall, I may say with Walter Scott, when speaking of the palace of Dalkeith,—

"Dalkeith, which all the virtues loved,
And classic Hawthornden."

though the only object near Heslington Hall which partakes of the classic is a Roman road, which I take to be the same (I have not a map of the Roman roads before me) that proceeds from the city of Lincoln.

Before concluding, I would hope that the directors of the Midland Railway will, now they are borrowing 5,000,000*l.* to improve their railway by a central station in London, not forget the good it would do the city of York to have the 2,000,000 persons who travel from Scotland and the north pass through York instead of past it, as they do at present. This, and the improvement of the river by raising the lock at Newburn, so as to allow of vessels of large tonnage from London, and the connecting the River Ouse with the Till and Calder Canal, thus bringing it into connexion with Manchester (a plan of which, I am told, was deposited in one of the chambers at Guildhall during the mayoralty of Mr. Alderman Meek), would, I am convinced, raise the city of York to a state of respectable opulence; and I hope the citizens of York, now that the railways are (I am happy to say) under the Board of Trade, will petition the Board, if necessary, to that effect. Of course, when I mention a central station for York, I mean only a central station for passengers, like that of the city of Carlisle (without workshops and smoky chimneys, which they have unfortunately added at Carlisle), leaving the workshops where they are at the York station on the other side of the river. This would make the matter complete, and the passengers would then all come into York instead of a tithing of them as at present, several of whom are only attracted to do so by the antiquarian glories of the Minster and the city;—at least, such ancient glories as are left by the present people of the Minster and the corporation, seized, as corporations sometimes are, with a spirit of destruction which has made only so-called restorations, instead of leaving to the joy of the antiquary the ancient, though perhaps broken, memorials of the past.

It has been proposed in a council of the Corporation of the City of York to alter the disposition of the pillars of the present portico of the Assembly-rooms in Blake-street, instead of making the portico like the new Theatre in Grey-street, Newcastle-upon-Tyne, in which portico the passengers pass through between the portico and the principal building. If iron gates were placed at each side of the portico of the Assembly-rooms in Blake-street they might be

* Practical Geometry on an entirely new Plan. By R. Rouse. London: W. Maxwell.

closed, whenever a ball is held, so as to exclude the public from the roadway under the portico and leaving them to the present footpath, which plan would not involve the present proportions or position of the pillars, both matters of the most rigid rule in Classic architecture. Drake, the historian and antiquary of York, gives the following account of the Assembly-rooms in Blake-street:—

"In this street, whilst I am writing, is now building and pretty near finished, a magnificent assembly-room for the gentry of the city to meet in throughout the year, and for the entertainment of the nobility, gentry, &c., who usually honor our horse-races with their presence. The room is an antique Egyptian hall; but the dimensions and grandeur of the building will be best understood by the adjoining plan, section, and upright of it. The design was first set on foot by a set of public-spirited gentlemen, for the most part resident in the city, who put out proposals for raising the sum of, first, 3,000*l.*, then 4,000*l.* for the carrying on and erecting this useful and ornamental structure. The subscription met with great encouragement from the nobility and gentry of the county, and several other parts of the kingdom; and though the expense has oversteered the first or second proposals, yet no gentleman can be uneasy when, at the small request of 2*sh.*, he is a proprietor in one of the finest rooms in Europe. The design was taken by that English Vitruvius, Richard Earl of Burlington, from Palladio, who gives the plan, but tells you that it never was executed out of Egypt. Our noble lord, finding that the ground the gentleman had bought would accept of this grand design, somewhat altered its dimensions from Palladio, threw it in, and added the common assembly-room, &c., on one side, and the offices on the other, as further conveniences. The first encouragement of a work of this nature—so much for the credit of both city and country—ought to have their names handed down to posterity. I have for that purpose caused the proposals and abstract of the purchase-deeds of the ground, the names of the first chosen stewards to the building, with an exact list of the subscribers, to be all placed in the appendix. Before the building of these rooms the street ran parallel with the great house facing it; but the proprietors have lately purchased all the houses from the new building to the end of the street; and by pulling them all down, a handsome area is now made before it. Towards which good way, the lord wanted in several other parts of the city—the lord mayor and commonalty gave 50*l.*"

So far Drake, and I will only add the following to what he says.—Where are Lord Burlington's original plans of the Assembly-rooms deposited? It was intended to make a perfect small palace of this building, but the Earl of Burlington was stopped from proceeding, in consequence of the Committee of Management being frightened at the magnificence of the ball-room he had planned. I may mention, in conclusion, a curious circumstance which regard to the old news-rooms adjoining it (the old one is rebuilt); there could not be discovered, when it was rebuilt, any deed to the upper room over the news-room, which belonged to the hotel in Museum-street, and it is supposed to have been forgotten in consequence of the alarm of Prince Charles Edward Stuart's advance from Scotland in 1745.

AN OLD CORRESPONDENT.

PAINTING AS A FINE ART.

At the ordinary meeting of the Architectural Association, held at the House in Conduit-street, on Friday evening, the 17th ult., Mr. R. Phénix Spiers, the president, in the chair, a paper was read by Mr. H. Mathews on "Painting as a Fine Art and its Principles, and their full Development in the Works of the ancient Masters." Referring, in the first instance, to the general desire for the introduction of mural decorations, he observed that the subject of painting as a fine art was one to which the architect could not be indifferent. Delineation was the most ancient of the arts, and it was used long before the introduction of painting. The Egyptians especially excelled in it, and much of their early history and character might be gathered from an attentive study of their paintings. The early Greeks had but a circumscribed knowledge of painting before the reign of Alexander the Great, who turned his attention to its development. At first they had but four colours, namely, white, yellow, red, and black; and yet with these they eventually carried the art to such perfection that it was related that a painter copied grapes so admirably that the birds pecked at them; and that on one occasion, when a celebrated painter was invited to inspect the work of a brother

* The whole is now finished, and the rooms finely illuminated with lustres of an extraordinary size and magnificence; and inures of which, with many other ornaments, as chimney-pieces, &c., were the gifts of the noble architect of the building.

† I need hardly say that it has not one feature of the architecture of ancient Egypt about it.

‡ I must not omit that a later inscription was done in brass, and riveted into the first stone of the building, which was laid with great solemnity by the lord mayor, &c., March the 1st, 1739, under the north-east corner, a copy of which I have, but I hope the original will be buried for many ages.

artist (consisting of a curtain only), he asked that it might be drawn aside in order that he might see the picture which he believed to be behind it. The ennoblement of Greece to Rome enabled the victors to reap the full benefit of that culture of the arts in which for three centuries the Greeks had so much excelled. The Romans, however, used floral colours, in addition to those borrowed from the Greeks; and the facility with which they painted on wood, cloth, plaster, and other surfaces, was demonstrated by the remains discovered both at Rome and at Pompeii. It was supposed that the ancients were not acquainted with perspective; at all events, they commenced practising the art of painting in a rude elementary manner, by the representation of objects or emblems only. The anchor, the dove, the lamb, and other symbols were frequently repeated; but in course of time their ideas became developed, and they began to put subjects together, and thus to form pictures. When the Papacy became established, a great impetus was given to the arts, and popes, bishops, and abbots vied with each other in adorning their churches with the most beautiful works they could obtain. In succeeding centuries the interests of art fluctuated with the rise or fall of various dynasties; but in the thirteenth century an extraordinary revival took place, and many artists arose whose works were still held in high estimation. A study of the pictures in the National Gallery would enable the student to trace the various schools which sprang into existence about that time, and to mark the progress which successive generations of artists had made.

Our national collection was not, it was true, as large as those of other countries; but still it contained pictures of the greatest interest and of the highest character. It was a pity, however, that a better system of classification was not adopted, so that the visitor might be able to note more clearly the various periods of art represented by the works exhibited. In 1270, Giotto, the son of a shepherd, first appeared upon the scene, and his fame spread so rapidly that popes, bishops, and ancient citizens became his patrons. He was said to have been the first inventor of portrait painting, and the introducer of allegorical subjects. He was also a sculptor and an architect. After the death of Giotto the number of painters in Italy increased, and they associated themselves together in religious confraternities, calling themselves "The Brothers of St. Luke." Having referred to the liberal encouragement, not only of the art of painting, but of architecture and working in metals, afforded by the family of Medici and other wealthy patrons of that period, Mr. Mathews traced the progress of painting from the time of Van Eyke (the first painter in oil colours) to that of Salvator Rosa, including Domenichino, Leonardo da Vinci, Michelangelo, Raffaele, Titian, Correggio, the Caracci, &c. Commenting upon the works of Correggio, Mr. Mathews stated that the "Christ on the Mount of Olives" in the National Gallery, long supposed to be an original, was only a fine copy, the true picture being in the possession of the Duke of Wellington. The word "after" (Correggio) had now been inscribed on the frame of the picture; but the copy was a very fine one indeed, and gave an excellent idea of the manner of the master. Of all the painters of Italy, Raffaele was by general consent admitted to be the prince; for nothing could exceed the grace, the dignity, and the harmony of his pictures. Correggio, who had heard of his fame, exclaimed, after a careful scrutiny of his works, "I am still a painter."

Mr. Tarver asked whether Mr. Mathews, in the course of his inquiry, had been able to throw any light upon the school of painters who seemed to have flourished many centuries ago in Norfolk. Many of the churches in that part of the country had their screens and other portions painted with great care.

A Member observed that, some four or five centuries since, a large trade was carried on between Norwich, the capital of East Anglia, and Flandere, and that it was highly probable that foreign artists were invited over to help in the decoration of churches in that city, and in the adjacent counties. Indeed, he was able to state, from personal examination, that many of the paintings, and some of the metalwork in Norfolk churches, were from the hands of foreigners.

Mr. J. D. Mathews corroborated this statement, observing that in Suffolk churches, also, there was abundant evidence of the presence of foreign artists.

Mr. H. Mathews thought it highly probable

that the English abbots invited foreign artists to assist in the decoration of their churches. He also suggested that foreign monks, many of whom were good architects, as well as painters and carvers, had contributed to this object.

Mr. Tarver said it was quite evident that the paintings which he had seen in Norfolk churches were not by native artists.

The Chairman called attention to the paintings in the chapter-house at Westminster, which it was reasonable to suppose had been executed by monks, who were acquainted with this description of art. He quite agreed with Mr. Mathews in recommending a careful study of the pictures in the National Gallery, which, however, might be made far more instructive and interesting if a proper system of classification were observed. It was a reproach to all our national collections, as contrasted with those of foreign countries, that, owing to a total absence of careful and intelligible classification, the value of their contents was greatly diminished.

TECHNICAL EDUCATION.

A MEETING of managers, practical foremen, artisans, professional gentlemen, and others interested in the advance of technical education in Birmingham, has been held in the Committee-room of the Town-hall. Mr. Sebastian Evans, M.A., presided over a large meeting.

The Chairman, in the course of a long speech, said,—With regard to the actual business before this meeting, ours is an exceedingly modest programme. What we want to do is, if practicable, to take the greatest possible advantage of the local institutions for the furtherance of technical education. We want as far as possible also to take into consideration that great question the art-education of workmen, for it seems to me that at all of the meetings which have been held on this subject far too much stress has been laid on the scientific instruction of the workman, and far too little importance has been attached to his artistic education. We shall do well, I think, to remember one fact, that in all scientific, mechanical, chemical, and other matters of the kind, the real technical education of the workman, must, after all, be given in the workshop itself. The chairman concluded an able address, in the course of which he reviewed the state of the various educational and art and science institutions in Birmingham, by moving the following resolution:—

"That in the opinion of this meeting the existing institutions for conveying technical instruction in Birmingham, by judicious administration and extension, and by encouragement and assistance from Government, may be rendered adequate to supply the needs of the town without the establishment of new Government schools of science."

Mr. Aitken also addressed the meeting at some length; and Dr. Melson said,—Don't let them take any hasty action which would thwart their purposes with reference to the Government. He would suggest that they adjourned the meeting until that night week; let them give, in the meantime, those valuable observations of Mr. Sebastian Evans, and those equally valuable ones which fell from Mr. Aitken, an opportunity of telling on the Birmingham public, and upon the London public, and upon all England. He moved as an amendment that the meeting adjourn for a week.

Other gentlemen addressed the meeting, and the chairman afterwards said his friend Mr. Aitken had put it that they were acting rather against the Chamber of Commerce, and against the Society of Arts. What he wanted to do was to work with them as far as ever they could. But he thought they had to take this into consideration. Here was the Chamber of Commerce committed to the theory that the Government ought to found new schools throughout the country for the furtherance of art education. It was the Chamber of Commerce who broached a new theory. They alleged that the duty of the Government was to establish new schools; but he maintained that the real duty of the Government, under the present circumstances, was to assist those institutions already in existence. Dr. Melson appeared to have misunderstood his remarks about throwing the Government overboard. They wanted assistance from the Government; but they did not want to place the exclusive control in their hands. The amendment was carried unanimously.

Professor Leoni Levi recently attended a meeting of the Manchester Chamber of Commerce, and delivered an address on the industrial competi-

tion which England is now encountering on every hand. Mr. Henry Ashwin told the Chamber, that not only was Belgian iron being used in the construction of our warehouses, but Belgian manufacturers were actually sending agents to Manchester for the sale of cotton goods. French and Belgian cloth is, it appears, regularly sent into Lancashire to be bleached. It is stamped with the bleacher's stamp, and is thus sent into the market as cloth of English manufacture. Principal Greenwood, who was present, said that Owen's College was being put upon such a basis as would enable them to carry on the work of technical education.

A joint meeting of the Liverpool Library, Museum, and Education Committee and School of Science Committee has been held to confer with Mr. Bernhard Samuelson, M.P., on the subject of science education in schools. Mr. J. A. Pictou (chairman of the library and museum committee) presided at the outset, but being obliged to leave to fulfil another engagement, at his request Mr. E. Samuelson took the chair. Mr. Gregson, in speaking of the School of Science, said that about three years ago the number of students fell off from 160 to 28. That was on account of the fees being raised, a measure that was rendered necessary by reason of the Government reducing its support. Last session the fees were reduced to the lowest point, and the result was that the number of students increased to sixty-eight. The number of students this year was only fifty-nine, but considering the difficulties they had to contend with, that result was deemed satisfactory. A want of funds crippled their energies.

SOCIETY OF FEMALE ARTISTS.

The twelfth exhibition by this Society, now open in Conduit-street, consists of 413 works, including the model of a "Moping Owl." Mrs. E. M. Ward leads, rather than contributes, a work; Miss Adelaide Claxton sends one of her clever spiritual appearances, "It would be spoken to;" Mrs. Swift and her daughters, and Mrs. Melville, contribute; but still the gallery makes no pretension to showing what our female artists really can do, such of them as have gained a power preferring always to take their chance with male competitors. It contains, nevertheless, many agreeable pictures, of which we may mention, as amongst landscapes, those of Mrs. Marshall, Harriette Seymour, Miss Heathcote, Miss E. D'O. James, S. S. Warren, and Middle. Bodichon; for views of old buildings, Louise and Margaret Rayner; for flowers and fruit, Miss Emma Walter (we give the names either with or without title as printed in the catalogue), Alice E. Manly, A. M. Fitzjames, Emily Lane, Mrs. Newcomen, &c.; and for dead game, Miss A. Baker and A. Dundas. "320," "Resting," Elizabeth Thompson, "322," "Elaïne," Miss Amy Butts; and "350," "On the Look-Out," all in oil, deserve praise. Miss Eliza Sharpe, we may add, exhibits a copy of Macclise's "Hamlet," made probably to assist Mr. Sharpe in producing the plate for the Art-Union of London.

SCHOOLS OF ART.

The Worcester School.—The fifteenth annual meeting of the subscribers and friends of this school has been held in the Music-hall. The meeting for the distribution of prizes, from some cause or other was not held last year, and consequently the successful student had to receive the reward of two years' labours; and, as this year only three days' notice was given of the intended meeting, the platform was but thinly occupied. The works of the students were exhibited in the school. Altogether the collection of works was a great improvement on those of former years, and reflect great credit on the pupils,—evidencing, at the same time, the ability and attention of Mr. Yeates, the master. The chair at the meeting was occupied by Mr. Henry Cole, C.B., of the Science and Art Department, South Kensington. The chairman, in his address said,—If they were readers of newspapers at the present time, they would read a great deal about what was called "technical education." The speaker pointed out that such education was indispensably necessary to enable English manufacturers to compete with foreign countries. The School of Art taught this "technical education," so important to manufac-

turers. At their china factories it was essential that the persons employed in them should have the knowledge that was acquired at schools of art. He was bound to say he thought the institution was tolerably prosperous.

The Gloucester School.—Mr. Cole also visited the Gloucester School, with the object of conferring with the committee relative to proposed changes in the system of Government aid to science and art schools. Mr. Cole strongly urged the desirability of uniting in one building the School of Art, Free Library, and Museum, and explained the extent of the help which would be given by the Department in the erection of such a building. He further said that however long it might be postponed, the demand for technical education, one of the greatest exigencies of the day, would ultimately compel the founding of such an institution, and that it was not unlikely that an education rate to provide for such objects would before long be made compulsory.

The Dorchester School.—This school, which was established at the beginning of last year, has completed its first session prosperously, and the only circumstance which tends to mar what would otherwise be its complete success is, that the artisan—for whose special benefit the Government foster such schools—have not availed themselves of the advantages offered so largely as it was hoped they would do. The report stated that the prospects of the school were satisfactory. It opened in April last, with fifty-six students, and had been attended during the nine months of its existence by seventy-nine, including temporary pupils, and sixty-four still remained upon the books. The income of the school was in a healthy state.

GLASGOW ARCHITECTURAL SOCIETY.

At the usual monthly meeting of this society Mr. John Honeyman, jun., president, in the chair, Mr. J. J. Stevenson read a paper on "Labourers' Dwellings," and the effect of municipal restrictions on them, as shown in the recent competition in Liverpool; and afterwards Mr. Alex. Thompson addressed the meeting on the City Improvement Scheme.

Mr. Stevenson, in the course of his remarks, referred to what prevented the erection of residences for the working classes in towns. He said,—Municipal regulations, not in Liverpool only, but in every town in the kingdom, throw obstacles almost insuperable in the way of this, while they do not prevent bad building, bad arrangements, and bad ventilation; in fact, render these essential to make the scheme pay, for it is only the "jerry" builders who seem to be able to build at a profit. But it is, as has been already said, much easier to find fault with present regulations than to suggest better; and it would be presumptuous to do more than indicate the direction in which they should aim.

At present they insist on a certain width of street in proportion to the height of the houses. This has given us a town like Manchester, with acres of streets in dreary sameness with stagnant air. Would it not be better to encourage variety in planning narrower streets, opening out into wider spaces and squares, where the difference in temperature between the wider spaces exposed to the sun might draw the air from the narrower streets, causing drafts and movements of the atmosphere? It is clear that streets might be built closer and higher, if their ends opened out on parks and greens, without harming their ventilation, than if they were extended for square miles of regularly disposed street, and court, and house, though only two stories high. This might be accomplished by fixing the proportion of space left open to ground built on, permitting builders to arrange their blocks as they liked, subject to conditions, of which the most important would be one which present building Acts ignore, that there should be no stop-gaps to the circulation of the air, no dwelling-rooms opening out into wells or small courts, in which there is no through current. Such an arrangement might be difficult to adjust to work fairly. It would have a tendency to raise the value of property near public open spaces, which, however, is not unreasonable; and it might necessitate power on the part of the Corporation to decide how streets should be laid off on private property, so that where one man had commenced a street it should not be blocked up by his neighbour, as happens in some of our English towns.

But we doubt not legal acumen could frame a regulation which would secure the desired result directly, instead of the present roundabout attempt at it, which provides streets of a certain width at every part, and yards of a certain size attached to every house, which does not always secure ventilation, and, though a good thing in some circumstances, is often unjustifiable waste. Again, it is obvious that in a short street, if it opens into wider streets, the houses may be made high, and the width confined, without the injury to its ventilation which would ensue if it were longer. So that there would be more reason in municipal regulations if they made the height of the houses dependent on the length of the streets, instead, as at present, only on the width.

OPENING OF RETFORD NEW TOWN HALL.

THE new town-hall at Retford has been formally opened. The main elevation fronts the square, so that its architectural proportions can be readily seen to advantage, and the side elevation faces Carolgate. The front to the square, which is entirely of stone, is divided into three compartments, two wings, and a centre, recessed. It is Italian in design, of a Palladian character, having a channelled base and moulded impost up to the first bay, and detached columns with carved caps and bases, moulded archivolts and spandrel, plain frieze, a bold cornice with cantilevers, balustrade, parapet, and a high Mansard roof, surmounted with iron cresting. From the centre of the roof rises the clock turret, which crowns an elevation of nearly 100 ft., and in which is fixed the clock, to which have been added by public subscription four new bells to chime the quarters and hours, and having four illuminated dials, facing the four cardinal points of the compass. In the main portion of the structure is situated the new town-hall, and in the other the market and corn exchange. On the ground floor, and immediately in front of the square, is arranged, on the west wing, the main entrance to the hall. The grand staircase has a spacious centre flight leading to the front landing, and returning right and left, at the level of the council chamber. The floor of this staircase, as well as of the vestibule, is laid with encaustic tiles, from a special design, supplied by Messrs. Maw & Co., of Broseley. The large hall is 90 ft. long, 40 ft. wide, and 26 ft. high. It is lighted by ten large French casements, with circular head. The hall has been decorated by Mr. Foster. All the panels have been relieved. Over the orchestra at the north end an allegorical picture has been painted, and contains the ancient armorial bearings of the borough. The council chamber is 40 ft. by 23 ft. The mayor's parlour is at the east end of the council chamber, and fronts the square. The hall-keeper's residence is in the rear of the large hall. The kitchen is fitted up with a Learning range, capable of cooking a first-class dinner for 500 people; a hoist and necessary apparatus are provided for special occasions. Underneath the large hall is the poultry market. The Corn Exchange is spacious, warm, and well lighted; and the markets are conveniently arranged for the accommodation of butchers. The architects were, Messrs. Bellamy & Hardy; and the contractor was Mr. Thomas Hopkinson. The work was superintended by Mr. Richardson. The architects' estimate was 6,057l., and the land cost 2,600l.

RESTORING AND SILICATING ABROAD.

THE Church of St. Madeleine, in Rouen, has been treated with the process of M. Léon Dalemagne with the view of preserving the stone, and, if we understand M. Dalemagne correctly, the parts wanting were first made good with some composition that he uses. The whole of the front, he says, was in a very bad state, abraded and broken away, columns, mouldings, and sculptures, and no one could have dreamt of replacing the wanting parts in stone! but all has been reinstated; and it may be as well to note, he continues, that experience has taught me it is not desirable to restore stone with compositions too compact. M. Dalemagne points to a part of the Louvre operated on by him in 1853 to prove the value of the system adopted by him, which is that of Fuchs.



MURAL PAINTING, PENKILL CASTLE, AYRSHIRE.

MURAL PAINTINGS FOR PENKILL CASTLE, AYRSHIRE.

We have already mentioned at some length a paper on mural paintings at Penkill Castle, read at the Institute of Architects by Mr. W. B. Scott.* The house where this series of pictures is in course of execution is an old peel-house or castle, as such partially fortified old houses are always called in Scotland, near the coast of Ayrshire. The subject of the pictures (as we previously mentioned) is taken from "The King's Quair," or King book (*cahier*, or *quatre* of paper) by the first King James of Scotland; and the medium used is a solution of wax in turpentine.

The first picture illustrates the first canto, in which the poet describes his rising in the early morning while the bell is ringing for matins. He bewails his luckless fate, having been a prisoner since his boyhood, and consoles himself by reading Boethius, and then calling upon the

Nine Muses, he sets about to write some new thing. The materials of the picture, as suggested by the poem, are the matin-bell, the warder, the night-watch going home, the young king in his chamber, and other matters suggested, as, for example, the brazen statue of Boethius adorning the wall.

The second picture illustrates the second canto. He looks from his prison window, and sees, as he believes, the fairest of womankind listening to the singing of the birds in the terraced prison garden. She has with her two maids and a little dog. As mythological persons are largely introduced into the poem, master Cupid,—Dan Cupid, as Chancer calls him,—is shooting the king from behind the bed.

In the third picture our poet falls into a dream. He is carried away to the Court of Love to get the assistance of Queen Venus. Master Cupid comes down to him from the starry sphere while he sleeps, and carries him away. Here the first flight of the stair is terminated by the landing of the ball or dining-room.

The fourth picture, which begins the second flight of stairs, is the most elaborate of the series. At the Court of Love the poet finds all the lovers recorded in history, and sees Queen Venus reclining on a couch. James, on his knees, prays her aid; but she sends him to the Court of Wisdom to get the assistance and advice of Dame Minerva.

To give an idea of the character of these works, we are enabled to reproduce an illustration of the first picture. The block is made by a new process, which is probably susceptible of improvement.

CONCRETE BUILDINGS IN THE METROPOLIS.—The officers of the Board of Works have prepared a form of license for using concrete as a building material, with conditions for the guidance of builders, also rules relative to the granting of licenses. These will be submitted for the approval of the Board at their meeting on (this) Friday, 31st January.

* See p. 31, ante.



HYDE PARK DRINKING FOUNTAIN, LONDON.—MR. KEIRLE, ARCHITECT.

HYDE PARK DRINKING FOUNTAIN.

The Drinking Fountain represented by the accompanying engraving has been erected in Hyde Park at the cost of H.R.H. the Maharajah of Vizianagram, with reference to whom our readers will probably be glad to have particulars of some of the instances of public spirit and enlightened philanthropy for which this gentleman has already received the thanks of Government. In October, 1863, it was officially brought to the notice of Government that his Highness had offered to endow a dispensary at Vizianagram, with 2,000*l.* for its permanent support; and it was at the same time mentioned that during the previous ten years, setting aside roads and irrigation, on which the Rajah had expended two lacs of rupees (20,000*l.*), he had contributed upwards of one lac of rupees to purely philanthropic uses. At Vizianagram he had long supported a dispensary and lying-in hospital; he had maintained in that town a school of a grade equal to that of a Government district school, and he had established schools in every chief town on his estates. The agent to the Governor added that, "in all these respects, and in the liberal systematic management of his estates, the influence of the example afforded to the surrounding zamendars and proprietors was very perceptible indeed." One of the roads referred to above was to open out the cotton-growing districts of Nagpore, with reference to which the Secretary of State for India, in his despatch, dated 14th of August, 1862, wrote as follows:—"The importance, both political and commercial, of such a line of road has long been recognized, and the Home Government fully shared in the appreciation of the liberality and public spirit evinced by the Rajah on this and on former occasions." Lord Harris, when Governor of Madras, fully admitted the service rendered by the Maharajah, and as a token of friendship and approbation presented him with a valuable ring, bearing the motto "Ever Loyal," which motto the Maharajah immediately adopted, and is with good reason highly proud of it, especially as coming from one so well able to estimate the value of the assistance received from the Rajah during the troubled times of 1857—1858. In November, 1863, Sir William Denison offered the Maharajah a seat in the Legislative Council at Madras, and in doing so wrote as follows:—"The large stake which you possess in the country, your acknowledged public spirit, loyalty, and energy, have pointed you out to me as one whose claims to act as an adviser to the Government are well established, while your attainments and the general respect in which you are held are a guarantee that your counsel and advice will be of much use to the Government." Before the Maharajah could take his seat in the Madras Council he was appointed to the still more distinguished post of member of the Legislative Council of India.

Since the beginning of 1863 the Maharajah has made Benares his head-quarters, and this being the place of his birth, and where his family have resided for many years, it was but natural he should show special interest in it; and this he has done by endowing a dispensary there to the extent of 2,000*l.*, and also establishing a scholarship, value 30*l.* per annum, and carrying with it a gold medal, for the best English scholar of the year in the Government College, Benares.

It was a worthy and becoming supplement to such a series of well-directed efforts to ameliorate and improve the condition of the people of his own country, and to further the views of the Government, from which he had received so many tokens of approbation, that the Maharajah should have turned his eyes towards England with a wish that he could there also in some way show his hearty appreciation of the benefits which it had conferred upon India.

He therefore communicated with the committee of the Metropolitan Drinking Fountain Association at the commencement of 1866, and offered to defray the entire cost of a handsome drinking-fountain for the use of the public in the metropolis. A design having been prepared by Mr. Robert Keirle, the architect of the Association, and forwarded to India, met with the entire approval of the Maharajah, and the drawings having also been submitted to and approved by her Majesty the Queen (who has thus graciously manifested her interest in the princely liberality of her distant subject), a site was designated for its erection on the north side of Hyde Park, opposite the end of Albany-street.

It is this that we illustrate. The landings are of York stone; the general body of the structure, of polished Bath stone; the bowls are of polished red Aberdeen granite; and the columns blue Pennant stone.

The main structure is about 12 ft. square at base, and 46 ft. 6 in. high from ground level to the summit of spire-finish.

It was executed, at a cost of about 1,200*l.*, by Mr. J. W. Seale, East-street, Walworth.

The fountain is approached by means of three steps extending all round; there are four howls and water-jets; and under each bowl is a galvanized iron grating, let into the landing, and having communication with the drain to carry off spilt water. In the tympanum of the canopy over two of the bowls are the royal arms, and in the other two is the motto of the Maharajah, "Ever Loyal," with an Indian crown, and the symbolical elephant's head, which alternates with the royal arms; and in the third stage, over the pediments containing their respective arms, are portraits of the Queen and the Maharajah. Under each portrait of the Queen is the shield of St. George; and under those of the Maharajah a five-pointed star. There is a trough for dogs under the howl on the north side. Access to the interior of the fountain is had by means of a man-hole. The stonework was treated with solutions of soap and alum before the scaffold was struck. The following inscription, "THIS FOUNTAIN, THE GIFT OF THE HON. MAHARAJA MEERZA VIDEHAN GULSHAN RAJ MUNEA SOOLTAAN BHAHDOR OF VIZIANAGRAM, K.C.S.I., WAS ERRECTED BY THE METROPOLITAN DRINKING FOUNTAIN ASSOCIATION, 1867," engraved on a brass plate, by Messrs. Cox & Son, is to be placed in the howl above on the south side. The fountain will shortly be publicly opened by his Royal Highness the Duke of Cambridge.

AN OPTICAL ILLUSION.

M. FELIX LUCAS, engineer of bridges and roadways of France, has written a memoir on transparent mirrors, by which singular optical illusions take place. Divide a circle into 2*n* sectors, of which *n* has a central angle, α , and *n* has a central angle, β , the sectors α and β succeeding alternately. Cut out the sectors β so as to form spaces. A sort of star will remain, formed by the *n* sectors α , on which either silvered glass or, what is preferable, metallic plates silvered over and polished are to be placed. This apparatus being placed vertically in front of an observer, he can perceive by the reflection produced by the silvered sectors his own image, and generally those of other objects and persons situated in front of the star. He can also see through the open spaces persons and other objects placed behind. No optical illusion can result from this superposition of two visual phenomena, because the observer distinguishes clearly the apparatus, and becomes acquainted with its action. But supposing that this star takes, round a horizontal central axis, a very rapid movement of rotation. The reflecting sectors are no longer distinguishable from the vacant spaces. The observer will think that he sees only a plate of glass almost invisible like window-glass. He will behold, not without astonishment, the images of the anterior objects superposed more or less confusedly on the objects behind; strange illusions can be the result. We all know that similar phenomena are produced by means of an unsilvered sheet of glass, when the anterior objects are much more illuminated than the posterior ones. The images of the first are then of a peculiar paleness and indistinctness: one would imagine them to be the species of real objects. During the last few years these circumstances have been greatly taken advantage of for creating astounding illusions.

The transparent mirror that we have described can serve the same purposes as unsilvered glass without requiring the same conditions of lighting. M. Lucas has constructed a small apparatus in which this disposition is realized. There are four radiating sectors, and the means by which they are fixed and traversed by a geared shaft are hidden under the table. A slit parallel to the foremost edge gives passage for the metallic blades. By the most simple gearing, we can obtain, by turning a handle, a rotation sufficiently rapid to produce the effect of an unsilvered vertical and semi-circular sheet of glass. The edge of this glass apparatus is concealed by a wooden frame.

A person being placed behind the mirror, at a distance of 6½ ft. from the vertical plane passing through the axis of rotation, we place another person in front of the mirror, at the same distance of 6½ ft. from the other side of the vertical plane. The latter individual sees two persons side by side, and the illusion is perfect.

The mirrors are made of metal, silvered and polished on both sides; the effect obtained is reciprocal, and the illusion is the same for the two persons.

M. Lucas obtains a curious effect of another nature by placing a common mirror vertically, at the distance of 2½ ft. behind the transparent mirror. The reflected image is repeated a great number of times at greater and greater distances, as is the case with an object placed between two mirrors. Yet, while in the latter case the successive images are in reversed position, those in the apparatus are face to face.

RAILWAY INTELLIGENCE.

Smokeless Coal on Railways.—The North London Railway for three or four months have used anthracite instead of bituminous coal, and the result is said to be highly satisfactory. Numerous accidents had been raised or threatened for damages for the emission of "opaque smoke." By the use of anthracite coal the company not only avoid all ground of complaint, but effect an annual saving of several thousand pounds. The coal is found to be 25 per cent. more effective than the bituminous coal previously used. The smokeless coal is as applicable for fixed steam-engines as for locomotives, and is now used at the City Flour Mills and other places where steam-power is required.

Opening of the New Line between King's-cross and Farringdon-street.—On Saturday afternoon the principal officials of the Metropolitan Railway made an inspection of the new or widened line between King's-cross and Farringdon-street Stations, previously to the opening of the line. The works upon the new line consist principally of covered way and tunnel.

Seven Years' Railway Accidents.—The result of the railway accidents of the last seven years is that one passenger in 8,746,475 was killed, and one in 350,831 was injured, from causes beyond their own control; and one passenger in 11,548,081 was killed, and one in 31,450,993 injured, owing (according to the companies' returns) to the misconduct or want of caution of these passengers. This statement is, to a certain extent, more unfavourable than the facts; for, as it is not known how many times the season and periodical ticket-holders travelled, they are counted only once. In the seven years the number of ordinary passengers increased from 163,435,678 in 1860, to 274,293,668 in 1866; and the number of season and periodical ticket-holders from 47,894 to 110,227, the latter class of travellers increasing the fastest. The length of line opened increased from 10,433 miles at the end of 1860, to 13,854 at the end of 1866, the number of passengers increasing a great deal faster in proportion than the number of miles.

The Summit Tunnel of the Pacific Railway.—A writer for the *San Francisco Alta*, who has just gone over the Central Pacific Railroad from Sacramento to the summit of the Sierra Nevada, says:—"There are about fifteen tunnels, so far, constructed on the road, and they are all known to the initiated as number So-and-so, each tunnel having a number of its own, beginning with Tunnel No. 1. The king of the list, however, is No. 6, that being the tunnel, or the Summit Tunnel, as it is generally called. It ought to be called No. 1. This great hole is 1,659 ft. long, and was about a year in being cut through. The rapidity with which the work was finally prosecuted to a close, however, was chiefly due to the discovery and use of that terrible explosive compound, nitro-glycerine. Experiments were commenced in February, and, after some considerable delay, the engineers became sufficiently familiar with the compound to use it constantly and safely, after which the works advanced with accelerated speed, equal to about 50 per cent. increase on all the former operations. Most of these tunnels are cut through the solid granite formation. The bridges on the Central Pacific are all built on the 'Howe truss' model, and are now eleven in number, making an amount of bridging equal to half a mile. Not the least noteworthy of the many curious things to be seen on this line of travel are the snow-

galleries. They are roofed coverings thrown over the track in such places as are likely to be blocked by snow. It is expected that about thirty miles of this protection against snow will be built. The track is now laid within nine miles and a half of the Summit Tunnel, and about twenty miles on the other side of it. After this connexion, now approaching, is made, the greatest obstacle between Sacramento and Salt Lake, in the way of road-building, may be considered overcome. There will be left a section of 600 miles to build, which will require about one year and a half to complete, making in all about three years and a half to finish the road to Salt Lake. In two years hence we shall be able to whirl across the vast continent from Missouri to Sacramento in three days and a half."

PROVINCIAL NEWS.

Luton.—The foundation-stone of a Corn Exchange for the town of Luton has been laid. The new building is to be erected on the site of the old market-place, which is being pulled down. The style of the structure will be Venetian-Gothic, and it will be surmounted by a turret containing a clock. There will be two large rooms, the upper one being for the sale of corn, and the lower for the sale of provisions. The cost will be about 2,550*l.* The architects are Messrs. Messenger & Grundy, of London; and the builders, Messrs. Stuart, Brothers, of Luton. A straw-plait exchange is to be erected in Cheapside at a cost of 6,000*l.*, for which Messrs. Smart, Brothers, also have the contract.

York.—Extensive additions to Castle Howard reformatory are in progress, and some have yet to be begun. An Early English chapel is nearly completed, one of the greatest wants having hitherto been a place of worship for the inmates. The chapel is a memorial one for the late Earl of Carlisle, and has been paid for by subscription, quite distinct from the English memorial of the late earl which is in course of erection on a hill two miles off. The memorial chapel will soon be ready for use. A schoolmaster's house was also required, and this is about to be built, a grant of money having been obtained from the North and East Ridings towards it.

Bradford.—New premises for the Bradford Old Bank have been erected and opened, at the junction of Lower Cheapside with Market-street. The architect was Mr. Alfred Waterhouse, of London. The style is Gothic, with semi-circular arches. The site which the bank occupies is perhaps the best in the town for situation, but the shape of the plot was one which must have given difficulty to the architect. The bank is entered at the corner of Cheapside, through a groined porch; over this is an oriel window. This is surmounted by a two-light window and a pinnacled gable, with a cinquefoil window in the centre. Three large windows light the bank-room from Market-street, and additional light is gained from five other windows looking into a yard at the side. In Lower Cheapside, besides the windows to light the rooms, other windows follow the line of an inner staircase, terminating in a lofty gable, relieved with a window in the centre. The ridges of the roof are ornamented with iron cresting and finials. The whole of the building is fire-proof. Concrete is used for most of the floors; they are first arched with this material, and the spaces being afterwards filled in with a preparation of the concrete, a firm flooring was obtained, impervious both to heat and moisture. The bank-room is lofty, and well lighted. The furniture was all designed by Mr. Waterhouse. The floor is of oak, except that portion in front of the counter which is laid with encaustic tiles of a quiet pattern. The furniture is of oak and mahogany, bordered with ebony. The room is lighted at night by sun-burners. The "strong-room" is constructed of ashlar, 18 in. thick, covered with iron plates and boiler-plates. In it is one of Chubb's strongest safes with all modern improvements. An ornamental iron descending gate, and an iron door of similar construction, combined with iron slutters, and window-frames of the same material, will protect the bank from outside. The contractors were Messrs. J. & W. Beauland, of Bradford, and Mr. Wilson was the clerk of the works.

Bristol.—The Wedmore Assembly Rooms have been opened. The necessity for a public room, for meetings, vestries, committees, &c., and also for concerts, lectures, balls, and amateur theatricals, had long been felt. Some twelve

months ago, an eligible site offering, a limited company was formed for the purpose of supplying the want. The front elevation is built of limestone from the Cheddar rocks, relieved with freestone dressings, and the arches of the windows and porch are supported by carved pillars. The interior contains two retiring-rooms, a reading-room, and the great hall, which is capable of accommodating from 350 to 400 people. Attached to the rooms is a ten-roomed dwelling-house, with a shop. Mr. John Tonkin supervised the progress and completion of the work.

Northampton.—The new brewery at Northampton, belonging to Messrs. P. & R. Phipps, which has been two years in hand, at a cost of 22,000*l.*, is now complete, and in full work. Messrs. Davison & Scamell, of London, were the architects and engineers. Mr. Dunkley, of Northampton, was the builder. The works have been carried out under the superintendence of Mr. H. J. Treasure, as clerk of the works.

Longstaff.—It is contemplated to erect, at a cost of something like 8,000*l.*, assembly, billiard, and reading rooms, near the Royal Hotel. They will be surmounted by a spire. The plans have been prepared by Mr. J. L. Clemence, we believe, and builders have been invited to inspect them. It is proposed, we understand, to raise the money by shares, and to complete the building by July next.

Evesham.—The new Corn Exchange here has been opened. It contains rooms for public meeting, balls and concerts, lectures, &c. The building was erected by Mr. H. Workman.

FROM SCOTLAND.

Edinburgh.—The Edinburgh and Leith Joiners' *société* came off in the Queen-street Hall, which was comfortably filled with a mixed festive company, including children as well as ladies. Mr. Duncan McLaren, M.P., had been expected to take the chair, but being prevented from attending, his place was filled by Bailie Fyfe. Visitors were supplied with fruit as they entered the hall, and the greater part of the evening was agreeably devoted to music, only two or three addresses being given. Banners were suspended round the hall, bearing trade emblems and political mottoes. Among other addresses given was one by the secretary of the association, Mr. Paterson, giving a brief sketch of the working of the society, and expressing the pleasure experienced by the workmen in consequence of the attendance of numerous employers at the *société*. The relations between employer and employed, he said, were much in want of revival; and if a better feeling prevailed, many of the disputes that had recently occurred would never have been thought of.

Leith.—A stained glass window has been put up on the northern side of the nave of St. James's Episcopal Church. This window is the work of Mr. F. Barnett, of Leith. The present window was presented by the late Mr. John Scougall in memory of his family, for many generations merchants in Leith. Its subject is the history of John the Baptist. The central figure, under a canopy, is that of the great forerunner of our Lord, and, in four compartments, are recorded the principal incidents of his career,—the naming of him as an infant, the preaching in the wilderness, the baptism of our Saviour, and the coming of the disciples to Jesus to inquire about John. The windows on either side of that lately supplied by Mr. Barnett are to be also put in by him,—one being destined as a memorial window to the father of the late Mr. Scougall, and the other as a memorial of that gentleman himself. The incidents of the sacrifice of Isaac, we believe, are to form the subject of the other.

Kelso.—An alarming and destructive accident has occurred in Kelso. The town is supplied with water from a large iron tank or reservoir, capable of containing about 60,000 gallons, and this is raised on stone walls to a height of 60 ft. or 70 ft. Into this tank the water is pumped by a steam-engine, and on the occasion to be noticed it was filled, no one supposing that there was any danger. The man in charge had not long left the place when a loud report was heard, caused by the bursting of the tank, and the water rushed out in a torrent, carrying all before it. A dwelling-house close by was completely shattered and a young lady severely injured. The damage to property is consider-

able. It is not yet known where the blame lies, if blame there be. The sides of the tank were not quite an inch in thickness.

Perth.—The Episcopal Bishop of St. Andrew's has commenced his new school house at Perth, on a site near the railway station, being a large room, 75 ft. in length by 21 ft. wide, a first portion of a group of ecclesiastical buildings, with church, to be erected for the Episcopal Establishment in his diocese, to serve as a church, in which the bishop may meet his clergy in the central spot. The buildings are from the designs of Mr. Joseph Peacock, of London, architect, and are to be built of stone, the inside faced with brick. The present room is to be used for service, until the church can be finished.

Dumfries.—The upright lights of the great east window for Greyfriars' Church, Dumfries, are in the saloon of Messrs. Ballantine & Son, of Edinburgh. Greyfriars' Church, Dumfries, is a new structure, now nearly completed, from the designs of Mr. Starforth, of Edinburgh. The church is in the Decorated style, and the glass is treated in the same manner. There are six upright compartments, each containing an incident in the life of Christ, viz., the Worshiping of the Magi, Christ seated amongst the Doctors in the Temple, the Baptism, the Last Supper, the Entombment, and the Resurrection announced by the Angel to the Marys. The glass is of a rough crystalline texture throughout.

HARTLEPOOL HEADLAND.

The Hartlepool Harbour Commissioners and the corporation a short time ago jointly offered a premium of 50*l.* for the best design of works for the protection of the headland north of Hartlepool, where the sea has made serious inroads on the cliffs, which are of soft magnesian limestone. The joint committee of selection have adopted the plans and estimates of Messrs. Martin & Fenwick, civil engineers, Leeds.

SANITARY MATTERS.

The Fever at Terling.—Active preparations, we learn, are in progress for removing the sanitary evils to which the fever has been traced, and arrangements have been made for most of the inhabitants quitting the place while these measures are being carried out. The total number of deaths that had occurred up to last week was twenty-three out of a population of 900, not far short of 200 of whom were attacked by the fever.

At a recent meeting of the committee of rate-payers of Ingatstone and Fryerning to take into consideration the imperfect state of the drainage of the village, it was proposed that Ingatstone should contribute about one-third and Fryerning two-thirds of the expense. This was objected to by Fryerning, on the ground that the proportion was unjust, and an amendment was accordingly moved to leave the question of the proportion to the decision of the Home Secretary, or to any other person named by him. On a division the votes were equal, and the chairman gave his casting vote in favour of the original proposition. As Fryerning will not agree to pay more than its due proportion, the drainage will probably remain in its present unsatisfactory state, and which is calculated to produce the same sad and alarming results as the unfortunate inhabitants of the village of Terling are now unhappily being doomed to suffer.

A writer in the *Times*, with reference to the Terling case, and while urging the sinking of wells as far from the house as possible, though the pumps and waste-pipes may be near, conveniences, says:—

"Polluted water does not generally betray its condition till possessed of a strong odour. Earlier intimation may, however, be obtained by the following tests.—Half fill a common water-bottle, cover its mouth with the hand, violently shake for a minute, and quickly apply the nose. If nothing unpleasant is detected, tightly cork the bottle, set it aside in a warm place at about the temperature of one's body for a couple of three days, and repeat the shaking, &c. Water of very bad quality may thus be recognised without any trouble and expense of analysis."

The letter is signed "John Attfield, Professor of Practical Chemistry to the Pharmaceutical Society."

Health of Hertford.—The health of the town, says the local *Mercury*, is improving. There

has been only one case of small-pox during the week. In the circumstances in which the town has been placed, the sanitary department of the corporation was called upon to perform a duty which has been most strangely neglected. In times of cholera some activity is usually displayed in the abatement of nuisances and the flushing of the sewers; but it does not seem to have been remembered that, though small-pox is a disease *sui generis* , it is intensified and extended by precisely the same conditions which cause cholera and fever to spread. During the whole period of the present visitation, the sewers have been left unflushed, and there has not even been an attempt to disinfect the poisonous emanations from sewers and drains, by sprinkling chloride of lime over the apertures through which they rise. At the meeting of the borough magistrates on Wednesday, Mr. Hancock stated that there had not been a single meeting of the Sanitary Committee since the present mayor came into office, nearly three months since.

ARCHITECTURAL INSTITUTE OF SCOTLAND.

At the first general meeting of the architectural institute of Scotland, to be held on the 11th inst., Mr. John Dick Peddie, architect, is to read a paper on "The Improvement of the City of Edinburgh."

According to the report of the council, the prizes offered,—1. For the best geometrical drawing, being an elevation of any existing example of Gothic architecture, to be competed for by apprentices, of not more than three years' standing, of any Scotch architect, was gained by J. L. Campbell; 2. For the best perspective line drawing of any existing example of architecture, projected and raised from the plan, by Mr. Jas. Darling; and 3. For the best original design,—subject, a memorial cross, by Mr. John Ord.

Mr. David Cousin, architect, offered a prize of £2. 2s. for a series of drawings of Magdalen Chapel, Cowgate; for which only one person competed, Mr. Andrew Dower, to whom the prize was awarded.

The Illustrated Transactions for the year consist of eight large folio sheets of lithographs, in a cover, illustrating Melrose Abbey; measured, drawn, and lithographed very creditably by Mr. W. H. Syme. The council appear to do a great deal with very small means. The annual subscription for 1866-7 was hut 100l. 16s. If the council are careful, as they say they are, to engrave those subjects only which, besides possessing architectural interest and beauty, have not been satisfactorily engraved already, the series they are issuing will be very valuable as an illustration of Scottish edifices of historical importance, of which no good memorial exists elsewhere, and which are exposed to dilapidation and natural decay.

OLD BUILDINGS ABOUT BIRMINGHAM.

BIRMINGHAM ARCHITECTURAL SOCIETY.

At the last meeting of this Society, Mr. J. J. Bateman in the chair, a paper was read by Mr. Allen E. Everitt, honorary member, on "Old English Buildings and their Restoration." In the course of it the reader said,—

"I feel that one of the objects contemplated by the Society,—viz., the cultivation of an artistic feeling for, and a true appreciation of, the value of our ancient remains,—will be best served by briefly noticing what there is of special interest near at hand, and also venturing to give an artist's thoughts on their present appearance and future prospects. For this purpose we will take our town as the centre of a radius extending for about fourteen miles; and first and nearest comes Aston, with its grand old mill and highly interesting church, rich in monumental remains of the last four centuries, and which we have the moated hall of Perry, dating from 1679; the old parish church at Handsworth, with its tower placed at the east end of the south aisle, and the towers of the old churches at Edgbaston, Harborne, and Moseley, with little else of ancient worth remains. The old house at Camp Hill, dated 1601, and the Old Crown, and a few others in Deritend, and a few picturesque bits scattered here and there at the outskirts of the town, but these are fast being displaced by the business requirements of modern days, serve as a lingering relic of the artistic taste of our ancestors; and even St. Martin's Church, although surrounded by a churchwarden's brick great coat, has still many points of interest, especially in its monuments of the old lords of Birmingham. Looking southwards, at a distance of about five miles, we have King's Norton, which, with its fine church and adjoining picturesque school, and the well-known objects of old gabled houses of Elizabethan and Stuart days surrounding the village green, forms a most pleasant architectural group, and one that will repay a visit. In its close vicinity lies Northfield, with a church of interesting Early Pointed date, having a massive tower and other curious features; and Coufton Hackett, with its quaint bell-

turret and adjoining hall. The latter, although apparently a modern house, has still remaining a portion of a fine old hall, with open timbered roof. We also have Bart Green, where the high picturesque half-timbered mansion, situated at the foot of the Lickey Hills, is well known to travellers on the Midland Railway. In this direction also is Alcechurh, with its old houses, and lately-restored church, to be referred to further on. Beside, with a curious church, containing some early Norman portions, and some admirable Elizabethan tombs, rich in decaying gold and colour; and the little town of Bromsgrove, full of interesting bits both for the architect and the artist. In a south-easterly direction we have Solihull, with a noble old cross church, worthy of attentive study; Knowle, with its Late Pointed church, once collegiate; and Temple Balsall, with its well-known church of the Knights Templars. Tanworth and Lapworth also have interesting features, the latter being especially noticeable for its almost detached tower and spire; and also Packwood and Baddesley Clinton, whose churches (more especially the towers) are similar in design, and are traditionally described as having been erected by Nicholas Bourne, in the latter part of the fifteenth century; the said Nicholas Bourne being the proprietor of the old moated house at Baddesley Clinton now remaining in its entirety, and perhaps one of the most interesting Medieval bits in this locality. The old mansion at Packwood, also, must not be overlooked, although many of its best features are concealed under a coat of roughcast, yet it is a fine example of the half-timbered structures of the Stuart days; and its ancient garden, with the clipped yew trees and formal hedges, is quite a gem. In the little town of Halesowen Arden may be noticed the remains of a picturesque old market cross, and many other bits of the olden time. In an easterly direction we have first, Yardley, with a spire church, having a richly decorated exterior, and an excellent open timber porch; Sheldon, with a good fifteenth-century tower, and portions of earlier work, lately restored (but which I have not visited since the same has been effected); Stion Hall, containing some good internal carving of sixteenth-century work; and Castle Bromwich, with its fine hall, rich in old tapestry and quaint carvings, and with a garden laid out with the clipped hedges and trim walks of Dutch William's days, forming a truly charming spot, and one well cared for by the Earl of Bradford, in whose family it has remained for several generations. Then we have Bick-minn, with a fine church, in which are many interesting Norman portions; and Hampton-in-Arden, noticeable for old cottage bits, subjects for no end of pictures, and a church in which are progressive examples of the Norman and early English architecture. A little further in this direction is Berkswell, whose church has a fine Norman chancel, under which is a good crypt, now used as the burial place of the Sir Sardley Wilmot family; and Packington, whose park comprises a relic of the once far-famed Forest of Arden, the grand old oaks in which have been immortalized on canvas by our worthy friend, Mr. P. H. Keneshaue. In this park is the old house built by Sir Thomas Fisher towards the end of the seventeenth century; and I may here mention that nearly all the old farm-houses in this part of Warwickshire have been furnished with a protection of wood, doubtless as a security required by the dense woodland tracts in which they were situated. In this neighbourhood also is Maxstoke, whose Priory ruins, with their closely-adjoining village-church, are objects of most careful investigation; and at a little distance the moated house, or rather Castle of Maxstoke, is the very picture of an old English feudal house. Near at hand, also, is Coleshill, with its restored church and High monuments, and other interesting relics of former days, including the pillory, a relic of old customs not often met with. In a north and north-easterly direction is Sutton Coldfield, where the good old Bishop Vesey must not be forgotten; and in its near vicinity is the moated house of New Hall, with embattled towers and quaint old work. There is Pipe Hayes, too, a timber mansion, now roughcast, but singular from having a number of little gables, and some massive bay windows. Curworth has a church, with a good Norman chancel arch; and Astley Church and Castle are well worth a summer day's journey. Kingsbury and Poleworte, the latter with its fine Coventry church, are objects of interest; and Tamworth, with its church and castle, the former rich in early monuments of the Ferrers and Neville families, must be well known to all. To the north-west there is not much of interest, the Black Country generally absorbed nearly the whole of the picturesque remains. The parish church of Walsall, however, has some chancel-stalls of rather good character; and at the edge of the town there is an old seventeenth-century moated brick, called Colmore Hall, worthy of inspection. At West Bromwich the old church of St. Clement has a few bits of good work almost buried under modern plaster; and in the neighbourhood are two old houses of timber construction. One near the church, called Bromwich Hall, has been greatly altered; but the other, called the Oak House, and situated near Spon-lane, remains in a perfect state, but surrounded with modern houses and smoky chimneys. At Wednesbury the old church, with its octagonal chancel, was sadly ill-used some thirty-five years since; and the Collegiate Church of Wolverhampton is too well known to be here commented on. At Tipton was an old church containing much early Norman work some few years since, quite in ruins; but I understand it has been rebuilt, but whether or not will come a day unknown. The Castle of Dudley is also one of the well-known objects of our neighbourhood; and in the vicinity of Stou bridge area, I believe, many old mansions of the Elizabethan and later periods, which should be well worth examination. To the west of Birmingham is Hales Owen, whose church has perhaps the largest amount of Norman work remaining of any in the neighbourhood, and the ruins of Hales Owen Abbey, close by, and the fine chapel of St. Kenelm, on the Cleat Hills, have much to render them interesting. The Hall and restored church of Hagley, and the picturesque Church of Clent, lying close under the shadow of the great hills, with their surroundings the list of the most noticeable architectural and antiquarian features concealed within what may be called "our neighbourhood."

The annual dinner of the society afterwards took place at the Exchange Restaurant. The chair was taken by Mr. Bateman; the vice-president, Mr. W. Harris, occupying the vice-chair. Amongst the gentlemen present were Messrs. B. B. Johnson, secretary; Joseph Hornblower, Thomas Plevins, J. H. Chamberlain, J. G. Bland, A. B. Fhipson, H. Corser, D. J. Williams, G. Inghal, and Hawkes, members of the society; W. B. Briggs, president of the Builder's Association; and Messrs. S. Evans, S. Timmins, and Allen E. Everitt, honorary members of the Architectural Society.

COMPARATIVE ALTITUDES.

COMPARATIVE altitudes having been to me for some years a favourite branch of study, I have often wished to publish a chart such as that desired by your correspondent, Mr. Middleton; but information has led me to conclude that, in scientific map-making, labour and profit are not always pleasantly connected.

Thinking that the subject may interest some of the numerous readers of the *Builder*, I have pleasure in offering, as a New Year's gift, the accompanying tabular view of certain altitudes in England, alphabetically arranged in six series, representing respectively cities and towns whose general levels do not exceed 100 ft., 200 ft., 300 ft., 400 ft., 500 ft., and 600 ft. Lincoln is included in the first series, although the altitude of the floor of the cathedral is figured 216 ft. High-street being only 23 ft. above the sea-level. A. J.

ALTITUDES ABOVE MEAN LEVEL OF THE SEA AT LIVERPOOL:—

Bath	Abbey Church	81
	Lansdown-road	418
Bangor	Cathedral	72
	Market House	72
Brighton	St. Nicholas Church	158
	Old Sleyne	27
Bristol	Cathedral	96
	Market-street	46
Canterbury	Cathedral	36
	Guildhall	39
Chichester	Cathedral	60
	Cross	50
Chester	Cathedral	84
	Castle	68
Carlisle	Cathedral	78
	Railway Station	65
Cambridge	Trinity College	31
	Museum	35
	Cathedral	65
	Cross	65
Hull	Holy Trinity Church	16
	Lowgate	14
London	Buckingham Palace	22
	Great George-street	18
	Charing Cross	28
	St. Paul's Cathedral	97
	Bank of England	46
	Langham-place	52
	Marble Arch	98
Liverpool	Town-hall	49
	Lime-street Railway Station	78
Leeds	St. Peter's Church	91
	St. John's Church	163
Lincoln	Minster	216
	High-street	23
Norwich	Cathedral	25
	Town-hall	59
Peterborough	Cathedral	28
	Town-hall	28
Rochester	Cathedral	32
	Market House	30
Southampton	High-street, Commercial-road	56
	High-street, Brunswick-place	62
Worcester	Cathedral	84
	Market House	53
York	Minster	53
	Bootham Bar	62
Derby	Town-hall	258
	Queen-street	174
Durham	Cathedral	212
	Market-place	158
Exeter	Cathedral	138
	Guildhall	138
Kendal	Old Church	144
	Whitehall	171
Lancaster	Castle	213
	Railway Station	110
	Exchange	120
	Piccadilly	152
	Corn Exchange	237
	Railway Station	192
Northampton	Cathedral	151
	Court House	152
St. Asaph	Cathedral	121
	Dentigh-road	114
Winchester	Cathedral	132
	Market Cross	129
Basingstoke	Town-hall	304
	Old Basing Church	257
Coventry	St. John's Church	262
	Barracks	276
	Cathedral	283
	Market-street	267
Leicester	St. Mary's Church	290
	Museum	235
	Cross	218
Oxford	St. Giles's Church	211
Stafford	Town-hall	253
	Christ Church	299
	St. Mary's Church	298
	Market House	233
Birmingham	Town-hall	456
	St. Martin's Church	376
Bradford	Railway Station	327
	Peece Hall	342
Halifax	Old Church	368
	Northgate	392
Huddersfield	High-street	302
	Market-street	301
St. Alban's	Town-hall	371
	St. Peter's Church	430
Tunbridge Wells	Holy Trinity Church	376
	Railway Station	318
Warminster	Town-hall	385
	St. Denis Church	386
Malvern	Abbey Church	426
	Belle Vue Hotel	476
Penrith	Parish Church	424
	Hotel	416
Wolverhampton	Old Church	628
	Market-place	619

NEW MARKETS IN BERLIN.

The first of a series of market-halls has been opened in Berlin by a company formed for the purpose, and is intended as a specimen from which others will be built in various parts of the city, with such alterations and modifications as experience will suggest. This first is 270 Prussian feet long (which are nearly equal to our feet) by 160 ft. wide, with a height of 60 ft. to the ridge-piece. The cellars occupy an area of 36,000 square feet, and above these a street, 48 ft. wide, divides the market into two equal halves, each containing twenty stalls, with an area of 70 square feet each, and 220 stalls, with an area of 36 square feet each. Twelve groups of buildings surround these halls, containing forty shops and 120 separate tenements, the offices of the company, the market police, &c. On comparing the arrangements of these halls with those of Paris, for example, we find this improvement, that stalls of greater or lesser area can be hired according to the requirements of the stallkeepers; whereas, in Paris, the stalls in one building are, except at corners, &c., all of equal size. If we remember rightly, the stalls at the "Halles Centrales" are 41 square feet in area, and those in the Rue Château d'Eau 42 square feet. These at Berlin are 70 or 36 square feet, *au choix*.

THE ARTIST AND THE PUBLISHER.

STR.—In the new entrance to the South Kensington Museum, turning to the right, you enter a longish gallery, with drawings on the walls and table-like glasscases below. On the right wall the two sheets of "edible and poisonous mushrooms," produced by Worthington G. Smith, with the book, are hung. The publisher's name is black and distinct enough: "Exhibited by R. Hardwicke, Piccadilly," but the artist's is nowhere to be seen, excepting by an energetic person like myself, who takes the trouble to peer round the corners. Now, you know this is not "right," it is another instance of the mischievous presence of the middleman, who in England continually interposes between the producer and the consumer, as so ably shown in your interesting "leader" last Saturday, and which was therein illustrated by the case of the bootmaker and the bootseller.

R.

ARCHAEOLOGY v. ARCHITECTURE.

STR.—Mr. Fergusson should have been a bishop: he could then have pronounced dogmatic decisions, which, if not privately undisputed, would at all events have been publicly received in solemn assemblage. He must not, however, be permitted to rate a whole institute of architects with impunity; and it seems to me high time that some protest was made against his self-assumed authority. He always speaks, and wishes to be recognised as having spoken, *ex cathedra*. Hence, when another man would reason, he takes upon himself to judge and decide categorically, as though every one were hanging on his lips for a decree, noticing just so much of the matter under his consideration as is convenient for his own immediate purpose.

Without taking any particular credit to myself for the faculty, I claim to be competent to distinguish between archaeology and architecture; and at the same time I do not acquiesce in Mr. Fergusson's teaching or definitions. In opposition to him, I define an archaeologist—i. e., a mere architectural archaeologist—to be one who, in making designs, not only studies the works of antiquity as a hook, whereby he may learn the principles of the art which produced them, and see how these principles were variously developed by successive architects,—in what forms they resinited, what ideas sprang from them, how they were influenced by, and in what outward expression they satisfied and symbolised the wants of the then existing generation; but actually reproduces such works, irrespective of all considerations of appropriateness, and modern wants, convenience, and requirements,—thus making the present subservient to the past, and expressing not the thoughts and character of his own mind or the age he lives in, but those of men and ages long since departed. A good architect, however,

must be a sound archaeologist. In designing a building, whilst considering solely "the purpose and age for and in which it is to be erected," he will work it out from his own thought and brain-power, without reference to books and examples; but so far from "not thinking of the past or of any other clime," or unreservedly rejecting the forms and developments of bygone ages, he will bring to bear on his work the wisdom, genius, and power of the great men by whom they were produced. Far, moreover, from fostering a supercilious disdain for them, he will avail himself of their experience and reverence for the same wants. It is a shallow philosophy, which, from a morbid desire of being novel, or a slavish fear of being a copyist, shrinks from a loyal avowal of the obligations a man is under to those from whom he has learnt the very alphabet and grammar of his art. In saying this, I am not likely to be misunderstood. No man has more roundly abused archaeological whims and old-world copyisms than myself, and none have been more roundly abused for doing so; but I denounce quite as strongly a principle such as that enunciated by Mr. Fergusson, which, followed out without qualifications, leads to nothing but extravagance and eccentricities. The partial truth it contains requires carefully guarding by the principle of authority, and reverence for the past is the best guarantee for success in the present. This seems to me to be the great safeguard against a spurious originality, which, if sought for apart from the restraints I have mentioned, only results in the weak, crazy, and fantastic developments of modern Paris and London. To "throw archaeology overboard," is in order to get at "a real and true architecture," is very much like discarding grammar in order to write with real and true elegance.

All that is true in Mr. Fergusson's definition of an architect has been the burden of my saying for many a day; but what he really means is to be found in his article in the *Builder*, on the Law Courts, which, although containing much that is both true and admirable, is so disfigured by extravagance, that it loses half its value. His ideal architect, it seems, is to cut himself off from "the past, and from every clime" under the sun, except his own. He is to free himself from "the trammels of archaeology," and to "invent a new style," with no principles but "common sense" and "progress" to guide him. He is to engage on every fresh work with the animating conviction that "Gothic (English) spires and Grecian porticoes are equally absurdities" in England; that all modern architecture is "a falsehood;"—Classical, one falsehood; Gothic, another; that a love of Gothic art is a mania to be classed with crinoline and chignons, and consigned with them to the "limbo of absurd fashions;" that veneration for the Middle Ages is "sentimental," and (if I rightly understand Mr. Fergusson) that neither "Pointed arches nor Classical pillars" should be tolerated. With such convictions, and in such a spirit, a man is to be successful in producing an original and entirely satisfactory style of architecture, "in harmony with the feelings and advancement of the age." Will Mr. Fergusson for once be a little less visionary and a little more practical, and give us some idea of the "original common-sense architecture" about which he discourses so dogmatically? There are several newly-erected buildings in London which seem to be at least efforts in Mr. Fergusson's right direction. The Charing-cross Hotel is wildly original, details and all; does that please him? The Strand Music Hall has certainly no parentage: surely this cannot be far wrong. Better still, the new University buildings in Burlington-gardens, which were pulled down last summer, and bodily carried off, when but half erected: these, at any rate, ought to have passed Mr. Fergusson's muster, for they were totally unlike anything ever yet seen, not only in design, but even in their general construction and masonry.

In these buildings we certainly see few "crotchets" such as those Mr. Fergusson so flippantly attributes to my father; but a mass of childish fancies, ludicrous abnormal conceits, and fantastic originalities. My father's "crotchets," at all events, had authority on their side; but these are the coinage of the most doubtful taste, opposed alike to all "true and real architecture," as to every rule of art. These, then, are the results of a principle such as that we architects are called upon to adopt; these are the Will-o'-the-wisps we are to follow

in our search after a "new style" neither Gothic nor Grecian," until we are lost in a quagmire of incompetence and conceit.

Space forbids me to follow Mr. Fergusson any further. Perhaps another opportunity may be afforded me of noticing the "syllabus of errors" with which he has favoured us; but I do think, since we are all such beighted creatures that we cannot even appreciate the difference between "archæology and architecture;" and that all architecture since the year 1500 has been nothing but a failure. Mr. Fergusson, in addition to his darling occupation of finding fault, might take the trouble to build up as well as pull down, and substitute something "true and real" for the "strange aberrations" of the present day. We might then place a higher value on his crusade against all modern architecture and architects. From his remarks in "Modern Architecture" respecting my father, I am convinced either that Mr. Fergusson wants judgment extremely, or that he is blinded by his resentment.

E. WELBY PUGIN.

A REASON FOR JOINING TRADES UNIONS.

SIR.—In your last week's impression, your correspondent "Jan Plans" gives (in my estimation) one of the principal reasons that workmen have for joining trades unions, viz., that in nine cases out of ten masters do not ask themselves what is a fair wage, but what is the most they can induce a man to work for; and the combination of capital and trade gives the masters so much more power (and so well do they wield it over the men, who have only their own strength to depend on) that they can without the benefits accruing from the unions, when trade is in its present depressed condition, and no prospect of improvement for some time, sooner than a man would accept a considerable reduction in his wages; and when trade does improve the masters are reluctant to return to the old standard wage, seeing that for a length of time they have had their employ labors on less. I speak from experience, having found this to be the case at a large seaport in Norfolk.

A WORKINGMAN.

DURHAM UNION WORKHOUSE COMPETITION.

SIR.—When the guardians invited architects to compete for the extension of the workhouse, they issued printed instructions, as follow:—1. That the existing building is capable of accommodating about 125 inmates, and the proposed additions must be of sufficient extent to accommodate, with the present structure, 300 inmates. 2. The present workhouse to be utilised as far as possible. 3. Due regard to be paid to economy. The architects and competitors were not to be revealed until the premiums were awarded. Nine sets of plans were sent in. They were referred to a special committee, to make a careful examination of the merits, and report thereon. The vice-chairman subsequently tells us that it took the committee as much as two hours and a half before they came to a decision. I ask, how is it possible that any committee can carefully examine upwards of 181 sets of drawings, to say nothing about the hundreds of pages of specification which have cost the nine competitors not only weeks but months of hard work. The plans marked "Half Moon and Shield" and "Civic Mundi" were selected for the first and second premiums. When these plans came to be examined, it was discovered by "Civic Mundi's" father that the man in the moon had designed the site for his plan, not the plan for the site. "Half Moon" states that the land objected to was the result of straightening the crooked fence, and that it was done with the intention of improving the site more than the design. "I was not aware," says "Half Moon," "until I saw the report of the committee, that the adjoining ground was not property belonging to the workhouse." Now, the straightening of the crooked fence was just the obstacle which every competitor was desirous of removing, had it not been an unjustifiable license which could not be taken when the line was drawn for all. This so-called crooked fence is nothing more or less than a substantial boundary wall, built as straight as "Half Moon" could draw it upon paper, and in order to straighten this fence "Half Moon" sootly takes upwards of 800 superficial feet of the old nursery gardens. "Half Moon's" plans have been measured, and likewise the site, and the result is that the site will neither accommodate the plan in length nor breadth. Besides, "Half Moon's" plans are for a new house, and according to estimate cannot be built for less than 9,000*l.*, while the average cost of the original plan is from 4,000*l.* to 5,000*l.* Some of the guardians admit that, if they had not abandoned the idea of extending the house, they would not have entertained either of the plans selected. These plans were referred back to the committee for the whole to be reconsidered, when one of the guardians said it was an insult to ask the committee to reconsider the matter, after having spent so many hours in selecting the designs. Was it because "Civic Mundi" had two extra votes out of five against "Half Moon's" chance? At the next meeting, on the 14th instant, only the two plans first selected were examined. The committee was looked at. The competitors who applied to see the drawings were positively refused a peep even at their own work, for what reason I cannot say, excepting it be that, previous to the meeting of the 14th, the plans marked "Half Moon and Shield" were discovered to emanate from the office of A. & C. E. The author was sent for, and allowed to remove the plans and make any alterations he might think proper, and return the plans signed "Jan Plans" for the meeting on the 14th. How did they know whom to send for, when the author was supposed not to be known until the competition was concluded? I ask, is all this honest?

FAIRPLAY.

sculptured alabaster, and is the work of Mr. Earp, of Lambeth, from a design furnished by Mr. Street. The tripod gas-burners, intended to light the chancel during evening service, were supplied by Mr. H. Neal. The chancel aisles have been filled with oak seats, and all the monumental slabs have been relaid. Two slabs containing incised brasses, in a good state of preservation, have been removed into the chancel. Some old hatchments, formerly placed in the church, have also been removed. The font has been taken from the west end of the church, and placed near the pulpit. The church is heated with a new hot-water apparatus, supplied by Mr. Haden, of Trowbridge. The organ, until now standing at the west end of the chancel, and the Perpendicular west window has been exposed to full view from the body of the church. The instrument has been repaired by Mr. Walker, of London.

Bradley.—St. Martin's Church, Bradley, erected by the Baldwin family, has been consecrated by the Bishop of Liefield. The church is in the Geometrical style, and will seat 350 persons. The plan is cruciform; the length of nave 78 ft., and width of organ aisles 65 ft. 6 in.; the tower and spire, 170 ft. high, are at the south-east. The material used for the walling is Gornal stone in coursed rock-faced ashlar, box ground stone dressings; the nave, piers, caps, and bases of Hollington stone. All the capitals and corbels in the interior of the church are foliated, the carving generally having been executed by Mr. Allen. The pulpit and font are of Caen stone; the joinery is of pitch pine; the aisles are laid with Staffordshire and encaustic tiles, the chancel and communion with Messrs. Maw's encaustic tiles, and the reveries is inlaid with encaustic and majolica tiles. In the tower is the framework for a peal of bells, only part being intended to be hung at present. The builder was Mr. Nelson, of Dudley; and the architect Mr. Bidlake, of Wolverhampton; the cost about 6,000l. The lower portion of the tower opens with an archway into the chancel, and is in part used as an organ chamber. The seats in the nave and side aisles are of one uniform character, in the modern open style, with carved scroll ends: the wood used is pitch pine, stained and varnished. Across the west-end—which is lighted by a six-light window, of great size—are rows of seats, one above the other, which will be for the use of the scholars at the morning services, and at other times free. The chancel is lighted by three stained glass windows, executed by the Messrs. Pilkington, of St. Helen's. The windows are in three-lights, independent of tracery openings, of which a large cinquefoil forms a prominent feature. The north-east window has in its centre opening a representation of the Nativity of our Lord. Above is a choir of angels floating in the air, playing harps, and bearing a scroll with the text, "Glory to God in the Highest." The opening on the right is occupied by a group of the wise men, with their gifts. The left opening is filled with a group of shepherds. In the top cinquefoil is seen the "Flight into Egypt." In the south window the subject is the Crucifixion. In the cinquefoil above is a representation of the Agony in the Garden of Gethsemane. The centre window displays the subject of the Ascension of our Lord. Underneath this, and in the side openings are distributed the Apostles. In the cinquefoil is the figure of Christ in Glory, surrounded by angels. The upper tracery openings over the side lights contain scrolls, with inscriptions. The remaining tracery openings are filled in with cherubs, stars, &c. On the north side of the chancel is a memorial of the Baldwin family, being a token of remembrance from Mr. Edward Pugh. The design is that of a canopied niche, with trefoil arch of serpentine marble, and inlaid. The tympanum is diapered with raised shield in white marble; the inscription slabs, also in marble, are recessed under moulded arches, supported on rich coloured marble shafts. The side shafts are also in similar marble, bearing on an enriched corbel table. The canopy is enriched with crockets and foliated pinnacles, with carved angels on the knee stones.

Bishop Stortford.—Albury Church has been re-opened, after being restored and repaired. The stone-work of the pillars has been restored, the walls re-plastered, and the nave re-roofed. New flooring has been put down, and the old high pews have been replaced by open seats. The memorial slabs have been relaid, and the font has been retored. The gallery has been removed, and a window inserted at the west end

of the church. A large Gill stove has been provided for the purpose of warming the church. These and other works have been performed by Mr. Gibbons, of Buntingford, under the superintendence of Mr. Perry, of Bishop Stortford, architect. The tower has been repaired, and a new spire erected, by Mr. Ginn, of Puckeridge. The cost of the restoration is, we understand, about 1,000l.

STAINED GLASS.

Wroxhall (Warwickshire).—Mr. T. Dury, of Warwick, has just placed a large stained glass window in Mr. Dugdale's mansion adjacent to Wroxhall Abbey, illustrative of the legend of Hugh de Hatton, as described in Dugdale. From the legend it appears that the knight went to warfare in the second crusade to the Holy Land, where he was taken prisoner and continued "in great hardship" for seven years. At the end of this period he prayed to St. Leonard for deliverance, which was miraculously effected, and Sir Hugh, in accordance with a vow, established a monastery at Wroxhall. The subjects show Sir Hugh departing for the Holy Land, his being taken prisoner, his "making plaint" to St. Leonard, who appeared to him in the habit of a black monk, his suddenly being found at Wroxhall Wood by his own herd, his interview with his wife and family, who recognize him by the hair of a broken ring, his receiving a revelation where to build a church, and his two daughters being made nuns therein. Two other compartments represent the legend of Dame Alice Craft, from the same authority. This window was one of those lately exhibited in Paris, and for which Mr. T. Dury received an award.

All Saints' Church, Emscote.—A three-light window, representing the good deeds of Dorcas, and subscribed for principally by mites from the poor, has been placed at the west end of this church to the memory of Mrs. Nelson, of The Lawn, Emscote. This window was one of those contributed by Mr. Dury, of Warwick, to the Paris Exhibition.

St. Neal's Church.—"The Adoration of the Kings," by Messrs. Hardman & Co., of Birmingham, presented to this church by Mr. Charles P. Rowley, has just been returned from Paris, and is now inserted in the east window of the Lady Chapel. This window was chosen out of a great number exhibited to receive the silver medal. The window cost 245l.

Clothall Parish Church (Herts).—A stained-glass west window, executed by Messrs. Henton, Butler, & Bayne, of Covent Garden, has been erected in this church. It contains two compartments, one of which represents the Nativity, and the other the Adoration of the Magi.

PATENTS CONNECTED WITH BUILDING.

STOVES OR FIRE-PLACES.—*E. Thring.* Dated 2nd March, 1867.—For the purposes of this invention the fuel to be burnt is placed in a shell or grate, circular in section, or it might be of other convenient shape, and turning on centres at its two ends; an opening is made through one side of the circular shell or grate, at which fuel is introduced into it. When fuel is introduced into the shell, the shell is turned on its axis, so as to cause the fresh fuel to be covered with the heated fuel previously contained in the shell; and any smoke arising from the fresh fuel will be consumed by its having to pass through the heated fuel. Air is allowed to pass to the fuel in the shell through perforations or openings formed through its bottom, as well as from the front opening, and the products of combustion escape from the shell through similar perforations or openings at the top, and pass away by the chimney. The axis of the rotating shell may be carried by a movable frame, so that it may be placed in any ordinary fire-place, or they may be carried by a frame to be fixed in the fire-place.

CONSTRUCTION OF FLOORS AND ROOMS FOR BUILDINGS.—*R. Moreland, junr.* Dated 26th March, 1867.—Among the features of this invention are the following:—He takes a number of wrought-iron girders, either hot and string lattice girders or bow and string web plate girders, and he places them at convenient distance apart, and fixes them either on main girders, if a large area is to be covered, or he builds them into the walls of the building when the area is smaller. When main girders are used

he supports the bow and string girders on the upper or lower flange of the main girders. The upper flange of the bow and string girders may be elliptical, or an arc of a circle in outline—the latter is preferred; the lower flange may either be straight or curved. He prefers that it should be straight. The top and bottom flanges of the lattice girders are connected together with vertical and diagonal braces riveted at the connections. Where main girders are employed the ends of the lattice girders may be fixed, bolted, or screwed to the girders which support them; and in some cases he uses additional tie-rods to stay the supporting girders. He also places along the edges of the supporting girders, and between the lattice girders bricks or lays on the flange or materials, which he rivets or lays on the flange of the supporting girder, to ensure the equal and level bearing of the edge of the corrugated iron, as hereinafter described. He prefers a brick of an angular shape showing the projecting edge corbelwise. On the upper or curved surface of the lattice girders he then lays sheets of corrugated iron or other material in as long lengths as possible, and forms them into a continuous sheet by allowing the sheets to alternate, or, as it is more commonly called, to break joint, and by holding or riveting the edges of the sheets together. He also secures the ends of the corrugated sheets which touch the wall by bent dog-bolts or cramps, which are bolted or riveted to the corrugated iron, and built into the wall between the supporting girders. The curve of contrary flexure of the corrugated iron may be varied both in shape, size, and form, so that the greatest strength possible may be produced. The corrugated iron plates may be connected to the lattice girders with rivets or bolts, but it is not usually required. He places the flutes of the corrugated iron at right angles to the lattice girders, and on the upper surface of the corrugated iron. He then lays concrete composed either of shingle or brick rubbish, mixed with lime or Portland or other cement or brickwork, in mortar or cement. He either lays the concrete levels or concentric to the curve of the lattice girders—the former is preferred—and he then lays the floor with joists and flooring boards in the ordinary manner.

Books Received.

On the Ventilation of Dwelling-houses, and the Utilization of Waste Heat from Open Fire-places. By F. EDWARDS, Junr. London: Hardwick, 1868.

The principal point in this volume is an endeavour to set forth, by words and diagrams, the best mode of utilizing heat wasted up the chimney by our present method of consuming coals. The author says, let us suppose that, instead of the large channel in which the smoke-flue is inclosed being used for the purpose of providing for an escape of air, it be used to supply a current of warm air to every apartment with which it is placed in communication, and that all the lower chambers of a house be made thereby to contribute heat to the upper ones. He is not able, as a proof of the practicability and utility of such a scheme, to adduce an instance where it had been carried into effect, and where the various results, whatever they might be, had been well ascertained; but, in the absence of any such case, thinks it may be useful to attempt a consideration of what may appear to be the various conditions which would enable such a system to achieve success.

"In the first place, to change a channel for the escape of air into a channel to admit air, the aperture provided over the roof has to be closed, and a proper provision has to be made below for a free admission of fresh cold air from an external source to the lower part of the chancel. This free admission of air to the chancel is most important, and could be provided for by means of ornamental perforated bricks, fixed in an external wall, and made to communicate as directly as possible with the chancel. For the admission of warm air to the rooms, apertures capable of regulation must be provided near the floor, instead of near the ceiling, because a low level is always the proper position for introducing a current of warm air, and care must be taken that the total amount of apertures in the various rooms do not exceed the horizontal area of the warm-air channel, or there may be a liability of the warm air passing by one room and ascending to another. For the escape of air, the fireplaces may be supplemented by ventilating flues of proper area in the partition wall opposite the windows, as already described, or in the party-wall. The remaining condition appears to be, that the smoke-flue should be of cast iron, and not of fire-clay or brick."

He gives various sections and plans, showing how he would carry this out; one section showing a number of houses heated by warm air

ascending from warm-air shafts in the party-walls, and entering the various rooms and on landings, at openings provided. In his preface, Mr. Edwards styles his hook "the first attempt to call attention to the utilization of the heat which escapes by our chimneys," and expresses a hope that it will receive serious consideration, in which hope we fully agree, though we cannot admit that his hook is the first attempt to bring about what is desired. From the time of London, and before, till now, plans have been proposed to make available in one room the heat produced in another, and which would be otherwise wasted. In the hook itself, a diagram is given of the flue patented by Mr. G. Jennings, which has a space around it, "by which air descends, becomes warm, and enters the rooms through open gratings, when there are fires burning, and air is prevented from entering by other means." However, there is no occasion to dwell on this. An enormous amount of heat, in the aggregate, is wasted under our present arrangements, and good will be done if the hook in question draw fresh attention to the fact, and lead to the utilization of that heat.

VARIORUM.

"Street Tramways for London: their Utility, Convenience, and Necessity; with some Remarks on the Working of Street Railways in the United States and Canada." By Charles Mackay, J.L.D. London: King, Parliament-street. Dr. Mackay here gives us the result of his experience of the working of street tramways in America. He is strongly of opinion that there are no objections to them in London except such as are wholly untenable, and are the result of either ignorance and prejudice or interested opposition. Their advantages, on the other hand, are in his estimation manifold; their celerity, convenience, and comfort, far beyond those of omnibuses.—London omnibuses especially. The rail used by Mr. Train was unfortunately a defective one; but now this has been obviated, and rails of an unobjectionable kind have been invented, and are available. These rails will interfere in no way with the traffic. The saving of street tramways to the rate-payers would be enormous, as may be inferred from the fact, that while the carriages of the New York and Brooklyn railways, in 1866, with 70,791,625 passengers, passed over 11,700,000 miles of streets, built and kept in repair by the companies at their own expense, the carriages of the London Omnibus Company alone, with somewhere about 41,334,602 passengers passed over 13,000,000 miles of streets built and kept in repair by the metropolitan authorities at the expense of the ratepayers.—"Slater's Sententious Chronologies; Revised and much Enlarged." By Elizabeth M. Sewell. London: Longmans, Green, & Co. 1868. The usefulness of Mrs. Slater's Sententious Chronologies having been proved by experience, it has been thought advisable to revise and enlarge them, and a very competent editor has been chosen to effect this improvement of a useful little book. There is a peculiarity in it of which many of our readers may not be aware. This relates to the recollection of dates. A sentence is composed of dates relating to the event indicated, the first letters of which words, being consonants, are made to indicate figures. Thus "for instance the date of the Universal Deluge, which we find in the first part of our chronology, is contained in the following sentence:—

Not a Man Remained Behind.
N M R B
2 3 4 8

This sentence informs us, therefore, that the Deluge took place 2348 years before Christ. The following sentence gives the date of the destruction of Carthage:—

They Burn Carthage.
R C
1 4 7

By keeping in mind this sentence we shall remember that Carthage was destroyed 147 years before Christ."

Miscellaneous.

THE WORKS AT SEFTON PARK, LIVERPOOL.—The town-council have accepted Mr. Campbell's tender, 72,345*l.*, on condition that he deduct 1,000*l.* for taking out the quantities. What does this exactly mean?

FALL OF CUPOLA IN PESTH.—On the 22nd January, at three p.m., the cupola of the new church, in the Leopoldstadt quarter of Pesth, fell in with an enormous crash, causing the ground to tremble all around. The vault of the church was completely destroyed, and nothing remained but the four walls and the external towers. No lives were lost.

DESTRUCTIVE FIRE AT THE ROYAL MILITARY COLLEGE, SANDHURST.—The whole of the left wing of Sandhurst College has been destroyed by fire. Great complaint is made as to the protection against fire in the college, there being only two old-fashioned engines kept on the premises, and in addition to this there is an insufficiency of water. Had it not been for assistance from Aldershot, the flames could not have been got under short of the destruction of the whole building. The fire originated in the quartermaster's department.

THE ROYAL ACADEMY.—A paragraph in some of the morning papers, giving the names of four or five architects as nominated for election to fill the two vacancies amongst the Associates, was obviously erroneous, to those who know anything about the matter, there being nearly seventy names on the list all equally nominated. It had a strong family resemblance to a similarly erroneous paragraph about the rebuilding of her Majesty's Theatre imposed on the morning papers a week or so ago, in which two or three of the same names were given.

HOTELS.—The Palace and Burlington Hotels Company's ordinary half-yearly meeting of shareholders has been held. The report stated that the company was steadily improving its financial position, and yielding a fair return for the capital invested. The hotel returns for the past half-year amounted to 16,963*l.* 3*s.* 4*d.*, as against 15,179*l.* 17*s.* 3*d.* during the preceding half-year, and 14,179*l.* 0*s.* 9*d.* during the corresponding half of last year. There was a net profit on the half-year of 3,962*l.* 16*s.* 9*d.*, out of which the directors recommend a dividend at the rate of 6 per cent. per annum, free of income-tax, leaving 1,259*l.* 0*s.* 3*d.* to be carried to next account. The report was adopted and the dividend declared.—In the Equity Courts, on the 18th instant, before the Master of the Rolls, Mr. Roxburgh appeared on a petition praying the winding-up of the Langham Hotel Company; and his lordship ordered a voluntary winding-up under the supervision of the court.

PURCHASE OF THE LONDON COFFEE-HOUSE BY THE CORPORATION: EX-PARTE MAYOR, &c., OF LONDON.—Mr. A. E. Miller, barrister, appeared before Vice-Chancellor Wood in this petition, on Saturday last. The object of it was to have an agreement, dated in July last, carried into effect, by which the corporation agreed to purchase the London Coffee-house, Ludgate-hill, for the sum of 38,500*l.* It was stated to be of importance to the corporation to have this property, especially in contemplation of the proposed enlargement of Newgate. There was evidence that the price was a fair one, and it was proposed to make up the purchase-money by various sums which had been received from the Metropolitan Board of Works, the London, Chatham, and Dover Railway Company, the Commissioners for the erection of the New Law Courts, and the Charing-cross Railway Company. His Honour approved of the purchase, subject to a reference to chambers with regard to title.—City Press.

THE NEW HOTEL AT LIME-STREET STATION, LIVERPOOL.—The extensive new hotel which the London and North-Western Company have decided to erect in front of their Lime-street Station, will shortly be proceeded with. A few weeks since the company advertised for tenders for the new building, and the directors accepted the tender of Messrs. Haigh & Co., of Liverpool, the amount of the contract being about 72,000*l.* The hotel will be in the modern style of Italian architecture, Mr. Waterhouse, of London, being the architect. The Lime-street facade will extend nearly the entire length from Gloucester-street to Lord Nelson-street, and at the south and north angles respectively there will be two prominent towers. There will be an archway in the centre of the Lime-street frontage, which will serve as a means of ingress and egress for passengers to and from the station. The several large additional platforms have now all been completed, and active preparations are in progress for erecting the immense new station-roof, which will consist of one enormous span only.

ST. GEORGE'S OPERA HOUSE, LANGHAM-PLACE. We are glad to see that Mr. German Reed is about to follow up his present success in the representation of comic opera, with the engagement of Madlle. Liebhart, who will make her debut on the English stage in Auher's "Amhasadress," on Saturday Evening, February 5th. A new tenor, Mr. Wilford Morgan, will appear at the same time. The *Contrabandista* and Offenbach's extravaganza, which are now drawing crowded houses, will then be played alternately.

SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—The first *conversazione* of the society this season was held on the 24th ult., at the Gallery of the Female School of Art, Queen's-square, Bloomsbury; Professor Donaldson in the chair. The proceedings were opened with an address, in which, after remarking on the want of some such society for the encouragement of art, for art's sake,—not as an occasional popular pastime, but as a constant source of intellectual enjoyment;—and instancing the humanizing influence the general cultivation of music had exercised upon the masses in Germany, and regretting that in England there had been no one to supply the place of Mr. Hullah,—the chairman congratulated the members on the society having now reached its tenth year, with every prospect of increasing usefulness and prosperity. A concert was then given.

THE PROPOSED TOWN-HALL, SANDGATE. — A meeting has been held to consider a proposal for the erection of a town-hall. Mr. Pledge said that the cost of the building would be 2,000*l.*, including the purchase of land, the hall to accommodate the members of the Literary Institute, offices for the Board of Health, &c.; and the scheme he proposed was to form a limited company, putting out the 2,000*l.* in shares, and then adopting the system of prize drawing, entertainments, bazaars, &c., to meet the necessary outlay. The proposition was accepted by the meeting, and a committee was appointed to make preliminary arrangements for forming a limited liability company. The site selected for the building has a frontage of 70 ft. on the north side of the road, and is known as a part of Knool House Estate, fronting Devon-place, the purchase-money being stated at 300*l.*

THE PROPOSED NEW AGRICULTURAL HALL, WALLSALL.—The scheme for the erection of an agricultural hall in Wallsall may be said to be now fully arranged, and the project is fairly before the public. It has been formally resolved to form a joint-stock company for the erection of an agricultural hall, the shares being fixed at 2,000*l.*, and their value at 1*l.* each. At a meeting of farmers and others on the subject, the chairman and fourteen other shareholders were appointed directors, and other officers having been named, Mr. Nicholls, architect, gave an estimate of the probable expense of putting up a building 80 ft. long by 40 ft. wide, and was requested to prepare plans for presentation at a future meeting. The directors were also empowered to treat for a site, the plot of land adjoining St. Paul's Chapel being regarded as the most eligible of several named. In the course of the proceedings it was stated that nearly 1,000 shares had been subscribed for prior to the meeting, and this number was considerably augmented before the company separated.

MACHINERY IN THE BRICK TRADE.—On Saturday in last week, Mr. R. White, brick manufacturer, gave a dinner to his brickmakers and other workmen employed at New Grimesthorpe, in erecting an improved kiln and in fixing some machinery for making bricks. Both the kiln and the brickmaking machine are the first that have been introduced into this neighbourhood. The kiln is known as Hoffman's patent. It consists of twelve compartments, each of which is capable of burning about 20,000 bricks, and the kiln is so constructed as to consume its own smoke. The cost of burning the bricks is thus considerably reduced: indeed, it is said that as many bricks can be burnt for a penny as would cost a shilling if burnt in the old kilns. The brickmaking machine, which is patented by Messrs. Bradley & Craven, of Leeds, almost altogether does away with hand labour. All that is needed is simply to cart the clay to the machine, which then does all the rest of the operations required; and the bricks which it turns out are said to be equal to pressed bricks. Mr. White has incurred an outlay of about 5,000*l.* in erecting the kiln and fitting up the machine.

TOBACCO AND VENTILATION.—A novel plan was recently adopted at Berlin for testing the working of a ventilating apparatus attached to the new large hall of the Lower House of Representatives. The 300 men engaged in erecting the building were provided with cigars,—we are not told whether Imperiales or Piquicks,—and shut up in the Hall, with general orders to “blow away.” After a lapse of three hours, the thermometer showed a rise of only one degree, and the atmosphere was comparatively pure, notwithstanding the amount of tobacco (or other vegetable matter) which had been smoked. The apparatus was one by Messrs. Stumpf & Elsner, of Berlin.

ANCIENT IMPLEMENTS.—At the meeting of the British Archaeological Association, held last week, Mr. H. Kettel exhibited a very fine flint implement which had been picked up in the Weald of Sussex. The chairman, Mr. S. Cuming, remarked that the implement was, in fact, made of Hornstone, and was a remarkably fine specimen of the earliest known implements. Mr. Kettel also exhibited a very fine club, II in. in length, made of clay-slate, found near St. Isahel, in South America, in a district where clay-slate does not occur. It was precisely similar to a weapon of half the size found some years since in the North of Ireland. Mr. E. Roberts remarked that the great similarity of implements found in all parts of the world seemed to show that in the earliest times a much freer communication existed than we were disposed to believe.

EASTBOURNE COLLEGE.—A new building for this college is proposed to be erected by a College Building Company, which is in course of formation. Plans have been prepared by Mr. Henry Currey, and are now under the consideration of the council. It is not proposed to erect the whole at once, but only a sufficient part to accommodate about 100 to 150 boys, which can be effected at a cost of about 7,000l. Shares have been already taken in the College Company to the amount of 4,160l. Besides the college buildings, masters' boarding houses will have to be erected, and the council are desirous that one for the Head Master should be commenced at the same time as the college buildings. They are estimated to cost about 5,000l. each, and in order to create a fund for the purpose, and thereby assist materially the object in view, a College Building Company has been resolved upon. At an influential meeting, resolutions in support of the project have been passed, and additional shares taken.

CAST-IRON WATER-PIPES FOR ABYSSINIA.—Three weeks ago a telegram was received from the Abyssinian expedition for eighteen miles of cast-iron water-pipes, intended to convey water from the bottom of the Koomale Pass to Zonia. The first shipload has already sailed from Liverpool. The order for them was distributed amongst the following firms:—Messrs. D. Y. Stewart & Co.; Messrs. Edington & Co., of Glasgow; Messrs. Cochrane & Co., of Middlesbrough; and the Staveley Iron Company, in Derbyshire. The pipes are each 4 in. in internal diameter, 12-32 in. thick, and 9 ft. 3 in. in extreme length, giving 9 ft. clear when fitted; they are all supplied with hored and turned joints. Each pipe weighs about 1½ cwt., and is calculated to resist a pressure of 400 ft. The head to which it will be subjected is only 170 ft. As showing the resources of the Ormesby Foundry (Cochrane & Co.), we may mention that the five miles supplied by this firm were completed in three weeks.—*Iron Trade Review.*

COLCHESTER: ESSEX HALL ASYLUM FOR IDIOTS.—In consequence of an outbreak of fever a new hospital or infirmary has just been erected in the grounds of this institution built of wood interlined with felt and match boarding. It has this recommendation that it can be occupied immediately, whereas had it been of brick it would have had a delay of some months before it could have been used must have taken place. The building is slated upon two open trussed roofs, a layer of felt being placed between the slates and roof boarding. It is 46 ft. long, 33 ft. wide, and contains four wards each, 17 ft. by 15 ft. There are a nurses' day-room and dormitory, kitchen, and two of Monie's patent earth closets. The rooms are lighted by windows and lantern lights, the latter being made to answer as ventilators. The hospital has been sanctioned by the Commissioners in Lunacy. It occupied one month from commencement to completion, fit for occupation, at a cost of about 450l. Mr. Joseph Grimes, of Colchester, was the builder.

THE BATHIST INSTITUTION.—What steps do the directors intend to take? Surely the public have a right to some explanation.

A THEATRE BLOWN DOWN.—Lancaster was lately visited by a heavy gale. The theatre at the top of Penny-street was almost blown down, the only portion left standing being the stage and “scenery.” It was a wooden structure capable of accommodating 1,000 or 1,200 persons.

PROPOSED NEW BUILDINGS AT TAUNTON.—A plan has been prepared by Mr. J. H. Spencer, architect, of this town, for laying out as building-ground the Greenway estate, at Rowharton. It arranges for fifty residences and a church. The residences comprise semi-detached villas of various capacities, with rows of smaller dwellings, each having a garden in front, with courtlage behind. The site is said to be a pleasant one.

PROPOSED NEW STREET IN LIMESHOUSE.—The notice in our last of this proposed short street, to be made by cutting through a very drearful neighborhood (St. Anne's rookery), lying to the north of Limehouse Church, was, by accident, inserted as part of the report of the proceedings of the Metropolitan Board of Works. It should have appeared in the “Miscellaneous.” The new street has not reached the Board of Works stage yet, though we are told it soon may.

TESTIMONIAL TO THE INVENTOR OF THE REAPER. At a meeting of the Highland Agricultural Society, last week, the sum of 1,000l. and a piece of plate were presented to the Rev. Patrick Bell, a minister of Carnylie, Forfarshire, as a testimonial in recognition of his merits as the inventor of the first efficient reaping-machine. The Marquis of Tweeddale made the presentation; and Mr. Bell, in reply, said that it was just forty years ago since he appeared before the society with a little model of his invention.

DISCOVERY IN GAS.—In accordance with instructions received from the Secretary of State for War, some trials in connexion with the consumption of gas have been completed at the gasworks of the Royal Arsenal, Woolwich. It has been found, that by combining hitmen with coal in gas retorts, the gas is evolved with great rapidity, and that it gives an illuminating power from one burner equal to twenty-five spermaceti candles. The experiments, which have been conducted by Captain the Hon. Arthur Cocklin, C.B., of the Steam Reserve, Shrewsbury, have been so satisfactory that 200 tons of hitmen have been ordered by the War Department for use of the Arsenal.

THE TRADE UNIONS COMMISSION.—The Report of Mr. W. Overend, Q.C., Mr. T. I. Barstow, and Mr. George Chance, the examiners appointed under the Trade Unions Commission Act of 1867, to inquire into the outrages asserted to have taken place at Sheffield and elsewhere with the support and connivance of associations of workmen, has just been issued, together with the evidence taken at Sheffield. The report is addressed by the examiners to the commissioners appointed under the Act, and consists of little more than a history of their inquiry, the facts of which received so much attention during its progress. The accompanying evidence, filling 450 folio pages, contains nothing of importance that has not already been published.

A LOCK AND ITS WARDERS.—The *Sunderland Times* tells a story, which may or may not be exaggerated. However, here is the pith of it. “A lock was wanted on premises in Sunderland, of which the Board of Admiralty has the official charge. The proper local functionary accordingly made application to their lordships at Somerset House for an order to hny the lock, which would cost 2s. In due course he received four or five folio sheets of inquiries, the blanks in which he had to fill up, and forthwith return. This having been done, a gentleman was sent over from Tynemouth to survey the hole in the door on which the lock was to be put. He came and returned first-class, and his railway fare and hotel charges came to a good round sum. The surveyor's report was transmitted to London, under the orthodox envelope, and then an order came down to Sunderland authorising the lock to be bought and fixed on the door. Verily, England is a great country, and if it is not exceedingly well governed it is not for lack of what some irreverently call circumlocution, but which the more knowing term painstaking, forethought, and oversight, to prevent jobs.”

THE PROPOSED ART-TREASURES' EXHIBITION IN LEEDS.—A meeting, convened by circular, of gentlemen interested in art, has been held in the Town-hall, Manchester, to receive a deputation from the executive committee of the proposed Leeds exhibition. The deputation consisted of Mr. William Beckett Denison, chairman, Mr. A. Fairbairn, Mayor of Leeds, and other gentlemen. The Mayor of Manchester, who presided, explained that the object of the meeting was to render assistance to the exhibition. Perhaps there was no part of the country that the people of Leeds had a greater right to look to for assistance than to Manchester. In course of the meeting, various gentlemen promised to become contributors; and the Mayor of Leeds said that he had been much associated with Manchester through his relatives, and he was convinced the inhabitants of Leeds would be highly gratified when they heard how handsomely the people of Manchester had responded to the appeal of the deputation.

SERIOUS ACCIDENT BY STORM AT EDINBURGH.—Edinburgh was recently visited by a terrible storm of wind and rain, which lasted six hours. It did immense damage both to the city and suburbs. Men, women, and children were blown down in the streets or injured by showers of falling slates and stones. Even cabs were overturned, and the huge watches, hoots, hats, cages, and other articles that serve as signs, were blown from their fastenings and whirled through the air. The castle buildings were partially unroofed. In Dnke-street a stack of chimneys fell upon a house, and crashed right through it to the very foundation, six stories in all, leaving little standing but the bare shell. Four dead bodies were taken out of the ruins, and two men had miraculous escapes, one of them having been saved from injury by a desk, which fell from garret to basement along with him, and finally rested in such a position as to keep the falling rubbish from his head. The accident was so sudden that one of the dead bodies, that of a clerk, had the arm bent as if in the act of writing. The storm raged with fearful violence in other parts of Scotland, and on the west coast of England as well. The *Western Morning News* gives a long list of fatal shipwrecks on the west coast.

TENDERS.

For the erection of a pair of semi-detached residences, on the Norfolk Park estate, Maidenhead, Berks. Mr. Shrubsole, architect. Quantities supplied:—

Sawyer	£1,359 0 0
Fish	1,486 0 0
Gibson, Brothers	1,486 0 0
Bayes	1,410 0 0
Dover	1,890 0 0
Heavell	1,369 0 0
Garrud	1,357 0 0
Grever	1,530 0 0
Hinsley	1,219 7 2
Russell	1,255 0 0
Dover	1,240 0 0
Keys	1,237 0 0
Nightingale	1,234 0 0
Sharplington & Cole	1,222 0 0
Palmer	1,183 0 0
Wileox (accepted)	1,062 0 0
Neale	1,060 0 0

For building dispensary and relieving office, St. Paneras, Mr. E. C. Robins, architect:—

Collings	£1,027 0 0
Loxatt	1,628 0 0
Saxter	1,476 0 0
Abbot	1,321 0 0
Staines & Co.	1,497 0 0
Sheffield	1,480 0 0
Lathey, Brothers	1,467 0 0
Atcheson & Walker	1,447 0 0
Palmer	1,410 0 0
Nutt & Co.	1,407 0 0
Thomas & Son	1,390 0 0
Newman & Mann	1,395 0 0
Brass	1,381 0 0
Sharplington & Cole	1,375 0 0
Crockett	1,350 0 0
Mann	1,345 0 0
Scribner & White (accepted)	1,341 0 0
Nightingale	1,333 0 0
Perkins (withdrawn)	1,197 0 0

For alterations and additions, at Cambridge Lodge, Harrow. Mr. J. H. Rowley, architect:—

Woodbridge	£650 0 0
Craibe & Vaughan	636 0 0
Shurmer	565 0 0
Sharplington & Cole	553 0 0
Nightingale	543 0 0
Salter	490 0 0
Fole	475 0 0
Chapman	445 0 0

For alterations and repairs to houses, Nos. 4, 5, and 7, Church-row, Aldgate. Messrs. Davis & Emanuel, architects:—

Webb & Son	£280 0 0
Nolley & Son	478 0 0
Ring & Sons	326 0 0

The Builder.

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A Glance at the Position.

IF the legendary attribute of the month of March, that its close is the opposite of its commencement, may be held to apply to the year, 1868 should go out as a lamb, for it certainly enters as a lion. A grave and anxious care seems to brood over the civilized world. Fifty thousand London citizens quit the cheerful blaze of the yule log for the chilly duty of the special constable, — responding to the invitation given by ourselves and by other friends of tranquillity and good order, to see that the stable-door is shut *before* the steed is stolen. The ring of the bricklayer's trowel and the dull thud of the mason's pick, are less audible than is the hammer of the armourer. Too many, from sea-in-chief to "navy," find themselves and willing for the work which is not forthcoming. Our nearest neighbour is ornamenting and touching peace which her present invention, by raising her army from 800,000 to 2,000,000 combatants, and by extending the productive occupation of her youth from a period of seven years to one of nine years, wishing, at the same time, the limit of militia height for a soldier, already reduced by the loss of the first empire. Italy, the very stones which cry out for the magic and fertilising hand of the engineer, has thrown herself back, in a month's insanity, for another sorrowful slide. The great aggressive power of North-Germany pauses only, like the gorged crocodile, to digest the last morsel, before attempting a new swallow. The heirs of the policy of the Great are twisting and stealing towards the coveted capital of the Greek empire. The King of Hungary has hardly learned to recognise himself in his new clothes. Everywhere is portentous expectation, and expectation what injurious kind which stops, instead of stimulating, industrial activity; and that certain political barometer, the national revenue, for the first time for many years, lost its elasticity. The "turn of the year" has brought with it the illustration of that unprecedented and anomalous state of industrial life to which we are not unfrequently referred in these columns. The strong vitality of the commonwealth, using the term in its original sense of the actual well-being of the great mass of the nation, has resisted collapse, not only in that artificial and unsafe stream of credit into which the modern relations of commerce have been developed, but in the vitality of public enterprise, and even in the ordinary confidence of the English character, which has proved a main element of our national prosperity. We regard with wonder the attach-

ment shown by the inhabitants of the towns that lie at the base of Vesuvius to the perilous site of their abodes. Again and again has it occurred that Torre del Greco, Resina, and adjoining villages have been all but extinguished by the earthquakes that accompany an eruption, such as is now actually in progress, of their fiery neighbour. Not a house on the last occasion before the present escaped more or less injury. The most massive and imposing buildings were the greatest sufferers. The direction of the "earth wave" or line of vibration of the shocks, was most distinctly ascertainable from the cracks in the walls and roofs of the houses that were not thrown down. For three or four days after the sudden outbreak of Vesuvius, marked by a roar like the explosion of a gigantic powder-magazine, Torre was deserted, and a stream of boiling water ran in a constant and plentiful rivulet from a new spring that had opened near the town into the blue waters of the bay. Within a week or ten days the awful silence of the streets was exchanged for an unwonted activity. The mason and the carpenter were in occupation. Props and shores and wooden centering rose like a forest; and the ready and ingenious craft of the Italian mason, soldering a huge crack here, throwing a relieving arch there, cutting out and replacing a damaged portion of a façade in another direction, had, in a month or two from the desertion, restored the town to as much apparent comfort and regularity as is ever to be found in those buildings which, being chiefly constructed of tufa, have at the best of times somewhat of a decayed and ruinous aspect.

So it is with commercial credit. Its basis and element are the anticipation of profit. It is to Italian ingenuity that we owe the main instrument of credit—the great lever of the banking business,—the bill of exchange. Any remarks as to the hazardous terms on which the main part of the whole complicated financial relations of the country is conducted, are likely to be received by "men of business," with as much cool compassion as the householder of Torre del Greco will extend to the ignorant stranger who counsels him to change his place of abode. It may be thought that the persons mainly interested are likely to know more than the bystanders. In one respect, at least, they are, if they live long enough, certain to know more. They will enjoy the benefit of actual personal experience. Nay, the convulsions of the credit system occur with even greater constancy than do the Vesuvian earthquakes, while the damage which they occasion is felt over an incomparably wider area. So great an advance have the political economists of our time made in the science of commercial convulsion, that they have detected the existence of a cycle or decennial period, at the expiration of which ruin and disaster may be confidently predicted. A maximum of confidence is held invariably to precede, and to foretell, these periods of extreme depression of the barometer of public confidence. And the long stagnation that has succeeded the sudden thunder-hurst of the 11th of May, 1866, is now explained by the statement that the panic of that year was antedated. Panic was due in 1857—it was abnormal in 1866. The two systems of waves, the illegitimate and unwarranted panic which the failure (we will not repeat the adjectives) of the great bill-breaking house caused on its own account, and the duly to be expected alarm and ruin normal to 1867, have intermingled with mutually augmented intensity. And so an unprecedented tardiness of recovery has intervened.

This great adversity, bitterly felt as it has been by many a fireside, or by many a hearth where fire ought to have been cheerily blazing, in this inclement winter, is not altogether without its uses. Its prolongation, which has been its most painful feature, has perhaps, in this respect, been

its most useful characteristic. It has made men serve a long and unwillful apprenticeship to caution. Nothing short of so continued a strain would have compelled the directors of our great railway companies to set their houses thoroughly in order. This one after another has been compelled to do.

Considerations like these, or, at all events, the facts on which they are based, have called the attention of some of our daily contemporaries to what they term the "elasticity" of the national resources. The most familiar instance of this elasticity is the revenue. For a series of years the revenue has improved more rapidly than experience warranted the Chancellor of the Exchequer to expect. Let him make as much allowance as he could justify to the House of Commons for the increasing productiveness of the diminished taxes, there has been always an odd million or so to the good cropping up at the end of the year. This pleasing phenomenon has, for the time, ceased. The revenue, we are told, has lost its elasticity. It is of little use to quarrel with the language in which so discouraging a statement is made; but we think that the term which has been borrowed from the dictionary of the mechanic is not a happy one. It tends to conceal the actual fact, and, quite unconsciously, to "make things pleasant" by such concealment. Elasticity is not a force. It is merely a certain mode of resistance. It cannot, under any circumstances, improve the original condition of the bodies which it characterises. It can only restore disturbed equilibrium, or facilitate the disturbance which causes motion. But the increase of the revenue has been something far more vital. It has been actual growth. The revenue itself has been in this respect only an index and a consequence of the growth of our national wealth,—of the sound active vitality of our prosperity. So far as this index is to be trusted, growth has become slower. No one can dream that it has been stopped by the fact of arrival at maturity. It must, therefore, have been arrested either by disease or by decay. It is our hope and belief that the former is the true cause, and that acute, and not chronic, disturbance of the healthy functions of the body politic is evinced by this arrest of development. But it must not be overlooked how readily the one may pass into the other; nor must it be forgotten how serious are the symptoms which, as we have again and again pointed out, indicate that unless, in some particulars, treatment and regimen are changed, John Bull has trouble before him.

It is dangerous to mistake analogy for argument. That which is, perhaps the most powerful element of the rhetorician is logically of no value. But so long as men use speech, and are not driven by stress of business to think in telegrams, illustration will form a main part of language. It is no less true that both analogy and illustration are often guilty of misleading the mind. When we see part to resemble part, we are apt to conclude that the whole resembles the whole. It is impossible to reflect on the subject without becoming aware that in our impersonation of countries and states, in our representation of masses by individuals, we tend towards a confusion of ideas. We see that to a certain stage the analogy holds; we see that by-and-by it breaks down; we do not trouble ourselves to work out the idea thus arrested to its legitimate conclusion. Thus we may compare the wealth, the confidence, the good fortune of the country to that of the sturdy squire whose lineaments are so familiar to our comic draughtsmen. John Bull sometimes pulls a long face, but we never conceive it possible that he should come to great disaster. Countries never die, we think, and John Bull, if down in his luck to-day, will be himself again to-morrow.

But let us take home to our reflection a remark of one of the most philosophical writers

who has ever used the English tongue, the author of the work called "Ancient Law," "The unit of ancient society," says Mr. Maine, "was the family." The individual was unknown as a distinct element regarded by the lawyer. Let us carry on the observation, and seek analogies for the prosperity or decadence of a nation in the history of a family. We shall now find the parallel to be exact. Then comes home the knowledge of the dilapidation that may be effected by the prodigal son; of the weight on the family property of numerous jointures, charges, and mortgages; of the maintenance, generation after generation, of a corporate existence, while the head of the house is either increasing in wealth, and advancing in social influence and position, or gradually and unwillingly being dragged down by a combination of errors and mischances of his ancestors, his children, and his kinsfolk, from which he is unable, by his best efforts, to extricate himself. Such is the position of an independent state amid the sovereignties of Europe; and with such an illustration before us we can scarcely close our eyes to the importance of the service that the labour of each class renders to the welfare of the whole community, and to the peril and disadvantage that the failure of a single industry, the beggary of a single craft, causes to the entire nation.

This pause in growth is a warning that we shall do well to take to heart while as yet the mainsprings of the national welfare are untouched. We have suffered no material evil since the arrest of our cotton supply,—none at least but such as comes within the ordinary chances of the more or the less advantageous. Our losses and gains have been, for the most part, either upon paper or amongst ourselves. The nominal or selling value of much of our property has been unduly diminished. This makes little difference to the holder unless he seek to sell. Even in that case the nation is only a nominal loser. Our loss in 1856 and 1857 has not been deprivation of what we possessed, it has been simply cessation of production. We have not wasted large sums in war, we have not lost accumulated capital in foreign loans or in ill-advised speculations. We have failed to set the "drugging goblin" of the nineteenth century his annual task. We have not extended the rich frontier of the kingdom of steam. In ordinary trade there has been ordinary activity. We have eaten and drunk, housed and clothed ourselves much as usual. But we have done little for the future; little in the way of making our estate more productive by a present outlay; been content with the magazines, and roads, and ports that we found to our hand, and increased our possessions accordingly, little or none. In our defences, indeed, we have made some progress, though slow, and even in this particular rather theoretically than materially, rather by experiment than by armament. This is a state of things that we cannot safely allow to continue. The active rivalry that obtains in the social community obtains also in the community of nations. It is not by exhausting the resources of the country, in order to maintain a disproportionate force, that a nation secures any real advance. The opposite is the case. In the development of national wealth, in the true and evident sense of the term, lies the secret of national power. In the direction of the energies of the workman to the exercise and to the mastery of his craft, and not to the tinkering of the laws, is to be sought alone the maintenance and the restoration of that pre-eminence which the British craftsman has so long enjoyed that he has forgotten that he must labour to maintain it. The good sense of our working classes is, we rejoice to believe, awakening to this important truth. Very often are their actions such as ought to put to shame many of their self-elected guides and interested friends. They have another step to take in the present year, and we shall never be surprised if they take it before their political guides have finished their debates on its possibility. No one can mix much with the producers of labour without becoming aware of the strong instinctive demand for improved education. If the wisdom of Parliament fail to give us workmen's schools, it may be that the co-operative instinct of the workmen may put their legislators to shame. Of one thing we are sure, and that is, that it is only necessary for the real producers of labour, whether by the sweat of the brow or the wasting of the brain; whether by hammer, axe, tool of iron, or subtle quill, to become fully aware of the great revolution which is now going on in

the field of labour, to know what the working classes of Germany, of Belgium, even of France, are actually doing in this respect, in order to come to the front in the bloodless battle, and to show that the men among whom the steam-engine and electric telegraph were born are not about to allow themselves to be distanced by those who owe their great mechanical and social progress to English origination.

PROFESSOR G. G. SCOTT ON EARLY ARCHITECTURE IN BRITAIN.*

THE subject of the architecture of Pre-Norman England,—that is to say, of England (exclusive of Wales and the counties occupied by the Britons), between the arrival of Augustine in 536, and that of William of Normandy in 1066,—a period exceeding by ten years the interval between the reigns of Edward III. and Queen Victoria,—has been held by some to be involved in such utter obscurity as to leave it uncertain whether any such architecture existed, or, at least, whether we have any means of ascertaining what it was; and yet no period of history is, perhaps, more replete with accounts of the foundation of cathedrals, monasteries, and churches. The cause of this is clear. The churches of this period were, no doubt, frequently of timber; but, of whatever material, were subjected,—first to the destructive effects of the repeated devastations of the Danes, and subsequently to the greater architectural ambition of the Normans which led to a perfect mania for reconstruction. The consequence is, that we have no cathedral or great abbey or church remaining of this period, and have to content ourselves with such evidences of their style as may be gleaned from among ordinary parish churches for the most part in rural districts, and consequently of a humble class.

The historical notices of the erection of churches during the Anglo-Saxon period are more frequent than descriptive.

On the arrival of Augustine, he found the Church of St. Martin, Canterbury, already used by the Christian King Bertha. This was, no doubt, a Romano-British structure. He found also a second, but in ruins; and this he made the nucleus of his metropolitan cathedral. He constructed also a third, afterwards called by his own name. We know, too, that in his day were also founded the cathedrals of Rochester and London; and there is no reason to doubt that all of these were of stone. I am not aware that we hear anything more, in Anglo-Saxon days, of St. Martin's, or that we have any description of the Norman Conquest in the writings of one Eadmer, a singer at the cathedral, who wrote early in the twelfth century. Recapitulating the account of its having been erected by St. Augustine on the site of a Roman church, he proceeds to say that in the days of Archbishop Odo, in the tenth century, the roof had become so decayed as to require renewal; that Odo took the opportunity of increasing the height of the walls, and that the work occupied three years. He also tells us that a church dedicated to St. John the Baptist had been added by Archbishop Cuthbert in the eighth century near the east end of the church for baptisms, &c. He says that the church escaped the destruction threatened by the army of King Sweyn in 1011; but was subsequently burnt down by accident, and remained in ruins until rebuilt by Lanfranc.

He, further, gives a very clear description of the church, from which it appears that it was built in some degree on the model of the Basilica of St. Peter at Rome. He minutely describes the eastern altar space as greatly raised above the general level of the church, and having beneath it a crypt or confessional, made in the likeness of that of St. Peter at Rome. He further describes an oratory and altar of St. Mary at the western end raised on steps, behind which was the pontifical throne. Also two towers, the one on the north end the other on the south side of the nave, projecting beyond the aisles, and containing chapels.

Professor Willis, in his admirable history of the cathedral, gives an able dissertation on its plan at this period, showing how precisely the description of the eastern arrangements agree with those of the Basilica of St. Peter, but that

the Chapel of the Virgin at the west end must have been a western apse, like those so common in Germany, and of which we have an earlier instance in the ancient design for the arrangement of the monastery of St. Gall, supposed to be of the eighth century. Eadmer confirms his account by saying that he can answer for its correctness, for he saw the ruins himself when a boy at school.

From the above description we learn, first, that a Roman model was taken; secondly, that the church was of stone or brick; thirdly, that it had aisles; fourthly, that it had both an eastern and western apse; beneath the former of which was an extensive crypt, called a confessional, as containing the tombs of confessors.

The additional church of St. John was clearly a baptistery; and Professor Willis thinks that Archbishop Odo's addition to the height of the walls was a choir-story. I am not aware that we have any information as to the cathedrals built by the companions of Augustine (Mellitus and Justus) at London and Rochester; but it is unlikely that they would be otherwise than of cognate plan and materials; while, curiously enough, there continues to this day at Rochester, and continued to the seventeenth century in our own St. Paul's, equally as at Canterbury, a crypt beneath the elevated sanctuary, no doubt the lineal successor and representative of those erected by these missionary bishops, in imitation of the great basilica at Rome, whence they had been sent to evangelize this distant region.

A few years later, Paulinus, another Roman missionary, succeeded, under circumstances very similar, in converting to Christianity Edwin, king of Northumbria, who, while receiving instructions preparatory to his baptism, built a temporary church of timber at York; but subsequently erected around the same, and under the instructions of Paulinus, a larger and nobler church of stone, which was completed by Oswald, his successor. Here, again, we have still remaining the choir-crypt,—the probable successor of that of the original church, and as some say, containing a relic of its actual structure. Thus, we have the two metropolitan cathedrals distinctly recorded as erected of stone by their first bishops.

Bede also relates that Paulinus built a stone church, of beautiful workmanship, at Lincoln, the walls of which remained at the time he wrote, though, by some mischance, it had lost its roof. It is clear, however, that some of Paulinus's churches were of timber, and, later on, we find St. Aidan and St. Finan,—missionaries from Iona,—erecting a cathedral of that material in the Island of Lindisfarne "*mona Sodororum*."

Shortly afterwards, however, a church was built, after the monastic rule of Lindisfarne, but of stone, at Lasingham, in Yorkshire; where, again, we find the choir crypt,—the successor of the original one,—remaining to this day. Still in the seventh century, we have a more minute account given us by Bede of the works of Benedict Biscop, in the erection of the monastic church of Monk Wearmouth. This church he built of stone, "according to the manner of the Romans, which he had always loved." He built also, the church at Jarrow of the same material and the existing remains of both I shall have presently to describe. So much did he consider himself a follower of the Roman manner, that he went, over and over again, to Rome, to procure ornaments wherewith to decorate his two churches. This was about 670 and 680.

The successor of Benedict Biscop is said to have sent architects to Naulan, king of the Picts, to make him a church of stone after the manner of the Romans.

About the same time we find St. Wilfrid the roughly repairing, glazing, and "washing white than snow," Paulinus's Church, at York, an building two of great splendour (according to the ideas of the times), at Hexham and Ripon.

The former is described by a contemporary writer in extatic language, as "supported by various pillars and porticoes, adorned with marvellous length and height of walls, and with passages of various turnings; nor was it ever," he adds, "heard that such another church was erected on this side the Alps. He tells us, also, of its ornaments of gold and silver and precious stones," and of its altar, clothed with purple and silk hangings. This church remained, though in a damaged state, till the twelfth century, when the Norman prior describes it in very similar words to those used by the Saxon historian. He speaks of the crypts at

* See p. 70, ante.

terracean oratories, the walls of great height, divided into three distinct stories supported by polished columns, some square, and others various forms," of the "capitals of the columns . . . And "the arch of sanctuary," "decorated with histories and images and great figures carved in relief in stone and metal, displaying a pleasing variety and wonderful beauty." The body of the church was surrounded by aisles and porticoes, which with wonderful art were divided above and below by "sloping and winding stairs:" above he describes "galleries of stone," by which "a vast multitude of persons might be there, and pass round the church without being visible to any one in the nave below."

Of the church at Ripon, the contemporary historian says that "he [St. Wilfrid] erected and finished at Ripon a basilica of polished stone in its foundations in the earth to the top, supported on high by various columns and porticoes." This church was founded by Odo, archbishop of Canterbury, in the tenth century, "reduced by the same and hostile incursions to a deserted and desolate solitude."

All the buildings of the erection of which we have briefly enumerated the records, were erected within a century of the arrival of St. Augustine. Within the same century (about 660) we have reason to believe was erected the church at Brixworth, in Northamptonshire, which still remains in a fragmentary state, but which shall presently show, with sufficient proofs, to have been founded on the plan of a nave basilica, with an aisled nave and an undivided choir, an apsidal and aisled sanctuary and high on a vaulted crypt. This church is but a humble dependency of the great cathedral of Peterborough.

We would not have fatigued you with these elementary accounts, had I not felt it desirable to prove the importance of these earliest temples of our English Church. Cathedrals, churches, and monasteries were, in fact, built throughout the length and breadth of now Christianized England. The more important buildings were of stone; many of the humbler of timber.

At times of trouble were at hand: "there is time to break down" as well as "a time to build up;" and what the Christian English had, the Pagan Northmen too often overthrew. In Alfred's time (though in the reign of his successor), we find Croyland, Peterborough, and other monasteries ruthlessly destroyed, in some cases they lay desolate for very long periods of time, though in others they were speedily restored.

As a later period, a new impulse was given to building by the introduction of the Benedictine monks, and we find monasteries either founded or reformed on this rule throughout the kingdom. Two descriptions of such Benedictine churches I quote, the first being from the history of Ely Abbey, in the time of Dunstan.

The architect's name is for a wonder mentioned in this case: it was Adnoth, and he, as it would seem, from Worcester. The architect is said to have had "two towers rising from the roof. The smaller of these towards the west, in front of the Basilica, presented a fine arcade from a distance to those entering the choir, standing upon four columns connected by arches stretching from aisle to aisle." This brief description seems to indicate a church with aisles, transepts, central tower, and a western tower. It may be, however, that the word "aisle" signifies not an aisle, but merely a sept.

For the other church I will refer to under this title is the Cathedral of Winchester, as rebuilt in the reign of Edgar. It had been founded in the days of St. Birinus, the first missionary to the West Saxons, about 635. Athelwold, made bishop of Winchester in 963, was a great restorer of churches, which had been devastated by the Danes. Among those restored by him were especially named those of Ely and Peterborough. He renovated and partly rebuilt the cathedral at Winchester, which was renovated in 980. It is described by Wolstan, in a poem addressed to the succeeding Bishop St. Elphege. He speaks of the "lofty walls and arches, and various aisles; the many windows which so distract the attention, that a stranger is at a loss which way to turn, seeing it open to him on all sides." He mentions also "the fine roofs of intricate structure, and the brilliant variety of the fabric." St. Elphege is said to have added a new apse, with "secret

crypts, where secret recesses lay on every side, the structure of which supported the holy altar, and the venerable relics of the saints." "A sparkling tower," also "that reflects from heaven the first rays of the sun." "It has five compartments pierced by open windows, and on all four sides as many ways are open. The lofty peaks of the tower are capped with pointed roofs, and arc adorned with various and sinuous vaults, curved with well-skilled contrivance. Above these stands a rod with golden balls, and at the top a mighty golden cock, which boldly turns its face to every wind that blows."

Again, however, came the ruthless Northman, and destroyed church after church throughout the entire course of his desolating march.

No former incursion probably had been so fatal to architecture as that of Sweyn. Its very success, however, brought its own cure; for his son Canute, being allowed to succeed to the English throne, not only became Christian, but devoted himself with exemplary piety to repairing the devastations which the sacrifice of his father and himself had perpetrated. He not only repented, but brought forth works meet for repentance; so that the last half-century of the history of the pre-Norman England, is replete with accounts of the restoration and building of churches.

The foregoing notices are sufficient to show that throughout the continuance of the Pre-Norman English Church buildings were constantly being erected of considerable dimensions and sometimes of great intricacy, and even of some degree of splendour of design; and that the more important of these were uniformly of stone, though the humbler ones were often of timber. It further shows that the architectural style of these buildings, as well as the internal arrangement of the churches, was intended to be an imitation of the Roman buildings of the same period.

We will now proceed to inquire into the existence and character of any remains of buildings of this period.

Of the more important structures, I may say at once that nothing remains; the ambitious character of the Norman builders having led them to reconstruct on a larger scale all the cathedrals and great monastic churches, excepting, indeed, that one which they found in course of re-erection at Westminster, and which was designed in their own style.

There exist, however, throughout the length and breadth of the land, remnants, and, in a few instances, large portions, of buildings of a wholly exceptional character; not assignable to the Norman or any other of the well-known styles which have prevailed in England, but evidently of earlier date. They are clearly not early Norman; for, with the single exception of the round arch, they have nothing in common with the specimens of that style erected in the reign of the Conqueror, but are clearly of a style quite distinct from them. In one instance, we have a tower known to have been erected in the days of the Conqueror in juxtaposition with the remains of a church in this more ancient style; and in many other instances we have Norman features in connexion with these mysterious remains, and to every eye asserting the entire diversity of their art. In some instances, again, as at Monk Wearmouth, Jarrow, Brixworth, and Deerhurst, the remains of this style are on the sites where churches are recorded to have been built in Anglo-Saxon days. These remains correspond in character with buildings represented in Saxon illuminated books. They evince in many instances evidence of having been built in rude imitation of the Roman works of these periods, though in some instances they seem also to suggest the imitation of timber construction.

The most obvious rules of induction, then, point to the conclusion that these are the remains of buildings of Anglo-Saxon date. The leading characteristics of these remains (though not all of them to be found in every instance, and probably varying with the date) are as follow. The frequent decoration of the external walls with pilaster strips, as is so common in Early Italian churches, and afterwards in Germany; the bonding of these by alternate vertical and horizontal stones; the imitation of this mode of bonding in quoins where no such strips are used, and in the jambs of doorways and other openings, excepting where Roman brick is made use of, which is of frequent occurrence; the jambs of doorways running square through the thickness of the wall, without recessed orders, and the door itself hung against the inner face of the wall; the frequent use of a

kind of pilaster on either side both of doorways and arcways, the impost moulding sometimes breaking round, and sometimes stopping against them, and a continuation of the pilaster going round the arch; the occasional use of triangular heads to doors and windows; the use of what are called baluster columns, or short pillars, turned in a lathe, not unlike Elizabethan balusters, bulging in the middle and ornamented with a number of mouldings of trifling relief, such as turners of all ages delight in (these are used for the division of windows, and other purposes); the windows, which are usually set high in the wall, are often equally splayed within and without, and the arches sometimes more splayed than the jambs, and slanting upwards like a bonnet; a very abnormal kind of mouldings, unlike those of any other style, and generally a very strange archaic look in the whole of the work, which makes one conscious of being in the presence of the works of men in a very pristine state of civilization, the style having little or no relationship to those Mediaeval buildings with which we are familiar.

I ought, also, to mention the frequent use of tall, narrow towers, unbroken, or nearly so, in their vertical outline, either simply quoined with the long and short work already mentioned, or with their surfaces diversified by pilaster strips and string-course, the intervening surfaces being usually built of rubble and plastered. The halfy-windows are often of two lights, separated by a baluster or other form of pillar set in the middle of the wall, and bearing a transverse bracket of stone, to enable it to support the whole thickness of the wall. Such towers are clearly imitations of the Italian campanile, though in a rude form. They occasionally have oblique strips as well as the vertical pilasters and horizontal strings, which suggest the idea of an imitation of timber-work; at other times the pilasters are united by arches.

It is not easy to describe the general plans of churches, as the remains we possess are too scanty to be generalized upon. Some had aisles, some transepts without aisles, many had neither. One, at least, has a central tower without transepts; and at least one a central tower with transepts. Some had apsidal chancels, and some had the square end. The towers, in a great majority of instances, are at the west end. The walls are in some cases by no means low, and the naves occasionally of greater width than is usual in village churches of later periods.

What forms were made use of for the pillar we are but imperfectly aware. One of the notices I have quoted speaks of their being square and of other forms. The few which remain *in situ* are of the former kind, mere fragments of wall; but at Worth Church there are, in the jambs of the chancel arch, half pillars, 2½ ft. in diameter, with very perfect capitals; and certainly an entire pillar of this form must have suggested the demi-column. At Canterbury there are two round columns brought from Reculver, which are clearly of Anglo-Saxon date. Their capitals are of the most remarkable form.

I will make special mention of a few Pre-Norman churches and fragments of churches as specimens; but to do more in a lecture such as this would be both tedious and unprofitable; for, however interesting the study of the primeval architecture of our race, it must be confessed that, while in general plan these churches are the progenitors of those we think worthy of imitation, we cannot venture to say so much of their details.

I exhibit a plan and a general view of Brixworth Church, enlarged from drawings kindly lent me by Mr. Roberts, who has given the church the most careful study. We have documentary evidence of the erection of the church by the abbots of Peterborough, about 680. Being near the ruins of a Roman station, it contains much Roman brick.

The chancel, or rather the sanctuary, was apsidal, with a surrounding aisle, and raised high on a crypt of corresponding plan. This sanctuary and aisle open by three arches into a choir of 30 ft. square, and this, I think, by a single arch, into a nave about 30 ft. by 60 ft.

This nave had arcades opening into either aisles or, as Mr. Roberts thinks, into chancels or oratories, the foundation of which he has found. The arches are turned in Roman bricks, very strangely used; a steep skewback being formed for their springings to reduce the angle of convergence, and so moderate the thickness of the mortar-joint, which, in arches of such a depth, would have been inconvenient. The nave and choir have had a clearstory, the windows of

which have arches of Roman bricks. This is thought by some to be a later addition, from the reduced thickness of the walls; but of this I feel far from certain. Mr. Roberts suggests it as possible that the wide nave was again subdivided by arcades; but I confess I much doubt this.

To this original church a western tower was subsequently added, in which the Roman brick does not take so prominent a place; and later still, though still in Anglo-Saxon days, a very large round stair-turret was added, west of the tower.

The alterations introduced when the tower was added are clearly visible, especially the introduction of a triple window with haluster pillars, looking from the second story of the tower into the church.

I exhibit also a plan and other drawings of the till lately ruined church on the Castle-hill at Dover. Here, again, Roman bricks have been largely used, both for quoins and arches, and some other parts. The church is cruciform, with a central tower, the transepts being narrower and lower than the nave. Wide and lofty arches open into the tower on the east and west, but those on the sides were, no doubt, low and narrow, and consequently were replaced by larger ones late in the twelfth century. The chancel is square-ended. The windows are of a very large size, and about equally played without and within, and had wood frames for the glass, the grooves for which were quite distinct. The main doorway seems to have been that on the south side. It has stone jambs of long and short work running square through the wall, the door having been hung against the inner surface. The arch is of brick, and a pilaster strip flanked it on either side and ran round the arch. Similar, on a small scale, was a ruined doorway, found in the north transept, and now restored precisely to its original form. Similar, also, are the windows of the tower, which were treated like doorways, with a shutter within. At the west end stands the ancient Roman pharos, from which was a communication to the church, both on the floor-level and also above. The latter had a doorway in a very perfect state, which opened into a western gallery, of which I found the holes for the insertion of the timbers. Beneath this gallery, on either side, was a small window, which, for want of room for an arch, was made square-headed, with splayed wooden lintels, of which the exact impressions of the ends were found, giving its precise form.

The tower arches have the pilaster strips on either side, each of its western face, and continuing round the arch. Each has a stone impost with very abnormal mouldings. Several very ornate balusters of Caen stone were found among the ruins. They appear from their freshness to have been always *interna*, and I fancy formed parts of a screen under the western arch of the tower, of which some foundations apparently remain. Externally, the quoins are partly of Roman brick and partly of long and short work, with very large stones. This is, perhaps, the most nearly complete of all our Pre-Norman churches. There is no clue to its date. Some call it a British church: some say that it was built by Eadwald, the son of Ethelred, about 640, and others that it is of a much later period, to which opinion I confess that I incline.

Another nearly complete church is that at Worth, in Sussex. The plan may be said to be that of the Dover Church, omitting the central tower and adding an apse. The transepts, like those at Dover, are small, and their arches low and narrow, while the chancel arch assumes almost majestic proportions. The transept arches (now much mutilated) had the pilaster strip, both to jambs and arch, with a double square impost of massive proportions. The chancel arch is more artistic in its treatment, having a large demi-column in either jamb, 2 ft. 6 in. in diameter, with a regularly formed, though plain, capital; while, instead of the pilaster, a smaller semi-column is placed against the face of the wall on either side, and indirectly carried round the arch in the form of a square projection. The arch itself is square in section, and runs without break, through the thickness of the wall. No doorway nor window of the original date remains. The walls of the nave are about 25 ft. high, and are divided at mid-height by a large string-course, above which the windows were probably placed. The angles have pilaster strips in long and short work, and similar strips are placed at intervals along the walls reaching up to the mid-height

string-course, all of them standing on a continuous base of two massive courses of stone. The half height string-course of the nave is continued round the transepts, as are caves course, and run across their gable ends. The chancel was externally dealt with much as the nave, though a little less in height. This church had no tower, and, as a curious commentary on the fashionable opinion that the Anglo-Saxons nearly always built of timber and their successors in after-times of stone, we find a timber tower of the fifteenth century added to the stone church of Saxon date!

At Bradford, in Wilts, a very complete church has but recently been discovered; having previously been so surrounded by buildings that its character was unnoticed. I give drawings of it, made by my friend Mr. Irvine, a zealous antiquary, who has also sent to the Academy a cast of some uncouth sculpture found there. The church consists of a nave and chancel, and has every characteristic of Anglo-Saxon work strongly developed.

At Jarrow-on-the-Tyne, the chancel of the Saxon church remains. It has few characteristic features. The windows are of a very pristine form, in this case with no external splay, the jambs of upright stones with horizontal stones for imposts, and arches cut out of single stones. They have been walled up at a very early date to a certain thickness from the exterior with very small perforations,—some circular and some more elongated,—in the filling up wall. This, I fancy, was done as a means of defence. There is one doorway, which is a plain arched opening running square through the wall, the door having been hung as usual against its inner face, and the jambs formed of large stones facing the reveal. There are some signs of an apse having existed, but of this I cannot speak with any certainty. A tower was erected between the nave and the chancel—as I am informed by a local antiquary—in the reign of the Conqueror. The nave has long since perished, but in the walls of a modern erection on its site were found, used as building material, about twenty haluster columns, some 2 ft. 3 in. high and a foot in diameter, of which I exhibit some drawings. This was in all probability the very church erected by Benedict Biscop, and in which the venerable Bede worshipped.

At Monk Wearmouth are the remains of the other church of Benedict Biscop.

This church was burnt, as also was that at Jarrow, by the Danes in 867, and both remained in ruins till about 1074, when (or a few years later) both churches were re-roofed and raised to their sacred use. It was at this time that the tower at Jarrow was erected.

The most interesting portion of the church at Wearmouth is its western end. From this projects a tower evidently of Anglo-Saxon date. This tower has arches on three sides of its lower story, which, till recently, were not only walled up, but almost buried in the accumulated earth.

In September, 1866, they were excavated, and the western entrance opened out by the local Archaeological Society, with the help of Mr. Johnson, architect, of Newcastle. The side doorways were found to have monolith jambs, 6 in. wide on the face, which are notched into a continuous cill, and support massive imposts, from which the arch springs, with very bold vousoirs. The western entrance, which is 6 ft. 4½ in. to the springing and 4 ft. 6½ in. wide, has an arch springing from massive abut 10½ in. thick, which are supported by haluster-shafts very similar to those found at Jarrow, two of which occupy the width of the wall on either side, and stand upon jambs each of a long and a short stone, the reveal of which is curiously sculptured with entwined serpents. This is decidedly the most remarkable doorway of this kind yet known. Above the doorway runs a hand or string sculptured with animals and edged with the cable mould. At the same time, the two lower stories of the tower were found to have originally formed a gabled porch,—two windows, of construction very similar to the side arches above described, having been stopped up in the end of the church by the conversion of this porch into a tower. Baluster-shafts have been discovered in the internal jambs of these windows.

At Jarrow, amongst many curious fragments discovered, is a stone in which is sculptured, as a continuous ornament, a long row of the balusters represented on a miniature scale as if they were established as arcades and windows are in Gothic architecture as a mere ornament.

The church at Stow, in Lincolnshire, con-

tained extensive remains of Anglo-Saxon work, but of doubtful date. The church was founded about the time of Paulinus, as a cathedral for the Bishops of Lindsey, but was burnt by the Danes, as it is believed, in 870. It was refounded about 1040. The tower arches and transepts are in one style, but of which date is doubtful. I confess I think the preponderance of evidence is in favour of the earlier date. Foundations have been discovered of aisles to the nave, clearly of the same age with the transepts. The older parts show everywhere marks of fire, and the transepts have been heightened in Saxon times; and, as I should think probable, at the time of the second foundation. The present nave and chancel are Norman. I have been enabled by the kindness of my friend, Mr. Pearson, to exhibit drawings and photographs of this venerable church, once the mother church of Lincolnshire.

There exist several crypts beneath chancels, which are of this date. Among these, besides the fragmentary remains at Brixworth, I will mention one not generally known, at Wing, in Buckinghamshire. It is of excessive rudeness, being built only of very rough stone; but it is notable for the completeness of its plan, being apsidal, with two ranges of piers, and as having remains of the two doorways through which it was approached by steps from either side of the chancel arch.

The apse in this case is polygonal, with pilaster strips up its angles, and parts of the nave are of pure Norman date, and show clear evidence of its having had aisles.

The crypt at Repton is famous for the finished and decorative form of its architecture. I give a drawing of it.

The crypt at Linsteadham is not of Saxon date, but its Norman successor. The original church was destroyed by the Danes. Its foundation I have already noticed.

The most numerous of the Anglo-Saxon remains are the bell-towers. These have almost always the peculiar characteristics which I have already noticed. Their number is so great that it would be impossible to enter into any enumeration of them. One of the best known, perhaps, is that of St. Benet's, Cambridge. It has pilaster strips up each angle, with long and short work. The string-courses are merely square courses: each story recedes a little in width. The lofty windows are double, divided by a mid-wall haluster, and bracketed, and there are plain windows again over their spandrels. The intermediate surfaces were plastered. The tower arch is of strangely rude design. The tower of Trinity Church, Colchester, is peculiar, as being, to a great extent, of Roman brick.

Earls Barton tower is the most remarkable of its class, uniting the profuse use of pilaster strips, diagonal strips, arched strips, long and short work, haluster columns, and other characteristics of the style. I have noticed here that the majority of the arches are so in form rather than in construction, some being cut out of the solid, some built up with horizontal courses projecting one over the other, and others, again, formed by a number of flat stones set on edge one behind another, and the arched opening cut through them all.

Baruch Tower is something like it, though with less variety,—a more Cyclopean look. I give some excellent drawings of it by my friend Mr. Graham Jackson.

The tower at Barton-upon-Humber bears considerable resemblance to that of the Earls Barton, though with less profusion of the usual characteristics and less rudeness of construction. This tower is rendered remarkable by having attached to it a very large and lofty western porch, apparently of about the same date.

Among the most remarkable towers, however, is that at Sompting, in Sussex. Its most striking characteristic is, that its sides are each gabled, and it is roofed like the typical steeples on the Rhine. I am told that an instance of this also existed at Flixton, in Suffolk. The details at Sompting are somewhat elaborate.

The tower of Clapham Church, in Bedfordshire, is chiefly remarkable for its great simplicity and plainness. The chancel arch, of great simplicity, here remains, as did one window of the chancel (a small honest-arched opening like some in the tower itself) till destroyed recently by a stupid builder.

One more building, I must notice. It has often been mentioned that our Anglo-Saxon forefathers built largely of timber; and, strictly to say, after the lapse of more than eight centu-

ries, we have one of their timber structures remaining!

Edmund, king of East Anglia, who had been slain by the Danes in the ninth century, had been canonized; and on the invasion by Sweyn, more than a century later in 1011, his relics were removed from Bryr St. Edmund's to London for security. On their being carried back in 1013, an old register of Bryr informs us, "he was also sheltered near Angre, where a wooden chapel remains as a memorial unto this day."

This chapel still exists at Greensted, near Ongar. It consists of cleft oak-trees grooved and tongued together by their edges, and let into grooves in horizontal sills and heads. The exterior of the trees was exposed on the outside of the chancel, the sapwood of which having long since perished, the furrowed and gnarled heart is now seen, presenting a most ancient and interesting appearance. It is more than thirty years since I visited this most venerable relic. Since then it has been repaired; but I trust that its antiquity has not been compromised, and that it will long remain as a relic of the royal saint, and a visible exponent of the old Anglo-Saxon verb *getymbrtan*—to build.

I must not, however, go on enumerating specimens: they will be found in great numbers in several publications, as Mr. Bloxam's "Principles of Gothic Architecture," Mr. Parker's "Glossary," Britton's "Antiquities," and elsewhere; while very interesting articles have been written on them by Mr. Freeman, Mr. Ayliffe Poole, Mr. Paley, and others. In my own practice I every now and then fall in with minor specimens not mentioned in books, and often walled up and hidden from view, to make way for later work.

Fragments of Saxon crosses are frequent. They are usually covered with that platted ornament so frequent in the illuminations of the period.

In proof of their early age, we often find them imbedded, as mere material, in Norman walls. In St. Peter's, at Northampton, I found the base of one of the Norman columns to be wrought out of a piece of one of these crosses; and at Jarrow there are several portions of them built into the tower, which was itself erected in the reign of the Conqueror.

Though this form of architecture sprang over a period of some 470 years, we have little or no means of classifying it into distinct divisions of date. It would seem that the system of rapid change which characterizes the centuries succeeding the tenth had not then commenced, and that much the same manner of building pervades long spaces of time.

On a conjectural view of the case, one would look, perhaps, for the following divisions:—

1st. From the arrival of Augustine to the earlier devastations of the Danes.

2nd. From the time of Alfred to that of Dunstan.

3rd. The period of the general establishment of Benedictine rule up to that of the devastations of the Northmen under Sweyn.

4th. That from the accession of Canute to the Norman conqueror.

Mr. Freeman divides the style into three:—
1st. The direct but rude imitations of Roman work, of which Brixworth is an instance.

2nd. The developed Saxon manner, with its high towers, its pilastered stripes, and suggestion of imitated timber-work, as at Earls Barton, &c.
3rd. That in which Norman features are introduced or anticipated.

I may mention, however, that we have proofs, as at Deerhurst, which is said to have been rebuilt in 1056, and elsewhere, that the style remained with little modification to the last.

I shall show you in my next lecture (in which I propose to treat of the earlier Norman buildings, erected by those who actually came over in the days of the Conqueror or of his companions) that the two styles overlapped; that there were pre-conquestal Norman and post-conquestal Saxon buildings. I will, however, at present detain you no longer; and if I have trespassed upon the rules of the Academy by giving a lecture more on *archæology* than on *art*, I must apologize on the ground that I have treated of our own early efforts at architecture; of buildings whose bold and archaic rudeness was so strangely accompanied by exquisite skill in other arts,—as in illumination, in embroidery, in jewelry; and the contemplation of which, to use the eloquent words of Mr. Freeman, "Should raise a thrill of patriotism in the heart of every genuine Englishman," "whose barbaric grandeur breathes in its fulness the spirit of England's ancient days of freedom and isolation," and reminds us "of the long roll of our native saints and heroes; of holy bishops and no less holy princes; of Ina, and Alfred, and Athelstan; of Bede and the martyred Alphega; of Harold and Gurth, and Leofwine; of St. Wolstan and Abbot Frederick; of the battle-axe of Hereward and the martyr-block of Waltham; and all the glorious train of the 'England of saints' are yet she bowled beneath the yoke of a foreign lord."

THE DRAINAGE OF LAND.*

Soils that require Drainage.

MR. STEPHENS, in speaking of this subject, gives it as his opinion, arrived at by dint of long and extensive observation of the state of the agricultural soil over a large portion of the country, "That not one farm is to be found throughout the kingdom that would not be much the better for drainage."† Fully sharing in this opinion, it may be said that lands absolutely requiring drainage are, all peat mosses, clays and tenacious soils, and others of a more porous character holding water, such as silts, sands, gravel, and chalk, and all soils in which springs exist; in fact, all lands of every description whereon the produce cannot be consumed at any season without detriment to the stock feeding thereon or without injury to present or subsequent produce. Drainage is very advantageous to grass land in improving the quality of the herbage and the healthiness of the stock. It is true that in many cases the result appears to be at first unfavorable. This cannot be better explained than by quoting from the prize essay on the management of grass land by Mr. Robert Smith, who observes: "The remark, that land has been overdrained, is familiar in many districts; hence it is inferred that the pastures have been spoiled. Now this inference is inapplicable to the draining: the soil being changed for the better, the food of the aquatic grasses having been removed they become dry and inactive: it is true the existing grasses become more like stubble than grass, but having so far changed the soil, it is equally necessary to change the herbage by other agents, such as suitable top-dressings to sweeten and increase the herbage, that the truly important branch of close-feeding may be effected. The pasture then becomes gradually improved, and Nature supplies her indigenous grasses, suitable to the then improved character of the soil, as the aquatic or other spurious grasses, in the absence of their food, decline."‡

On the same subject another authority says,— "Jow, wet, clay soils may be converted into good pastures by draining them well; and the improvement thus produced is so great, that judicious draining in such soils is the most profitable investment of capital.§

Let it not be supposed that the indiscriminate drainage of all pastures and meadows is here recommended. There is an old saying,— "Let well alone;" and when a field is superior to any in the neighbourhood, is yielding large supplies of food, and the stock are healthy, it would be folly to experimentalise upon it. Judgment and discretion in the application of drainage are as necessary as in every other alteration and improvement.

Time of Year to Drain.

The time chosen for putting in drain-pipes must be regulated by the cropping and other circumstances; but it may be stated, that the drier the weather the better for the drainage. In clay soils, the drying action of the air and wind on the trenches allows the soil to contract and form the crevices necessary for the rains to escape to the drains. Experienced drainers recommend the month of February for the work, and that the pipes, receiving a light covering of soil, should be left open through March, if it be a drying weather, by which means the cracking of the soil is much accelerated, and the complete action of the drains advanced a full season.

In laying drains in a silty soil, the worst time to choose is when the ground is full of water; the feet of the men working in the grips cause the silt to purge, so that it is impossible to get a good and even bed to lay the pipes on; and

even when laid they are extremely liable to choke, by the loose silt in the trenches being washed in by the water which pours out of the ground. If the pipes are laid when the silt is dry, or only slightly wet, the bottom of the trenches may then be taken out hard and firm, and the ground, owing to the effect of the drainage, will never again become so charged with water as to make them liable to be stopped up; and even should the ground, from any exceptional cause, be drowned, after the soil in the trenches had once become settled and consolidated, there would be no danger of the water washing it into the pipes, as it would find its way to them through the regular crevices or canals. A few years since the author had occasion to lay some large drain-pipes at a depth of 5 ft., under a road, for carrying away sewage, the soil being silt, and at the time very full of water. In fact, the "soil" was within a few inches of the surface, and it was only with the greatest difficulty the pipes could be laid, the water pouring in out of the sides of the ground, causing the bottom of the trench to purge and be all alive. The pipes were ordinary stoneware socket pipes, and the joints were made good in the sockets with well-puddled clay. In the course of a very short time the ground on either side for a very considerable distance became dry; in fact, a large pool of stagnant water more than 50 yards away dried up, and has remained so ever since; but from time to time the surface of the road kept settling in places, and this went on to so great an extent that it became necessary at last to open out the trench and examine into the cause: when it was found that the pressure of the water, soaking out of the sodden silt, had forced an opening through the puddled joints into the pipes. In many places the silt had eaten away all the clay, leaving the joints bare, and the pipes were found to be nearly full of silt, and had to be taken up and relaid. Such an instance has never happened in the author's practice when at the time of laying the pipes the silt has been free from water.

Whether, then, for a tenacious or a porous soil, it is better, where possible, to choose a dry time in preference to a wet one. The only advantage of wet being to make the digging better and to give the workmen a guide to level by, which may be accomplished by other means to be explained hereafter.

Depth.

Perhaps on no question relating to drainage has there been a greater diversity of opinion than as to the depth at which drains should be laid below the surface. The two great drainage engineers, Mr. Smith and Mr. Parkes, who may be considered the founders of the modern system, entertaining very different views. Mr. Parkes advocated drains 4 ft. and 5 ft. deep, and from 10 to 13 yards apart on stiff clay, and 14 to 19 yards on mixed soils. Mr. Smith's opinion was, and he carried it out most successfully in his practice, that distances of 6 to 8 yards, with depths of from 2 ft. to 3 ft., have been found, over extensive tracts, and in soils of various texture, to effect complete thorough drainage for agricultural purposes; and that he had invariably found from experience that when distances beyond 8 or 10 yards had been adopted in compact soils, there had not been a perfectly uniform dry condition of the soil, especially when rain had recently fallen. Another great authority, Mr. Spooner, considered,— "That in the generality of soils drains are not safe at a depth of much less than 3 ft., and that they may to greater advantage be laid at a depth varying from that to 4 ft.; but he had not seen evidence to prove that a greater depth than this is attended with such advantage as to sanction the increased incidental expenditure." Mr. Stephens, in endeavouring to determine the proper depth, remarks that a drain is not a mere ditch for conveying away water; were it only this, its size would be easily determined by calculation or experiment, of the quantity of water it would discharge in a given time. But the principal function of a drain is to draw water towards it from every direction; and its secondary purpose is to convey it away when collected. The depth of a drain, he further remarks, must to a certain extent be regulated by the culture of the ground; that for ordinary ploughing and cross furrowing it may safely be assumed that a greater depth than 10 in. is never reached, but in an soil and trench ploughing the ground will be disturbed to a depth of 16 in. or 18 in.; that the drawing portion of the drain ought to lie below this, and

* See pp. 40 and 51, ante.
† "Book of the Farm," vol. 1.
‡ Journal of Royal Agricultural Society," vol. ix.
§ Rham's "Dictionary of the Farm."

in a tenacious soil 1 ft. is sufficient to allow for it, so that in such a soil a depth of 2 ft. 6 in. is the minimum, and when the subsoil draws slowly the depth should not be less than 3 ft.

Having quoted the opinions both of engineers and agriculturists of the greatest experience, the various points to be noticed in determining the depths will now be considered, which, after all, must be regulated by the special circumstances of each case, rather than by any fixed rule.

The object to be kept in view in determining the depth of any drain, as already stated, is that it may be placed so deep that, while it rapidly draws and conveys away the surplus of the rainfall, it shall also be so situated as most effectively to promote a circulation of air, and allow the moisture to be drawn up from the subsoil below the drains to the roots of the plants in dry weather. Where no special circumstances arise to prevent it this object seems to be most effectively attained where there is a covering of 3 ft. on the top of the drain pipes; and this may be taken as a safe depth to lay drains, whether in tenacious clays or silts and more porous soils; and 8 yards or 9 yards in the former class of soils and from 10 yards to 15 yards in the latter, is as great a distance as the drains can drain the water from the soil with uniformity and regularity.

A depth of less than 2 ft. 6 in. or 3 ft. does not allow of sufficient space for the proper filtration of the water. Earth has a wonderful facility of absorbing from water any organic matter which it contains, and this has been taken advantage of in many towns, to purify the sewage which is allowed to flow over the surface of the land, and to gravitate through it to the under-drains, from which it passes away clear and pellucid. But there must be sufficient of the filtering medium, or else the water will escape to the drains, together with the greater part of the matter held in suspension. If two drains, the one very shallow and the other at a proper depth, were watched after a heavy rain, it would be seen that the water running from the shallow drain would be muddy and turbid, while that from the deeper one would be clear and bright. This is especially the case in a field which has been recently manured; and thus a great part of the virtue of the manure is carried away to the drains. Shallow drains are also very liable to choke in silty or sandy soils, by the fine particles of earth washing into them.

On the other hand, it must be borne in mind that any increase of depth adds considerably to the expense of the labour; and if it does not add to the efficiency, is only waste of time and money. There may be special circumstances where drains may be advantageously laid at depths from 4 ft. and 6 ft.; for instance, supposing a mouldy, deep soil, 4 ft. in depth, resting on an impervious subsoil; in this case the drains ought to rest 3 in. or 4 in. in the subsoil, making them more than 4 ft. below the surface. By neglecting to descend a few inches in certain soils, many of the benefits of drainage may be lost. Again, where springs occur it is often necessary to lay the drains at considerable depths, and to resort to special means of getting rid of the water, as by boring down through an impervious soil to the porous stratum below. But these are cases which fall within the province of the engineer, and need not, therefore, be further alluded to.

But if it be waste of money laying drains too deep, it is worse than useless laying them too shallow. Many hundreds of acres have been drained with the pipes scarcely out of reach of the horses' feet, and have now to be re-drained. An authority writing on this subject, says,—So generally is the practical part of the operation diffused, that every manager of land conceives that he knows the whole subject of draining so correctly that he will commence his operation with the utmost confidence of success; and this confidence has caused much money to be expended in draining that has in great part been ill-directed. Were the efforts of ignorance in draining confined to the squandering of money, they might be compensated for by superior management in the other operations of the farm; but unfortunately the sinking of valuable capital in injudicious draining cripples the means of the farmer, and at the same time prevents his reaping all the advantages derivable from drainage itself.*

Shallow drains have been laid under the erroneous idea that the water enters the pipes at the top, and flows immediately through the

soil into the drain; the fact being that the water enters the pipes at the sides or bottom, and a field may be drained with tiles laid at a depth of 9 in. or 1 ft., and yet the surface be wet and ponchy. A striking instance of this came under the author's notice a short time ago. Having occasion to lay a main drain across a grass field for the purpose of conveying away water from an adjoining site, it was found, on opening the trench, that the field had been under-drained with pipes, laid at a depth of about 9 in. below the surface. These drains were perfectly dry, although the surface of the field was so wet that the water oozed up over the hoot-soles. The trench was cut 3 ft. deep, and as soon as a depth of 2 ft. was reached, the water began to flow freely out of the sides of the trench, and continued to do so for more than a week, during which time it remained open, the land for a great distance on each side becoming dry and firm. The soil was a clayey silt, of a class that receives very great benefit from drainage; but here money had been completely thrown away, which, if it had been expended under the guidance of skill and experience, would have been of the greatest service.

Although it is recommended that 3 ft. should be considered as a minimum depth under ordinary circumstances, there are cases where a drain laid 2 ft. deep will prove more effective than one laid at a greater depth. The depth a drain is laid must always depend on the outfall; and there are many cases in fens and marsh land, where the state of the outfall ditches and drains will not allow of a greater depth than 2 ft. The pipes should never be laid so low that their ends are buried in the water in the ditches into which they empty; such a practice is simply laying pipes for the purpose of soddening the land with water instead of draining it. It completely stops the whole circulation of air, and arrests all the benefits to be derived from a properly laid drain. A drain laid 2 ft. deep, and free at the end, is far more effective than one laid 3 ft. with the outfall constantly under water.

The outfall should always be the first care in draining, and, where it is deficient, means should be taken for improving it by scouring out and deepening the ditches. This may involve works on adjoining lands, and is more a matter for a civil engineer than an agriculturist; but it may not be out of place to remark that special enactments of the Legislature have given powers to carry out works on the lands of adjoining proprietors where necessary to procure outfalls, and have also given great facilities for mutual operation where the works may be beneficial to several adjoining estates.

The outfall of the drains, where they empty into the ditches, should be constantly inspected, to see that they are free, and not stopped with weeds and earth. The ditches ought to be regularly scoured out and cleaned once at least every season; and the master of the farm should make it his own peculiar business to inspect the outfall-pipes, to see that they are clear. It is a good plan to lay the last tile of the main drain on a flat paving tile or brick, and to place a small iron grating before the mouth of it, to prevent the vermin from getting up; and too much care cannot be bestowed in keeping these outfalls clean and free.

Direction and Fall.

Drains should always be laid to run with the fall of the land, and not across it. A different theory was held for a short time by some drainers, but practice has proved, what theory would teach, that the drains should fall with the land, the only exception being in the case of springs. A consideration of the subject will show that the water has the least distance to travel to the drains when laid in this manner, and, when there, will get away most quickly. For, supposing the strata to have the same inclination as the surface, and the drains to be laid 30 ft. apart, the water will of necessity flow in the direction of the strata, and a part of it must, therefore, travel 30 ft. if the drains be laid to run across the slope; but, on the other hand, if they be laid to run with the inclination, the water will flow from the centre space between the drains in both directions, and thus have only 15 ft. to travel, or only half the distance.

When the inclination of a field is in one direction, the drains should be laid parallel throughout the field, terminating in a main laid at right angles to them across the lower end of it; and if there is a ditch at the upper end they should be continued through the headland to it,

which will allow a free current of air to pass through them. In an undulating field the main drain should be carried up the hollow part of it, and the minor drains brought in parallels down the inclination to it.

Where a field is in one plane, and level throughout, it is better to lay the main across the centre of the field, letting the drains radiate from it at right angles towards the sides. The object being to get rid of the water quickly, the less run it has through the small pipes the more rapid will be the discharge, the friction in the mains being much less than in the smaller drains. And so, in a very large field, it is never desirable to lay the smaller drains of a greater length than 200 yards. Some engineers allow 300 yards as a maximum length, and instances have come under the author's observation where 2-inch pipes laid in a clay soil in lengths of 20 chains have been in effective working order for the past ten years, and will possibly remain so as long as the pipes last; but, under ordinary circumstances, 10 chains may be taken as the maximum safe working length.

The fall of the drain must be guided more by the shape of the ground to be drained than by any arbitrary rule. Where the surface of the ground slopes, the drains should be laid parallel with the slope, and have the same mean inclination; but where the field is a horizontal plane, it is better that the drains should be laid perfectly level than that a fall should be acquired by laying them shallow at one end, and deep at the other, a practice recommended by some of the early drainers. The advantage gained by a fall, thus acquired, is neutralised by the varying effect the difference of depth must have on the uniform drying of the ground. The distance the drains are apart is determined with reference to the depth; therefore if the drain be laid shallow at the upper, and deeper at the lower end, the distances must either be too great at one end, or too little at the other.

Fall is not necessary to the safe working of drains. By the action of gravity, water is attracted towards the earth's centre, and travels towards that point until its progress is arrested by some impediment. Water varies from more solid substances in that all its particles are free to act. If a piece of wood be dropped from a height, it falls bodily, and retains its shape, the cohesion of the particles of which it is composed counteracting the action of gravity on each individual particle, and allowing it to act only on the mass; but the particles of water have so little cohesion, that every particle is free to obey the influence of gravity; and therefore if a body of water be allowed to escape from a vessel, each particle immediately acts on its own account, and seeks the lowest place it can find; that is, the nearest point to the earth's centre. So when the rain falls on the land, in obedience to this law, it soaks downwards through the earth; still pursuing this law, it is attracted to the drains, and in the haste to reach a lower place, each particle pushes the others on till the drain is emptied. Fall only assists this action, because all falling bodies acquire a velocity, in proportion to the height from which they fall; and so the greater the fall the greater the velocity, and the greater the velocity the greater the power to overcome obstacles, and the more certain and rapid the discharge. Thus, while fall is a great advantage, and even a necessity in drains which convey water having matters in suspension, as in town sewers, in enabling the water to keep the drain free from deposit, it is not absolutely necessary to the discharge of clear water, or for land drains laid at a proper depth; and many miles of drains have been laid that are now doing their work well, which have not an inch of fall.

A good working inclination for a drain is 1 ft. in 4 chains, which is equal to about $\frac{1}{4}$ in. in a length of 10 ft.; and for an open outfall ditch, 4 ft. in a mile will be enough to enable the water to flow away with sufficient rapidity to keep the drains clear and prevent injury to the land.

Where pipes are laid level, or where only a very slight fall can be obtained, the main should, wherever possible, be laid lower than the small drains, and the end pipes should always tip, or be laid at a greater inclination than the others, in order to assist in drawing off the water.

The connexions of the drains should never be made at a right angle, but the smaller pipes ought always to be made to enter the main with a curve, or at a very obtuse angle. The reason for this is obvious. When one current of water impinges on another at a right angle, it

* "Book of the Farm," vol. i.

causes a stoppage in both, and hinders the flow: an eddy is thus created, and any heavy matter held in suspension is precipitated, having a tendency to choke the pipes; whereas, if the smaller stream has the same direction given to it as the larger, by the pipes being made to join the others with a curve, the united currents flow on together without interruption. Experiments made in sewer-work resulted in ascertaining the fact, that when equal quantities of water were running direct, at the rate of 90 seconds, with a turn at right angles, the discharge was only effected in 140 seconds; whilst, with a turn or junction, with a gentle curve, the discharge was effected in 100 seconds.*

Irregularities in the cutting of the grips and in the form of the pipes are far more injurious to efficient drainage than want of fall. It is of the first importance that there should be no hills and holes in the bottom of the grips, but that a regular inclination, when there is a fall, should be given throughout the whole length of the drain. In selecting pipes, those should be chosen which are evenly burnt and which are not warped or twisted; and care be taken in laying them in the ground that the ends properly fit. There is a very great difference in the manufacture of pipes, owing either to the want of care and skill on the part of the maker or the nature of the clay of which they are made; and those yards should be selected which turn out true and straight pipes, although it may involve either extra cost in the purchase or extra leading.†

W. H. W.

FROM PARIS.

The cold weather having ceased, the works of demolition are being donbled in activity for the prolongation of the Rue de Rennes to the Place St. Germain-des-Prés, and for preparing the junction of this street with the Boulevard Saint-Germain. Already the block of houses formerly bounded by the Rues Bonaparte, Goulin, Childers, and d'Erforth has disappeared. On the opposite side clearance has been made as far as the Rue de l'Égout. The Mont Parناسse Railway Station is now visible from the Place Saint-Germain-des-Prés, and the *coup d'œil* is magnificent, especially as Saint Germain-des-Prés is on an eminence of considerable height.

The works for the new park of Mont Sorris progress rapidly at the side of the Bièvre. Two railways, in open cutting, traverse the new park, viz., the line from Paris to Seann and the Paris circular railway. To the west of the park are to be constructed, as we stated at page 714, vol. xv., the enormous reservoirs, similar to those of Menilmontant, to receive the waters of the Vanne for the further supply of Paris. At the south-east angle of the new park are to be placed open and covered riding and training schools for the cavalry. At the south, on the Boulevard Jourdan, in the gorge of a bastion, new barracks have been erected for the *employés* of the *octroi* and their families. Lastly, one of the points of observation of the meridian of Paris passing through Dunkirk, Montmartre, the Observatory, and Perpignan is at the south, and in the park itself.

Works are extensively carried on for the Boulevards drags, starting from the Place Enfer, Mont Parناسse, continued as far as the Boulevard de l'Hôpital, and Moulletard, between the Gobelins and the Place d'Italie; also the Rue Monge, and the Place Fer à Moulin, which will be an important thoroughfare. The ancient Faubourgs Saint-Jacques and Saint Marcel have already been pierced for these arteries some months since. The last works for the circulation of the Rue Monge are finished and the street opened, thus affording a convenient communication between quarters which were formerly separated more by the difficulty of access than by distance.

One of the most curious hotels of ancient Paris, is the Hôtel de Sens, at No. 1, Rue du Figuier, in the St. Cervalis quarter, dating from A.D. 1500, and built by order of Tristan de Salazar, Bishop of Sens, as we now see it. Before the construction of this hotel, there existed near the river, on the Quai des Célestins, a hotel, of the same name, which was constructed in the fourteenth century, and purchased by Charles V., to form the Hôtel Saint Paul, the irregular *ensemble* of which was composed of several buildings and hotels, such as those of Saint-Marr, Puto-y-muce,

&c. In 1622 the building was sold, and up to the year 1790 was the property of the Archbishop of Paris. It is now occupied by M.M. Lesage and Paignard, manufacturers of sweetmeats. The recent demolitions which have taken place around this remarkable building, led to fear that the fine front, with its two towers, would be sacrificed; but this ancient dependence of the Hôtel Saint Paul is to be preserved. The neighbouring space left vacant by the demolition of the Ave-Maria Barracks, is to be converted into a market. The Rues des Barres, Du Figuier, and Du Fauconnier, are to be widened out, or partly destroyed. At the corner of the Rue du Fauconnier there may be seen a niche, with its socle finely sculptured, on which was placed a small statue of the Virgin. Below is inscribed,—AVE MARIA. This is all that remains of the ancient Convent of Ave Maria, dating from the thirteenth century.

In the twentieth *arrondissement* a new hospital is to be constructed, so as to serve a district composed of a portion of Belleville, La Courtille, Menilmontant, and Charonne. The façade of the monument is to be parallel with the façade of the new mairie of the twentieth *arrondissement*.

The New Opera House began early to "pay its footing" in fire. On Sunday, the 19th ult., a fire broke out in the new building at the extremity of one of the *colonnades* leading to the Salle. The fire, which it is presumed was communicated to a tarpaulin screen by a stove chimney serving to heat the *ateliers* of the modellers, was put out at once by the *sompniers*, with a few buckets of water. An arch blackened by smoke and flame shows what proportions the fire would have acquired had it not been speedily extinguished.

On the Place du Château d'Eau, a vast promenade has been laid down in *huitmes*, corresponding to that already made at the right of the entry of the Boulevard du Prince Eugène, the dispositions of the latter *promenoir* being symmetrical with those of the former. Each contains four rows of young plane-trees, planted with every care, and calculated to give shade next year. Not less than 200 trees are employed in this portion alone. The site formerly occupied by the ancient fountain now re-erected at La Vilette abattoirs, has been levelled, and the Place du Château d'Eau will in a short time assume its architectural proportions.

FROM GERMANY.

Berlin.—The works connected with the new National Gallery are steadily progressing. The foundation-stone was laid without any public ceremonial by Professor Strack, the architect from whose designs the building is being erected.—A "Victory," by Rauch, has lately been unveiled near Babelsherg, the residence of H.R.H. the Crown Prince. Three steps of Camenz granite lead to the pedestal, which, together with the statue upon it, is of bronze, cast at Lauchhann. The height of the whole design is about 40 ft.—The battle-fields of Düppel and Alsen are about to have monuments commemorating the victories of the Prussians in the Danish peninsula. They will both be Gothic, somewhat like our Eleanor "Crosses," and about 60 ft. high. The cost of the one at Düppel is estimated at about 5,800*l.*; that at Alsen at about 4,500*l.* They will be executed in sandstone, and ornamented with figures representing the various branches of the service.

Vienna.—Professor Ferstel has completed his designs for the projected Austrian Museum. It is in the Renaissance style, and the internal arrangements specially include the means of accommodating a school of art.—The "Concordia" Club is about to erect a new club-house on a site given to it by the Emperor. Messrs. Schachner & Deter are the architects, and the building will cost about 12,000*l.*—On the occasion of the unveiling of the Schwarzenberg Monument, Professor Dr. Hähnel, of the Royal Academy of Dresden, received the Leopold Order, as did also the architect, Mr. Schwarz.

South Germany.—Those who have visited Nuremberg, and remember the dilapidated state of the cloisters of the Carthusian Monastery, now used as the "Germanic Museum," will be glad to hear that the sums now collected warrant the immediate commencement of the much-wanted reparation. Old King Ludwig and others have sent contributions of 250*l.* and upwards,

whilst the chief cities of Germany, North and South, have contributed to this national work.—The Committee for the Restoration of Frankfort Cathedral, lately partially destroyed by fire, call upon all natives of that city residing in foreign countries to subscribe and to collect from other Germans funds in aid of the Cathedral of the Kaisers.

GENERAL EXHIBITION OF WATER COLOUR DRAWINGS.

The fourth "General Exhibition of Water-colour Drawings," as it is called, in the Dudley Gallery, Egyptian Hall, consists of 684 works, ninety of which are by ladies. While many eminent names are in the list of contributors, such as E. M. Ward, R.A., F. W. Cooke, R.A., W. Cave Thomas, H. Dawson, F. Dillon, Holman Hunt, with others to whom we will briefly allude presently, this exhibition serves to bring before the public a number of promising artists, and some more than promising artists, at present little known out of doors. The exhibition as a whole is very interesting; thoughtfulness and harmoniousness being observable in the majority of the pictures. Mr. Poynter exhibits the original drawing for his now well-known picture "Israel in Egypt." Mr. Yeames has a picture, "Exorcising" (87), the merit of which becomes more observable the more it is studied; and Mr. Marks one of the best drawings he has yet made. For manipulative dexterity parts of "Heliogabalus, High Priest of the Sun and Emperor of Rome 118-22 A.D.," by Simeon Solomon, are a marvel.

Foremost amongst works of the as yet less known artists we must place "Preparing for Guests" (49), and "An Eavesdropper" (154), by A. C. H. Linnmore, for whom we prophesy a good future. Vicat Cole exhibits a charming landscape, "Evening Shadow" (283), and in the same department (75), by Geo. Mawley; "Luccombe Chine, Isle of Wight" (265), Frank Walton; "The Homeward Rookery" (323), M. F. Halliday; "Betwix-y-Cood, North Wales" John Ernest Croft; and several more, deserve the same adjective.

Amongst other noticeable works are "Calatafimi, the scene of Garibaldi's first victory in Sicily," Talmadge White (though over-hard); "A Mideummer's Night's Dream at Hampton Court" (353), Adelaide Claxton; Mr. C. Leslie's heads; and Mr. Donaldson's earnest works.

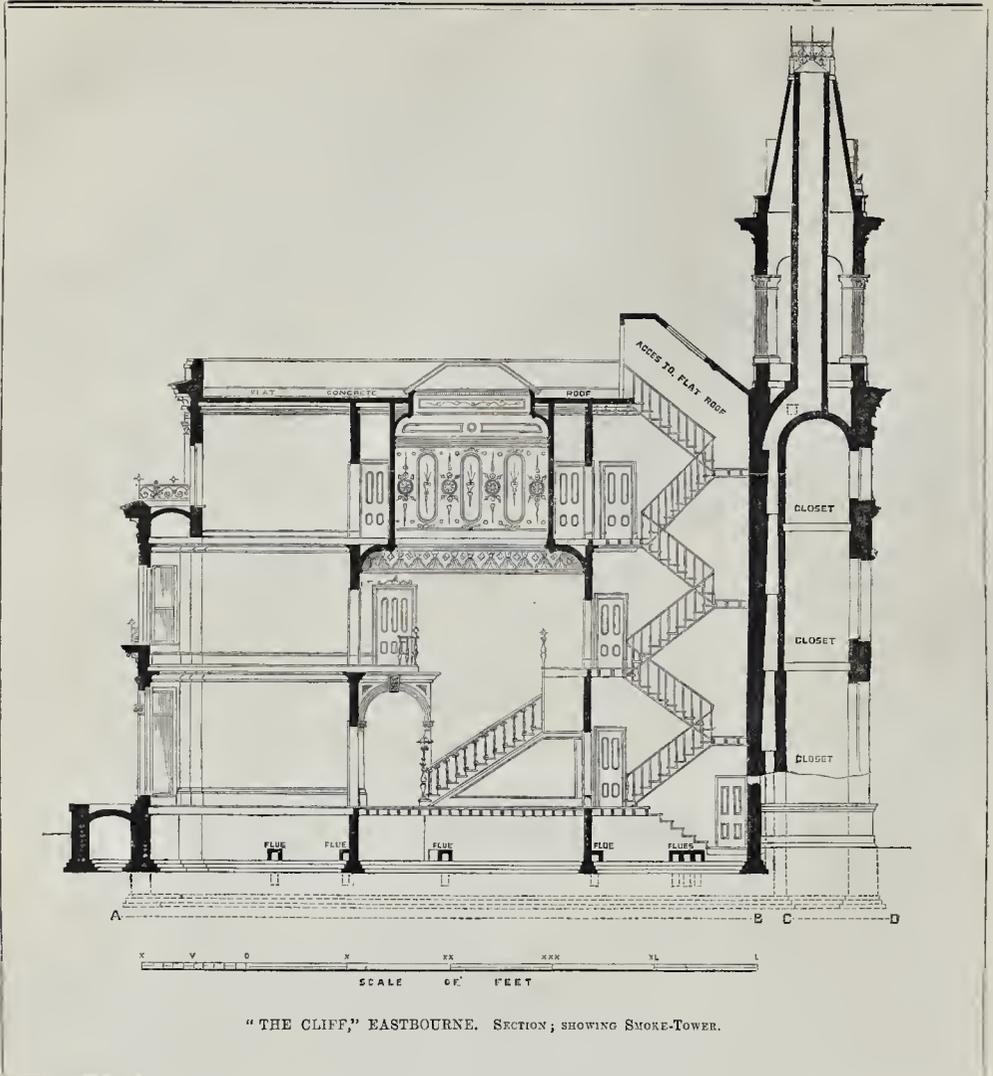
A RESIDENCE AT EASTBOURNE, WITH SMOKE TOWER.

The Cliff, Eastbourne, of which we give three illustrations, is now in course of erection for Mr. William Earp, of Eastbourne, upon land leased from the Duke of Devonshire; Mr. Henry H. Vale, of Liverpool, recently elected a Fellow of the Institute, being the architect. The site of the house is commanding; it is about half a mile to the west of Eastbourne, on the way to Beachy Head, with a prospect of the English Channel, Pevensey, Hastings, and St. Leonard's; and is approached by a new road, made by shelving down the escarpments of chalk, and so forming a terrace upon the face of the cliffs. This road has been recently made from the plans of Mr. Wallis, the resident surveyor, under Mr. Currey, the architect to the Duke of Devonshire, who is the owner of the land here,—in fact, of the whole of the land upon which modern Eastbourne has been built.

Those who know Eastbourne only from recollections of seaside holidays in the "Old Town," with its quaint tint houses, and ancient church, say some ten or fifteen years ago, would be much astonished on visiting the Eastbourne of to-day, with its handsome villas, hotels, and promenades. The present Duke of Devonshire has greatly promoted this change, and Eastbourne now bids fair to become one of the most architectural of our watering-places. The house under notice will, when finished, be a conspicuous building, partly from its elevated situation, and partly from its dimensions and skyline, but the special feature to which we purpose calling attention is the absence of visible roofs and chimneys.

The magnificence of the view suggested to the proprietor the idea of having the roof finished flat, to serve as a promenade, and, in order to remove the objections arising from the contiguity of chimneys, it was arranged that the

* Sanitary Report, 1852. † To be continued.



smoke should be carried into a smoke tower, some 55 ft. high at the angle of the building, as shown in the accompanying perspective view.

The plan of basement, which we have engraved, shows the direction of the horizontal smoke tunnels; and the section represents the construction of the same, together with that of the smoke tower. On reference to these drawings it will be seen that the smoke from the ground and first floors is to be drawn downwards to the basement by the extracting power of the tower, and taken thence in a double tunnel, 100 ft. long, underneath the vineries and conservatories to the base of the smoke tower. In order to regulate the draft, a system of dampers has been arranged so as to give command over the flues, whether only one or several fires be lighted. This tower is also used as a ventilating shaft, the vitiated air from the apartments being drawn upwards to the flat roof of the house (from each room and closet just underneath the ceilings) by means of wall cavities, and then conducted across the shaft in the tower, which is divided by a wall into two parts, the one serving for the smoke, the other for the foul air. Of the efficacy or otherwise of the mode adopted we have not at present the means of judging. Smoke and ventilating flues from

the stable buildings are also brought underneath the stable yard of the base of the tower, where they join the smoke shaft.

The main entrance to the house is by a large portico between the vinery and conservatory, with large glazed doors opening into them from it to the right and left, affording a view of the range of houses spanned by light iron roofs, with ornamental iron principals, and divided by glazed screens. The porch, vestibule, and hall under lantern light are to be paved with variegated marbles, with sunk avenues for strips of pile carpet to the various doors. The fireplaces of the rooms surrounding the hall are so arranged that the hall can be heated through ornamental metal grilles projecting into the hall and covered with marble tops. Steam piping is to be laid on throughout the halls and passages and attic story. There will be a Turkish bath and hot and cold showers upon the chamber floor.

The sloping nature of the approaches calls for careful treatment by terracing, so as not to cut off the views of the house, by running out the plateau upon which it stands too great a distance. This plateau has been formed by removing the top of the conical hill to a sufficient distance to receive the house, outbuildings and lawn, the gardens being placed at a lower level.

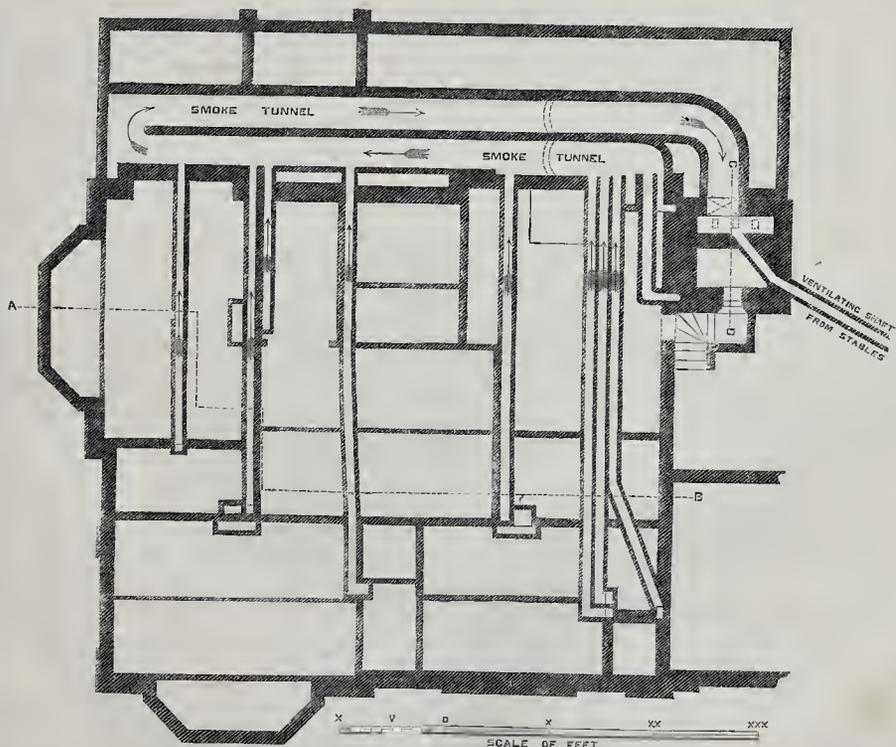
The upper parts of the stabling and offices are seen in the perspective view.

The bay windows of the house open on a terrace with steps and balustrades, the same being laid with Minton's tiles. In order to admit of a wide range of view the bays have been constructed of large dimensions, being 18 ft. in the clear opening. These and other windows are to have balconies and crests of ornamental iron-work, as indicated in the view. The materials of the buildings generally are local bricks, covered on the exterior with Portland cement. There is neither stone nor lead used throughout the works (excepting Portland stone for outside steps and landings); the interior piping is all of iron. The baths are of hard wood, screwed together and well painted.

An enclosed passage above the cove of the lantern of main hall leads to the various apartments on the second or attic floor; the servants' stairs are continued, as shown upon the section, to the flat roof, which covers the entire building. This roof is constructed of joists brick-grouted, concrete, and cement; the upper surface of flat being laid with falls to channels or gutters, which take the water to the down spouts. The cement which forms the top finish of the roof is of a special manufacture, found to answer the purpose in other buildings. The



"THE CLIFF," EASTBOURNE, SUSSEX. WITH SPECIAL ARRANGEMENTS FOR SMOKE AND VENTILATION. —MR. H. H. VALE, ARCHITECT.



PLAN OF BASEMENT. SHOWING POSITION OF SMOKE-TUNNELS.

arrangement of the rooms with regard to aspect has required consideration. Owing to the proximity to the chalk cliffs the heat in summer becomes intense.

The style adopted for the exterior dressings and interior decorations and enrichments may be called Anglo-Italian. Owing to the absence of the two leading features, viz., roofs and chimneys, the architect has had a somewhat difficult task to perform to produce a satisfactory architectural effect. As will be seen from the perspective view, he has designed the façades with strongly-accentuated grouped pilasters at the angles, finished at the top with acroterial terminations for skyline, the breaks being slightly pedimented.

Pressed bricks and stone being at Eastbourne very costly, almost all the buildings there are coated with Portland cement. The tower will form a belvedere, with open arches, and angle pilasters, leaving a space to walk round the circular smoke and ventilating shaft in the centre. The space not required for the smoke-flue on the lower stages is used for closets to the bedrooms and oven for the kitchen.

Provision is made for access to the top of the tower inside the ventilation flue, for painting the iron crests and for repairs.

We shall be glad to hear of the success of the system adopted for heating and ventilating this house. Mr. Vale is fortunate in having a client with the courage to leave the beaten track. It is the more important, therefore, that every care should be taken to render the experiment successful. Whether or not, the heat of the smoke-tower might be further utilised seems worth consideration.

Mr. Charles Naab Foster, of Whitefriars, London, is the sole contractor; Mr. Taylor, the resident foreman; the works being carried out under the architect's superintendence.

THE SEWAGE QUESTION.

MR. SLAGG, in a pamphlet recently issued,* objects not only to the casting of town sewage uselessly into the sea, but to the combination of towns as proposed in the Thames Valley, for its distribution, and even to its concentration in single towns. Sewage, he considers, ought not to be accumulated into one unwieldy mass of fluid anywhere, but should be radiated from towns in several directions, and distributed to the soil by underground or sub-soil pipes, or covered tile gutters rather, of a simple character, with serrated side openings, such as we have already described in the *Builder*; and these would require to be taken up every three or four years, by help of a ripping plough made for the purpose, and replaced for other three or four years as before; the sediment clogging them being ploughed into the soil on which it is deposited. Thus much difficulty as to the obtaining of sufficient ground for irrigation would be overcome, as in no one spot would a very large expanse of surface be required; and as building extended round a town, the irrigated suburban market garden, or farming ground, could be given up, and the sewage taken farther out in different directions around the town as might be requisite.

Mr. Slagg's system may be called the individualizing by contrast with the generalizing; the radiating by contrast with the concentrating, on which so many minds are now, as he thinks mistakenly, at work. And there is much in Mr. Slagg's system to recommend it to serious attention at the present moment.

On this plan an inhabitant of Kingston thus writes:—

"Surface irrigation has been tried again and again, and is an acknowledged success. The Commissioners for Preventing the Pollution of Rivers, after visiting Norwood, Croydon, Worthing, Edinburgh, Carlisle, &c., gave the following report:—

"That at the public inquiry at Croydon all the witnesses, medical gentlemen, and others, agreed that the irrigation works were not injurious to health. That, with the exception of lands liable to be flooded, there seems to be no soil that will not serve the purpose. Between the light and blowing sands of Edinburgh, and the stiff clay of Norwood, are included all the differences of soil which can be met with in this country, but at both extremes we find the application of sewage attended with success."

This, be it remembered, is said of surface irrigation. Now, what has Mr. Slagg got to

support the claims of subsoil irrigation? Why, the solitary fact that, in 1855, a Mr. Wilkins, of Reading, tried it on a very small scale, and found it answer. So that, on the one hand, we have offered us surface irrigation, the success of which has been amply testified, and on the other subsoil irrigation, which can be called nothing more than an experiment. True, Mr. Slagg might say, "Surface irrigation was at one time an experiment, and every great undertaking has been at first received with caution, if not with positive scepticism or ridicule." But the question is, Are the ratepayers of Kingston and Surbiton willing to risk 25,000l. or 30,000l. in endeavouring to solve the agricultural problem,—which is the best way to dispose of our sewage?"

Mr. Baldwin Latham, C.E., vice-president of the Society of Engineers, and engineer for the public works of Croydon, has written a pamphlet* under the title of "The Purification and Utilization of Sewage; with Plans of the Croydon Irrigation Fields."

On the results of the utilization of sewage he says,—

"The great result to be arrived at in the utilization of sewage is the prevention of the fouling of rivers, and the purification of the sewage before being turned into any stream; and upon this head the results are most satisfactory."

In the case of Croydon, the sewage of that town, after being utilised, is positively purer than the water supplied by some of the metropolitan water companies. The results of the application of sewage, in an agricultural sense, are also equally satisfactory. Indeed, it is surprising what enormous crops are produced under the influence of sewage, and the great difficulty is what to do with the crops; they grow so rapidly that it exceeds large, that it aspects all the preconceived notions of farming. Indeed, the only way in which sewage grass can be dealt with with certainty is the means of making it artificially into hay, and this the author has succeeded in doing, and is now about to submit the process to the test on a large scale."

In a paper read before the Society of Engineers in Exeter Hall, Mr. Latham remarked that 650 towns were now governed in their sanitary operations by the Public Health Act of 1848, and with great benefit to the various localities; and from a table which he held in his hand it appeared that, in the towns of Banbury, Cardiff, Croydon, Dover, Ely, Leicester, Macclesfield, Merthyr, Newport, Rugby, Salisbury, and Warwick, typhoid fever has been reduced at rates varying from 40 to 75 per cent., and at rates of from 41 to 49 per cent. Proceeding to examine the case of Croydon as one example in detail, Mr. Latham showed that the sanitary expenditure had been in the gross 195,000l., and the saving in thirteen years as follows:—Funerals (less), 12,195l.; sickness prevented, at 1l. each, 60,974l.; value of labour of persons kept in health, 166,828l. Total, 239,995l.

Mr. J. C. Morton, who has the management of the Lodge Farm, near Barking, where experiments are being carried out by the Metropolitan Sewage Company, gives the following account of these experiments:—

"It is not only on the sand-plot at the north London outfall that the experience has been obtained. They have there, as you appear to be aware, obtained great crops of grass and vigorous plants of wheat, mangold wurtzel, celery, and carrots, by the use of sewage poured over about an acre of the Maplin Sand, which had been brought up by barge and spread 30 in. deep over a contractor's yard. But, besides this, they have, since Lady-day, 1866, been tenants of 200 acres of light and gravelly land at Lodge Farm, two miles from the Barking outfall, and on this, by pumping apparatus, they can deliver sewage at the rate of 300 tons an hour. During the summer of last year about 60 acres of this land were laid out water-meadow fashion either on the ridge and furrow, or where the slopes are greater, on the catch-water plan; and from 53 acres of Italian rye-grass sown on this land and watered with sewage in this way, we have during the past summer cut 2,450 tons of grass."

"I believe that, fairly read, the lesson taught us is, that 60 tons per acre (and the quantity taken from that portion of the land which was in good producing order was more than this), or 2,250 tons of grass off 31 acres of ordinary land may be obtained from 250,000 tons of sewage properly applied. And if we deduct 12 tons of grass per acre (say 700 tons from our area) for the natural and unsustained yield of this soil under an Essex climate, we shall have 2,500 tons of grass as the produce of 250,000 tons of sewage. It is plain that if a ton of good grass can be obtained from every 100 tons of London sewage, a handsome revenue will yet be obtained from what now runs to waste at the Barking outfall. That sewage-grown Italian rye-grass is admirable cow food, and we had ample proof on Lodge Farm during the past summer."

Besides this large extent of Italian rye-grass, small experimental plots in wheat, mangold wurtzel, and other crops have been sown; and we may add the results to this report, notwithstanding that we cannot attach so much importance to them because of the small scale on which they have been obtained. Eighteen tons of mangold roots were weighed off rather more than a third of an acre, over which 1,100 tons in all of sewage per acre had been poured at three separate times during the summer. This was at the rate of 33 tons per acre,—more than twice the quantity obtained on fields close by, manured and cultivated in the ordinary way. And a plot of wheat (1 rood and 21 perches), which received three dressings of sewage when the land was dry in spring and early summer,

yielded 15 bushels of grain, which is after the rate of 43 bushels per acre; while, surrounding this plot on two sides of it, 2 roods and 23 perches of similar land, in all respects similarly treated, excepting only that it had no sewage, yielded 18½ bushels of grain, or at the rate of only 29 bushels per acre.

I will only add that, having had the management of this farm during the past two years, I know the circumstances, and can vouch for the accuracy of this account of them."

The local board of Tunbridge Wells having petitioned the Home Secretary to institute an inquiry with the view to obtaining a provisional order to enable them to take land for the purpose of sewage irrigation, &c., under the Sewage Utilization Act, 1867, an inquiry has been opened by the Government inspector (Mr. Arnold Taylor) at the Town-hall. There was a strong muster at the opening meeting of members of the local board, of gentlemen whose lands will be affected by the scheme which the board wish to carry out, and of professional gentlemen; but of ratepayers there were not many.

At a recent meeting of the Southampton town council the surveyor was directed, on Dr. Watson's motion, to prepare a report as to the best mode of ventilating the sewers. This was only, Dr. Watson said, carrying out the suggestions of the officer of health and of the surveyor. The system of drainage that prevailed in the town was modern, but the ventilation of the sewers was overlooked. If the report of the surveyor were true, the matter required immediate attention, as the decomposition of the solid sewage created obnoxious gases which ought to have a way of escape without entering dwellings. In the day time, he believed, the quantity escaping was small, in consequence of the continual action of the sewers, but there could be no doubt that much escaped by night, and created various forms of zymotic disease. The remedy was very simple, the admission of fresh air into the sewers, which could be done at slight expense. Mr. Chipperfield said that if people's drains and closets were properly trapped there would be no complaint, and that through attention to this in his own house, he believed 10 in. had not entered since it was built. Mr. Sharp, gas engineer, proposed ventilating the sewers through the gas columns, and thus burning the gases as they rose.

Mr. T. Hoey has read a paper at a meeting of the Glasgow Association for the Consideration of the Sewage Question in his plan for the reservation of water-closet soil in air-tight boxes, and its removal by pneumatic pressure, and through the intervention of larger receptacles, to the country for utilization in the soil as manure. We have already spoken frequently of such plans. Mr. Hoey's, if we mistake not, inclusive. On his system, as he stated, "the deodorizing of matter was secured by an apparatus on the 'bird-cage fountain' principle, so connected with existing closets, movements as to discharge the requisite quantity of sulphuric acid or solution of sulphate of iron into the basin along with the flushing water for the purpose of fixing the ammonia developed in the soil during the process of decomposition." He then explained how this apparatus would be worked and the quantity of sulphuric acid required. An intercepting tank could be placed directly under the lowermost water-closet, or a soil-pipe could be continued at a proper gradient for conveying the soil from the bottom of the vertical pipe tank to any convenient place at the back of the house. The emptying of these intercepting tanks would be effected by a cart carrying a cylindrical vessel divided into four compartments, each compartment being of such capacity as to contain the contents of one tank. Those compartments would be partially exhausted by air, through a process which will be expounded. He also explained the *modus operandi* of conveying the soil from the tanks to the carts, which was effected by pneumatic pressure. The matter would then be conveyed and discharged into large central tanks on the same principle, and when these depôts were full they would be discharged by air pressure acting on the surface of the mass, and conveyed to a general depôt situated in a suitable locality selected in the country. We do not recommend such a system.

MASTERS AND WORKMEN.—On the evening of the 31st ult. Mr. W. Higgs entertained the persons in his employ in South Lambeth, about 500, including wives and children, sitting down. Afterwards Mr. Higgs, the Rev. C. H. Spurgeon, and two or three other gentlemen addressed the meeting at some length.

* The Principles of Town Drainage. By Charles Slagg, Borough Surveyor of Kingston-on-Thames. London: Stanford, Charing-cross, 1868.

* Spou, Charing Cross, Publisher.

and inspector of weights and measures, prisoners' cells, large kitchen and offices, &c. The total cost of the building, which has been erected from the designs of Messrs. Bellamy & Hardy, of Lincoln, will be about 16,000*l.*, exclusive of the cost of site, &c.

The floor of the entrance is covered with Minton's encaustic tiles, and from the centre hangs a bronzed gaselier. Directly opposite the main entrance is the sessions court, 35 ft. by 34 ft., and 23 ft. high from the floor to the dome. Both dome and ceiling are ornamented. The remainder of the ground story is occupied by offices for the local Board of health, committee rooms, a town servants' room, and a record room for corporation deeds and documents; this last apartment is fire-proof, with a floor of Portland cement.

On the right of the main entrance is the magistrates' room, 31 ft. 6 in. by 26 ft. 6 in., and 19 ft. high. A grand staircase leads to a vestibule through which one passes to the council chamber. The decorations of the hall, grand staircase, and vestibule are to be noted. The staircase is 32 ft. long by 24 ft. wide. The council chamber occupies about the whole length of the western side: the length of this apartment is 74 ft., the width 31 ft., and the height 26 ft. On the left of the council chamber is a library, 40 ft. by 31 ft., and 24 ft. high. In the mezzanine story are the town-clerk's room, grand-jury room, another record-room, &c. The basement comprises a police entrance from King-street, an office for the superintendent of police, a charge-room, stores for stolen goods, and police day-rooms. Adjoining are an engine shed, parade corridors, seven cells, an office for the inspector of weights and measures, a large kitchen, &c. A patent lift to the council chamber, to be used on the occasion of banquets, is also provided. All the windows on the basement story are barricaded. Mr. E. Gibbons, of Ipswich, was the contractor. Mr. Edmund Catchpole has acted as the clerk of the works. Mr. W. P. Ribhaus, the town surveyor, also supervised the erection of the building. For the masonry, Mr. Ireland, of this town, was sub-contractor. The more delicate portions of the carving are the work of Mr. Barrett. The plaster work was done by Mr. Adkins. Messrs. D. & E. Haggard, of Ipswich, supplied the gaseliers, and executed all the plumbing, painting, and glazing. The gas pipes were laid by the local gas company, and the sun lights were fixed by Mr. Stroud, of London.

SULPHUROUS ACID AS A FOOD PRESERVEE.

Dr. BAIRIE, of Edinburgh, says,—

"We have, for some years, been in the habit of fumigating the larder with the fumes of sulphur, particularly in moist, muggy weather, and in summer, and have never yet had a single article spoiled or become putrid, which is the more remarkable as we have, during the whole time, derived most of our supplies from the extreme north of Scotland, so that they were exposed to the influence of the external air and sun for at least thirty-six hours before they reached us. The mode of fumigation adopted is to put a small crucible into a pan of hot coals placed on the floor of the larder, and, when heated, project into it two or three small pieces of common stick sulphur, shutting all the doors and windows, and allowing the vapour to diffuse itself through the larder. This may be repeated once or oftener each day, so long as the weather continues hot or muggy. In a similar way, whenever called upon to attend a case which either is, or shows signs of becoming, contagious, I am in the habit of directing the room to be fumigated with sulphur thrown on hot coals repeatedly in the course of the day and night, and have never observed or heard of the least inconvenience or even effect arising from or attributable to the process."

We have already more than once spoken of the utility of sulphurous acid in fumigation, and recommended it in cholera seasons. We stated that Government had for many years used it in lazarettos (as they may still do) for the fumigation of all articles coming from plague-stricken countries. It was also used whenever articles of any kind—even letters—were passed out of these lazarettos to friends outside. But it is not in modern times alone that sulphurous acid has been esteemed: the old pharmacopœists, such as Salmon, speak very highly of it as a medicine, and Dr. Dewar, of Kirkaldy, in Scotland, has revived its use in this respect. The writer of this, many years since, in a course of medical experiments on himself in Scotland, made special use of it; but one objection he recollects of is, that he thought its internal use required care to prevent catching cold under its influence. Of course this is no objection to its external use as a sanitary agent or an antiseptic.

EMPLOYMENT FOR THE POOR.

MR. THOMAS WEBSTER, Q.C., has read a paper on "The Industrial and Profitable Employment of the Casual and Destitute Poor," at a meeting of the Department of Economy and Trade of the Social Science Association; Mr. R. Rawlinson, C.E., C.B., in the chair. The remedy for the admitted shortcomings and evils of the present system which he proposed was that which proved effective in Lancashire, and was frequently had recourse to by the Governments of Continental countries, namely, a provision of work and wages for the unemployed. It seemed, indeed, most inconsistent at the same time to be squandering millions in poor-rates and punishment, which produced no return, and leaving useful works which were demanding execution all over the country undone, which would prove a source of additional national wealth and advantage, employ industrial energy, and be actually remunerative. It was proposed, therefore, that a society be formed for the furtherance of these objects, to be assisted by a Government grant of public money, in order to enable it to carry on its operations on a sufficient scale, and that the society, under its Act of Parliament, should have compulsory power to take certain land for reclamation, on the usual terms of compensation to owners; that laborers be then employed in large numbers, lodged in temporary buildings to be erected for the purpose, and, if necessary, fed and clothed by the society. Something also must be done for those who are not able-bodied, for women and children.

BOULEVARD OF THE ARTS FROM PONT-STREET TO SOUTH KENSINGTON MUSEUM AND A GREAT GENERAL MARKET FOR THE WEST.

ALLOW me on public grounds to submit to you the following observations concerning the above important West-end improvements:—

1st. That such an enterprise as is presented by the boulevard in question would be the greatest and most appropriate monument the British nation could offer to the memory of the late Prince Consort, as the creator of South Kensington and the successful promoter of arts.

2nd. That if carried out in the spirit recently suggested in the *Builder*, with triumphal arches at each entrance, statues throughout on either side of the boulevard, dedicated to the great men past and future of the British empire, gardens, fountains, &c., thus giving to it a thorough national character, the grandeur of effect would call forth similar efforts elsewhere in the metropolis, and give rise to an entirely new school of architectural design.

3rd. That such a site (between Belgrave-square and South Kensington Museum) thus developed would be at once rendered a centre the most valuable as well as the most fashionable in London.

4th. That the parties who have the direction of this important undertaking are equal to the responsibility devolving upon them, in having to metamorphose thus so large a space (some 70 acres), of which about 30 acres are uncovered with houses, for the future embellishment and improvement of the West-end, and to insure success the secret consists in beginning well.

5th. The residences built on the "boulevard" having all the improvements of the day, will find buyers, because no frehold is to be had in Belgravia, and certainly none in any way comparable with the future "Boulevard of the Arts" is in existence in London; and it may be safely said, without exaggeration, that such favoured property must continue to increase in value as the place would be unique.

6th. A *Great General Market* for the west is imperatively demanded, and the neighbourhood surrounding the spot to be thus occupied affords many advantages owing to the poverty of much of the adjoining district (say of Lower Sloane-street and White Lion-street in front of the new suspended Chelsea Bridge), its facility of access from all parts, proximity to the river, and being in the centre of several railway stations, &c. &c.

An additional attraction might be here set forth, which, if carried out and organized in departments (fruit, flowers, vegetables, meat, poultry, &c.), after the magnificent model of our Parisian neighbours, would at the same time afford a most acceptable lounge, and

one of the chief wants of the day, and of certain to result favourably in a mercantile point of view, which, after all, is the chief element of all English enterprise. The space occupied by such general market would be three or four times the size of Covent-garden Market. The place now of a very inferior description; the cost of the ground would be small, for it cannot be improved, having in front of it the new barracks and higher up Chelsea Hospital and Chelsea College, so that a market there is the only improvement suitable to it, and this would satisfy all classes, poor and rich.

7th. A great general market would improve our taste for better cooking and economy, and would be the only check on the extortions of tradesmen and retail markets from which the dwellers suffer, as the small dealers are completely now "masters of the situation." An very likely the architect who will build a city of palaces in Belgravia will see the opportunity and the necessity of turning his attention to this suggestion.

While on this subject, I venture to remark that a West-end fish-market somewhere on the banks of the Thames between Chelsea Bridge and Millbank would be a great boon to the inhabitants of its southern shore, as well as to those of Belgravia north and south.

A BELGRAVIAN.

ARCHITECTS' CHARGES.

RANDAL G. GRAY.

SIR,—I have seen a report in the *Builder* of trial (Randall G. Gray) in which a clerk of works in my employ gave evidence, and, as might be expected, incorrect evidence, about architects' charges. I do not see how he could have an acquaintance with the subject. Of my own practice in such matters, he certainly knew nothing. His appearance at the trial is greatly to be regretted on every account. Being engaged by me in the superintendance of a definite work his time, of course, is not his own property. Without my knowledge he was first consulted, and then was taken as a witness to Shrewsbury. This I learnt accidentally, and only a few days before the final trial. The case had then gone so far that had I forbidden him to appear I should have exposed myself to the charge of arbitrary interference with the course of justice. I think the charge would not have been an unreasonable one.

Judging by the report of the trial, my own name would seem to have been most improperly and unfairly used, the witness having been led to speak of that of which, I repeat, he could have had no accurate knowledge, and so to give an impression respecting my own practice altogether contrary to the fact.

W. BUTTERFIELD.

PIECEWORK AND APPRENTICESHIPS.

SIR,—I differ from your correspondent in his conclusions on the subject of piecework. To a skilful and muscular workman may find it sometimes advantageous to his interests to work by the piece, I admit; but that it is also to the advantage of the customer, who wants his work done well, I deny. An experience of nearly thirty years as journeyman and foreman has convinced me that, at least in the building trades, where we seldom do two things alike, and a pleasing variety prevails, if you want your work done well, you must get it done *day work*; and this applies not to the journeyman only, but to the master contractor also. The system of contracting must be abolished, and the far more equitable system of measure and value or daywork substituted.

Then, again, piecework causes over-exertion. I have known several instances of this. One in particular occurs to me;—a joiner, who worked so hard in the ten hours, that he was positively unable to walk to his home at night, without holding on to the shop-fronts and lamp-posts for support. After a very few years he died a premature death, and his family went to the workhouse. The extra money he earned was spent to support the extra waste of muscle, and his conduct led to the reduction of the price paid for the work; so that the employer got all the benefit.

I think that there ought to be, and that it will be necessary in the future to make, a difference

in the working hours in the summer and winter, especially for out-door work. I have often been on a scaffold for an hour or more in a morning, and from three-quarters of an hour to an hour in the evening, in raw, cold, foggy weather, when it has been sheer robbery to the employer to be there, and not only uncomfortable, but dangerous, to the workman. The same objection does not apply to the shop or indoors; but, independently of the saving in gas, I should be glad to see a reduction in the hours of daily labour in the winter.

Trade or "technical" education I hold to be absolutely necessary to every workman, if good work is to be done, and I think that can best be obtained by the establishment in every district of a school under the Department of Science and Art; and workmen should be encouraged to attend such schools, and should be able, other things being equal, to obtain priority of employment on showing certificates to employers. At present the knowledge of practical geometry is woefully at a discount even among joiners and masons, to say nothing at all of bricklayers and plasterers, who seem to think that subject altogether foreign to them. What per-centage of London painters could undergo a very mild examination on colour, or joiners on botany, and the strength of timber, or plasterers on the chemistry of cements and free-hand drawing, or masons on geology?

And that brings me naturally to the subject of apprenticeships. I find them to be mostly a sham and a deceit; for if the apprentice is placed in a small shop where the master works with the men, yet he calls himself builder, and undertakes all branches, so that the apprentice is expected to do a bit of jobbing carpentering, then a bit of painting, and it may be bricklaying, or plastering, certainly whitewashing and cleaning, and at the end of his time he may be fit for a respectable labourer.

But it may be that the apprentice is placed in a larger shop, where several men of each trade are employed, yet there are some masters who take so many apprentices, that there will be one to each journeyman, or more, on the average. Here the employer is seldom seen more than once a day, and the whole care is left to a foreman. His position is an unenviable one, for generally there is a combination of the apprentices, who work and play just when they please, and set him at naught. I know such a shop well. The master gets 25*l.* to 30*l.* with each boy, and they have to learn their trade as best they can. There are seven apprentices to about six journeymen, sometimes less. The kind of work turned out may be imagined.

Now, I should like to see a plan adopted something like that which obtains in France, where every apprentice is bound by his indentures to attend a trade school at least one hour per day during his apprenticeship. Such a school under the Department of Science and Art would give certificates of competency in theoretical knowledge. After the apprentice is out of his time, which might, I think, be limited to five years,—say from fourteen to nineteen,—he should then be bound to serve as journeyman for two years more in any shop or buildings as he pleased. He should then be able to come up for examination before a competent judge appointed by the department, who would, if satisfied, give a certificate of mastership.

I venture to say that, with such a training, we should hear very little of bad work; our eyes would not be so often offended by its appearance, and much valuable life would sometimes be saved. Employers would, on engaging a man with such certificates, be confident that their materials would not be spoilt, and their money wasted; and every workman who owned such certificates would feel that he would be quite capable of executing any work entrusted to him with satisfaction to himself and to his employer.

E. G., a Workman.

to be the case, it would make fourteen hours' extra work in a week, which would amount to 8*h.* 4*d.* As "J. P." seems to infer that the employer requires a greater amount of profit upon piecework, I deduct 2*s.* 4*d.* 7*½* would then remain, which, added to the present wages would form an income of 4*s.* 8*d.*; and there is not one man in twenty but would earn this amount if allowed to do so.

Quoting from the letter in question, "J. P." says, "I have known men in small towns who have been pointed at as those who, by overwork, had brought themselves to death's door." I do not remember to have seen any such case, but do not tell whether it was piece or day work that produced this disease of the system. I have known many such, and know in what manner it had been brought on; with a great many, by their own folly, through being hardworkers, as we hard-workers when under the piece-work system, by overtaxing their strength for three or four days a week—days of (perhaps) fourteen hours, in order to make six days' wages, the other two or three days being devoted to what they call a "fuddle." There are, I know, to be found in almost every shop a certain one or two who may be termed the "rascals," or "leaders," who tax their strength and skill to the utmost, for the only inducement of being on familiar terms with the foreman, and being able to boast that they do more work than any other man in the shop. Now, because a few choose to run themselves over, it does not follow that the whole working community would imitate their example through the introduction of piecework. Let a price-list be drawn up, of every kind and quality of work, per foot, and a fair understanding between master and man, and I venture to say the working of the system would prove its success.

F. D.

"THE ARTIST AND THE PUBLISHER."

SIR,—In the last number of the *Builder*, "R." complains that my name, as the exhibitor of some sheets of "edible and poisonous mushrooms" at the South Kensington Museum, was more prominent than that of Mr. W. G. Smith, the artist who drew them; and proceeds to say, "This is not right; it is another instance of the mischievous presence of the middle man." The idea is quite new to me, that it is "mischievous" for a publisher to put his name to useful books because he is neither artist nor author. Does "R." mean to say that artists and authors ought to do without publishers? The book to which "R." alludes is intended to give certain large diagrams of Fungi exhibited in the Food Collection of the Museum, and the sheets are published in a portable form to enable the public to carry true figures beyond the walls of the Museum. I have no objection to a source of profit, which may be had for the gathering. The prominence given to the name of the person from whom the public may obtain the work is therefore quite in order. If the pictures had been exhibited as specimens of botanical drawing, my name but that of the artist would have been out of place.

Surely there are but few people who would give credit to the publisher for the skill which so manifestly belongs to the artist. The allusion of "R." to middlemen cannot apply to publishers, as the relative positions of "the artist and the publisher" can be readily seen by any intelligent man who takes the trouble to think about the subject.

ROBERT HAWKES.

"R." makes no complaint against Mr. Hawdick, but claims, and we claim too, that if a work of art is exhibited, the name of the producer of that work be shown at any rate as prominently as that of the publisher or exhibitor of it. It is a matter of principle, an important principle too.

WARRINGTON SCHOOL OF ART.

SIR,—The account given in the *Builder* of the 25th ult., under the above heading, of the gold medal awards to schools of art, refers to the competition which ended in May, 1867, but was not announced, I think, till only far to those schools which were successful in the competition of March, 1867, to state, that in the latter competition the only provincial schools which obtained gold medals were—Glasgow, Kidderminster, Manchester, and Nottingham.

A SECRETARY.

DURHAM UNION WORKHOUSE COMPETITION.

SIR,—Being the author of the design bearing the motto "Shield and Half Moon," which was assailed in such an untruthful manner by a person signing himself "Fairplay" in your last week's issue, I consider it a duty to your readers to bring the true facts of the case before them.

In the first place, "Fairplay" says the "guardians issued printed instructions." This was not the case, the instructions provided were written; each competitor having to procure a copy for himself.

"Fairplay" says, "The crooked fence was just the obstacle which every competitor was desirous of removing," he contradicts himself almost immediately after by saying, "it (i.e., the boundary or fence wall) is built as straight as can be drawn upon paper." If this be the case, where was the obstacle that competitors were so desirous of removing?

"Fairplay" states that "the plans have been measured, and likewise the site, and the result is that the site will neither accommodate the plan in length nor breadth." This assertion, like the others, is not the truth, as the buildings are of considerably smaller area than the site.

"Fairplay" says, "The plans are for a new house, and, according to the estimate, cannot be built for less than 3,000*l.*, while the average cost of the other seven designs is from 4,000*l.* to 5,000*l.*"

This, again, is false, as nearly the whole of the present buildings are retained in the design; and the estimated cost is between 7,000*l.* and 8,000*l.*, and not 9,000*l.*, as "Fairplay" says.

Even in the number of competitors "Fairplay" is mistaken, as, according to the committee's report, there were only seven designs sent in, instead of nine, as "Fairplay" says; and the estimates of the unprejudiced designs range from 4,000*l.* to 8,000*l.*, not from 4,000*l.* to 5,000*l.*, as "Fairplay" says. The lowest estimate was submitted by the author states, an approximate one. Like this competitor I could have sent an approximate estimate between 4,000*l.* and 5,000*l.*; but what would have been the result if the design had been put into execution, and in the end (as

is frequently the case in competitions) the cost had doubled the estimate?

"Fairplay" says "the plans were discovered to emanate from the office of a C.E." This is very like "Fairplay" and, like his other lying effusions, is without foundation, as the plans did not emanate from the office of a C.E. but from my own residence. Where can "Fairplay" emanate from? No doubt, time will solve the mystery.

"Fairplay" intimated that the plans were altered after being before the committee. This is again false, as the plans can be at any time produced the same as first sent in.

The above facts ought to be sufficient to convince any one of the faith to be placed in "Fairplay's" statements.

WILLIAM FOX.

THE CO-OPERATIVE BUILDING COMPANY.

SIR,—Your report of the formation of the Co-operative Building Company, says that no one but operatives will be admitted as shareholders, or to take part in the management of the company. Being president of the committee, I can vouch for the committee that no such rule is contemplated. Mr. Walton, in his lecture to the meetings at Wilcox's Rooms, Westminster-bridge-road, January 12th, stated that he had not mentioned the labourers in his lecture, but that they must not think he had forgotten them, nor think that they would not be permitted to avail themselves of the opportunity to become shareholders, that the company would be open to the public in general as well as the building trades, and the more shareholders the better.

Also for the information of the Plumber who writes from Hyde, and the trade in general, I would beg to state that we should be most happy to receive a committee of plumbers to act with the committee *pro tem.* We meet every week at the Brown Bear, Broad-street, Bloomsbury, on Friday evenings, at eight o'clock.

THE PRESIDENT OF COMMITTEE.

DRAINAGE AND WATER WORKS, GIBRALTAR.

SIR,—Our attention has just been called to a letter appearing in your journal of 15th December last, with regard to the above works, and signed "The Contractor." Will you allow us to say through your columns that the said letter is not from us, and that we are totally unacquainted with the author.

A. KYAN & Co.

Gibraltar.

CEMENT KILNS.

SIR,—Will you permit me to inquire whether any of your readers can furnish me with information respecting the best description of cement kilns at present in use, especially with respect to the application of the heat given out by the exterior of the kilns, for the purpose of drying the washed chalk in the tanks.

W. E. H.

CORROSION OF LEAD PIPES.

SIR,—I shall feel obliged if any of your readers can tell me an effectual preventive of the corroding action of the ground on lead pipes. In a case now under my notice some section pipes laid in marl and clay were so eaten away in thirteen years as to require renewal. I had the new ones surrounded with sand, but find they are already so corroded as to admit air, though having been in use only three years.

The water of the well has no effect on lead, as is proved by the inside of the pipes remaining perfectly clean and smooth.

JOHN HART.

TWO DAYS' NOTICE TO DISTRICT SURVEYOR.

Tolley v. Kell, Waring, Brothers, & Lucas.—In Westminster Police-court on Saturday last, Messrs. Kell, Waring Brothers, & Lucas were summoned by Mr. James Tolley, district surveyor of St. Margaret, St. John, and St. Peter, Westminster, for not complying with the 35th section of the Metropolitan Building Act, which requires two days' notice in writing before any building of any work in, to, or upon any building is commenced, to be given to the district surveyor, under a penalty of 20*l.*, to be recovered before a justice of the peace.

The district surveyor conducted his own case; Mr. Joyce, instructed by Messrs. Baxter, Rose, & Norton, appeared for the defendants.

From the opening speech of the district surveyor, it appeared that the defendants, as contractors for the Metropolitan District Railway, had taken down a house, No. 1, Smith's-place, York-street, and re-constructed the greater part of what was originally a party wall between Nos. 1 and 2 as an external wall to No. 2, which work, he submitted, required notice under section 38. He then proved service of notice on the 10th of January, calling defendants' attention to their neglect.

Mr. Joyce claimed exemption for the work under the 6th section of the Act, and stated that the wall was erected upon ground belonging to the railway company, and, although they were not actually using the wall at present, they could, and probably might, use it for affixing signals or placarding with notices.

The district surveyor said, assuming it to be a party wall, half belonging to the railway company, that he was entitled to notice for the other half, and informed the counsel that he was in error in stating that the ground belonged to the railway company.

Mr. Arnold.—The railway company cannot have the right to cut a hole through the wall into a gentleman's drawing-room, for instance.

Mr. John Man Inghal was called, and examined by the district surveyor. I reside at No. 30, York-street, Westminster. I am owner of No. 2, Smith's-place and the adjoining houses. The railway company purchased No. 1, and caused it to be pulled down; the wall erected is in lieu of the party-wall originally existing between Nos. 1

PIECEWORK.

SIR,—If you will allow me, I should like to make a few remarks upon the letter preceding mine in your issue of the 25th ult., your correspondent "Jack Plaine's" ideas and mine so widely differing upon the subject of piecework. I will endeavour to give a clearer proof, apart from personal experience, in support of my opinion, that piecework, as a recognised system, would be beneficial to employer and employee. The standard wages now in London are 37*s.* 3*d.* per week of fifty-six hours. Now I feel inclined to asserting that nearly every man could in eight hours perform the same amount of work as he now does in ten, with the object of 1*s.* extra per day in view, without having to bring into action that amount of physical exertion that would be detrimental to health. Taking this

and 2. The wall is entirely on my ground. I pronounce the deeds with plain assent.

Cross-examined.—Taking down the wall left the rooms exposed; it was necessary to rebuild it; the house was dangerous without. I believe it is done properly.

The district surveyor remarked that making it a case of emergency would not help the other side, as section 44 made it a condition that before the expiration of twenty-four hours after such work has been begun, notice thereof shall be given to the district surveyor.

Mr. Joyce.—I cannot sustain the defence longer, nor resist the infliction of a penalty; but as it seems we have been labouring under a mistake, and as I understand the district surveyor not to press for a heavy penalty, I trust your worship will make it as light as possible.

The district surveyor.—The amount of penalty is not my object, but the clear enunciation from the Bench of the necessity of giving notice. He then directed attention to the greatly-increased labour thrown upon district surveyors by the neglect, and said, knowing the respectability of the firm, it had been his unpleasant duty to question, and feeling certain that it was with them a question of principle and not of fee, he begged to join in asking the magistrate to make the penalty as light as possible.

Mr. Arnold, in summing up, said, I never had a clearer case, and cannot understand upon what grounds the defence was undertaken, except, as the learned counsel has stated, under mistake; but as this is the first case against the defendants, and in consideration of your request, I think the object sought will be obtained by the infliction of a nominal penalty of one shilling and costs; but should another case be proved against the same parties before me, I shall feel it my duty to impose the full penalty, namely twenty pounds.

Railway Companies and the Building Act.—Sir: As London is threatened to be overgrown, perhaps some further legislation is required, so that protection may be afforded to the public, and a little restraint put upon those companies who completely set at naught and ignore everybody else. Ranges of wooden workshops, with felt roof and iron smoke-pipes, have been carried up in Clerkenwell, clearly abutting on dwelling-houses. Substantial brick cottages have been abutting on the backstreet by the contractor, for his own convenience; and he shelters himself under the plea that they are for the use of the railway, when, in fact, they are his own private property, over which the company have no control. A. RAVENHOLME.

THE TRADES MOVEMENT.

The operative slaters of Glasgow have taken advantage of the pressure of work consequent on the late storm to strike for a rise of wages. The masters have resisted the demand, on the ground, says the *Workman*, of its being a breach of a distinct agreement, arrived at some time ago, that no change should take place on the rates without three months' notice.

The reduction of 10 per cent. in the wages of ironworkers, which has been determined upon by almost all the principal firms in South Yorkshire, has resulted in a strike on the part of the men.

In accordance with a notice issued by Messrs. Hawks, Crawshaw, & Co., a reduction of 1s. 6d. per ton for puddling has been made in the new plate-rolling mills. The men turned out on strike. This strike has occurred at a very inopportune time, as there are some excellent orders in course of execution. One Russian order for sixty-three bridges is to amount to 120,000*l.* An amicable settlement, however, was anticipated, as masters and men were to have a conference on the subject.

Mr. Roebuck has attempted to read the working men of Sheffield a lesson on the proper relations between labour and capital. He was listened to for a time, but at length the men hooted the hon. gentleman down. Subsequently, a proposal to award him a vote of thanks was indignantly rejected.

CHURCH-BUILDING NEWS.

Grendon Underwood.—Grendon Church, which has just been restored by Mr. Bruton, of Oxford, consists of nave, chancel, and western tower. Its date is the latter half of the thirteenth century, except the tower, which was built in the fifteenth century, at which period the walls of the nave were raised, the present roof put on, and several windows inserted in the walls. At that period, the chancel escaped, but about two centuries ago it was "improved" in the style then in fashion—a wagon-headed roof was put on it, and a broad flat-headed window inserted in the eastern wall. Subsequently the wagon-headed roof was plastered to the form of a semi-ellipse, severed through its longest axis. Fortunately the builders of this latter period left enough evidence of its former state to enable the architect to ascertain the dimensions and period of the destroyed eastern window, and sufficient remains of the glass to enable Messrs. Clayton & Bell to effect a restoration of that also,

and these gentlemen have inserted all they could of the old glass to prove the faithfulness of the restoration. The nave roof has only been repaired, and stained to an even colour, and the walls newly plastered, while the windows and chancel-arch have had a million, or a portion of a jamb, &c., inserted where necessary, though all the windows have been newly glazed. A new open-timbered roof has been placed on the chancel, with framed principals and arched ribs, wind braces, &c., of as high a pitch as the gable end of the nave would permit. The walls of the chancel, where the work would allow, have been pointed instead of plastered. The floor of the church has been laid with tessellated pavement, increasing in richness as it reaches the east end, encaustic tiles being used with it in the sanctuary. The benches in the nave are wrought out of the old ones, which were of oak, the top moulded rails being re-used where possible, and the standards being also of oak. The remainder of the work is of stained deal, and the mixture of the wood does not detract from the effect. The old pulpit, of the Jacobean period, has been restored and removed to the north side and placed on a stone pedestal. The font has been repaired and placed near the south doorway. The doors are of oak, all new, and have ornamental hinges. The chancel-fittings, including lectern and altar-table, are also of oak, and were executed by Mayretts & Son, of Oxford. The rest of the work was by Jones & Sons, of Oxford, and Anthony, of Waddesdon, the latter of whom did the masonry, glazing, and chancel roof.

Mentham (Suffolk).—The church here has been restored. It was built in the time of Henry VII. in the Perpendicular style; and at a later date was added a clearstory, lighted by eight windows, and the roof was flattened. This had become in so had a state that about eighteen months ago, a beam fell and smashed some of the pews. Mr. R. M. Phipson, architect, Ipswich and Norwich, was consulted, and it was found that nothing but a thorough restoration of the nave, with entirely new roofs for the aisles, would meet the case. This has been done. The floors have been laid with Minton's encaustic tiles; the old loose-box sort of pews have been superseded by oak-benches, with stained deal seats, and carved poppy-heads, on which are represented many of the flowers and fruits of the country, some also containing inscriptions carved on scrolls, in church text. The stonework of the windows has been refaced and restored, and the windows are filled throughout with cathedral glass in two tints, worked in different patterns. In order to stop all appearance of damp, the walls have been cemented inside, and finished in stucco, which will obviate the necessity of whitewashing hereafter. The stone arches have been cleaned; a gallery at the west end has been removed; and the base of the tower thrown open to the church by a small and not very ornamental arch. There is a new panel ceiling to the tower, which contains six bells; the battlements have been restored, and the outer roof released. At the east end of the south aisle were found a priest's squint, a somewhat large one, with its original door, and in the south wall a piscina in good preservation, and both are now laid open. Originally there was a chapel here, and it is intended to throw a screen across and appropriate it to a vestry, the tower having hitherto served that purpose. At the east end of the north aisle a small organ has been erected upon a platform—the only elevation in the church. The church is heated with Gedney's underground stove. The entrance-door into each aisle is new. The outer walls have had the rough plaster taken off, the flint work has been pointed, and the stone millions of the windows have been restored, and the stone dressings refaced. Several old trees in the churchyard fence have been removed, and the paths fresh gravelled. The work has been carried out by Mr. Grimwood, of Weybread; Mr. Jno. Groom, of Ipswich, and Mr. R. Gobolt, of Harleston, in that gentleman's employ, executed the carving. The works have cost about 1,500*l.*

Stamford Bridge.—A Chapel of Ease, attached to the parish church at High Catton, has just been consecrated. The edifice is intended to seat an congregation of 170 persons. It is dedicated to St. John the Baptist, and has cost about 1,500*l.* in its erection. Mr. G. F. Jones was the architect. The architectural design is Early English, of the thirteenth century, and the chapel consists of a nave and chancel. Its extreme internal length is 75 ft., and breadth 22 ft. Of the former 25 ft. are given to the chancel, and

50 ft. to the nave. The height from the floor to the apex of the nave is 27 ft. 6 in. The roof is high pitched, open timbered, and boarded—stained and varnished, whilst it is covered in with Westmoreland slates. The interior is lighted by lancet windows, the east end having three lights, with a quatrefoil window above; the west window is of two lancets, with quatrefoil head; the side windows are lancets, with stained horlogers. The whole are filled in with cathedral glass. A bell turret, containing two bells, stands on the chancel arch, and the turret is surmounted by a cross, which makes the extreme height of the edifice 43 ft. The porch is on the north side of the nave, and the vestry on the north side of the chancel. The chancel arch is of stone, with nail-head moulding, springing from an impost. A font of Caen stone, and furnished with an oak cover, stands near the entrance to the church. The seats are open, of deal, and stained and varnished. The whole of the ironwork has been supplied by Messrs. Fryer & Son, of York. The material of which the chapel has been built is Bradford walling stone, and the dressings are of Ancaster stone. The yard is enclosed by a brick wall and iron fence. The masonry and brickwork of the place have been executed by Mr. Grange. Messrs. Weatherley & Rymer have been the joiners; Messrs. Hodgson the plumbers and glaziers; Mr. Worthington the painter and stainer; Mr. Wood the slater; and Mr. Young the plasterer.

STAINED GLASS.

Nottingham Parish Church.—A window of stained glass, in memory of Mr. George Mill White (an honorary surgeon of the General Hospital, and practitioner in the town and county of Nottingham), has been erected by his brother, Major Loraine White, Military Knight of Windsor, in the lancet light on the north side of this church. The window represents Hope, with face gazing upwards, the arms stretched down, and the hands clasped together in an attitude of rhapsody. The Holy Spirit hovers over the figure, and sheds rays of glory downwards: around the upper part of the figure are angels in attitudes of prayer; this is all upon a ground of ruby. In the top part of the window, and within a circle, is treated according to ancient form, the emblem of the Holy Trinity. In the lower portion, and in connexion with the simple inscription "In memoriam, G. M. W.," is a panel of grisaille, founded on an ancient glass in Salisbury Cathedral, in the centre of which, and placed on the grisaille, is shown the anchor (emblem of Hope), which is designed so that the upper limbs form a cross, on which rests the crown of thorns. Above this is the alpha and omega. The ground-work filling-in is of a grisaille pearly glass. The artists were the Messrs. O'Connor, of London.

Telsbury Church.—Another memorial window, the gift of Mr. W. Hamilton Yatman, of High-grove House, has just been completed. It adjoins the one lately placed in the church by Mr. Alexander, and was executed by Messrs. Wallces, of Newcastle. It consists of four lights, which are divided transversely, and embrace two subjects, extending the full width of the window. The upper and larger is the Crucifixion, with groups of figures in the several lights, illustrating the various incidents recorded by the Evangelists. The subject at the base is the Entombment. The tracery is occupied by angels, bearing emblems of the Passion.

St. Saviour's, Southwark.—A stained glass window has just been put up in this church, the gift of the Rev. S. Benson, M.A., chaplain of the parish. The subjects are—1. The Christian desiring his heavenly rest. 2. The widows showing to St. Peter the coats and garments Dorcas had made while she was with them. 3. The Christian encouraged to faithfulness to the end by the crown of life. The artists are Messrs. Ward & Hughes.

Godstone Church.—A stained glass east window by Messrs. Ward & Hughes has been put up in this church, in memory of the late vicar, Archdeacon Hoare. The series represents the ministerial offices of Christ in His Church. In the centre light are three medallions representing the three great wonders of Redemption, the Crucifixion, the Resurrection, and the Ascension of our Lord. The lower side-medallions are symbolical of the two Sacraments: Baptism—young children are brought to Christ that He may bless them; Holy Communion—He is

making Himself known to the two disciples at Emmaus in the breaking of bread. Above, Christ the Good Shepherd extends his care over the "little flock;" and on the other side the net of the Gospel is being brought to land, and the produce of the miraculous draught laid at the feet of Him who had blest the disciples' toil. In the two upper medallions are the woman of Samaria and the Sermon on the Mount.

Leintwardine Church.—A stained-glass window has just been put up in this church. The style is Perpendicular, and the window is composed of four main openings and tracery. The artist has sub-divided the window laterally, and the spaces formed by the two centre upper divisions have been filled with Our Saviour restoring the Blind to Sight, the corresponding spaces below being filled with the Adoration of the Magi. The four remaining spaces in the side lights are filled respectively with the Annunciation, St. John preaching in the Wilderness, the Baptism, and the Presentation in the Temple. These subjects are all inclosed within canopies and texts of Scripture explanatory of the subjects are inscribed beneath each picture. The tracery is filled with the Agnus Dei; cup and vine; the Pelican in her Piety; the symbol of the Holy Ghost; with sacred monograms, surrounded by foliated work. The window was put up by Mr. C. J. C. Prestcott, in memory of his father, Mr. John Clarke Prestcott. It was executed by Messrs. R. B. Edmundson & Son, of Manchester, and is one for which they received the jurors' medal at the late Exposition in Paris.

Books Received.

A NEAR edition, in two volumes, of John Spencer's "Things New and Old," has been issued by Mr. Tegg. It is a book full of wisdom, and not to be objected to because mostly taken out of other men's books and sermons. As Dr. Thomas Fuller says in his preface to it (January 10th, 1657), "Is the spider's poison the better for being sucked out of herself, or bees' honey the worse for being extracted from flowers?"—The current *Quarterly Review* contains a valuable article on the British Museum, and which advocates the removal of the natural history objects from Bloomsbury. The writer is wrong, as other writers before him, in giving the whole credit of the new reading-room to Mr. Panizzi. The idea of a circular building for the purpose on the site it occupies, was first published by the late Professor Hosking, in the *Builder*, and the present building is the work of Mr. Sydney Smirke. Much is, doubtless, due to Mr. Panizzi; but to say that the reading-room, "the largest," as the writer calls it, "best built, best lighted, best arranged, and really most beautiful apartment the world has yet seen," issued forth, "full grown, from the brain of the British Museum Jupiter, armed at all points against criticism," is downright nonsense and great injustice.—An agreeable paper, entitled "Ramblings," in *Fraser*, shows what Gilpin (of the "Forest Scenery" &c.) did by means of his sketches, which were of a bold, generalizing character, picturesque rather than precise. These sketches—made with a reed pen and a brownish "iron-water" ink, and afterwards "toned" with a yellow wash—he used to give away to his friends, until it came into his mind that he might make by these means some money for the benefit of his poorer parishioners. He had already, out of the profits of his books, built and opened a school at Boldre for the children of day labourers, twenty boys to be taught reading, writing, and cyphering; twenty girls, reading, sewing, and spinning. To this school he wished to leave a permanent endowment, and also an aid to the school at Brockenhurst: so he sold for these ends a collection of his drawings, received 1,200l. for them, and put this into the Three per Cents.—The sum being still insufficient to carry out all his intentions, he went to work again with his reed-pen, at the age of seventy-eight, and in two years produced a large number of drawings. These, "the last effort of my eyes," were sold by auction at Christie's, and produced no less than 1,625l. The schools were endowed accordingly, and the Boldre children, in addition to being taught free of all charges, receive yearly, the boys a jacket, pair of breeches, and a green vest; the girls, a green frock and black petticoat." We heard only a day or two ago of a clever lady who had taken a similar step, successful in a smaller degree. A stained-glass window was

wanted in the parish church, partly restored, and funds were not forthcoming, on which the lady in question went to work, made little drawings of a number of the churches in the country, which were lithographed, and have been sold readily, far and wide, for the benefit of the window fund.—The February number of *London Society* is more than usually entertaining.

Miscellanea.

THE ROYAL GOLD MEDAL OF ARCHITECTURE.—The council of the Royal Institute of British Architects have resolved to recommend Mr. LAYARD, M.P., to the members for the Royal Gold Medal.

NEW CHURCH AT BRIERLEY, NEAR CUDWORTH.—The tender of Mr. Ridal, of Sheffield, for a new church at Brierley, near Cudworth, has been accepted. Mr. G. S. Fojljambe, of Osherton, has presented the site, together with 1,000l. towards the building, besides providing the endowment.

JETS OF NAPHTHA.—An artesian well of naphtha has been discovered at Kudaco, in the Caucasus, by boring. At the depth of 274 ft. from the surface the liquid was first struck, and for a whole month gave a supply of 1,500 barrels daily. Since then a fresh source has been met, which rises with irresistible force to the height of 40 ft. above the ground, the jet being 4 in. in diameter, and delivering a daily supply of 6,000 barrels.

MANCHESTER FIRE BRIGADE.—The superintendent of the Manchester Fire Brigade, Mr. Fozer, has just issued his official annual return of fires that have been attended in that city from September 29th, 1867, to September 29th, 1867. Of the total number of 291 fires, thirty-two have been serious, or one-sixth or more of the property destroyed; and 262 slight, or less than one-sixth destroyed. The total amount of property destroyed is 42,207l., out of 1,116,604l. at risk. There are 41 firemen employed. In 1847, the amount of property destroyed was 42,653l., or 21.4 per cent. on the amount of risk; in 1857, the amount destroyed was 30,237l., or 5.3 per cent. on the risk; in 1867, the amount destroyed was 25,055l., or 2.4 per cent. on the risk.

THE INSTITUTION OF CIVIL ENGINEERS.—At the meeting on January 28th, Mr. C. Hutton Gregory, president, in the chair, the paper read was "On the Relation of the Fresh-water Floods of Rivers and Streams, to the areas and physical features of their Basins; and on a Method of Classifying Rivers and Streams, with reference to the magnitude of their Floods—proposed as a means of facilitating the investigation of the Laws of Drainage," by Lieut.-Col. P. P. L. O'Connell, R.E. With the view of illustrating how far this method of classifying rivers as flood-producers was likely to prove useful, reference was made to some facts respecting the Mississippi and its tributaries, as recorded in the report on that river by Capt. Humphreys and Lieut. Abbot, who intended to show, in the author's opinion, that the method might be useful, if cautiously applied.

MR. FOTHERGILL COOKE AND THE ELECTRIC TELEGRAPH.—While glad of the recognition of Sir Charles Wheatstone's claims to honour on account of his share in the advancement of electric telegraphy, we hope the Government do not intend to overlook the unquestionable claims of Mr. Fothergill Cooke to recognition also as the introducer of the practical telegraph. The Society of Arts awarded their fourth gold Albert medal to Mr. F. Cooke and Mr. Wheatstone, but Mr. Wheatstone himself, cordially acknowledging that "Mr. Cooke is entitled to stand alone as the man to whom this country is indebted for its practical introduction" did not even claim his duplicate medal, though we think he might have fairly done so; thus leaving the honour of receiving it to Mr. Cooke alone. We must recollect, too, that Sir Charles Wheatstone is not the only one who has been honoured in connexion with the electric telegraph, but that Mr. Bright, the engineer, was also knighted, in connexion with the certainly noble work of merely laying the first line of telegraph across the Atlantic. It would be most invidious now to overlook Mr. Cooke's claims; and even were a knighthood not acceptable to him, there are other modes of doing him justice as well as honour.

A MINE ON FIRE.—The mine of Trien-Raisin, in Belgium, has taken fire, and 12,000 tons of small coal are burning.

EDUCATIONAL CONFERENCE, SOCIETY OF ARTS. A full report of the proceedings at the conference will be found in the "Journal of the Society of Arts" for January 31st.

TO PAINT OR PAPER ON DAMP WALLS.—Messrs. De Grelle have sent us, in reply to "G. D. B." and others, a sample of their prepared tinfoil to lay over the damp parts. As the inquiry is from numerous quarters, we depart from our custom, and say the address of the preparer of it is 79, Basinghall-street.

THE DILAPIDATED COURT OF JUSTICE AT TONBRIDGE.—Mr. Lonsdale, judge for the district, had to sit with hat and overcoat in the primitive justice-hall at Tonbridge, the other day. It is a curious old edifice, and in a bad state of repair. Something should be done, either to put it in a proper condition, or to erect another building for the purpose.

THE SUFFOLK AGRICULTURAL ASSOCIATION'S COTTAGE PLAN COMPETITION.—It has been resolved to publish six only of the plans, including the prize ones, the subscription and vote together amounting only to 27l. The cost incurred in reducing the plans, and lithographing 1,000 copies of each, was 28l. 10s., and other charges brought up the outlay to 36l. Copies may be had at 3s. each. Competitors who refused to allow their plans to be lithographed will not have copies sent them, but the other competitors will.

THE HURRICANE OF FRIDAY AND SATURDAY.—We do not recollect of so many casualties in London by any single gale as were caused by the powerful wind of Friday in last week. Chimneys have been blown down, and roofs and floors smashed, houses unroofed, gables-ends and even houses thrown down in various parts of the metropolis. Similar damage has been done in many of our country towns, and the whole country has suffered. At Bradford two chimneys, each 90 ft. high, were knocked over. At Batley a building 50 yards long, and three stories high, was blown down, and so on. The rain, too, swelled rivers and destroyed bridges, as on the Cambrin railway.

PROPOSED REBUILDING OF ST. ANDREW'S, HERTFORD.—The *Herts Guardian* says,—The news that plans are again invited for a proposed new church in this parish will be received with general surprise, and by very many with regret. It is a matter of common notoriety that several years ago, when designs were sent in for the church, those of Messrs. Smith & Son were accepted. They were exhibited in the Shire Hall as the accepted plans, together with plans from Mr. T. Y. Kington and other architects. The public will await, with considerable curiosity, the reasons to be given for quietly ignoring of plans that have been accepted; and, as such, publicly exhibited.

RESERVOIRS IN INDIA.—In fourteen districts of the Madras Presidency there are 43,000 irrigation reservoirs now in operation; and 10,000 more have fallen into disuse. The embankments by which their waters are retained in natural hollows, valleys and combs, average half a mile in length: one dam, now broken, is thirty miles long, and incloses an area of from sixty to eighty square miles. The Veramm tank comprises fifty-three square miles, has a dam of twelve miles long, and produces 11,450l. per annum. In Ceylon is a solid dam, built of cemented stone, and covered with turf, which is fifteen miles long, 100 ft. wide at the base, and 40 ft. wide at the top. Generally speaking, these enormous tanks are effective.

THE EFFECT OF STRIKES.—In the Town-hall, Newcastle, a number of working men recently appeared on the platform before an immense audience, their object being to condemn strikes and endeavour to win either the sum of 15l. or a gold watch of the value of 5l. These prizes were offered by Messrs. A. B. Joseph & Co. Mr. Joseph Cowen, jun., occupied the chair, and some gentlemen officiated as judges. There were thirty-five competitors in all, representing nearly every trade, and belonging to different towns and villages in the district. The subject of the speeches was "Strikes, and how to prevent them: showing their Disadvantages to Nations and Individuals." Each competitor was a *bona fide* working man, and no speech was read. Many of the speakers displayed considerable ability, and were warmly applauded.

STOPPING-PLACES, RAILWAY STATIONS.—"Piscator" draws attention to the erroneous design of the pavement of these places, and the nuisance that results. We are not disposed, however, to go farther into it. The architects of railway companies should take the hint.

THE ROYAL ACADEMY.—On Friday evening, 31st ult., the full members of the Royal Academy assembled in their council chamber, Trafalgar-square, to elect three associates. The following gentlemen, Mr. George Leslie and Mr. William J. Orbardson, were elected associate painters; and Mr. Thomas Landseer was elected associate engraver.

COMPETITION, PERU.—An architectural competition, open to all nations, is announced by the Peruvian Government; the subject being a design for a monument to commemorate the victory obtained on the 2nd of May, 1866, over the Spanish squadron. Drawings are to be sent to the Peruvian Legation in Paris, 66, Rue de Ponthieu, on or before the 15th of February.

EVERY ONE TO HIS TRADE.—A Bellhanger complains that at a house in Croydon the bell-hanging has been done by carpenters, who know nothing about it, and that it will soon prove worthless. If the latter part of the statement be correct the transaction is a fraud on the employer, and should be condemned. To the mere assertion that a builder had a carpenter who understood bell-hanging and allowed him to do it, we should have nothing to say. We are perfectly satisfied as to the advantages of free trade.

TRAMWAYS IN LONDON.—The Metropolitan Tramway Bill has passed standing orders before Mr. Palgrave, one of the examiners for Parliament. This Bill failed to pass during two previous sessions, but owing to an alteration made by Parliament in standing orders during last session the numerous technical difficulties previously existing were removed. The Liverpool Tramway Bill, promoted by the same parties, comes before Mr. Palgrave on Thursday. All opposition to it has also been withdrawn, excepting that of the Liverpool omnibus proprietors. It has been supported by the corporation of Liverpool and all the local authorities during the last two years, and it is believed it will be successful this year.

THE CHADWICK MONUMENT FOR BOLTON.—A large and influential meeting was held in the Temperance Hall, Bolton, convened by the mayor (Alderman Barlow), to initiate steps for a public recognition of Dr. Chadwick's liberality to that town. The Mayor presided. Lieutenant-Colonel Gray, M.P., and many gentlemen of prominence in the town took part in the proceedings. Mr. Barnes, M.P., expressed by letter his entire concurrence in the movement. The following resolution was adopted:—"That in commemoration of the munificent donation made by Mr. James Chadwick in providing improved dwellings for the poor and the establishment of an orphanage in this town, a statue be erected by public subscription, the design, material, and site for which shall be such as may be hereafter determined by the committee to be appointed at this meeting." Other resolutions were passed appointing the committee for carrying out the object of the meeting.

DONCASTER NEW MARKETS.—The tenders for the extensions and improvements of the Doncaster Cattle Market were opened by the market committee, at the Mansion-house. They were in two sets, namely, for the builders' and contractors' work, and for the ironwork,—the former series consisting of nine tenders, and the latter of twenty-seven. The work to be done under the first-named head is the building and completing of three new slaughter-houses, with pinning-pens and boundary walls, &c.; the laying out of a new cattle-market, making roads and paving floors, constructing drains, sheds, with all the necessary adjuncts. The lowest contract was that of Mr. Wm. Huddleston, of Lincoln, 4,298*l.*, and it was unanimously recommended by the committee. The highest contract was that of Messrs. S. & W. Pattison, Ruskington, Sleaford, namely, 5,366*l.* The smiths' and ironfounders' tenders were required for "the cast and wrought iron work necessary for constructing and erecting pens for 5,000 sheep, 750 pigs, and 120 fat beasts." The lowest contract was here again accepted,—that of the York Railway Plant Company, York,—namely, 1,020*l.*; the highest tender being 2,050*l.* 10*s.* 9*d.*, sent in by Messrs. Cliff & Company, Bradford. These recommendations of the committee will come before the council for confirmation on the 11th inst.

THE ANSTICE MEMORIAL, MADELEY.—The committee chosen by the subscribers have inspected the designs and plans sent in by architects. Upwards of fifty designs were placed upon the walls, and their merits discussed. Ultimately it was agreed that they should be again exhibited, after which the subscribers to meet to make a selection.

A STATUE OF DEATH.—A singular will case has come before the Roanoke courts. A M. Pira died last year, and left his property to his heirs on condition of their spending 1,500*l.* sterling in erecting a bronze monument on his tomb representing Death, under pain of forfeiting the property, in which case it would go to the sick poor of the town. The heirs wish to evade this clause. Why should they be allowed to do so?

MR. GLADSTONE AND THE TRADES UNIONS.—A special meeting of the sub-committee of trades' delegates, to arrange the proceedings of the conference to take place with Mr. Gladstone on the 18th of February, has been held, and it has been decided that the following questions form the subject of the conference:—(1) The limits of apprentices; (2) the minimum standard of wages; (3) piecework and overtime; (4) the alleged action of trades unions in driving trade to foreign countries; (5) the practical advantages of trades' unions.

TRINIDAD BITUMEN AND CHEAP GAS.—A limited company appears to have been formed for the purpose of working the bitumen lake of Trinidad, which belonged to the late Earl of Dundonald, as a substitute for bog-head mineral in the improvement of gas from coal. Mr. A. A. Cochrane, of Westminster, it is reported, has succeeded in obtaining excellent results, although the bitumen in its natural state contains about 23 per cent. of water and 28 of ash, with a good deal of sulphur. The application of bitumen to coal in the economization of gas has been patented by Messrs. Cochrane & Upward.

THE WESTMINSTER PALACE HOTEL COMPANY.—The half-yearly meeting of this company has been held at the hotel, Sir Charles Russell, bart., M.P., in the chair. The report stated that the gross receipts for the half-year ending December, 1867, had been 11,970*l.* 16*s.* 5*d.*, and the expenditure 9,666*l.* 2*s.* 6*d.*, leaving as net profit 2,304*l.* 13*s.* 11*d.*, which, after deducting 737*l.* 7*s.* interest on mortgage, and after charging the amount of the reserve funds, 9,411*l.* 19*s.* 11*d.* would, with the amount carried over after paying the last dividend, namely, 1,523*l.* 0*s.* 10*d.*, leave to the credit of profit and loss account 2,145*l.* 8*s.* 8*d.* The directors recommended the shareholders to forego a dividend this half-year. The chairman, in moving the adoption of the report, regretted exceedingly having to place so unsatisfactory a state of things before the shareholders as the recommendation of no dividend. This result was due to the great depression prevailing, and to the fact that the portion of the premises lately occupied by the India Board was still unlet and unsold. The chairman asserted that the utmost economy had been exercised. The report was adopted.

TENDERS.

For pulling down and rebuilding house, 9, Woodstock-street, for Mr. Machu. Messrs. Parris & Co., architects:—

Table with 2 columns: Name and Amount. Includes Winterton (21,330 0 0), Sawyer (1,430 0 0), Nightingale (1,236 0 0), Wilcox (1,190 0 0), Palmer (1,267 0 0), Ennor (1,138 0 0), Sharpington & Cole (1,130 0 0), Schofield (1,110 0 0), Crabbe & Vaughan (1,068 0 0), Faulkner & Lee (1,089 0 0), West (1,053 0 0), Crabbe & Vaughan (1,049 0 0), Snowden (1,045 0 0), Rogers & Richards (870 0 0), Perkins (827 0 0), Chitt (818 0 0), Smith & Simmons (735 0 0).

For the erection of a clock tower in the Old Haymarket, Leicester. (The furnishing of four statues of ancient benefactors to the town and the carriage not included.) Messrs. H. Goddard & Son, architects:—

Table with 2 columns: Name and Amount. Includes Osborne, Brothers (6349 0 0), Neale & Sons (889 0 0), Barfield (accepted) (546 0 0).

For house at Twywell, Northamptonshire. Mr. R. W. Johnson, architect:—

Table with 2 columns: Name and Amount. Includes Wilson (4336 10 0), Barlow (434 12 0), J. Henshaw (433 0 0), W. Henson (437 10 0), Gubb (429 0 0), Coates & Fletcher (421 17 10).

For proposed new Workhouse for the parish of St. Mary, Heath. Mr. R. H. Burden, architect:—

Table with 2 columns: Name and Amount. Includes Heath (486 00 0), Hill & Kitchin (80,073 0 0), Simpson (73,350 0 0), Foale (79,600 0 0), Piper & Wheeler (79,100 0 0), Carter & Son (78,385 0 0), Jackson & Shaw (78,850 0 0), Patman & Fotheringham (76,698 0 0), Higgs (76,350 0 0), Palmer (74,860 0 0), Myers & Sons (74,280 0 0), Masley & Rogers (73,610 0 0), Carter & Son (72,385 0 0), Mansfield & Pritchard (72,347 0 0), Mansbridge (72,238 0 0), Bracher & Son (70,500 0 0), King (69,873 0 0), Executors of John Adams (69,194 0 0), King & Sons (68,985 0 0), Hart (68,790 0 0), Webb & Sons (68,340 0 0), Lacey & Flaxman (66,476 0 0), Henshaw (66,430 0 0), Nutt & Co. (64,000 0 0), Sawyer (43,668 0 0).

For alterations and additions to the house and business premises of Mr. John Elmona, High-street, Leighton Buzzard. Mr. Frederick Gotto, architect:—

Table with 2 columns: Name and Amount. Includes Dawson (4385 0 0), Holdstock (363 0 0), M. Leachman (494 0 0), Adams (310 0 0), Whiting (300 0 0), Groom (accepted) (295 0 0).

For residence at Kettering. Mr. R. W. Johnson, architect:—

Table with 2 columns: Name and Amount. Includes Hawthorn (21,899 18 0), Henson (1,277 0 0), Barlow & Britten (1,202 5 0), Wilson (1,197 0 0).

For erecting tavern and shop in Old-street, St. Luke's, for Mr. A. Bowden. Mr. T. J. Hill, architect:—

Table with 2 columns: Name and Amount. Includes Brown (23,307 0 0), Chestnut (3,134 0 0), Sabey (3,749 0 0), Perry (3,016 0 0), Morland & Burton (2,896 0 0), Rivers (2,983 0 0), Webb & Sons (2,769 0 0), Ennor (2,634 0 0), Henshaw (2,629 0 0).

For alterations and reinstatements of No. 5, Shepherd's Market, Mayfair. Mr. Charles Innes, architect:—

Table with 2 columns: Name and Amount. Includes Wilcox (429 0 0), Preedy & Son (416 0 0), Thomas & Son (405 0 0), Snowdon (398 0 0), Fish (394 0 0), Henderson & Cairn (383 0 0), Simpson (388 13 0), Nightingale (382 0 0), Perkins (377 0 0).

For alterations and repairs to premises, Backlebury. Mr. J. Ebenezer Sanders, architect. Quantities by Messrs. Birdseye & Stoner:—

Table with 2 columns: Name and Amount. Includes Young (21,481 18 7), Collins (1,134 0 0), Colla (968 0 0), Ramsey (956 0 0), Forrest (accepted) (847 0 0).

For the erection of new schools at Fallowfield, near Manchester. Mr. Ernest Bates, architect. Quantities supplied:—

Table with 2 columns: Name and Amount. Includes Robinson & Son (21,130 0 0), Ward & Co. (1,120 0 0), Porteous (1,100 0 0), Quillish (968 0 0), Thornton (1,055 0 0), Grimshaw & Co. (1,040 0 0), Meadows (1,127 0 0), Hrows (1,005 0 0), Barber & Gibson (accepted) (1,000 0 0).

For a factory and stables in Peckham-grove, Camberwell, for Mr. Jones. Mr. Coe, architect. Quantities supplied:—

Table with 2 columns: Name and Amount. Includes Larke (2785 0 0), King & Sons (769 0 0), Batchelor (739 0 0), Johnson (719 0 0), Shapley & Webster (673 0 0), Smith (638 0 0), Mortar (554 0 0).

For building two houses at Stratford New-town, for the Temperance Building Society. Mr. William Faice, architect. Quantities supplied:—

Table with 2 columns: Name and Amount. Includes Nightingale (425 0 0), Fidler (419 0 0), Snowdon (356 10 0), Wheeler (338 0 0), Pierce & Booth (323 0 0).

TO CORRESPONDENTS.

H. L. J. S. R. W. J. H. F. G. M. R. B. J. J. M. C. A. M. H. C. J. R. P. C. A. Z. H. L. P. W. F. O. & K. J. H. W. H. B. J. M. F. J. T. W. B. C. P. H. H. B. F. P. R. F. J. G. S. J. F. R. & Son. T. J. H. T. C. G. T. L. D. D. O. H. S. & W. R. & G. J. E. S. M. E. W. W. F. C. L. W. E. W. A. O. C. H. S. (we cannot write letters on private disputes).—If a correspondent desires to send his name as guarantee of good faith, &c. (we are forced, uniformly, to decline).—G. H. T. (A. is wrong).—Mexican Architecture (continuation sheet).—W. H. (next week).

We are compelled to decline pointing out books and giving addresses. All statements of facts, lists of Tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication. Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the author.

The Builder.

VOL. XXVI.—No. 1306.

The Epidemic of Fever at Terling.



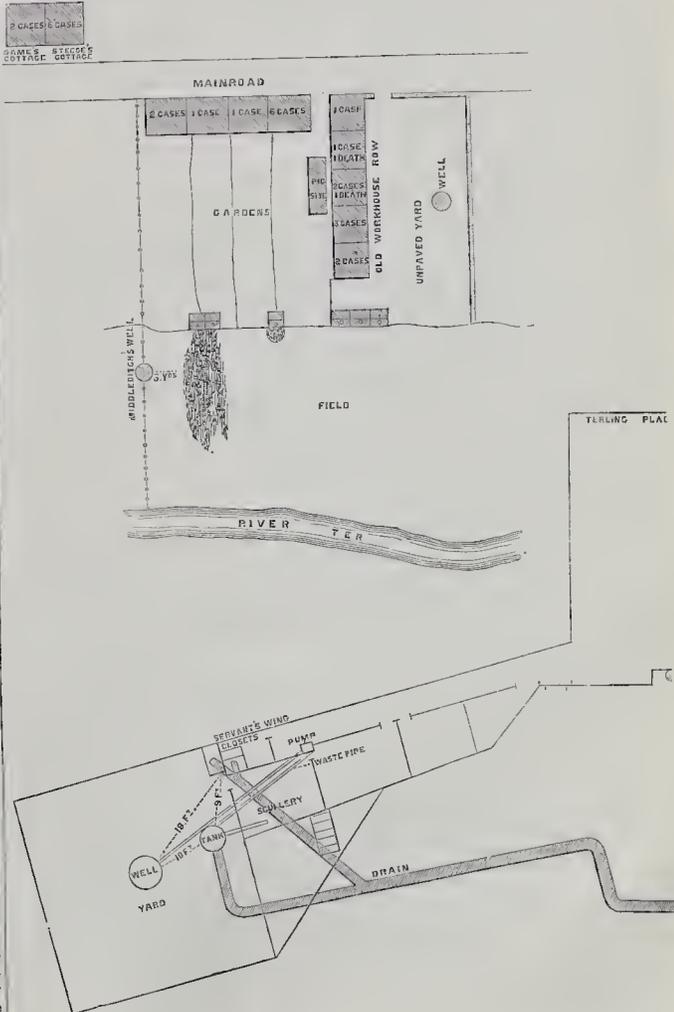
IN the whole range of medical science there is perhaps, in regard to acute disease, no causation so well made out as that of typhoid fever. It is now universally admitted to be the use of water polluted by fecal impurities. The evils resulting from sewage contamination are from day to day so prominently brought under the notice of the public in so many forms, the preventive efficacy as regards typhoid fever of perfect sewerage is so decided, and so many facilities are afforded by the advanced state of engineering science for the removal of objectionable conditions of soil, that one is fairly startled at the recital of the story of the outbreak of fever at Terling, as related by Dr. Thorne, the

Sanitary Council inspector, and which refers to outbreaks whose occurrence ought in 1868 to be impossible. Those who have had any experience of medical practice in low-lying country districts, know well enough that typhoid fever is seldom absent, certainly for any length of time, from the cottages that are seated beside the little running streamlets that meander through the villages in rural localities, and receive the filth from the privies, pigsties, and stables near them. The mischief thus done is great; it constitutes a very large amount of the sickness amongst the population of England, and a much greater crippling of the working power of the country, than appears on a superficial examination of the matter, for the simple reason that the death-rate is pretty low, and this is the only guide, and an indirect one is to the prevalence of the fever pest amongst the community at large. Water pollution, about which we have long spoken, is going on throughout the country, and its more than ordinary effects every now and again attract attention, as at the present time, and lead to the belief that some new influence is at work to produce disease where there is merely an intensification of a condition always existing to a slighter degree.

Too great prominence cannot be given to the matter. The facts of the Terling outbreak illustrate in a very clear and forcible manner the origin of typhoid fever so admirably that we place them on record as a valuable addition to sanitary science and to our earlier statements. Terling is a village in the Witham union inhabited by about 900 agricultural labourers, who are badly housed, and by no means well fed. The country is flat, and the important point to note is the fact that the soil is porous. In addition, all those conditions that conduce to the saturation of the ground with excrementitious and other filth, exist in abundance. The cottages are surrounded by every possible species of nuisance. In the first place, there is an allotment garden in the place, and the poor people assiduously collect whatever manure is to be got hold of into heaps, which are

allowed to stand undisturbed near their houses for a long time; moreover, cesspools abound,—the privy arrangements are of the most objectionable kind. Under these circumstances, there is abundant soakage into the soil of every kind of stercoraceous impurity. These nuisances are many of them placed on a higher level than the wells of the village which supply the water drunk by the cottagers. The wells are sunk in the gravel, are generally uncovered, and merely lined with bricks placed together without any mortar or cement. Some of the inhabitants drink water obtained from the ponds into which the drains from the field ditches and roadside discharge. Overcrowding is everywhere to be found in Terling; and this, of course, acts the part of an intensifier of the impurification of the place. In one instance, a woman suffering from fever occupied, with six of her family, a room 10 ft. long by 9½ ft. broad, and 6 ft. high; the chimney being blocked up, and the window less than 3 ft. square. So that each person in the room had less than the average of 82 cubic feet of air! The extent of the disease may be judged of by the fact that between December 4th, 1867, and January 13th, 1868, 208 persons had been attacked, and fresh cases were occurring daily. It is remarkable that the

majority affected by the fever were women, and children under fourteen years of age. It is supposed that the men and boys, being away from home in the fields at work, had no occasion to use the polluted water so frequently as the women and children, substituting beer instead to a great extent, and so escaping infection. Out of 145 attacks seventy-nine were those of children under fourteen years of age, and fifty of the remaining sixty-six were females. The presence of accumulated filth of all kinds upon and in the soil, and the peculiar porosity of the latter, were two factors which had much influence in the production of the epidemic; but the main point of interest remains to be discussed. The tendency of all the evidence which Dr. Thorne collected is to the effect that the great infective agency was to be found in a special state of the water-supply—a particular change in the level of the surface-water. It is held by some of the German authorities that typhoid fever breaks out when the surface-water falls; but Dr. Thorne arrives at an exactly opposite conclusion. He found that prior to the appearance of the epidemic the water had considerably diminished in quantity everywhere in Terling; during the preceding summer, in fact, there had been a drought. The lowest level, perhaps, was reached towards the



end of November. This was followed by a rapid and sudden flow of water into all the wells. In several instances the connexion between the rise in the level of the water and the outbreak of fever was clearly traced. Of course the sudden increase in the amount of water acted by washing the foulness of the soil into the wells. The following instances will illustrate the position here defined. In one of the most crowded parts of the village stands a row of five cottages,—Old Workhouse Row (see diagram). Behind them are some pigsties and accumulations of filth of every kind; there is a dirty unpaved yard in front; there is also an uncovered well. The cases of fever in the cottages were respectively, 1; 1 and a death; 2, and a death; 3, and 2. The water in the well having been deficient for two months, and others obtained from a well hard by called "Middleleitch's," rose again in November. A woman in house No. 1 was confined November 19th. She could get no water from the well in the yard, but a week after plenty was found in it, and this was used for drinking. The first case of fever in the "Row" occurred in this woman's family on the 6th of December, just ten days after the drinking of the water which had risen in the well,—and the interval here marked out coincides with the period of incubation of typhoid fever. Three days afterwards two more cases occurred in the same row of cottages, one on the 12th, and three more on the 15th. It seems that in these latter cases, as the water was not bright and clear at first it was not drunk for two or three days after its re-appearance in the well. Dr. Thorne, in like manner, accounts for the appearance of fever in the two cottages named Steele's and Gamo's, about a fortnight after they were able to procure water on their own premises, and in the four cottages intervening between the other two blocks already noticed. The epidemic did not spare any locality in the stricken district. Nine cases occurred in a detached wing of Lord Rayleigh's residence,—Terling place,—occupied by the servants; that is to say, amongst those who were living under conditions one would suppose of the most perfect hygiene. The only thing wrong was the drainage. Dr. Thorne says, in turning his attention to the discovery of the cause of the disease, he found "at the end of a long passage a pump, the water from which is used by the members of the household with the exception of the servants. This pump is supplied from a well 40 ft. deep, which is situated in a court-yard at the end of the servants' wing, and the pipe which passes from the well to the pump crosses a brick drain leading from two water-closets (see diagram). This pipe, which is a leaden one, I found to be perfectly sound. The drain was then opened, and, on examining it, it was evident that the mortar which was used to cement the bricks together was almost destroyed, and at the side of the drain which is nearest the well, a leakage had evidently taken place into the surrounding ground, which had a focal odour. Nine feet from this drain, and about midway between it and the well, is a brick cesspool, which ought only to receive the dirty water from the scullery and from a portion of the roof. On opening it, I was struck with the fact that the odour was most distinctly of a focal character." The well might have been polluted from the drain, or the cesspool. It is noticeable that the appearance of fever at Terling place and in the village was exactly coincident—a fact that suggests at once the operation of a general cause acting simultaneously over the whole area of the district. All the wells of the village are so placed as to be readily contaminated by focal filth.

Now, as we might have expected, typhoid fever has existed in Terling for several years past; and it is necessary specially to explain the peculiarly sudden and general outbreak of the disease recently. This is to be ascribed to the more than usual accumulation of filth and excrementitious matter, consequent upon the marked drought of last summer, and the saturation of the water to an intense degree by the rapid rise in the surface water which took place just before the outbreak in December. The points of prime interest in Dr. Thorne's report are these, viz., the coincidence of the onset of the epidemic with a rise and not a fall in the level of the surface water, and the correspondence between the ordinary period of incubation of typhoid fever and the length of time which elapsed between the rise of the polluted water from the before diseased well, and the occurrence of the first signs of disease. It may be as well to mention incidentally that the fever which has

lately prevailed at the Essex Hall Idiot Asylum, Colchester, has been shown to depend upon the use of water contaminated by sewage.

For the last two years occasional cases of fever have occurred in the institution; during the summer and autumn they increased considerably in number. The well was examined, and found to be poisoned by sewage from the common drain. Water was then promptly laid on from the Artesian well at the waterworks, and from that day the fever ceased to exist.

Terling has paid and is paying a terrible penalty for the neglect of the most ordinary sanitary precautions with which the nuisance authority is quite capable of grappling. The false economy of the owners of property will be seriously experienced in the expense to which the district will be put by the after-demands made upon the inhabitants, through the death and sickness which prevail.

An apt illustration of the want of "saving" faith is given by Dr. Lankester, as follows:—In Worcester typhoid fever is endemic, and the report made by the Sanitary Committee, appointed in 1866, to investigate the matter, showed that the influence of "overflowing privies and cesspools, imperfect drains, or an entire absence of them," in connexion with the use of wells very generally throughout the old cathedral town, must be exceedingly great. But the town council do not seem to be able to appreciate the idea of diminishing death and disease by the expenditure of a little money. Yet the death-rate, it is calculated, might easily be lowered from 27 to 17 per 1,000; or, in other words, the lives of 400 people and 8,000 illnesses might be saved annually. This would be equivalent to a gain to Worcester of 10,000l. a-year. It is to be hoped that the lesson of the Terling epidemic will have its due effect upon indolent nuisance authorities throughout the country. Typhoid fever is the offspring of deficient drainage, and it seems disposed to make its appearance throughout the country at the present time by explosions of serious intensity.

THE DRAINAGE OF LAND.*

MEN by constant practice acquire a wonderful skill in judging of the fall of the ground and the regularity they give to their grips, and where the ground is wet and the water either runs away or follows them they cannot get far wrong; but in dry ground, and especially where it is uneven, the eye of a most practised drainer is apt to be deceived. Too much attention cannot be bestowed to this part of the work, and the pipes should never be laid in the grips or covered up until the work has been inspected by the master or a trustworthy foreman. To obtain the levels over an estate or to lay out a large system of drainage, the use of a spirit level is absolutely necessary; and this instrument should only be handled by those who are fully acquainted with its management. For the drainage of single fields several simple and inexpensive levels have been invented, but they are not more effective or useful than the ordinary honing rods commonly used by workmen in setting out short sections of earthwork. These rods are made in the shape of the letter T, about 3 ft. 6 in. long, the cross being 14 in., and the size of the rods 2½ in. by ½ in. They should be painted white, and to render them more visible the top of one should have a black line about ½ in. deep on its upper edge.

The method of using is as follows: supposing, first, that across an uneven field (see fig. 1†) it is desired to give the drainers a guide as to the depth at which they are to cut their drain in the hollows and on the hills: driving a peg in at A, the upper end of the grip, and another at C, the lower end, an assistant holds one of the rods on the peg C; the other is held by the leveller at A, and the third by another assistant at any intermediate space between. The eye of the leveller is then directed along the top of the three rods, the intermediate one being either raised or lowered according to the nature of the ground, until the whole three are in a true line; when the peg is fixed, and the intermediate rod removed to another place. At B and D it will be seen that the ground is above the true line of inclination, shown by the dotted line, and a hole has to be dug with a spade or other tool to admit

of the rod being placed on the head of the peg; at B there is a depression below the line of inclination, and the peg stands out from the ground. The pegs having been thus placed, the drainer has only to take a rod, the depth the drain has to be; if 3 ft. deep, then a rod 3 ft. long, and measure from the top of each peg as he comes to them, the bottom of his grip at each peg being exactly 3 ft. below its head. For ascertaining whether grips have been correctly dug a very simple plan has been devised by the

author, consisting of a rod having a leg (see fig. 2) with the feet and inches marked on it, which leg is made to slide up and down it by means of two screws working in a slot, and can be fixed at whatever depth the drain is to be cut, say again, 3 ft. Then, when the sliding leg is fixed, the rod is 3 ft. longer than the others. To use this, the foreman places one of the other rods on peg A, the assistant places the other on peg C, and the rod with the long leg is held in the grip and moved along by the assistant; the foreman meanwhile directing his eye so as to keep the three in a true line. Any elevation or depression in the bottom of the grip is by this means at once detected. The use of these rods is acquired with very little experience, and levels can be ascertained with quite sufficient accuracy for all practical purposes.

If it is desired to find the inclination or fall of the ground, all that is necessary is to fix two pegs, about 10 ft. apart from each other, making them level with the aid of a straight edge and spirit level, or with a carpenter's level and plumb-hob; and then holding the two honing-rods as before on these pegs. The third rod with the sliding leg is to be held at the lower end of the grip, or wherever else it is required to level to, and then sliding out the leg until the top of the three rods is in a line; the distance the leg has to be slid out being the fall.

Pipes.

After trying various sizes and shapes for the pipes, opinion is now universally in favour of cylindrical tubes, 2 in. in diameter and 1 ft. long, for the small or feed drains, and from 3 in. to 4 in. in diameter for the mains. Some tilth-hummers manufacture a circular pipe, having a flat bottom; if they could insure that these would burn without the least twisting, there would perhaps then be a slight advantage in their having a better bearing on the bottom of the trench; but, as this is never the case, the flat bottom is worse than useless in rendering the pipes heavy and cumbersome. The author has repeatedly watched men laying these pipes, and not one in ten is laid with the flat part downwards, the reason given being that the men cannot make the ends fit when so laid. The circular pipes are less liable to warp and bend in the burning, having the same thickness of material on every side, and are therefore easier and better to lay. Collars are occasionally used, but are quite unnecessary, except in very rotten ground, when they are useful in assisting to keep the ends of the pipes from dropping away from one another. In such ground, in order to lay the drains effectually, the expedient should be resorted to of putting sods at the bottom of the trench, and treading them well down, so as to give a firm bed for the pipes to lay on. This is often absolutely necessary, and the only way of putting pipe-drains in boggy soils.

As the expense of carting pipes from the makers is a consideration in the cost, it may be mentioned that a one-horse cart will carry 800 2-in., or 600 3-in., pipes; and one horse will take this load easily on a good road, but it will require two horses to drag it over soft ground.

Cost.

The cost depends upon so many local circumstances, as the quality of the soil, the rate of wages, the depth at which the pipes are laid, and the distances apart, that it is impossible to give any fixed or definite sum. But it may be stated, as an average, that two men can dig out the trenches in a soft clay soil free from stones, lay the pipes, and fill in again at the rate of from four to five chains a day; and that an average price for pipes, at the maker's yard, is

* See pp. 40, 64, 93, ante. † See p. 41, ante.

11s. per 1,000 for 2-in. pipes and 4s. for 3-in. pipes. Having ascertained the cost of the pipes and the rates of wages for the district, the cost per acre can be calculated from the following table:—

Distance apart.	Number of Pipes required for 1 acre.	Number of Chains of Digging.
Yards.		Chains. Rods.
5	2,905	44 0
5½	2,640	40 0
6	2,420	35 2½
7	2,015	31 1
8	1,816	27 2
9	1,613	24 1½
10	1,432	22 0
11	1,320	20 0
12	1,209	18 1½
13	1,147	17 0
14	1,037	15 3
15	974	13 ½
16	907	13 0
16½	880	11 1½

The following examples, selected from cases which have come under the author's own experience, and which agree with the results given in evidence before the Committee of the House of Commons, may be taken as a guide as to cost:—

County.	Nature of Soil.	Depth of Drains.	Distances apart.	COST OF LABOUR.				TILES.				Sundries.	Total Cost per Acre.
				Rate of Wages per Day.	No. of Chains per Acre.	Cost per Chain.	Cost per Acre.	Cost per 1,000.	No. required per Acre.	Cost per Acre.	s. d.			£. s. d.
Devon.	Hard clay with stones, requiring use of pick	3 0	10	2 0	22	2 10	3 2 4	1 0	1,432	1 9 0	8 0	4 10 4	
Ditto	Ditto	4 0	..	..	..	5 6	8 1 0	..	1,432	1 9 0	8 0	7 13 0
Gloucester.	Clay	3 0	11	2 3	20	1 4	1 6 8	1 1	1,320	1 7 9	7 0	3 1 5	
Ditto	Ditto	2 6	6	2 3	36½	1 0	1 15 9	1 1	2,420	2 10 11	10 0	4 17 8	
Lincoln.	Ditto	2 6	10	2 3	27	1 5	1 12 2	1 1	1,432	1 10 6	8 0	3 0 8	
Ditto	Ditto	3 0	8	2 6	27½	1 3	1 14 4	..	1,816	1 18 2	9 0	4 11 6	
Ditto	Silt.	3 0	11	2 0	20	1 0	1 0 8	..	1,320	1 7 9	8 0	2 15 9	
Ditto	Ditto	3 0	10½	2 0	16½	1 0	1 0 6	..	1,037	1 3 0	7 6	2 6 0	

The head of sundries has been introduced to cover the extra cost of tiles used for the main drains, for carting, and for cleaning out the small ditches and other incidental expenses.

The annual charge which is put on the land, allowing 5 per cent. interest on the amount of capital expended, and the repayment of the principal by annual instalments spread over a certain number of years, may be ascertained from the following table, which gives the annual amount to repay every pound expended with the interest:—

Years.	s. d.	Years.	s. d.	Years.	s. d.
1 ..	21 0	11 ..	2 5	21 ..	1 6½
2 ..	10 9	12 ..	2 3	22 ..	1 6½
3 ..	7 2½	13 ..	2 1	23 ..	1 5
4 ..	5 7½	14 ..	2 0¼	24 ..	1 5
5 ..	4 7½	15 ..	1 11½	25 ..	1 5
6 ..	3 11½	16 ..	1 10½	26 ..	1 4½
7 ..	3 8½	17 ..	1 9½	27 ..	1 4½
8 ..	3 1	18 ..	1 8½	28 ..	1 4½
9 ..	2 9½	19 ..	1 7½	29 ..	1 4
10 ..	2 7	20 ..	1 7	30 ..	1 3½

Thus, supposing a tenant enters a farm on a ten years' lease, and lays out his capital in draining the first year, and reckoning his money worth 5 per cent. for every pound spent, he will pay an annual charge on the land of 2s. 7d.; or, making the cost of drainage of a clay soil at the rate given in the above table, viz., 12s. 1s. 6d., the annual charge will be 11s. 9d. per acre. Putting the increased produce for the wheat crop alone during the ten years at an aggregate of three quarters to the acre, and making the price of this at 50s., will be equal to an annual sum of 15s., leaving a balance of 3s. 3d. annual profit, in addition to the 5 per cent. interest, the increase of other crops, and the saving of labour in working the land.

Tenant Right.

In order to encourage the improvement of land, some well-defined and acknowledged system of allowances to out-going tenants ought to be recognized; but, unfortunately, at present such allowances are entirely dependent on the previous agreement between landlord and tenant, and the arbitrary custom of a particular district. While in some counties tenant-right has become so established a custom as to be acknowledged almost as a right by the courts of law, in others it has gained so slight a footing, that if the incoming tenant objects to pay for any particular improvement, the valuers cannot allow it.

An authority on tenant-right says on this subject,—"No valuation can be claimed by law for drainage unless allowed by agreement, and unless the farmer has paid such allowances on entering to the farm; for if the farmer commences such work without an understanding on

the subject, he must look for remuneration from the expectations which induced him to commence it, which must have arisen as much from the increase of produce he anticipated as from any allowance that might be made him."*

The Committee of the House of Commons, which was appointed in the year 1848, to inquire into this subject, examined some of the most eminent land agents and agriculturists from every part of the kingdom. The evidence given by these gentlemen as to the allowances to be made for drainage were very various. The case divided itself into two parts: one where the tenant found both tiles and labour; and the other, where the landlord found the tiles, and the tenant the labour and carting. The evidence as to the time over which an allowance should extend for the former varied from five up to twenty-one years, and for the latter, from no allowance at all up to ten years. But there was less discrepancy as to the time over which the former was to run than the latter, the general opinion being, that from ten to fourteen years was a sufficient time for the tenant to be paid for his outlay, with a fair amount of profit. As to the time the effect of well-executed drainage would last, the answer given by one witness

perly executed and the landlord's money not thrown away. The practice in use in some parts of Nottinghamshire, as given in evidence by Mr. John Parkinson, of the landlord, in addition to finding tiles also finding a man to lay them, affords some guarantee for the efficient performance of the work. Baydon advises that the landlord should execute the whole of the work, the tenant being at the expense of carting the tiles and paying five per cent. on the outlay, and remarks: "This is an excellent arrangement, the landlord having a permanent interest in the land, is secured by his own workmen executing the drainage against any imperfect performance of the work. The charge is light upon the farmer; and at the end of twenty years the expense is repaid, and the land to be re-let at an improved value of at least one-third."

The Effect of Drainage on the Climate.

Before concluding this article, reference ought to be made to the important effect drainage is having on the rivers and underground supplies of water throughout the country. However advantageous drainage may be to the cultivation of the soil, it cannot be denied that its effect is otherwise on our watercourses. The rain rapidly discharged from the ground is poured into the rivers, which rise with sudden and impetuous freshes, and then as rapidly subside. The land being thus cleared of its surplus water, there is little or none left to percolate to springs and streams during the summer months. This want of water is beginning in some places to be seriously felt, and to it in a great measure alone can be traced the diminished rainfall in some parts of the country.

Two remedies suggest themselves: the one, the conversion of suitable sites into reservoirs for the storage of water in winter, to be used during the summer in irrigating the poorer grass land, and thus affording a due supply of moisture to the air by evaporation; the other by stopping the cutting down of timber in the wholesale manner in which it is now carried on. A heated surface soil reacts by its radiation on the clouds as they pass over it, and thus prevents many a refreshing shower, which they would otherwise deposit, or disperses them altogether. The foliage of trees, on the other hand, defends the soil beneath and around them from the sun's direct rays, and disperses their heat in the air, to be carried away by winds, and thus prevents the ground from being heated in summer.* As a shelter from winds, the utility of woods is evident. The evaporation which goes on by their leaves is a powerful and incessant cause of moisture; the least lowering of the temperature precipitates the vapour of the air, and the resulting water penetrates into the soil. Evidence is at hand to prove the truth of this theory. The rainfall over large regions of North America is said to be gradually diminishing, and the climate otherwise altering, in consequence of the clearance of forests; whilst, on the other hand, we have the very remarkable fact that, under the beneficial influence of a largely increased cultivation of the palm-tree in Egypt, rain is annually becoming more frequent. The climate of parts of Scotland has been wonderfully improved, and the crops increased on the plains, by planting the mountain sides with larches; and this example should be followed throughout the kingdom. Every lover of his country should exert all his influence to prevent the growing utilitarianism of the age from denuding our hedgerows of some of the most ornamental and beautiful objects which nature has sent to enrich the landscape and cheer the weary traveller on his way, and to teach us to lift our eyes from nature up to nature's God. W. H. W.

LONDON AND COUNTY BANK.—The directors state in their report that, after paying all charges and interest to customers, and making provision for bad and doubtful debts, the net profits amount to 82,624l. 15s. 4d. This sum, added to 7,081l. 1s. 1d., brought forward from the last account, produces a total of 89,705l. 16s. 5d. The annual dividend of 6 per cent. for the half-year, together with a bonus of 3 per cent. which will absorb 81,895l. 6s. 3d., and leave 7,810l. 16s. 2d. to be carried forward to profit and loss next account. The dividend for the whole year 1867 will thus be 20 per cent. A statement of the accounts will be found in our advertising columns.

* Baydon, on Reuts and Tillages.
† Wingrove Cooke, on Agricultural Tenancies.

* Steinmetz, "Compendium of Popular Meteorology."

PROFESSOR G. G. SCOTT
ON EARLY ARCHITECTURE IN GREAT
BRITAIN.

LECTURE II.*

My last lecture was rather antiquarian and historical, than instructive in any principles of art. It showed you how the Celtic inhabitants of Ireland and Scotland worked out for themselves,—upon Romano-British reminiscences, added to those of their own race,—a manner of building which, though severely simple, was by no means to be despised; and also how our own Anglo-Saxon forefathers went through a similar process, working partly on the same foundations, but more directly on lessons brought to them from Italy, though not always very well understood.

I might further have shown you (had it been my subject) how that both of these races were far more successful in the more delicate arts of embroidery, illuminated painting, and jewelry; and how little in their practice of those decorative arts they trusted to any but their own traditions.

I am not sure, too, whether in sculpture the pre-Norman English may not have succeeded better than in architecture,— quaint and untechnical though their productions were.

I fear, however, that we must admit that, in our own particular art of architecture, we have little to learn from their buildings, however interesting and quaintly picturesque; and that, though belonging to a branch of the great round-arched family, they fall—almost of all effort, certainly of any success—in developing that manner of building into a style of art.

That fearful deluge, whose destructive waves swept with such overwhelming fury over our land after the decease of the last—the sainted—monarch of England's older dynasty, may be likened to the sudden breaking down of its banks by some mighty river, which, while it sweeps from the earth the crops and the homesteads, leaving nothing but devastation on its track, yet deposits, in subsiding, a film of foreign substance upon the deluged soil, which adds to it a new productiveness, and, in time, far more than compensates for the loss and havoc which accompanied it.

So it was (at the least with architecture), after the Norman conquest. The old manner of building which, during a course of nearly five centuries, had failed to generate any development of a truly artistic character, was swept once and for ever from the face of the earth, so much so that some have denied its very existence, but there was substituted for it a style which, if at first little less rude than its predecessor, contained within itself the germs of a thoroughly sound artistic system, which speedily germinated into a series of developments, the most glorious which, perhaps, man has ever yet seen.

We have the clearest evidence, both from the statements of old writers, and such as we derive from our own observation, that the style of building introduced into England by the Normans, was viewed as a distinctly new one—a "*novum genus compositionis*," and in no degree as a development of that which preceded it in this country.

How far the Norman style was distinct from the Romanesque of other parts of the north of France is a question which it would be curious, though difficult, to investigate. I think it might be shown that architecture, both in France and other countries of Western Europe, made a sudden forward start after the thousandth year of our era; possibly owing to the relief experienced at finding the futility of the prevalent fears that the world was to come to an end in that year. If such a simultaneous impulse did take place, it would be especially felt by a young and energetic race like the Normans, newly admitted into the Christian European family, recently reclaimed from the savage barbarism of Scandinavia, and grafted on to the old and comparatively civilized stock of France. Unlike, too, the other portions of France, Normandy had lost, in all probability, a large proportion of her ancient churches by the devastation of this very race while yet pagan; and nothing would be more natural than that, when Christianized, settled down, and instructed in the arts of their new neighbour, they would feel a special impulse towards repairing the effects of their own devastations, and would, while

doing so, take a vigorous course in developing the manner of building in which they had been so newly instructed. I would not, however, wish to claim for the Normans any great degree of originality in architecture. Different districts of France each possessed its own local variety of Romanesque, though all clearly of one family; and Normandy, like the others, had its own variety, and that a vigorous one; and to ourselves the most interesting, as having been transplanted into our own country and become the parent of all our architectural developments. What was the form of Romanesque which prevailed in Normandy before it was overrun by the Northmen and transformed into Normandy, I think we have no means of judging; the relics of its buildings being so few and fragmentary as to offer no distinct evidence; but just as the converted Northmen in the days of Canute were in this country the earnest restorers and builders of churches, so did those who had settled in France become the vigorous promoters of the art which they had once destroyed; while, by a remarkable coincidence, they were the means of bringing over in a succeeding generation to those of their own and kindred race in England the developments which they had generated under more favourable circumstances and guidance in the country which had for a century and a half adopted them into its own family.

If, however, the more vigorous pursuit of the building arts in France dates, as I have conjectured, only from the opening of the eleventh century, and was only contemporary with the revived impulse in this country under Canute, it follows that the mode of building introduced by the Normans was not only to the English, but in reality, a *novum genus compositionis*.

Quite in accordance with this is the character of what we call in this country Early Norman. Had Norman architecture been fully matured before its transplantation into England, we should not recognise its earlier productions by evidences founded upon rudeness and immaturity; yet such is unquestionably the case. Noble and vigorous as are the works of the Normans of the early days of their occupation of England, they undoubtedly bear evidences of an early and archaic stage of their form of art; and, even in Normandy itself, we do not find buildings of great architectural importance of dates much antecedent to those of the first structures built by the invaders of England. Early Norman in England would still be Early Norman, if in Normandy; so that we may consider the style, though generated on French soil, to have run the greater part of its course *pari passu* in both countries.

The investigations made, and recently published, by M. Bonet, of Caen, into the architectural history and changes of the abbey church of St. Stephen, founded in that city by the Conqueror, fully bear out this view, and show that the church, as built by William, was a very different and much more archaic structure than that which we now see; a large proportion of the more prominent features of which are proved to be the overlays of later, though still Romanesque, times.

As it is not my purpose, generally, to illustrate my description of the Norman style by its productions on its native soil, I shall select the church just named as the *point de départ*, by means of which I shall transfer my consideration of the style from Normandy to England. There are several churches of earlier date than this, such as parts of the abbey churches of Jumièges and Bernay, but St. Stephen's is clearly the great connecting link. In the first place, it was rebuilt by the Conqueror, and was in actual progress when he invaded England; and, in the second place, Lanfranc, the first abbot of St. Stephen's, which was built under his direction, was also the first metropolitan of England appointed under the Norman dynasty, and immediately on his assumption of the see of Canterbury,—only four years after the arrival of the Conqueror,—he commenced the rebuilding of the cathedral (then lying in ruins), after the almost precise design of his own abbey church at Caen. This abbey church, then, at Caen, and the metropolitan church of England, were built under the influence of the same monarch and at the same time; for, though St. Stephen's was first begun, it would appear that Canterbury was finished first: they were built under the direction of the same ecclesiastical head, and in all leading features are the same design, their plans being absolutely identical. The only difference of importance was the existence at Canterbury of the crypt, on which

the choir was raised by many steps,—a reminiscence of the church built by St. Augustine, described in my last lecture, while such did not exist at St. Stephen's. Both churches had naves of eight bays in length, in addition to which both had a western façade, with two flanking towers.

The transepts of both churches are of two unequal bays, and the outer bay of each had a gallery all across it, supported by a massive pillar (as at Winchester); in each there was in both transepts an apsidal chapel repeated on the triforium level; and though both have lost their original choirs, the probability is that both were of two bays long, with the addition of a simple apse. Professor Willis has shown that their very dimensions were nearly identical.

It has been discovered that at St. Stephen's the western towers were a subsequent addition, though so early that little difference can be observed in their details. I give drawings of capitals from the nave and the western towers, which are identical. I judge from this that the towers at Canterbury were a derivation from the design of St. Stephen's, which was at once rectified by adding them to the prototypic building.

The piers of St. Stephen's are oblong masses, divided at each end into groups of three large shafts. To this are added, on the side facing the nave, shafts, alternately single and triple, which ran up to the roof. The triforium story is almost a repetition, to a less height, of the main arcade; though, where it passes the western towers, it is divided into two sub-arches by a single shaft. Mr. Parker, whose excellent paper on the subject will be found among the Transactions of the Institute of British Architects, seems to think that the triforium floor was of timber, and the aisle unvaulted. Professor Willis was under the impression that it had no floor, but that the two stories were united, as is now the case at Rochester. This, I think seems disproved by Mr. Parker's paper, and by M. Bonet's drawings, which show a doorway opening into the triforium story. This story is at present vaulted above with a half-barrel vault. This Mr. Parker thinks an addition; but M. Bonet shows a remnant of it embedded in the east wall of the transept, where the old choir aisle has been removed, which seems to suggest its being original.

The greatest alteration which the older portions of the church have undergone is the addition of vaulting to the nave and the entire transformation of the design of the clearstory in a later Norman style, which, to a casual observer, seems to work in so well with the older parts as to appear original. M. Bonet and Mr. Parker have found the remnants of the original arcade,—which were uniform in height and incompatible with vaulting,—both in the nave and transepts, proving that vaulting was not contemplated in the first erection.

I am, however, rather anticipating my history, and must fall back upon a somewhat earlier period; for, though Canterbury Cathedral was probably the first church erected in England after the Norman Conquest, it was nevertheless by no means the first Norman church; for it was in a Norman minister that the Conqueror had, full four years before the works at Canterbury were begun, received at the hands of an English archbishop the crown of England.

You will remember that as early as 1013 Ethelred and Emma, the parents of King Edward the Confessor, had fled with their children from the fury of King Sweyn to the court of Bjarndar Bon, duke of Normandy. It followed that the education and tastes of the future king were Norman; and long subsequently, after he ascended the throne, England so swarmed with Normans as not only to excite discontent but to give occasion to civil war. It was, then, natural that, when King Edward determined (about 1050) to refund the Abbey of Westminster, he should adopt for his new work a Norman rather than an English design. We accordingly find it spoken of by William of Malmesbury (writing in the following century) as "That church which he, the first in England, had erected in that mode of composition which now nearly all emulate in its costly expenditure." Matthew Paris,—a century later,—says that Edward "was buried in the church which he had constructed in that new mode of composition from which many of those afterwards constructing churches, taking example, had emulated it in its costly expenditure." These notices by men of whom the one knew most and the other might have known all of the Norman

* Royal Academy, January 30, 1868.

† See pp. 70 and 80, ante.

churches in England, are sufficient to prove the Confessor's church to have been not of Anglo-Saxon but of Norman architecture; and, as they thought, the earliest of its style in this country.

Whether that erected by Earl Harold at Waltham, and consecrated in 1060, was in the same style, we cannot ascertain. His proclivities were certainly not Norman, yet he may have adopted the fashion just coming into vogue, though we find that other churches built nearly as late, and some even subsequent to the Conquest, still retained the older and more national character.

The church built by the Confessor at Westminster is thus described by a contemporary writer:—

"The house (*domus*) of the principal altar, constructed with very lofty vaultings, is compassed round with squared (stone) work uniformly jointed; the aisle around the building itself is shut off by a double tier of arches from either side, the continuity of the work being firmly consolidated in every direction.

Further, the cross (transept) of the temple which would enclose the choir of those singing the praises of God in its midst, and by its twofold support on either side would sustain the lofty apex of the central tower, rises at first simply with a low and massive vaulting; it then swells out with several staircases, skillfully ascending with many windings; then with a plain wall it runs up to the roof, which is of wood, carefully covered with lead.

Below, however, and above are arranged in order chapels (*domicilia*), which are to be consecrated through their altars in commemoration of apostles, martyrs, confessors, and virgins.

This multiplicity of a work so vast was, however, begun at such a distance from the east of the ancient temple, that even some part of the nave which was to lie between them, intervened with ample space, lest the brothers occupying it should be interrupted from the service of Christ."

Another contemporary writer describes the church as "upheld by diverse columns, and vaulted everywhere with multiplicity of arches."

- From these accounts we may gather:—
1. That the church was apsidal.
 2. That the aisles were of two stories, and each of them vaulted.
 3. That there was a lofty central tower under which the choir sat, and that this had winding staircases, and was covered with a timber roof and leaded.
 4. We further learn that the church contained numerous chapels and altars placed both below and above, and that in the eyes of one who had, perhaps, lived to see several of the new Norman churches commenced, it appeared a work of vast size and great multiplicity.

Lastly, we find that it was placed so far to the east of the ancient church, that not only were the services in that church never discontinued, but that a portion of the nave of the new church might be erected. The latter proves of course, that the entire nave was not completed by the Confessor himself, as he died within a few days after the consecration.

A writer of the thirteenth century, in a poetical life of the Confessor, thus describes his works at Westminster:—

"Now he laid the foundations of the church with large square blocks of grey stone; its foundations were deep; the front towards the east he makes round; the stones are very strong and hard; in the centre rises a tower, and two at the west front, and fine and large bells he hangs there. The pillars and entablatures are rich without and within, at the bases and capitals; the roof rises grand and royal; sculptured are the stones and storied the windows; and when he finished the work, with lead the church completely he covers. He makes there a cloister, a chapter-house in front towards the east, vaulted and round, . . . refectory, dormitory, and offices, in due order."

This description adds to what I have before stated, that there were two western towers, though these were not really erected till later, but were, nevertheless, in all probability a part of the first design. It tells us also of the monastic buildings.

Of the scale of this first Anglo-Norman church we have some indirect means of judging. In the first place, it is unlikely that a church of royal foundation, built in juxtaposition with the palace, and intended as the burial-place of its founder, built also in substitution for a pilgrimage which he had vowed to make, should be other than of similar scale to the

great churches erected at the time in the country whence he borrowed his architecture. In confirmation of this we have several evidences, not necessary here to state, that it differed but little in scale from the present church; indeed, had it been otherwise, the succeeding historians would hardly have spoken of it in the terms which they make use of.

As to its architectural character, we have little to guide us. We have the extensive sub-structure of the dormitory and the lower part of the refectory. From these we find that the offices were of the plainest variety of Norman; indeed, the pillars of the first-named structure are of the very extreme of massive simplicity, and the shafts of the refectory arcading have cushion capitals of the most normal type.

We have recently discovered, beneath the pavement of the altar space, the bases of two of the great piers of the Sanctuary; from which we find that they were clustered, not unlike those at St. Stephen's at Caen. The bases consist of a double hollow, precisely like one from that church. The work is by no means so rough as that common in early Norman buildings; a circumstance which I have noticed in several pre-conquestual works.

Having noticed this one building in which Norman architecture was used in England before the Conquest, I will mention one or two instances of Anglo-Saxon architecture being used subsequently to that event. I refer especially to two churches (St. Mary's and St. Peter's, at Gouta,) in the lower town of Lincoln. This portion of the city did not exist till after the Conquest; when, owing to the expulsion of many of the inhabitants of the old, or upper, city to make way for the Norman castle and cathedral, they were obliged to build below the hill, where they founded these two churches; building them in their own old English manner, while the castle and minister were being erected by the Normans in conformity with their own taste above. There are a number of towers between Lincoln and the Humber which correspond so closely in style with these as to lead one to assign to them the same date. Nothing can more manifestly prove the distinctness of the two styles than that the most marked church of the period was built by the Norman-loving Anglo-Saxon king in Norman architecture before the conquest, and that old-fashioned English people still built in the Anglo-Saxon manner in the days of the Norman Conqueror.

It is time now that we should consider what were the distinguishing characteristics of the Norman style.*

THE PROPOSED ENLARGEMENT OF NEWGATE: THE CORPORATION AND "THE BUILDER."

In the *Builder* of the 1st inst. there appeared an article under the heading "Proposed Enlargement of Newgate," which most of our readers have probably read. After explaining the costly surroundings of the prison, such as the City end of the Holborn Viaduct, the new Meat Market in Smithfield, and commenting thereon, the article goes on to say:—

"It is proposed to take in the best part of Warwick-square, some of Tylor's Market—which many people think is part of Newgate Market—and some courts and alleys adjacent. If this is done, of course the present proprietors of the required premises will have to be bought out handsomely. As they are mostly publishers, or connected with the commercial department of literature in some shape or other, they cannot be 'improved' out of the way without money. Then there will be the freeholders to settle with, and after that the old buildings to be pulled down and the new ones put up," &c.

Portions of the same article were copied into the *Times* and other daily papers, and opinions expressed in proportion to the extended circulation of the rumour, to the effect that Newgate, instead of being either altered or enlarged, should rather be swept away altogether.

It must be understood that the Old Bailey Court House—that terror of judges, but venerated pile of aldermen—was included in the condemnation. It is time that execution should be at last done on executing Newgate. We are not without sources of information in the City, and we have, upon wide inquiry, heard only one opinion, and that has been in perfect unison with what we previously expressed, and what we say now.

The proposed enlargement and alterations for the enlargement of Newgate, were

* To be continued.

the common talk of the "pigeons" in Guildhall-yard for many weeks before we sent the branded scheme flying through the town. Well, then, what was our astonishment to read the following in the report of the proceedings of the Court of Aldermen, held on Tuesday, the 4th instant, in the court-room, Guildhall:—

"The Gaol of Newgate.

Alderman Sir W. Rose called the attention of the Court to a paragraph relating to the gaol of Newgate, which had been copied from the *Builder* into several of the daily journals, to the effect that a very large and undesirable outlay was about to be incurred in extending the limits of the prison, and that with that view the Corporation was about to purchase a large piece of ground. The fact was, he said, that a very small outlay had been sanctioned by that Court, there being ample space within the existing walls for any enlargement that might be required. It was absolutely necessary that there should be a gaol of detention within the City and in immediate connexion with the Central Criminal Court, which had jurisdiction over eight counties. Under these circumstances, considering that only a small amount of additional accommodation had become necessary, and that an outlay of only about 600*l.* had been authorised for providing it, he had thought it right to make that statement, the more so as the public had been led to infer that the Corporation was about to expend a large sum, and, as in some instances, the paragraph in question had given rise to editorial comments founded on erroneous information.

Mr. Alderman Copeland said there were now only eighty-seven prisoners confined in Newgate; but when he was Lord Mayor in 1828-29, there were sometimes as many as 500 waiting for trial, and after trial hundreds were detained there awaiting transportation.

The matter then dropped."

We, however, beg leave to take it up for a short period. Alderman Sir W. Rose is, no doubt, a very estimable, truth-loving gentleman, but he will find, we hope, before he has finished reading this article, he is not the only truth-loving person in this world who goes about with his eyes open.

Again, in the Court of Common Council, held at Guildhall on Thursday, 6th inst., under the presidency of the Lord Mayor, the prison came up again:—

"The Gaol of Newgate.

Deputy Fry asked whether there was any truth in the report that an enlargement of the gaol of Newgate was in the contemplation by the Court of Aldermen. Again, if that were not so, whether the subject of removing the gaol to another locality had ever been under the consideration of that court.

Alderman Sir William Rose repeated the statement he made in the Court of Aldermen on Tuesday last, to the effect that 600*l.* was about to be expended in alterations connected with the prison; that it was a house of detention as well as a gaol, and was used as such in connexion with the Central Criminal Court, to which, as having a jurisdiction extending over eight counties, besides that of the Admiralty, it was indispensable. There had never, to his knowledge, been any intention on the part of the Court of Aldermen to remove the gaol to another locality.

Mr. Bonnewell reminded the Court of the statement in the *Builder* on the subject, and asked if it was true. The Lord Mayor said there was no foundation whatever for that statement.

The subject was then allowed to drop."

Mr. Bonnewell, because he had received no reply to a cool inquiry made by him as to the truth of our statement the day after it appeared, favoured us with a letter of reproof, wherein he takes upon himself to discourse thus:—

"You will see by the report in the *Times* that the matter was brought before the Common Council yesterday, when the Lord Mayor gave an unqualified contradiction to the statement. You will excuse my expressing an opinion, that in future, before you bring reckless and unfounded charges against any man holding a public office, it would be as well to make the necessary inquiries as to the accuracy of the charges made before publishing them to the world."

"We do not excuse Mr. Bonnewell; but let that pass for the present. The accuracy of this journal has been seriously, not to say grossly, impugned, and we have been very properly asked by some of those who have read the contradiction, if we could produce any tangible authority for saying that there was a proposal to enlarge the prison. It was thought probable that we might have been told of the matter as a rumour of idle gossip, and so have been misled, as many other well-meaning people have been before us. It was not so. We had very good authority, and here it is, in the shape of an advertisement:—

"We, being two of the aldermen of the city of London, and two of the visiting justices of the gaol of Newgate, and having jurisdiction within the city of London and the district of the said prison, do, by this our certificate, specify that there is a necessity for an alteration in or at the gaol of Newgate, and that the houses and premises specified in the schedule hereto are required for the purposes of effecting such alteration; and we do hereby give notice that this presentment will be taken into consideration at the Court of Lord Mayor and Aldermen of the said City, to be held in the Inner Chamber of the Guildhall of the said City, on Monday, the 13th day of January, 1868.

Dated this 15th day of December, 1867.
ANDREW LUSH,
WALTER S. HALL.

The Schedule above referred to:—
House and premises, No. 1, Newgate-street, in the occupation of the officers of the gaol of Newgate.
Passage to the premises known as Tylor's Market, and

the sites of houses now pulled down on the western side of the said passage, and the counting-house, stalls, and other conveniences abutting on the said passage.

House, workshops, and premises in Warwick-square, abutting upon Newgate, and in the occupation of Joseph Taylor & Sons.

House, workshops, and premises, No. 9, Warwick-square, in the occupation of Benjamin Manning.

House, workshops, and premises, No. 8, Warwick-square, in the occupation of Ann Straker & Sons.

The site of a house and premises in Warwick-square, now burnt down, late in the occupation of Messrs. Biggs & Collins, or their undertenant.

House, workshops, and premises, No. 11, Warwick-square, in the occupation of William Henry Hayden, or his undertenant.

House, workshops, and premises, No. 11, Warwick-square, in the occupation of Woolley, Sanders, & Co.

House, warehouses, workshops, and premises, No. 12, Warwick-square, in the occupation of Messrs. Copstake, Moore, Crampton, & Co., and the site of the court along the south side of the said premises.

A vacant piece of land in the south-west corner of Warwick-square, adjoining the last-mentioned premises.

The "presentment" is signed "Andrew Lusk," "Warren S. Hale." It appeared week after week in the advertising columns of the public journals. Is it a hoax, or is it a forgery? Let us know that. We wish it to be remarked that the aldermen whose names are to it are visiting justices of the prison, and they certify in a formal manner "that there is a necessity for an alteration in or at the goal of Newgate, and that the houses and premises specified in the schedule hereto are required for the purpose of effecting such alteration." It is addressed to the "Court of Lord Mayor and Aldermen," and the consideration was fixed for the 13th of January. That being so, both the Lord Mayor and Alderman Rose were bound, officially, to be in the knowledge of its contents. The next time, therefore, that Mr. Deputy Fry and Mr. Bonnewell meet the Lord Mayor and the Aldermen in the Common Council, let them put their fingers on the present page of the *Builder*, and ask, "What is the meaning of this?" Will either the Lord Mayor or Sir W. Rose have the bravery to repeat, in the face of this "presentment," that "there was no foundation whatever for the statement in the *Builder*?" We feel strongly on this matter. It looks somewhat odd—"a strange coincidence," we should say,—that neither Alderman Lusk nor Alderman Hale was "in his place" when this inexcusable statement was made.

Sir W. Rose told the court that not more than 600L. is to be expended. If so then the presentment must have fallen to the ground, still-born as it were. Let us look over the schedule and see what the houses are like, and how much of them could be had for 600L. We will pass by the house in Newgate-street, which is occupied by the prison officers, and go into Warwick-square. It may not be breaking confidence to state that the property of the Messrs. Taylor & Sons is considered alone worth 50,000L., and that they would be likely to present a claim to that amount were they forced to move. They are condensing apparatus manufacturers, and have a very extensive business in metal-work for building purposes as well. They possess a house, workshops, and premises, being part of the passage through Taylor's market, leading from Warwick-square. No. 8 of the square is in the possession of Messrs. Ann Straker & Sons, printers, a class of persons who must have, more or less, valuable premises, plant, and interests. No. 9 is in the occupation of Mr. Manning, a stereotyper; the house is an old one, but of ample size. No. 10 is in the joint occupation of Mr. Hayden, music publisher; Bancroft & Co., San Francisco; and the *Publishers' Circular*. No. 11 is occupied by Messrs. Woolley, Sanders, & Co., straw-hat manufacturers and warehousemen. This house is a very large one, and has only been built a few years. It is five stories high, and the newness of the bricks has not yet worn off. No. 12 is in the occupation of Messrs. Copstake, Moore, Crampton, & Co., the well-known Manchester warehousemen, of Bow Churchyard, Cheap-side. It has a frontage of probably 35 ft. It is five stories high in one half, and six stories in another. This is an end house of that side of the square, with a vacant piece of land beside it. The other end of the same side was a house with many tenants, but was burnt down, and has never been rebuilt. Such is the character of that side of the square which appears in the presentment schedule.

Let us return for a moment to Alderman Rose. In speaking of the article in the *Builder* and contradicting it, he said that there was "ample space within the existing walls for any enlargement that might be required." If this be so, why should two aldermen, visiting justices of Newgate, make a presentment to their own court that there was *not*, and schedule, say,

100,000L. worth of property, to be removed for its enlargement? Perhaps Sir W. Rose will be kind enough, in the fulness of his good nature, to "put that and that together" and tell us what it means? He "thought it right to make that statement, the more so as the public had been led to infer that the Corporation was about to expend a large sum, and as, in some instances, the paragraph in question had given rise to editorial comments founded on erroneous information." But who led the public to "infer," &c., and who applied the erroneous information? In the face of this advertisement it has been asserted there was not the slightest foundation for our remarks. What would be thought of the Chief Commissioner of Public Works scheduling all the houses on one side of Parliament-street for removal to enlarge the roadway, advertising each house and each tenant, and then, when asked in his place in the House of Commons why Parliament-street was to be widened, branding the assertion as a falsehood? It has been often said that one half of the world does not know how the other half lives. It would seem to be equally true that one half of the Corporation does not seem to know what the other half is doing.

A WORD OF CAUTION.

We have to call the attention of those whom it may concern to the present state of the lofty wall separating the courtyard of Burlington House from Piccadilly. The western angle of this wall has been taken down, so that the tie which it has for so many years formed is broken. The structure thus exposed in section is on the move, or, to speak with more precision, has visibly moved towards the street, and now overhangs its base by as much as its own respectable thickness. Without applying actual measurements to the spot, it is yet possible to speak with some certitude as to the fact of actual displacement. For an observer standing near the end of Burlington Arcade may note a well-defined vertical cleft which he may easily bring into line with the exposed section of the boundary wall in question. There are obstacles in the way of aligning this cleft with the inclined face down to the ground, but if they are made to coincide at a point somewhere between one-half and one-third of the height of the boundary wall, measured from below, the divergence at the level of the coping will be seen to be very considerable. That the fact has not escaped the attention of those in charge of the works is evident from the presence of two struts, not mere casual props, but struts formed with a care that seems to contemplate their maintenance for some considerable time. In fact, the wall is now leaning on these props, and, if they were suddenly removed, would in all probability fall on the footpath.

It is not fair to the public, nor is it desirable for the credit of those responsible for the works in progress on the spot, that the wall should be allowed to remain in this state. We do not say that there is any urgent menace of danger. It is quite possible, nay, probable, that if they are made to rest for months on its two wooden legs, like some of those veteran pensioners who exhibit their honorable losses, borne in the service of their country, in the corridors of Chelsea Hospital. But we cannot afford to leave such a matter to probability in an important thoroughfare of a great city. If the wall fell, the loss of life, though not so calamitous as in the case of the much loftier wall that fell the other day at Naples, might still be of a nature that would startle the public. It is a time when there are evil spirits abroad amongst us, if not exactly seeking whom they may devour, yet evidently bent on mischief. It is not justifiable to peril the safety of even a single passenger out of the many thousands who daily pass over the pavement on which this wall would fall if the props were struck, while cross-cut saws and sledge hammers are accessible to those who have the ill-will to use them. We must remember that apparent purposelessness is a feature of much of the destructive agency of the day. But apart from the last few weeks, had unusual proof of the violence of the wind. It is true that danger from wind depends not only on the velocity, but on the direction of the blast. But it is no less true that the direction is as little to be foretold with certitude as is the force. We do not think any man familiar with building would feel com-

fortable in taking shelter on the lee side of the Burlington House wall if such a wind as that which has recently visited us more than once were howling at his back. We make no prophesies—we express no vivid apprehensions. We only say that, in such a city as London, every possible precaution should be taken against fatal accidents. A lofty wall, overhanging its base, and propped by wooden struts, is a very possible cause of fatal accident. Are there any means of resisting the inference that that cause ought to be at once removed?

ON THE APPLICATION OF WATERGLASS (SILICATE OF SODA) FOR PAINTINGS AND DECORATIONS.

ALTHOUGH more than thirty years have elapsed since the introduction of waterglass, yet its application is at present but very limited.

It is a well-known fact, that paintings executed in oil or encaustic colours are soon destroyed in the open air; the fatty substances are consumed by a mortar ground, or by the oxygen of the atmosphere; the white lead used in paintings is soon converted, in large towns, into a grey and dirty mass (sulphurated lead); the latter process destroys all harmony of colour, and the result cannot be removed by any other means than painting over again.

With interior wall-paintings, a somewhat ro-verse action takes place; the oils become darker, and if—to counteract this defect—mud spirits of turpentine is used, the colours become harsh and adhere imperfectly: after a short time, minute particles are detached, through the variousities of temperature, through the heat of fires, gas, and candles. Now, if only portions of rooms, halls, schools, and churches were coated with waterglass painting,—walls, for instance,—the carbonic acid exhaled by our lungs would be absorbed with avidity, and assist in the solidification of waterglass colours, and of the plaster.

The white colours, used in common and elaborate interior paintings, are mostly white-lead; its actions upon the human frame are well known. The white colours employed with waterglass for large surfaces are perfectly harmless, and the obnoxious smell of oil paint is entirely absent with waterglass application. Yet oil paint and varnish are for many reasons more durable for *woodwork of dwelling-houses*; oil and varnish are of an elastic nature, more fitted for the changes of sudden expansion and contraction of wood.

Walls of mortar, stucco, Roman cement, stone, &c., are the substances upon which waterglass may be employed with the greatest advantage. There is great affinity and relation between those bodies; waterglass becomes an insoluble mass, which, by the absorption of carbonic acid, becomes harder and more indestructible. Cypium (plaster of Paris) ought to be avoided as a ground; there is no affinity between these two substances.

Mortar which is composed of lime and sand is the best ground for waterglass. The sand used must be free from salts, ground flints, &c. The so-called artificial sands are the best, they have an even and sharp "corn." The lime may be slaked; if fresh lime is used, it should be powdered fine to prevent "blowing;" in both cases the mortar should be rather poor in lime. Roman cement, mixed with mortar or with sand, also forms a good ground; but plaster of Paris must be avoided in the last layer of mortar.

The ground should be of an even grain,—not smooth; the larger the wall and the details to be painted, the coarser the grain of the sand may be. After the ground is perfectly dry it ought to stand for a week or two before painting is commenced. The colours used for painting pictures, decorations, or large surfaces, are—imply ground fine in pure water: the water is best purified by boiling. The colours are applied with water only. These artists and decorators who are used to paint in tempera, in body-colours, or distemper, will find this process easy; those who are used to oil-painting only, require some practice to master the details of manipulation. Before application of colour, moisten the places with water; and should the ground become dry under the brush it is kept moist with a syringe, throwing the water in the form of a fine mist. In all cases where it becomes necessary to paint over again, to deepen or lighten the colours, the places ought to be always moistened with the syringe. While painting is going on, the colours must not be touched or rubbed with

finger, as they are now only "hound" with water, and are soon damaged and rubbed off when a picture or a wall is finished, the colours must be "fixed," and now, for the first time, water-glass comes into operation.

For fixing the colours the "fixing water-glass" is used. The surest way of using it is to dilute the solution with pure water considerably. That water-glass which is of the consistence of thick syrup may be diluted with six times its bulk of water; that which is sold as "fixing solution," with an equal bulk of water. The whole surface is evenly sponged over. Care must be taken not to apply too much, or the colours may flow into each other. After the lapse of a day, the water-glass having had time to combine and harden, a second coat is applied: this time the solution may be a little stronger. In most cases the colours will be all "fixed" when the second "coat" is dry; if, however, some of the so-called meagre colours, such as black, &c., will rub off with the finger, it is best to go over these with a soft brush and water-glass.

There is no advantage in adding more water-glass than is absolutely necessary to fix the colours. If too much is used, the surface becomes bright, which is also the case if too much lime is in the mortar. These bright places, in the course of a few days, turn into a white film, which, however, will disappear in the course of time, or must be removed with a sponge and clean water. The safest way to ensure success is to begin the fixing with a weak solution, and repeat it rather three or four times, than to use a strong solution at once.

The colours or pigments to be used are as follows:—Zinc white, permanent white (artificial phosphate of barytes), dark yellow, burnt and raw ochre, terra de Sienna raw and burnt, cadmium and chrome yellows, red chrome, chrome green, blue and green ultramarine, oxide of iron in red, brown, and crimson, burnt umber, mineral and lamp black. No vegetable colour is admissible. Vermilion, cobalt, and light blue ought to be avoided also.

For larger surfaces, for walls where expense is a consideration, lime and chalk (whiting) may be used, only those latter do not cover well: a little addition of zinc white will balance that defect and produce a good "body." It should be also borne in mind that water-glass is antagonistic to oil paint; if any oil-painting is in proximity to water-glass painting, or upon a wall to be fixed, the oil paint ought to be covered with paper before fixing with water-glass, otherwise the oil paint will suffer.

Woodwork when new, where a smooth and even surface is not required, where the smell of paint is too obnoxious, may be coated with water-glass. In that case it is recommended to "bind" the colours with weak size, and apply the water-glass afterwards with a brush. Woodwork is also protected against fire by the simple application of two or three coats of pure water-glass, without any pigment. The wood so treated becomes darker.

One more observation as a guide to the operator is this: all the colours become a little darker under the fixing process, but in the course of a few days they regain their original tone. Certain colours, such as oxide of iron, artificial white of barytes, and some of the ochres, contain sometimes smaller or larger portions of sulphuric acid. These colours must, therefore, be washed with plenty of pure water before using them for painting.

Such are the principal features of water-glass painting, verified by practical success.

RAMBLES ON RAILWAYS.

CONNECTED for years with railways as Sir Casack Roney has been, and travelling largely as he did for a long time, both in the Old and New World, it was to be expected that he would introduce an amusing and instructive book, when he announced his "Rambles on Railways," and we are not disappointed expectation.* If he had trusted more to himself, and avoided a few of the quotations, introduced evidently through anxiety to make the book amusing, the result would have been even more satisfactory than it is. Best of all, if he could have brought himself to it, would have been his Rambles about Railways. An instructive story he could tell, we have a strong opinion; and one of these days he may perhaps

be led to do it. The present generation remember the commencement of the work of covering England with railways, and since that time 455½ millions of money have been spent. The story of how this has been done, in what ways it was raised,—who won, and who lost,—would make a wonderful book. Well, never mind that just now. The volume before us gives a variety of information concerning, amongst other undertakings, the Union Pacific Railroad, the Canadian, Indian, and Italian, and includes a number of maps and diagrams, with a view of a centre-rail-engine ascending a steep gradient amongst the Alps. The Pacific Railway, which is to cost thirty millions sterling (16,000,000 a mile), is being made at the eastern end wholly by Irishmen, and on the Pacific side by Chinese, to a man.

The longest of all European railways is nearly half Italian, and a little more than half "South Austrian." It is called in France, *Sud Autrichienne et Haute Italie*. In Italy the two last words are converted into *Alta Italia*. The total length is now 2,565 English miles, of which the South Austrian portion measures 1,349, and the Italian 1,216.

The two extreme western points of the mighty system of the South Austrian and Alta Italas are at Snaa, at the foot of the Mont Cenis Pass of the Alps, and Canoe at the foot of the Col di Tenda. Its two eastern are Vienna, and still farther, Pesh. Its northern is Kutzen, about a hundred miles to the south-east of Munich. Its southern, Piatoa, is twenty-two miles to the north-east of Florence. It possesses railways across two of the passes of the Alps, the Sommering and the Brenner. Its stations are at Genoa, Turin, Milan, Innspruch, capital of the Tyrol, Verona and Venice, Trieste, Vienna, and Pesh. It is equally fitted (as it has proved itself to be) for a great military railway, and for one to be devoted not to commercial and industrial development, but it has its skeleton in its closet,—it is not at Florence, capital of United Italy, nor is there prospect of its being there, except by a combination which shall unite with it the whole of the *Strada Ferrata Romane*.

The two next longest railways of Europe are French. The Paris, Lyons, and Mediterranean Company has a length of railway, in France, of 2,234 miles, and in 1864 it adopted a transitional little son, which is known by the name of the "Algorian Railways." At present the gentle youth is of modest proportions, only thirty-one miles open for traffic: eighty-one to be opened in the present year; and of the remaining 26½ which are to constitute its full-grown mileage (376 miles), little more work than *études préliminaires* has been bestowed upon them.

The railway that in mileage comes next in succession is the Orleans Company. Its length is 2,052 miles. The last of the four railway giants is our own English giant, the London and North-Western. Although the length of our countryman is the least of all,—only 1,320 miles,—it is shown that in its other dimensions it is in most respects superior, in none inferior, to its Continental brethren.

The gross receipts from traffic for the year 1866 were,—South Austrian, 2,957,713*l.*; Alta Italia, 1,738,202*l.*; total of the company, 4,695,915*l.*; average weekly receipts, 90,306*l.*; per mile per annum, 1,932*l.* Paris, Lyons, and Mediterranean, total traffic, 8,105,776*l.*; average weekly receipts, 155,691*l.*; per mile per annum, 3,640*l.* As the total traffic receipts of French railways was, approximately (but the figures are very nearly exact), 24,140,000*l.*, it follows that the receipts of this company exceeded one-third of the total railway receipts of the empire by 101,110*l.*, and that its average weekly receipts per mile exceed the average weekly receipts per mile of all France (2,865*l.*) by 956*l.*

The traffic receipts of the Orleans Company for 1866 were 4,401,894*l.*; average weekly receipts, 94,267*l.*; per mile per annum, 2,189*l.*; or 496*l.* per mile per week below the receipts per mile per week of the total French railway system. London and North-Western, 6,312,056*l.*; average weekly receipts, 120,400*l.*; per mile per annum, 4,782*l.*

The construction of railways cheaply in France is now occupying attention. A railway on this system was opened on the 25th of August last,—the line from Fongres to Vitry, on the Chemin de Fer de l'Est. Its length is twenty-three miles, and it has been constructed for 100,000*l.*, or at the rate of 4,348*l.* a mile, notwithstanding the fact that it is carried through a difficult country, necessitating numerous heavy works,

the greatest of which is a viaduct constructed of granite 120 yards long, and 22 yards high. The rails are Vignoles pattern, 60 lb. to the yard. The above price includes rolling stock, shops, and their equipments, &c. "But everybody received 'argent sonnante' as the works progressed, and the line was not opened until everything had been settled up and paid for. This is one of the secrets," continues our author, "appertaining to the economic construction of railways." That is just the text on which we should like a sermon.

The grandest exceptional run ever made on railways, according to Sir Casack, "was on the 5th of January, 1862, the occasion being when answers were brought to the despatches sent to Washington requiring the surrender of Messrs. Mason and Shidell, who had been taken out of the *Trent*, Royal West India mail steamer, by orders of Commodore Wilks. The steamer arrived at Queenstown at 10½ p.m.: at 11:28 p.m., Irish time," the special train started from Cork, and accomplished the journey to Dublin (166 miles) in four hours and three minutes; or at the rate of 41 miles an hour, including stoppages. The mail steamer *Utales* arrived at Holyhead at 8:15 a.m. The special train started at 8:28, and it is from this point that the most remarkable part of the express journey was accomplished. The run from Holyhead to Stafford, 130½ miles, occupied only 145 minutes, being at the rate of 54 miles an hour, and although so high a rate of speed was not attempted over the more crowded parts of the line approaching London, the whole distance from Holyhead to Euston was performed by the London and North-Western Company in exactly five hours, or at a speed of 52½ miles an hour,—a speed unparalleled for so long a distance on a line crowded with traffic."

We have travelled faster than this for shorter distances, fifty and odd miles, on more than one occasion. Years ago we travelled, for example, from London to Didcot at the rate of a mile a minute, Brunel being engine-man.

In France, the fastest train is timed for 35½ miles an hour; in Belgium, for 34½ miles.

One special purpose of the book is to fight the battle of railway companies as against the Post-office, and more than once the author asks:—

"On what grounds, other than the hollow one of pretence, can the Post-office claim special exemptions, as regards payments, as well as special rights and privileges, without adequate remuneration for them? Neither the Post-office nor any other department of the State assisted railways during their inception, or during their construction; on the contrary, whenever they had the chance of raising their hands against or making exorbitant demands upon railways, they never failed to do so."

It is quite right, he thinks, in the interest of the community at large, that, inasmuch as railways are the public highways of the land, the right of postal transmission upon them should be secured in the most complete, prompt, and absolute manner that law can enforce. There must be no doubt or hesitation upon this point; but that limit passed, the postal department is, notwithstanding that its officials are of "her Majesty's service," nothing more than, as a whole, an extremely well-organized, efficient trading establishment, protected, as a monopoly, by many Acts of Parliament."

"The railways have never shown themselves otherwise than ready, it might rather be said anxious, to serve the Post-office; but in this land of trade and commerce, their managers look for proper remuneration for services rendered. No more is asked, and no more is expected. The law and practice have very wisely instituted a distinction between the manner in which ocean and railway mail contracts shall be entered into. Because the ocean highway is open to all, tenders for conveyance upon it are invited from all; on the other hand, with railways it has been very properly decided that they shall convey the mails, whether they like to do so or not; but the same law that has enacted this compulsion, has also prescribed the manner by which a just and reasonable remuneration shall, in case of difference, be obtained."

The quotations made by the author in his account of the Indian railways (a system for which the Government of India has guaranteed to the extent of 88,000,000*l.*) seem to show culpable neglect of accommodation for third-class passengers at the different stations. Bad treatment of native travellers is also asserted. The shareholders in the various lines ought at once to take up this matter, and insist on an immediate change from this hind and suicidal course.

According to our author, the total amount

* There is a difference of twenty-six minutes between London and Dublin times; London being to the east is earlier. Dublin time has now become universal time in Ireland.

* Rambles on Railways. By Sir Casack P. Roney. London: Edinghams Wilson, 1868.

of guaranteed interest on railways which has been paid by the Government of India from the year 1849, to the 31st of December, 1866, has been 18,929,576l.; of course during the early period of the Indian railways, it was all expenditure and no profit, for, although guaranteed interest commenced in 1849, the first length of Indian railways was not opened for traffic until 1853, and then the miles opened were twenty-two miles. In 1854, the miles opened were fifty-five; in 1855, ninety-eight; in 1856, 102; in 1857, 145; in 1858, 145; in 1859, seventy-five; in 1860, 208; in 1861, 759, which is the largest number of miles opened in any one year: the following year, 1862, was nearly as much, being 747. Since then, the amount has been increased at the average annual rate of about 300 miles; and the total mileage now is 4,070.

The companies have repaid to the Government, out of net earnings, about 7,000,000l.; making the present debt of the railways to the Government nearly 12,000,000l. Their net earnings for 1865 were 1,341,550l., and for 1866 they were about 2,170,000l. The amount paid by Government for guaranteed interest during 1865 was 2,796,676l., consequently the net amount of money which the Government had to find, and to debit against the companies, was 1,455,126l.; but, in 1866, whilst the amount paid in guaranteed interest was 2,964,073l., as the net earnings were 2,170,000l., the Government had only to debit the companies with about 800,000l. It is expected that the sum deficient this year will not be more than 600,000l., notwithstanding that the amount of interest for which the Government is responsible will be about 3,900,000l.

We may not, however, accompany farther our agreeable guide. We introduce him to our readers, that they may take his "Rambles" and enjoy his genial gossip.

A VOICE FROM EDINBURGH AFTER THE STORM.

When a man makes a narrow escape of his life as I did the other day, his first duty, after thanking Almighty God for his safety and preservation, is to try and prevent a recurrence of the circumstances under which the accident had arisen. The best method of doing this appears to me to write a note to the *Builder*, which if you will kindly publish you will do me, and a great number of other residents in Edinburgh, in whose name I may venture to speak,—a very great favour.

You are aware, of course, that upon the 24th day of January ultimo the city of Edinburgh was visited by a severe and protracted gale of wind. There had been nothing like it in the recollection of the oldest inhabitant. By and by the gale grew into a violent storm, accompanied with heavy showers of rain and gusts of wind that blew with the noise of distant thunder and with the force of a whirlwind.

Just at the commencement of the most furious part of the storm I was coming out at the front door of my residence, and while standing for a moment hesitating whether I should venture forth, a whole avalanche of chimney-pots, fragments of mortar, and decayed masonry was precipitated on the landing of the outer stair! Literally, I escaped within an inch of my life. Had it not been for the signal of a tradesman opposite, who had observed the mass to topple, it is certain that I should have crossed the threshold, and so perhaps have been killed on the spot:—

"No reckoning made, but sent to my account
With all my imperfections on my head."

Having thus providentially escaped, I returned to the house, where, for six or seven hours we were prisoners. From our parlour windows, which overlook the intersection of George-street, and Castle-street, we watched the storm and its consequences; and I must tell you that I do not remember in all my life to have seen so much terrible damage done in so short a space. Life and property were alike in jeopardy: chimney-cans were blown down with great violence; slates were flung about in all directions; portions of chimney-stacks fell through roofs; several people were blown down and severely injured, and four people were killed. That I did not happen to be included in the latter category was due entirely, as I have said, to the timely warning I received from the oppositeside of the street.

Now, sir, what I wish to say is, that although this gale, or rather storm, was more than commonly severe, the accidents with which it has been accompanied are by no means uncommon. Indeed, they are the very reverse. Every year numerous accidents occur from chimney-pots and decaying roofs in Edinburgh, both in the old and the new town; and I do not need to inform your Edinburgh readers that it does not always require a terrific storm like that I have described to produce the fall of a lofty tenement and a destruction of human life. It is not easy to account in a single word for this condition of things; but one conspicuous defect in the Edinburgh municipal administration I will point out, and that is, there is no proper supervision, inspection, or regulation with regard to buildings in force in the city. *There is no Building Act in Edinburgh.* There are no district surveyors; nor any professional committee of the town council to supply the defect; and, finally, there is no organ like the *Builder* to advocate in such cases the public interest. I cannot better describe the Dean of Guild Court, which is popularly supposed to be entrusted with the order and regulation of buildings, than by comparing it to the Court of Wardens, or the lord mayor's show. It is an institution that has survived its usefulness, and become antiquated. The Lord Dean of Guild in Edinburgh (Law) is a tea merchant; the convener (Ford) is a cheesemonger; and so on. There is of course a city architect and a burgh engineer, or superintendent of buildings, and there is above all a legal gentleman of great power and nobility, *videlicet*, the town clerk. The case for these local authorities cannot be better stated than by quoting, with your permission, part of an article which appeared in the *Scotsman* the other day, which I think bears very strong internal evidence of an official affluat, but which seems to ignore or repudiate completely the whole theory of official responsibility. The *Scotsman*, you are perhaps aware, is more distinguished for its political than its technical articles:—

"The recent lamentable accident in Duke-street had the natural effect of calling an unwonted degree of attention to the condition of chimney-stalks and chimney-cans in the city; and it has also excited inquiry as to whether the woodwork ere of the better class of our dwellings, is such as it ought to be. We have seen, in another case where a chimney-stalk fell through a roof and one of the upper floors of a dwelling, that its further progress was then arrested, and that thus a sacrifice of life was happily prevented. *There is too much room to be seen that, had the woodwork of the roof and the floors of the house in Duke-street been of proper strength*, the community would not have had to deplore the awful results of the catastrophe of Friday week. It is not, however, to indulge in such speculations that we now refer to the matter, but to impress upon proprietors and tenants of property the responsibility which attaches to them individually to look immediately to the condition of the buildings in which they are interested, and to see that they are not such as to endanger either residents or passers by. From many of the communications which are addressed to our subject, it appears to be a prevalent idea that this is a matter for the authorities, and that if they do not take action, proprietors are relieved from all responsibility. This is quite a mistake. Nothing in our Police Acts can be construed to vest the vestiture of the responsibilities which attach by common law and common sense to the possession of property. It is the undoubted duty of every proprietor to see that his building and all its pertinent parts are secure, and if carelessness or neglect others suffer, the law will give the sufferers their recourse against him. *The instinct of self-preservation* also suggests to occupants of property the duty of seeing that they are not exposed to unnecessary risks. The landlord is bound to keep their dwelling wind and water tight. He is no less bound to keep it safe, so far as that can be secured by human care and foresight.

All this seems to be so obvious as not to require statement here. But, as we have said, there is a prevalent desire on the part of many to transfer the natural obligations of landlords in the matter of public functions, and such persons should be made aware without delay that this is impossible. In the interest of the public police officers are empowered to inspect, and punish the negligent or refractory landlord to do his duty, or, failing his doing so, to cause it to be done at his expense, and to subject him to the whole costs of the proceedings prescribed by law in that respect. But neither the action nor inaction of public functionaries can relieve any landlord of his own proper obligation and responsibilities, which extend not only to removing danger when that exists, but to seeing that none does exist. This, of course, involves the employment by the landlord of practical men of skill, and cannot be met by an appeal to the burgh engineer, who is bound to *quite different duties to perform*. No doubt, if the landlord fails to discharge his duty, the burgh engineer will interfere, in the interest of tenants and of the community, to compel him. But that is a purely official position. There are, too, emergencies when the burgh engineer must act spontaneously and decisively. When the risk of serious injury to human life, or when a serious accident has occurred, the law arms him with summary and arbitrary powers to protect or save life and property. But still the landlord remains liable for the consequences of his previous neglect, and of these he cannot by any means divest himself.

These remarks are certainly valuable as containing what we may reasonably assume to be a statement of the law in Scotland. How then

stands the fact? How far do human ingenuity and foresight go in repairing the errors of original defective construction? What weight per square yard of Ballachulish slates will a 3-inch deal support? How long is a rubble chimney stalk with a range of red tile cans supposed to last? What is the capacity of endurance of a zinc ridge at an altitude of 200 ft. above the level of the sea? How long does a slate nail last? Why should the best buildings in Edinburgh have such wretched dormers, covered with slates, no courses on the front wall, and no gables to the argument. "Human foresight" and "the instinct of self-preservation" are, I am afraid, too intangible and too perfunctory in their operation to be defended at this time of day, as the ultimate principles of protection to human life,—particularly when compared with the regular systematic and intelligent instructions of a skilled surveyor acting upon the said principles. What does a poor old woman left with a piece of rickety property know about such philosophy, even supported by such jurisprudence? Accordingly, some people residing in Edinburgh would be glad to know a little more of the nature of the duties of the "Burgh Engineer." I have not a single word to say against him either professionally or as an individual; for Mr. Charles Macpherson is, I believe, a competent engineer, and he comes of a good stock. But it is the system I wish to attack. As far as I know, he issues no annual report, takes no cognisance of new buildings, and does not even, except by way of mild remonstrance, require people to clean out or abolish their underground cesspools. I universally find him called in to do something when it is too late. He is more of an undertaker than a physician. There, for example, was erected in an exposed situation at Morningside a United Presbyterian Church, one of those deluded and grotesque imitations of Early English—the chief feature of which is a high-pitched triangular roof with perpendicular windows in the gables. It has very properly been pronounced a sham, and its downfall had been often predicted. But the first and only occasion on which I ever heard of the engineer surveying it was on the very day I refer to, when he had to survey its ruins! I will give one more instance if you will allow me another quotation from the report of our town council proceedings respecting the accident at Duke-street.

"The clerk read a report by the burgh engineer, stating that he had employed workmen to remove dangerous portions of chimney-stalks during the storm, and rubbish at the scene of the accident in Duke-street, and that the expense of the work amounted to 26l. 5s. 6d.

Mr. Stott said that in Duke-street he believed the work was well done, but in other parts of the town, great mischief was done to the roofs of the houses by the rough manner in which the chimney-cans were thrown down. In one case in Lothian-street, he said chimney-cans actually smashed on the roofs instead of falling them down. The Lord Provost said that he could bear witness to the activity of the superintendent and burgh engineer. In the middle of the storm he went down to Duke-street, and saw an immense deal of exertion employed to extricate the people from the fallen ruins. As some reflections had been cast upon the city officials in regard to other matters, he felt great pleasure in saying that the burgh engineer's anxiety was shown to extricate the sufferers. In the name of the Council, he would say he thought the workmen who were labouring amidst the dust to remove the rubbish, and extricate, if possible, the people from the fallen ruins,—he thought it was a matter of thankfulness that the work was done with so much activity.

Dean of Guild Law said that among those who were exerting themselves at the Duke-street accident he noticed Mr. Slater (who recently got a medal), with some of his best men; and it was astonishing how much exertion was made by these men. The Lord Provost.—He is a most useful citizen that." [He is a Slater to trade.]

I will not dwell, sir, on the lugubrious gratification one may derive from a consideration of the fact that in Edinburgh the work is well and actively done in digging one's body out of the fallen ruins! Even the circumstance of a Lord Provost, or a Lord Dean of Guild, superintending the operation, does not, in my estimation, make the prospect one whit more pleasant. I had rather a thousand times hear of a good slater or an honest chimney-sweep inspecting my roof now and then, and pointing out to my "instinct of self-preservation" that my chimney-stalk was in need of pointing, or that my chimney-pots were in danger of toppling down.

Even now the danger is very great. Since the storm occurred a period of a fortnight has elapsed, and very little has been done to repair the damage. My sky-line is every where bounded with broken and dilapidated chimney-pots, some of which are actually detached from the building.

In conclusion, I beg to say that you would

confer a great obligation on the Edinburgh public if you point out to their official representatives some of their positive duties with regard to sanitary police. I am aware the subject is not a favourite one here. That small report on the fatal accident which occupies, I shall say, three inches of space in the newspaper columns, was followed by one on Sunday-trading which occupied *three feet!* and that is by no means an unfavourable example of the municipal wisdom, sagacity, and public spirit of modern Athens.

AN OBSERVER.

STORM AND FLOOD.

The force of the wind in London during the late storm, reached a pressure of 35 lb. on the square foot, or 6 lb. more than that of the great storm of 1866, when the *Royal Charter* was lost.

The most serious destruction of property at Hull was at the works of the British Gaslight Company. No. 1 gascmeter, a very large structure, was blown bodily over and fell into pieces, the surrounding pillars and stonework being also very much broken. The gascmeter at the time contained about 250,000 ft. of gas. The whole took fire, and the flames raged for about half an hour with great intensity.

At Sheffield two chapels were partly blown down. A circus, a house, and a chimney were also blown down.

The oldest plane-tree in Scotland, and perhaps the largest of its kind in Britain, fell in the same gale. It grew by the side of the river Allan, near Dunblane, and was known as the "Big Tree in Kippenross," as long ago as the reign of Charles II.

Considerable damage was done along the Thames on Saturday last by an unusually high tide. The water rose 3 ft. higher than the usual spring tides, and it is some years since such an influx of water has taken place. At the present stage of the progress of the Thames Embankment, this tide did much damage. The water overflowed the walls, and the whole of the vacant space which is being reclaimed from the river was filled. Other damage to property has resulted on the Surrey side of the river. Several streets were partially inundated.

A remarkably high tide was experienced at Hull on Saturday morning, the water having risen to a height of 30 ft., or about 3 ft. higher than the usual heavy tides. Houses, cellars, and streets were flooded.

COMPARATIVE ALTITUDES.

The article upon comparative altitudes is one to which I have devoted considerable attention, and I had collected a number of examples of the section of many railways, showing the ordinates at each change of gradient, and their levels above high or low water mark, but there are not many of them connected with the sea level as a common datum.

But many of these levels are not connected with the high and low points of towns, as they might have easily been done when they were being prepared, and they would have formed an invaluable record of the respective levels of every place in the country.

This has been done, to a certain extent, in the Ordnance Survey, where the levels of some high points are noted; but I think it has not been carried out with especial reference to our towns and villages; and I think, on the ground of health, it is of the highest importance, as I believe the altitude, as well as the physical and geographical position of towns, has a very marked effect on the public health, much more so than is generally admitted; in fact, producing a difference of climate, and it does not appear to me to be sufficiently considered by those whose place it is to study the hygiene of the population.

In corroboration of the above remarks, I may instance places I have personally visited and known, viz., Havana, Vera Cruz, Belize (Honduras), and New Orleans, all situated very low, (few feet above the level of the sea. Most of those are well designed and laid out. Except in the first-named the streets are narrow, but in the latter they are wide and spacious, and built in special regard to regularity and order, to prevent overcrowding; and in respect to the public health, in all these places, notwithstanding they are greatly troubled and decimated with low

fevers, agues, yellow fever, &c., with all their attendant evils, and a change of climate, a sea-voage, or removal to a higher altitude, or one of them, is invariably recommended by the faculty to their unhappy patients, even when medicine has failed to remove the disease; and the result is generally successful. Some who visit these places are so constituted as to escape those deadly and depressing diseases, as did your correspondent; but these cases are few, and at those periods when they are the most rife and virulent, the air appears disagreeable and oppressive, and a feeling of lassitude seems to steal over your whole frame, rendering any exertion unpleasant and almost intolerable; but a relief is soon produced to those feelings by the springing up of the trade winds, or a cold "norther," showing the necessity and the benefit of a change of air. If such be the marked effect in a tropical climate, it certainly must produce a similar one in a temperate one, and the high and low levels of towns will, and doubtless do, play a considerable part in the hygiene of the inhabitants, and one that appears worthy of greater notice than appears to be bestowed upon it.

I beg to append a list of the levels of a few places, taken at the instance of the late Mr. Telford, C.E., between Holyhead and London, to supplement those contributed by your correspondent "A. J." It will be found there are some places where they differ from "A. J.'s;" but these are occasioned by the difference in datum, Telford taking high-water at Holyhead, and "A. J." mean level of the sea at Liverpool,—rather an ambiguous term, as the level of an average tide is a moot point with engineers. The following are the respective altitudes of the towns situated on the Great London and Holyhead road, running across the country diagonally from north-west to south-east:—

	Feet.
Highest point between the town and Stanley Sands, Holyhead	47
Bangor Cathedral	54
Town of Corwen	144
Llangollen	291
Chirk Village	334
Oswestry town	428
Welsh Bridge, Shrewsbury	474
Corner of town-hall, ditto	500
Cock Inn, Watling-street	532
Prior's Lee	495
Bridge at Shiffall	570
Wolverhampton Market-place	598
Summit east of Earl Dartmouth's Park	651
Ditto at Hockley Inn	425
Top of Bull-street, Birmingham	439
Summit of Meriden-hill	437
St. John's Church, Coventry	253
Opposite market-place, ditto	288
Summit east of Braunston	543
Ditto of Daventry-street	489
Opposite the Angel Inn (late the Dirt House)	447
Stoney Stratford-street	231
Church, Little Brickhill	480
Hockliffe-street	354
Dunstable-street (opposite inn)	374
Summit of St. Alban's-street	357
Ditto Peabrook Inn, ditto	358
At Sixth Mills Tollgate	257

I think I can further supplement this statement by the addition of many towns, taken from a number of canal sections that have intersected various parts of the country, and also from the sections of many railways, but I find there are many of them not at present connected with the sea level as a common datum, although such a one would have formed a capital basis for a record of levels throughout the country.

B. B.

THE OWNERSHIP OF ARCHITECTS' DRAWINGS.

An Architect writes as follows:—"I was employed to make drawings and specifications for a building with the understanding that I should carry out the works. Tenders were obtained, but owing to unforeseen circumstances my employer could not proceed with it. I have sent in my bill, charging simply for the work done, viz., making the drawings and specification; but I am refused payment unless I hand over the whole of the plans and specification. Am I bound to give them up?"

If the charge sent in is for "making drawings and specification," recovery at law could scarcely be expected as matters at present stand, unless the things charged for had been delivered. There would be more likelihood of success, without giving up the drawings, if the claim had been shaped as for time and skill employed in preparing the necessary documents and instructions for the production of a building not farther proceeded with, and obtaining tenders for the necessary works from builders. It is beginning to be

pretty generally understood, the understanding being assisted by the printed declaration of the Institute of Architects, that an architect's drawings, when the building has been executed, belong to himself,—they are simply the tools by which he has worked, and the client pays him for the result. The same understanding ought to prevail when only part of the process preparatory to the erection of a building has been gone through, but we are afraid it does not at present.

HYDE PARK AND KENSINGTON GARDENS.

OUR remonstrances have not been without some effect. The wrongly shaped and placed reflectors have been removed, and other hurners provided, with obvious improvement in the result. Something, however, is still needed, apparently, in the shape of ventilation. Many of the globes, when we passed them a few nights ago, were bedewed and bedimmed with water. Surely there has been a want of intelligence shown in this little matter which is scarcely creditable. The new railing which, after many months, has been put up in Park-lane, seems strong, but it is very ugly.

In Kensington Gardens, too, things are not always done thoughtfully. For many a year a covered garden-seat or alcove has afforded protection as well as rest to pedestrians. It was lofty, and the front very open; but being placed to back the sun and the prevailing rains it did good service. This alcove has been recently brought away from its original position and re-erected at some cost near where the fountains are; evidently, however, without a thought as to aspect and purpose, for it is so placed as to receive the full force of hot sun and rain.

The site of the new drinking-fountain in the park, of which we recently gave a view, would have been better described as near Stanhope-place Gate.

THE TRADES MOVEMENT.

THE operative builders of Sunderland are applying to their masters to be allowed to work only nine hours a day. The employers have appointed a sub-committee.

The operative masons in Halifax have sent a six months' notice to the masters to the effect that they will expect an increase of wages to the amount of 2s. each per week.

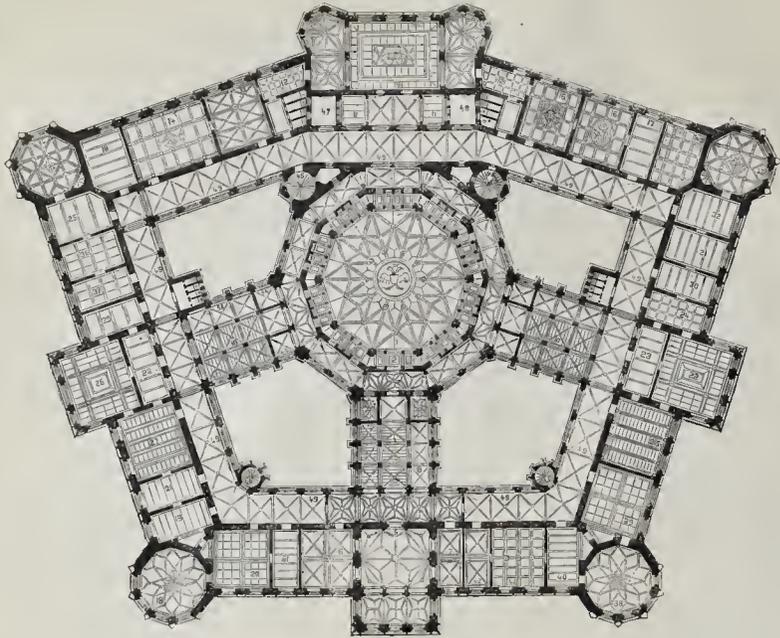
The master builders of North Staffordshire have given notice of a slight increase in the working time of their men, thus deviating from a mutual arrangement entered into by arbitration in May last. The men have determined "to retain the present code of rules by every legitimate means" in their own power. By a subsequent resolution, they have empowered delegates "to settle the dispute to the best of their judgment."

A lock-out has just occurred among the moulders at Glasgow, and it is believed will be general over Scotland. Fourteen shops in Glasgow are subject to the lock-out, and more than half the moulders in the city are involved. The men complain of harsh treatment by the masters in sundry trade matters, and particularly as regards wages.

A painful excitement has been produced at Brynmawr in consequence of the great iron-masters, Messrs. J. & B. Bailey, having announced the closing of their Nantyglo works. Something like 8,000 persons are employed at the works.

A deputation of trades unionists have had a meeting with the members for the city of Manchester, Messrs. Thomas Bazley and Jacob Bright. The purpose of the interview was to lay before the hon. gentlemen a copy of a bill which it is proposed to introduce into Parliament in the ensuing session, the main object of which is to give trade societies the same legal footing at present enjoyed by friendly societies, especially as to the safe custody of their funds, and the power to prosecute defaulting members for embezzlement.

A large meeting of the working men of Sheffield has been held in the Temperance Hall, Town-head-street, the chief object being to hear an address "on Trades' Unions, Mr. Roebuck, M.P., and the Royal Commission," by Mr. Applegarth, of London, the general secretary of the Amalgamated Society of Carpenters and Joiners. The meeting was convened by the Executive of the Association of Organized Trades, and although only a comparatively short



DESIGN FOR HOUSE OF LORDS, VIENNA.—Plan of Principal Floor.

notice had been given the room was well filled. Mr. George Anstlin, the president of the Alliance of Organised Trades, occupied the chair. After some discussion the meeting passed, amid acclamation, the following resolution:—

“That this meeting, believing trades’ unions to be essential to the well-being of the working man, and the best means at his command for successfully resisting the encroachments attempted to be made by unprincipled employers upon his rights and privileges, and seeing the numerous attacks made on such unions in certain quarters, pledges itself to do all in its power to promote their interest, and strenuously to oppose the return to Parliament of any gentleman who is not in favour of the legalisation of trades’ unions, the protection of their funds, and placing them more on an equality with other institutions of the country.”

A political resolution as to Mr. Rochuck was also passed.

THE TECHNICAL INSTRUCTION MOVEMENT.

A REPORT addressed to the vice-president of the Committee of Council on Education has been issued. It touches on technical, industrial, and professional instruction in Italy and other countries, and is by Professor Leone Levi, who visited for that purpose some centres of manufacturing industry in this and Continental countries. With reference to technical instruction, Professor Levi lays before Lord Robert Montagu suggestions for the establishment of an industrial university or a superior technical institute, as a normal school for teachers of science; chairs of lecturership; technical schools, with workshops, collections of tools and instruments, museums, and libraries; agricultural schools, with farms and gardens, throughout the country districts; schools in relation to weaving, dyeing, and mechanics, in places such as Manchester, Leeds, Glasgow, and Belfast; mining schools in Truro, Newcastle, and Glasgow; navigation schools in London, Liverpool, and Greenwich; agricultural schools in Bedford and Warwick; schools of metallurgy in Birmingham and Sheffield, &c.; studentships; technical school committees; also suggestions for the use and adoption of existing institutions, wherever available, for the purpose of technical schools; the extension of grants by the Privy Council for such schools; the extension of the factory laws to

agricultural labour; the establishment of a public primary school in connexion with every parish; the introduction of science instruction in schools and colleges, and the early introduction of the metric decimal system of weights, measures, and an international decimal coinage, to facilitate and shorten the time now employed in the study of arithmetic; the formation of manufacturing and industrial museums in the chief manufacturing and industrial towns; the diminution of the evil of a profusion of talents by giving to inventors the option of taking out a patent or accepting a Parliamentary grant for a limited period, on the recommendation of a committee of experiments acting under the Patent Law Commissioners; and finally, a further and more systematic inquiry as to the relative position and progress of Great Britain and other countries in manufactures and industry.

The adjourned meeting of the Birmingham artisans and others has resulted in the passing of a resolution,—“That a society be now formed for assisting the local institutions for promoting technical education in Birmingham, and other purposes, connected with the interests of skilled labour; and that the following twenty-five gentlemen [names not in resolution as reported] in conjunction with those artisans of Birmingham and the neighbourhood selected by the Chamber of Commerce, at the request of the Society of Arts, be appointed a committee, and he requested to take the necessary steps for organising the society, and report to a future meeting.”

DESIGN FOR HOUSE OF LORDS, VIENNA, AUSTRIA.

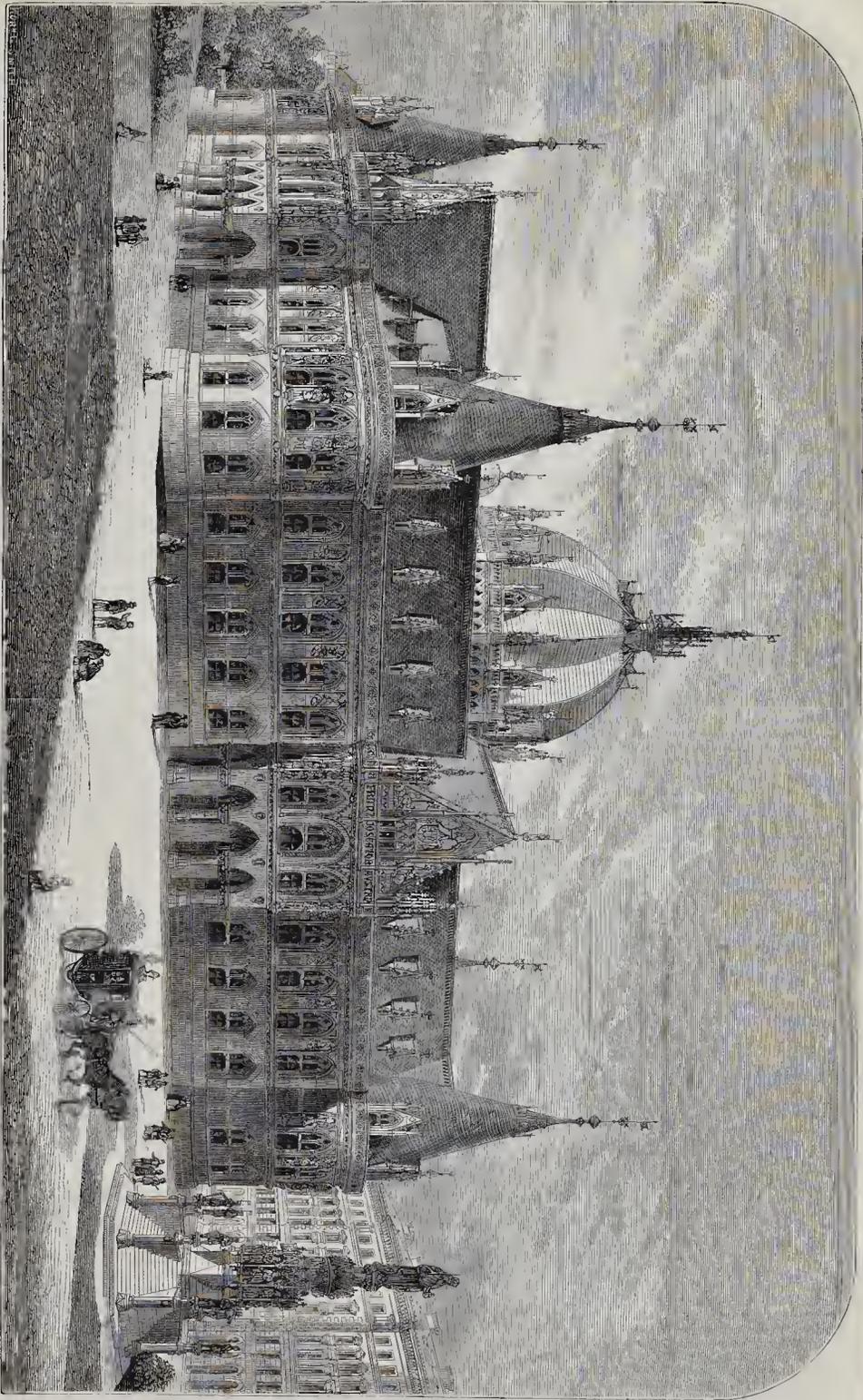
JUST previously to the war with Prussia, a limited number of architects were commissioned to submit designs for the erection of a House of Lords in the Austrian capital. No decision was come to in face of national troubles. The project, however, is now beginning, we believe, to be talked of again, and we give in our present number illustrations of the design that was submitted by Herr F. Schmidt on the occasion referred to. In some recent articles on the present position of ecclesiastical

architecture in Germany, we had occasion to mention with commendation and illustrate some of the churches of Herr Schmidt.* The present design will show his skill in dealing with a secular building. The style adopted may be termed Burgundian Gothic. The dome, the arrangement of which is felicitous, is similar to that of one of his executed churches previously illustrated in our pages. The dome, it will be seen, is over the great meeting-hall. The following references will serve to show the appropriation of the different apartments on the principal floor:—

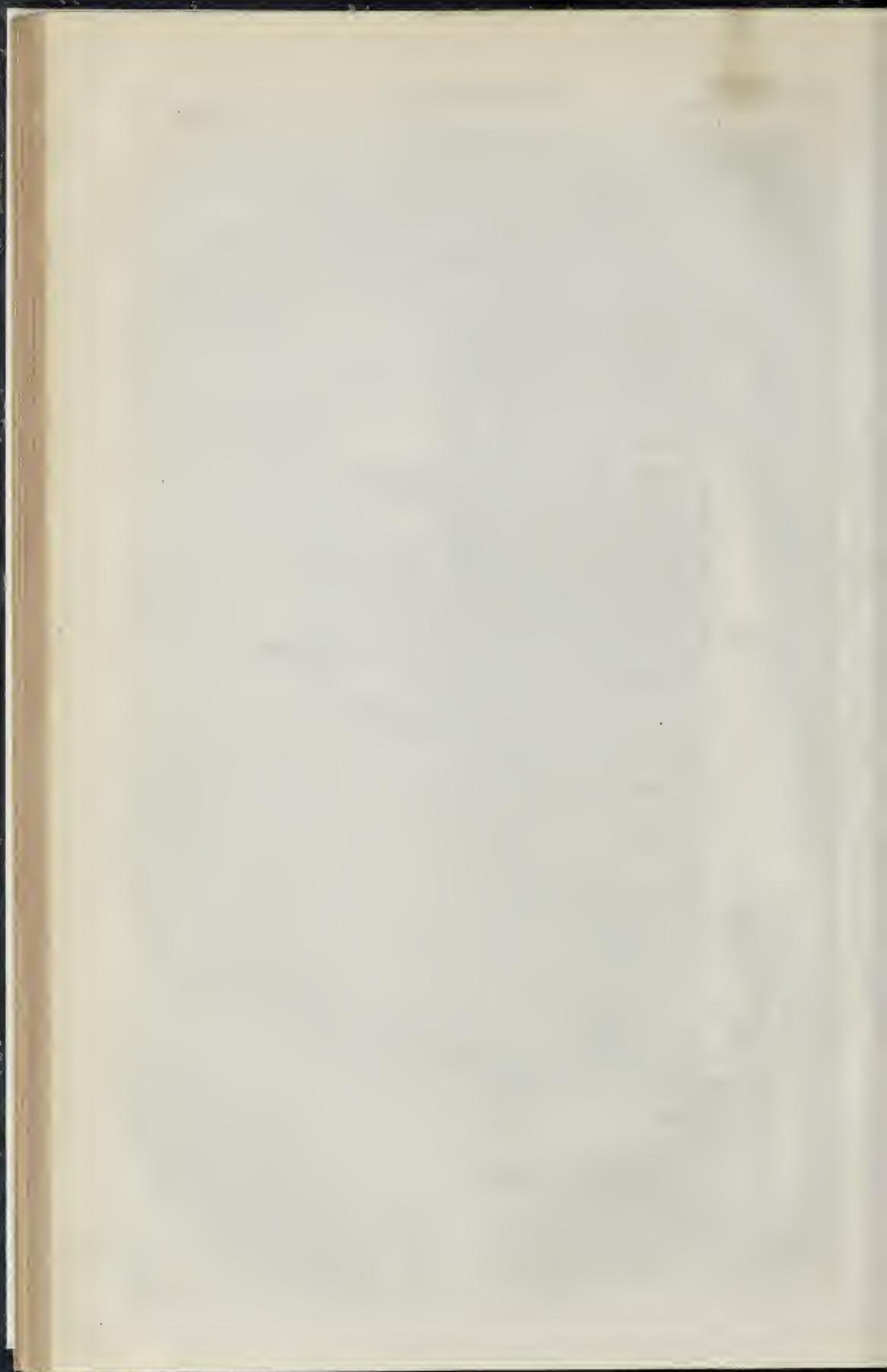
REFERENCES.

1. The session hall.
2. Box for the royal court.
3. Dressing-room to same.
4. Staircase for the court.
5. Meeting-room for the archbishops.
6. Ante-chamber and servants' room.
7. Dressing-room for the archbishops.
8. Connecting passage for the archbishops.
9. Meeting-room for the members of the house.
10. Staircase for the members of the house.
11. Wardrobes.
12. Dressing-rooms.
13. Writing-room.
14. Reading-room.
15. Servants' room.
16. Refreshment-room.
17. Buffet.
18. Minister's room.
19. Ante-chamber to same.
20. Minister's private room.
21. Servants' room.
22. President's saloon.
23. Ante-chamber and servants' room.
24. Meeting-room.
25. Studio.
26. First vice-president's studio.
27. Second vice-president's studio.
28. General ante-chamber.
29. Servants' room.
30. Ante-chamber to offices.
- 31, 32, 33. Offices.
34. Director of shorthand writers.
35. Ante-chamber and servants' room to same.
- 36, 37. Reporters' rooms.
38. Archives.
39. Recorder's office.
40. Ante-chamber to same.
- 41, 42. Chancery to same.
43. Journalists' room.
44. Dressing-room for occupants of boxes.
45. Public staircase.
46. Servants' staircase.
- 47, 48. Court with glass covering.
49. Corridor.
50. Connecting passages.
51. Disposable space.

* See vol. xxv, pp. 793, 901, 909, 923.



DESIGN FOR HOUSE OF LORDS, VIENNA.—BY HERR F. SCHMIDT, ARCHITECT.



THE LATE MR. JOHN PHIPPS,
H.M.'s BOARD OF WORKS.

We mention, with great regret, that Mr. John Phipps departed this life on the evening of the 8th inst., aged seventy-three years. Mr. Phipps was an old and faithful public servant for nearly fifty years, and fulfilled his arduous duties as an architect and surveyor in the department of her Majesty's Works and Public Buildings, with invariable satisfaction to the heads of the department. He was possessed of great energy, and was of the kindest disposition,—qualities which gained for him the good-will and confidence not only of his colleagues, but of all the various classes with whom business matters from time to time brought him into communication. During his official career, many circumstances occurred to test his professional abilities; and his responsibilities at times were very heavy. In proof of this, it is only necessary to mention that, within his experience, the duties of devising and superintending the works, fittings, and decorations requisite for two coronations devolved upon him,—viz., those of King William IV. and of her Most Gracious Majesty the Queen. At the last coronation the fearful rush of people into the hanging galleries in the old Abbey of Westminster caused him great alarm. Although he had had them partially tested by gangs of men in marching order, he was unprepared for the forward rush of the people toward the fronts of the galleries, and this circumstance so shattered his nerves that it was a long time before he recovered from the shock, and his friends believed that he then received a lasting injury.

Among other works we may instance that Mr. Phipps had the planning and arrangement of the Royal Gardens at Frogmore, which brought him under the personal notice of her Majesty and the Prince Consort.

The decease of this gentleman was much lamented by all who knew him; and it is to be regretted that, at the date of his death, he had not had two years' enjoyment of the rest to which his well-earned pension entitled him.

DINNER TO SIR CHARLES LANYON, M.P.,
ARCHITECT.

The members of the Royal Institute of Architects of Ireland, and of the Royal Hibernian Academy, entertained the president of the former body, Sir Charles Lanyon, at dinner, on Thursday evening, the 6th inst., to congratulate him on the honour which he has lately received at the hands of his excellency the Lord Lieutenant.

The chair was occupied by Sir John Benson, fellow of the Institute, in the absence of Sir Thomas Deane, senior vice-president of the Institute. In reply to the toast that was drunk to him,

Sir C. Lanyon said he was proud to accept the honour that had been conferred upon him in connexion with his profession, and he believed that the honour was intended as a compliment to that profession as much as to himself. The chairman had alluded to his position as a member of Parliament. With regard to public measures, he thought that during the last session he had had an opportunity of being useful to the profession in the matter of the Law Courts competition. Sir C. Lanyon then gave an account of the course he adopted on the occasion referred to in the House of Commons, and of the result attending his efforts, by which two professional men were added to the list of judges. He regretted that at the present time he could not congratulate the Institute on the prospects of professional employment. He believed that the progress and enterprise of the country had received a most unfortunate check, and that their profession, intimately connected as it is with the development and improvement of the country, must be amongst the first to suffer from any check which may be given thereto. No one could deny that the feeling of insecurity and want of confidence at present prevailing in many parts of Ireland necessarily tended to prevent the outlay of capital and retard all improvement. Although he could not congratulate the profession in general on its present prospects, he could point with pleasure to the impress which the present generation would leave on this country, both in matters of taste and mechanical knowledge. At the risk of being considered tedious, he would, before con-

cluding, express a hope that the attention of the Royal Institute would be given during the present session to one or two important matters connected with the public interests. He desired much to see those satisfactory laws which had been laid down by the Institute for the regulation of competitions, and which were in the hands of the members, strictly enforced by committees and the members of the profession.

BREAKFAST AT BIRMINGHAM TO THE
ARTISAN REPORTERS AT THE PARIS
EXHIBITION.

Mr. J. S. WRIGHT, chairman of the Artisans' Sub-committee of the Birmingham Chamber of Commerce, has given a breakfast, at the Assembly-rooms, to the deputation sent to the late Paris Exhibition to report upon the Birmingham trades. The mayor (Mr. T. Avery) presided; and the borough members, Messrs. John Bright and George Dixon, were present.

The mayor, in opening the proceedings, said that the report which had been published must have convinced every one how very desirable it was that such a visit to Paris should have been made, and that the deputation should consist of persons of great practical knowledge and skill, who could judge for themselves what their rivals in other countries were doing in their particular trades, and who could supply their competitors and the artisans of their own and other towns with exact information as to what was really taking place. He believed that some of them returned sadder and wiser men, and exceedingly impressed by the visit with the progress that was being made in other countries. For his own part, he did not at all regret that this was the case; for the greatest of all dangers was the unconsciousness of danger; and the first lesson to be learned in overcoming difficulty was to recognize in an exact and precise manner what that difficulty was.

Mr. Bright strongly urged the Birmingham people to open their purses and contribute liberally to the advancement of technical instruction, and the establishment of a museum in Birmingham. There was no occasion to go to Government for it.

METROPOLITAN BOARD OF WORKS.

At the usual weekly meeting of the members of this board, the report of the committee of the whole board submitting evidence taken by them in relation to the depositions of Mr. Furness before the Registrar in Bankruptcy, was submitted, and various motions and amendments were considered, but without anything other than a negative result. The nearest approach to a majority in favour of any proposition or series of propositions, was made on the motion of Mr. Le Breton, who moved—

"That the board, having considered the allegations made by Mr. Furness before the Commissioner in Bankruptcy, and subsequently, as far as they affect Mr. Doulton and Mr. Roche, members of this board, as also the statements of those gentlemen, and of others, and the letters and documents now submitted by the committee appointed to investigate the matter, find—

1. That the terms on which Messrs. Cleland and Clench agreed to become bound for the due performance of his contract by Mr. Furness were negotiated by Mr. Doulton; that, though part of the consideration passed through his hands, he denies having retained any portion for his own benefit; and it is admitted by the sureties that the whole amount was received and appropriated by them.

2. That Mr. Roche, who was not the standing solicitor of the Lundy Granite Company, but engaged specially for the occasion while the acceptance of the tender of Mr. Furness was pending before the board, obtained a written agreement from him to purchase from that company, on certain specified terms, any granite which might be required on the works, and that it was stipulated in such agreement that Mr. Doulton should be the referee in case of any dispute between the parties. Mr. Roche has stated that he acted merely in a professional capacity, and such statement is proved to be correct by letters from officers of the Lundy Granite Company.

3. That the board deprecates the taking part by its members, in business or professional transactions, with parties connected with the works of the board in matters relating thereto, as calculated injuriously to affect the character of the board in the conduct of its business."

After a very long discussion a vote was taken, when there appeared—

For the amendment..... 15
Against it 15

The chairman gave his casting vote in favour of the amendment, and then vacated the chair, which was taken by Mr. Savage.

It was afterwards stated that Mr. Bevan's name had not been recorded, and after some

discussion the chairman ruled that it must be inserted, which negatived the amendment.

Eventually the original motion, by Mr. Silas Taylor, "That this board, having investigated the evidence of Mr. Furness, given before the Registrar of the Bankruptcy Court on oath, and adhered to by him, are of opinion that the statements made by him have been proved," was put, and seven voted for it and twenty against it, so that no decision whatever was come to upon the subject, although it had been discussed for upwards of five hours.

Mr. Doulton handed in a protest censuring the proceedings which had been taken against him, and taking exception to the way in which they had been conducted.

A motion was made, "That it be entered on the minutes," to which Mr. Richardson moved an amendment, "That the protest do lie on the table, and that the receipt of it be not recorded in the minutes," which was put, and carried by fifteen to six.

After sitting seven hours, the board adjourned.

FROM IRELAND.

Dunboyne.—The new church of St. Peter, Dunboyne, which has been erected from funds contributed by the Rev. James Hamilton, of Ballymacoll and the Ecclesiastical Commissioners, has been consecrated by the Bishop of Meath. The church has been built from the design of Mr. S. Rollinson, architect, Chesterfield. It is in the Early English style. At the east end there are three stained-glass windows, in memory of the late Major and Mrs. Hamilton, of Vessington.

FROM SCOTLAND.

Edinburgh.—At a meeting of the sub-committee on the improvement of St. Giles's Cathedral, Mr. R. Matheson, of H.M. Works, showed plans of the proposed improvements, which were cordially approved of. The intention, says the *Scotsman*, is to open up the building on the comprehensive scale adopted in the Cathedral of Glasgow; but, in the meanwhile, the alterations are to be confined to the Choir or High Churoh. The perspective view of the interior of the choir shows the galleries taken down, a new pulpit at a lower level, and the whole seats, with rows of stalls along the sides, in the style of the King's College Chapel at Old Aberdeen. The estimated expense is 3,500l.

Leith.—The foundation-stone of a Scandinavian Church, for the benefit of Danish, Swedish, and Norwegian seamen frequenting the port has been laid. The site is on the west side of North Junction-street, adjoining North Leith Poor-house. It was gaily decorated with British, Danish, Norwegian, and Swedish flags. Of 1,200l. required to complete the building, 800l. have been already subscribed.

Borrowstouness.—The Custom-house at Bo'ness and various adjoining properties have been burnt to the ground.

THE IRISH RAILWAY SYSTEM.

An influential meeting has been held at the Dublin Mansion House, to consider the present condition of the Irish railway system. The Lord Mayor occupied the chair. Lord Handon moved a resolution approving of the "policy of the purchase of the railways by the State." They were endeavoring to establish the cultivation of flax in the south, with the hope of having a portion of the linen trade established there, and some employment given to the people. The buyers from the north said they would be delighted to go frequently to Cork, but the fare was more than they would have to pay to London. Things in the west were the same. The fare from Cork to Galway was more than to London. Remonstances had been made to the Great Southern and Western Railway, but they gave a deaf ear to their entreaties, and nothing but the exercise of power by the Government would do any practical good. The Marquis of Clarinard moved—"That we rejoice to observe that her Majesty's Government, by issuing a commission of inquiry, have taken prompt and decided measures to ascertain the present circumstances, condition, and actual value of all the Irish railways, in view of the contingency of their eventual purchase." The resolutions seem to have been agreed to *nem. con.*

FORTIFYING POLICE-STATIONS.

The Government, it is said, have determined to fortify the police-stations in London, this being the preliminary step to a scheme of general fortification of all the police-stations and barracks in the United Kingdom. It is to be hoped this is not to be done without sufficient reason. The obvious purpose of the few invisible Fenians who infest this country has been to produce a panic; but surely the Government must have information which the public do not yet possess as to the magnitude of this movement, otherwise there is something very indiscreet in all this. The head office of the Metropolitan Police force at Scotland-yard will be the first, it is said, to be placed in a state of defence, and with this object Messrs. Clarke & Co., of Rathbone-place, are manufacturing bullet-proof iron shutters for the windows of the station. The shutters will be so constructed that they can be closed almost instantaneously, and an apparatus adjusted inside which will make them proof against any fusillade of small arms. Just think of the Fenians treating a London police-station to a fusillade of small arms, while the police and the military are nowhere! The doors, it is surmised, will be similarly protected. When all the stations in the metropolis and suburban districts are provided with the bullet-proof shutters, the stations and barracks of the police in Ireland, it is stated, will next be placed in a state of defence. Surely they should be the first to be protected.

PRIZE-WINNERS FOR ART-WORKMANSHIP.

We give a list of the works submitted to the Society of Arts to which prizes have been awarded:—

FIRST DIVISION.

- 1. Carving in Stone.—After a chimney-piece by Donatello. By H. Cole, Alma-terrace, Lambeth. (Prize of 5*l.*)
2. Carving in Marble.—After the same design, by John B. Fidler, Sheffield. (Prize of 15*l.*)
3. Carving in Stone.—After a chair-back in the South Kensington Museum. By W. H. Barrett, Alma-terrace, Lambeth. (Prize of 7*l.* 10*s.*)
4. Carving in Oak.—Panel, by C. H. Line, Prince of Wales-terrace, Kentish-town. (Prize of 7*l.* 10*s.*)
5. Reposed Work in Marble.—After the Martelli mirror case in the South Kensington Museum. By A. Dufour, Cleveland-street, Fitzroy-square. (Prize of 10*l.*)
12. Ditto, after a panel, in low relief, of the "Virgin and Child," in the South Kensington Museum. By J. Bunk Fide. (Prize of 5*l.*)
13. Ditto, after a tazza in silver. By Alfred Page, Myddelton-street. (Prize of 3*l.*)
14. Hammered Work in Brass.—After a knocker in wrought-iron, in the South Kensington Museum. By E. Millward, Little Clarendon-street, Clarendon-square, N.W. (Prize of 5*l.*)
16. Ditto, in iron. By W. Sendall, High-street, Wicheh. (Prize of 10*l.*)
17. Chasing in Bronze.—After a reliquary in marble, "Virgin and Child." Price 15*l.* By S. Beresford, Oxford-street, Stoney. (Prize of 7*l.* 10*s.*)
19. Ditto, by H. C. Hatfield, sen., Bolover-street, Euston-road. (Prize of 10*l.*)
20. Ditto, ornament after a missal cover. By H. J. Hatfield, jun., Bolover-street. (Prize of 5*l.*)
21. Ditto, in silver, after the same design, by A. E. Millward, New Compton-street, Soho. (Prize of 10*l.*)
22. Engraving on Metal.—After an arabesque by Lucas Van Leyden, by G. W. Hindley, apprentice to Messrs. Garrard & Co., 29, Pantoon-street, Haymarket, S.W. (Prize of 2*l.*)
23. Ditto on ivory, after the same design, by G. Barry, Brewster-street, Golden-square. (Prize of 5*l.*)
24. Painting on Porcelain.—After a drawing by Raphael. By Edwin Saunders, Marltha-street, Cambridge Heath. (Prize of 10*l.*)
25. Ditto, by Walter J. V. Nunn, Grafton-street, Mile-end. (Prize of 3*l.*)
26. Ditto, by Thomas Stanway, Lower Russell-street, Hanley. (Prize of 12*l.*)
32. Ditto, Ornament, by Alexander Fisher, Clyde-street, Stoke-on-Trent. (Prize of 3*l.*)
33. Ditto, by W. H. Slater, James-street, Stoke-on-Trent. (Prize of 3*l.*)
37. Decorative Painting, after a picture-frame in the South Kensington Museum. By Charles Pfander, Bayham-street, Camden Town. (Prize of 7*l.* 10*s.*)
38. Engravings on Glass.—Executed on a claret-jug, after an arabesque by Lucas Van Leyden, by E. Oppitz, Stamford-street, Blackfriars. Exhibited by Messrs. W. T. Copeland & Sons. (Prize of 10*l.* to E. Oppitz.)
41. Glass Blowing.—After an original in the South Kensington Museum. By Joseph Leicester, Tenison-street, Lambeth. (Prize of 7*l.* 10*s.*)
42. Bookbinding.—"Do Imitations Christ's" bound in calf, after a specimen in the South Kensington Museum. By Louis Genth, High Holborn. (Highly commended, but ineligible for a prize, the producer having received an award in the same class in a former competition.)
43. Ditto, Mosaic, bound in morocco. By Louis Genth, 90, High Holborn. (See note to 42.)
45. Illumination.—After a specimen in the South Ken-

ington Museum, by Miss Mary R. David, Anderson-street, Chelsea. (Prize of 1*l.*)
46. Ditto. By Charles Pfander, 28, Bayham-street, Camden-town, N.W. (Prize of 2*l.*)

WORKS SENT WITHOUT PRESCRIBED DESIGNS.

- 51. Chasing in Metal.—Emblem of bread and wine. Modelled and chased by C. Jacquard, J. St. George's-road, New Kent-road S.E. (Prize of 1*l.*)
54. Hammered Work in Metal.—Series of specimens. By T. Winstanley, New Compton-street. (Prize of 2*l.*)
55. Moulding in Plaster.—Etruscan emblems. By J. Meiklejohn, Sussex-street, Fulham. (Prize of 3*l.*)
56. Ditto, panel of spring flowers. Designed and modelled by E. Dujardin, Gambier-street. (Prize of 3*l.*)

SECOND DIVISION.

WOOD CARVING WITHOUT PRESCRIBED DESIGNS.

- (a). Human figure in the round, in alto or in bas-relief. Animals or natural foliage may be used as accessories.—1st prize of 5*l.*, and the Society's Silver Medal. 2nd prize of 15*l.*, 3rd prize of 10*l.*
65. Female figure, in carved panel of walnut-wood. By Samuel Moutrie, Stanhope-street, Hampstead-road. (Prize of 3*l.*)
68. "Summer," female head. By Mark Rogers, Techbrook-street, Fulham. (Highly commended, but ineligible for a prize in this class, the producer having received an award in the same class in a former competition.) (The "North London Exhibition" prize.)
70. Girl's Head, carved in pear-tree. By H. Godard, Upper Marylebone-street. (Prize of 2*l.*)
71. Medalion and Flowers. Designed and carved by E. Dujardin, Gambier-street. (Prize of 2*l.*)
(b). Animal or still life. Fruit, flowers, or natural foliage may be used as accessories. 1st prize of 10*l.*, 2nd prize of 7*l.* 10*s.*, 3rd prize of 5*l.*
73. A Dead Leaf. By John Wallace, Adam-street East, Portman-square. (Prize of 2*l.*)
(c). Natural foliage, fruit, or flowers, or conventional ornament, in which grotesque figures or animals may form accessories, preference being given where the work is of an applied character for ordinary decorative purposes, as representing commercial value. 1st prize of 10*l.*, 2nd prize of 7*l.* 10*s.*, 3rd prize of 5*l.*
80. Jewel Casket. By G. Rumford, Eccleston-street East, Fulham. (Prize of 2*l.*)
81. Portrait Frame. By G. H. Bull, Millman-mews, Millman-street, Paddington. (Prize of 1*l.*)
83. Panel of Flowers Carved in Satin-wood. By Edward Glancy, Manor-street, Chelsea. (Prize of 1*l.*)
85. Panel representing "Spring, Summer, and Autumn." Designed and carved by K. A. Brangan, Foley-street, Portland-place. (Prize of 5*l.*)
88. Panel for Cabinet Door. By G. H. Barnsdale, Queen-street, Peterborough. (Prize of 1*l.*)
89. Part of a Jery; subject from "Midsummer Night's Dream." By J. M. Leach, Ellingham-street, Pimlico. (Prize of 3*l.*)
91. Gothic panel in oak, for pulpit or reading-desk. Designed and carved by H. G. Price, 38, London-street, Fitzroy-square, W. (Prize of 2*l.* for the three works. Nos. 91, 92, and 93.)
94. Panel in Walnut-wood for a round-end sideboard. By J. Sparrow, Vauxhall Bridge-road. (Prize of 2*l.*)

A WORKING MAN'S OPINIONS ON MATTERS RELATING TO TRADES UNIONS.

Sir,—Questions which a short time ago were thought to be within the province of only a few of the massed minds of the country have, from a variety of causes, taken a wider range, and for important reasons, are now the all-absorbing matters of the day. The public mind is undergoing a change in relation to these questions, and almost every one, except those most interested, are saying that something must be done. Not long since, the popular panacea for slackness of work was emigration; but as time has passed, and they term the labour market of the superabundant labour; so as, by reducing the number of labourers, to raise the wages of those that remain. It appears that in this case the science of political economy is at fault, as no provision has been made to meet the present condition of trade. One of its axioms has been, that the condition of the laborer depended on the extent of the labor fund, and the number of claimants upon it; and according to that number would wages be high or low. But it is not now how few are the producing classes, in comparison with the upper or great-consuming classes; nor how much wages can be given, or what profit can be made by the production of articles for home consumption; but it is whether England can, with her present taxation, high profits, and wages, maintain her supremacy in the markets of the world. It is certain she will in the future have to compete for commerce with others in places where she has up to the present been the sole possessor of it. It is said that England is already fast leaving this country, and middlemen and others seem particularly anxious to verify it. Working men are often forced to listen to the arguments of these narrow-minded conclusions of the employing and selling classes, on economic science. One will tell you, with greatunction, that a friend of his bought iron castings in Belgium much cheaper than they can be produced in this country. Another will say that he can, and does, buy foreign glass of every description so cheap that he can sell for unpopace that which he could only sell for a shilling if manufactured here. But the worst part of the matter is, that these men, in their superabundance of wisdom, think the question of cheap production only concerns the working classes. And it seems to us surprising if workmen happen to be able to reply to them, and state, if the general condition of the working classes is lowered through foreign competition, or if the foreigner can only sell the English in the home-market, trade, which depends for existence upon the wages of the working classes, must fall; and the article which they retail to that class would

* This prize consists of the interest of 167*l.* 7*s.* 3*d.* Consols, invested in the name of the Society of Arts, to be awarded by the council "for the best specimen of skilled workmanship" at the Society's Exhibition.

not be of any use; and, as every class depends upon the profits of labor, they would in the end be reduced to the level of the workman.

I sometimes put the question to them in a practical manner. I ask them how much of these profits they are willing to forego, and how much reduction of expenses in every department of the trade they are willing to apply for to lower the chances of the English in the competition race. I now pay 5*s.* per year for an eight-roomed house, and the parish rates are 4*l.* per quarter, besides the fire tax, and assessor's tax; now how much will my landlord reduce that to allow me to hear a reduction of wages to meet the exigencies of the times? These questions are already answered by the workmen, and every day they will grow in importance.

It will not do to throw all the burden on the labour class; the others must look around to see if there is anything in their hands that wants putting in order; and I think it will be found that there is work for us all to do. It has been neglected too long; the warnings of fair-seeing men have been unheeded, and now the crisis has come. Old prejudices and habits must be eradicated; moral, industrial, and economic science must be placed on a firm foundation, if our country is to maintain her manufacturing prestige and supremacy.

Every one who is acquainted with the history of his country knows that the regulation of wages, capital, and labour has been one of the most difficult parts of Government. It is a question which these questions has in almost every case created general dissatisfaction. The guild system tried to produce the desired effect, and failed; and the same result was accomplished by the Government, almost every case created general dissatisfaction. The guild system tried to produce the desired effect, and failed; and the same result was accomplished by the Government, almost every case created general dissatisfaction.

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Although legislative and other means have not settled the labour problem, a portion of the labouring classes, through the action of unions, are trying by irregular means to compass that which the wisdom of ages could not do. In a free country, the members are bound to obey the laws made by the legislative assembly. If they are on one side, oppressive, or unjust, or otherwise unconstitutional remedy, the Government alone has the power of free action in matters relating to labour. Every one is at liberty to form his own judgment as to the nature of his employment, and to contract with any one, or decline the employer's terms. He also is at liberty to combine with others for any legal purpose. But if those combining agree to coerce or use force against others, or to deprive them of their means of obtaining a livelihood by labour, they then violate that liberty which the country says they shall enjoy, and commit a crime.

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Several other points I had marked down for a few thoughts upon, but I find I have sometimes said more than I intended to say. I have some questions are of some importance at the present time to masters and workmen, I hope you will think them worth a place in the Builder, and I shall be glad to have the opportunity of stating my opinion on various other points connected with economic and trade-union questions.

JACK PEARSE.

THE DUKE OF BUCKLEUCH AND THE THAMES EMBANKMENT.

In the Court of Exchequer, on the 8th inst., in sitting at 11th Place (before the Lord Chief Baron and a special jury), the action "Duke of Buccleuch v. Metropolitan Board of Works" was heard.

This action was to recover compensation in damages for injury done to the plaintiff's residence, at Whitehall, by the works of the Thames embankment. The defendants pleaded a variety of pleas, denying their liability.

Mr. Mellish, Q.C., for the plaintiff, said the Metropolitan Board of Works to recover a sum of 5,325*l.* which had been already awarded to him by Mr. Chas. Pollock, Q.C., as umpire, for the damage the duke had sustained as owner of the house, Whitehall, by the works of the Thames embankment. The freehold of the house and grounds belonged to his crown, but for 200 years the property had been in the hands of his predecessors, and the duke was to have a renewal of the term for ninety-nine years, in consideration of his expending 20,000*l.* in rebuilding the house. In 1794 an addition was made to the garden of the house by the erection of an embankment wall, surmounted by an iron railing, and having an iron gate with a key, leading to a causeway or jetty which ran down to lower-water mark. The Duke of Buccleuch had the advantage of water-communication to the river, and a perfectly free water-communication. It was well known that in the reign of Elizabeth, and three subsequent reigns, means of navigation were opened up the river, and the Duke of Buccleuch, Westminister, and that one of his chief attractions was the water-communication which they possessed, but those had all disappeared, and Mr. Montagu was said to be able to go to the house of that kind which remained. By the embankment the causeway or jetty in question was entirely destroyed, and in accordance with the provisions of the act, the Duke of Buccleuch was said to be entitled to a claim for compensation. The matter came before Mr. Charles Pollock, and in August last he awarded 5,325*l.* for the destruction of the jetty, and the closing up of the mansion by the erection of the wall. The defendants refused to pay the money, and hence the present action. In the first place, they denied that the Duke had any pro-

perly in the jetty; but, although it was not mentioned in the lease in express terms, he should prove that, as far back as anybody could recollect, there was a jetty running down to low-water mark, with an iron gate at the eastern end, and that it was used exclusively by the duke and his predecessors, and kept in repair by them. Between 1833 and 1834 the duke spent about 800*l.* in its repair. In the present mansion was built, barges brought the materials required to the river-front. There could be no doubt that the destruction of the jetty and of the access to the river had, within the terms of the Act of 1862, injuriously affected the premises.

Evidence *pro* and *con*, having been adduced, including that of the eritor, Mr. Rollock, Q.C.,
The Lord Chief Baron said.—I am of opinion that upon this evidence the Duke of Buccleuch is entitled to the full benefit of the award, and consequently to the verdict; but if you can show that the umpire has allowed anything which he has no power to give, that would be fatal to the award, and you can set aside the verdict and enter a non-suit.

A verdict was then returned for the plaintiff with the following damages.—Amount of award, 8,325*l.*; interest, 286*l.*; costs of award, 560*l.*; 11*s.* 5*d.*; total, 8,888*l.* 11*s.* 5*d.*. Leave was given to the defendants to move the court above on the points of law.

HERALDS' COLLEGE.

In the Equity Court, Feb. 8, before Vice-Chancellor Sir W. Page Wood, Mr. Amphlett, Q.C., appeared in support of a petition by the Corporation of the Pursuivants and Herald of the College of Heralds, Doctors Commons, praying that out of a sum of 7,600*l.*, which had been paid into court by the Metropolitan Board of Works for a part of the petitioners' estate, a sum of 2,150*l.* should be paid out at once to the petitioners, and the rest carried over to their account, with liberty to apply. It was stated that the sum was required to meet an instalment of payments on a contract which the college had entered into with Messrs. Villan & Co., of the Gray's Inn-road, for the rebuilding of their premises on their own ground, for the sum of 5,363*l.*; and the petition was supported by the affidavit of Mr. G. S. Bell, of the firm of Gardiner & Bell, architects, certifying that the plan and specifications were such as the court might approve.
The Vice-Chancellor made the order as prayed, and ordered the Board to pay the costs according to the Act.

CHIMNEY-STACKS AND THE LATE GALES.

SIR,—I wish to call attention, through your columns, to the numerous accidents and loss of life which have occurred in town and country during the late gales, by the falling of chimney-stacks; and also to obtain, if possible, some protection for the future from such catastrophes. I believe that when the late Lord Palmerston was Home Secretary, and his Metropolitan Smoke Nuisance Bill commenced practical operation, plans were proposed by which it was intended to abolish chimney-stacks entirely. Cannot some of the many scientific men and inventors of this country produce efficient plans for this object, and so get rid of those dangerous deformities of dwelling-houses? And further, if by some means the smoke arising from the chimneys can also be got rid of, it will assist to purify the atmosphere, and promote the health of the inhabitants of all large towns and cities. C. F. M.
* Several schemes with this view have been proposed. We print this note to keep the inquiry open.

ST. JOHN'S CHURCH, WEYMOUTH.

In your paper of January 25th, I find a notice of the proposed alterations to St. John's Church, Weymouth, in which it is stated that "the architect is Mr. F. Bennett, of Weymouth." Permit me to inform you that this is incorrect, as I am the architect, and have made all the designs, plans, &c., and, during the time thus engaged, I was in constant communication with the incumbent, the Rev. Mr. Stephenson, as such.
To save travelling expenses, it was arranged between that gentleman and myself, that some local clerk of works should be engaged to see that my designs were carried out in their integrity, and the party to whom you refer was engaged in that capacity. I may mention that this church was built from my designs some fourteen years since. The enlargement will consist of building an additional transept on each side, and lengthening the nave 14*ft.* (by which more than 300 additional sittings are obtained), and rebuilding the chancel. I should not have troubled you with this explanation, but that the same erroneous statement has appeared in the local papers: it is injurious to an architect to find that his designs are attributed to parties who are engaged only to see that his designs are properly carried out, and who may misstate things with a view to their own advantage. TALBOT BURY.

NOTES ON CHURCH BELLS.

No musical instrument has ever exercised so great an influence upon architecture as the church-bell. "To it," says the Rev. J. H. Sperling, "we owe the most striking external feature of our churches," namely, the tower, which, I may add, in many instances, surmounted with a beautiful spire tapering heavenwards; and "these towers were not built for mere fancy or picturesque effect, but to contain musical bells."
It is a lamentable fact, however, that many of our metropolitan church towers contain bells which, as I have often said, are a disgrace to the edifices to which they severally belong. Let one, possessing a grain of musical feeling, listen, on the Sabbath-day, to the hideous clang, clang, which issues from various one-bell towers, and then say whether these things are not "disturbances of the human race." It must be admitted, too, that the "hop, skip, and jump" style of music so often repeated in waltz time, at two or three West-end bellies, is extremely wearisome, while the jangling of the wretched

bells at certain other churches is truly painful to the ear. Now, I do not presume to dictate, but I venture confidently to assert, that if, in any parish, one or two spirited individuals would take up the subject, the evils in question could be easily remedied, for musical bells can be supplied in exchange for the present objectionable ones at a trifling expense. I say, at a trifling expense, because, for various one-bell towers, I would suggest a lighter and less powerful bell, and in such cases the proceeds of the metal of the old bell would very nearly pay for the undertaking.

Moreover, I may take occasion to observe that a bell is an appropriate gift to a church, and a lasting memorial. On this point the following statement will be found interesting.

On Tuesday, the 13th of August, 1867, Mrs. Gladstone laid the corner-stone of a new church at Penmaen, in North Wales; and, after the ceremony, Mr. W. E. Gladstone, in the course of a speech, said.—He was happy himself to be associated with this good work; and, if the parishioners would accept it, he would present them with interesting portions of the furniture of Christian temples, and they had been the subject in Germany of one of the most beautiful poems of the nineteenth century. But, he said, for he thought that bells were among the most charming, he confessed there was another circumstance which led him to make this offer, and that was, that he could not give the bell at all until there was a tower in which to put it; and, if they accepted this offer, they were pledged in the face of the world to the completion of the work they had undertaken.

In conclusion, allow me to call attention to another parishworthy example. A very grand bell which will be presented by the Duke of Bedford to the new church at Woburn, has just been cast by Messrs. Mears & Stainbank, at their foundry. It is the heaviest parish church bell in Great Britain, its weight being 35 cwt.

THOMAS WALDEBY.

HERNE BAY PIER.

SIR,—Evidently Lyon, as well as "Paulatin" and "C. E.," take an interest as to the present and future state of the pier at Herne Bay. If they, or any one who would cordially co-operate, will communicate with me, being the only director likely to see your notices, they can know the difficulties to be surmounted. H. F.

OUR PRISONS.

Some time back it was proposed to move the House of Correction, and now that railways have entirely changed the order of things, it is a question whether all prisons, common goals, &c. *et id genus omnia*, may not with advantage and considerable economy be taken out of London? They should be perfectly isolated, and not surrounded with buildings, which they must be if they remain in London. By their removal great improvements could be made.

EXTRA MURAL.

PIPES FOR WATER.

Mr family have been enquiring from lead in the water, occasioned by its passing through pipes of that material; will you be good enough to advise me, in your next paper, what will be the best substitute, as I am wanting seven water lead from the main and through the house without having it pass through lead at all. E. W. M.
* The tin-lined lead pipes have been recommended.

CHURCH GLAZING.

WITHOUT concurring in much that "M. P. G.'s" letter of February 1st contains, I am induced to re-open the subject of "church glazing" from another point of view. That lead glazing has its advocates no one can doubt; and of its appropriateness to certain styles of architecture each one is at liberty to form his own conclusions.

It is far from being universally known and appreciated, that glass is a rapid conductor. The fact that it is so, and that the artificial heat which is generated by any means, is rapidly "carried off" by contact with external glazing, is often lost sight of. Hence the complaints, alike from "church" and "chapel," to which I have frequently had to listen, of great draughts from the windows, even when hermetically sealed; but if otherwise so much the worse.

How is this to be avoided? I suggest by double glazing, from which the following advantages would accrue, viz., the draughts complained of would no longer be felt; all condensation of the moisture held in suspension, and which in many instances disfigures the walls, would cease; and the warming appliances be economized. The additional cost would be comparatively small, and right well applied. Lead glazing might thus, if appropriate, be used for the exterior, and stained glass, obscured or plain, according to taste or means, for the interior, with an air-chamber between the two. It may be inquired, "But how, in this case, is ventilation to be accomplished?" I reply, that windows are not the legitimate vehicles of ventilation: other and more appropriate means are usually available; and where not found they may be devised by the exercise of a little common sense. WILLIAM HILL.

THE MEMORIAL CHURCH, CONSTANTINOPLE.

SIR,—It is now nearly a year since I addressed you on the subject of the "Memorial Church at Constantinople," which produced a reply and statement from the contractors. The *Builder* reports regularly church-building news of every kind. Would you do myself and relations, as well as many subscribers to that very large fund (in the hands, for the last thirteen years, of the Society for the Propagation of the Gospel, who take no notice of us) the favour to procure some public report of its condition, present prospects, and expenditure, and when it is likely to be finished. H. F. AINSLIE, Colonel.

SIR,—Pray try and learn for us how it is that the Memorial Church at Constantinople has been dragging on for so many years. The whole affair has been a mystery and a muddle from the beginning. The architect first employed was dismissed. Will you ask why? and will you further say that England has gained very little credit in Constantinople by the way in which the affair has been managed. LEVANTER.

** We are informed that the building is now going on steadily to completion, and that no pause has occurred since the present architect and contractors commenced the work.

HEATING A BATH.*

SIR,—I can bear witness to the practicality of "Expertus" manner of treating a bath by use of coke-pan. In Japan and great part of China, every house, or rather hut, is provided with its bath, fitted at one end with a funnel about 7 in. diameter, for the reception of charcoal: by this manner a good hot bath can be obtained in about one hour's time. This bath is used by the natives both in winter and summer, and I wish I could see the poor in England follow the example of these we call uncivilized people. I am inclined to think Mr. C. R. Havell's plan is a natural patent to the poor, as you cannot use it without gas, and that you seldom find in their houses. ONE WHO HAS BEEN IN JAPAN.

THE WATER SCHEME FOR LONDON.

THOUGH the scheme for supplying London with water from Wales or Cumberland has been much canvassed in the newspapers, there is one unanswerable objection, which, as far as I know, has not been adverted to. The objection to which I refer touches that part of the scheme which proposes entirely to supersede all the existing water-works, thus making the whole city dependent on one source of supply only. Now, suppose after completion of the works, some accident should occur, so as to stop the supply of water for a time,—such an accident as the bursting of a reservoir, or the failure of the pipes at some point (as at the siphon across the Severn), which could not be immediately repaired,—how inconceivably fearful would the consequences be. Imagine a district of two million inhabitants suddenly deprived of all possibility of obtaining water. It would be little short of madness for any Government to permit the execution of a scheme which contemplates the supply of water for a large city from a single source. PROVIDUS.

ST. REGULUS'S CHURCH, ST. ANDREW'S.

SIR,—Professor Scott in his lecture on "Early Architecture in Britain," referring to the church of St. Regulus, says,—"I imagine it to be anterior in its date to the introduction of Norman architecture into England." This conclusion is at variance with that of our best modern Scottish archaeologists, such as Robertson and Wilson, who affirm it to be the work of Bishop Robert, 1127—44.
A careful examination of the present remains has satisfied me that they were correct in their views. The details differ in no way from the common at this date: the plan is that most usually to be met with in Norman churches in Scotland. Indeed, there is nothing about this

* See p. 85, ante.

building differing from other Norman churches of that date except the exaggerated height given to the tower and chancel.

I don't if it was ever intended to build a nave west of the tower; certainly none was ever built. Bishop Arnold, formerly abbot and builder of the great abbey of Kelso, succeeded to Bishop Robert; and his ideas on church building being somewhat grander than those of his predecessor, he laid the foundation of the cathedral, the remains of which indicate the noble design of the founder. In the meanwhile the priory church of St. Rule served as the cathedral, and here Bishop Arnold, dying before his church was well begun, was buried.

Various suggestions have been made to account for the peculiar proportions of this church of St. Regulus. Amongst the more feasible are the following:—

1. That it was intended by these means to give to a small church the dignity and importance necessary to mark it as the chief cathedral church in Scotland.

2. The priory of St. Andrew's, being composed of Cildan clergy and Augustine canons, it is not improbable that the Culdees may have insisted on a high tower, which was a characteristic feature of their own earlier architecture, and with them generally marked a principal station or collegiate establishment. The Norman architect, in carrying out this idea, followed the traditions of his art in building it square. The body of the church would of course require to be high, so as to be in some fair proportion to the tower.

3. That the tower was intended to serve as a "Pharos," for the proverbially dangerous coast of St. Andrew's.

Any one or all of these reasons would, to my mind, sufficiently account for the peculiarities of this church; but whatever the reason, I cannot understand how any architect, having personally examined the building, could arrive at the conclusion which Professor Scott has embodied in his able lecture, reversing the decision of our most enlightened archaeologists, and confirming the vague conjectures of the antiquaries of 100 years ago, whose knowledge of art was, to say the least, exceedingly confused.

ERKULPHUS.

DAMP.

I think, if "G. D. B." make a mixture of 1 lb. coal-tar and 3 lb. Portland cement, and lay that on, after having dried the present cement as completely as possible, he will find the paint will remain on it perfectly.

J. DE J.

CORROSION OF LEAD PIPES.

I RECOMMEND to your correspondent, who complains of the corrosion of the outside of lead-piping, the following simple plan, which I have practised, but with what success time alone can show. Procure common earthen drain-pipes of snitable diameter, and slide them over the lead-pipes close together, like beads on a string. By this means the lead will be effectually protected from contact with the corrosive soil.

In laying new pipes this plan is easily carried out; but piping already laid must, of course, be lifted and relaid before it can be applied.

EXPERTUS.

PAVEMENTS IN PARIS.

SEVERAL sorts of pavement have been for a long time tried in Paris without having led to the adoption of one that answers completely to the requirements of traffic. Pavements of all sizes and from all sources have been tried; pavements have been replaced by macadamizing, to which asphalt has succeeded in many parts of the capital, and in many quarters the macadamizing has been replaced by the ancient pavements.

An essay of macadamizing with the addition of iron turnings and filings, has been made on a small scale, it is said with admirable results: the ground, which had finished by obtaining a metallic consistency and solidity, did not yield under the pressure of the heaviest loads; but the enormous expense prevented its being adopted by the administration. As to wood pavement, of which there are several examples in various parts of the town, it has been abandoned on account of the considerable cost of maintenance. Still an

effort is made to return to it, and a new system of wood pavement, by M. Dagnan, has been tried on the Boulevard de la Chapelle, between the Rue des Poissonniers and the Rue Neuve de la Goutte d'Or. The system consists of iron plates, a metre square, pierced with holes, in which the wooden blocks are fitted. We have seen something of the kind in England.

MASONIC HALL, WINCHESTER.

THE inauguration of the new Masonic Hall took place here on Wednesday, the 29th ult. The new building occupies the site of an old chapel, which was formerly used by the French prisoners in the time of the war between France and England, but is now bapilly occupied by the more peaceable brotherhood of Freemasons. The edifice is Domestic Gothic in style, and is built chiefly of brick and flint stones, with Bath stone coping, and medallions with various Masonic emblems carved upon them. The gable on the principal front is surmounted at its apex by a triple Tau. The interior comprises a kitchen, ante-rooms, &c., and over all a handsome lodge-room of good proportions, well lighted by two sunlights. The works have been carried out under Mr. Stephen, jun., architect; by Mr. Newman, mason; Mr. Carter, builder; and Mr. Sealy, plasterer.

CHURCH-BUILDING NEWS.

Blunsdon.—The restored church of St. Andrew, Blunsdon, has been re-consecrated. The main portion of the restoration has been completed. The style of architecture may be designated Early English. The church as it originally stood only consisted, as it were, of one long room, the chancel being almost level with the nave, and an old elongated oak communion-table, the date of which it would be hard to speculate upon, stood at the east end. Now there is an aisle on the south side, and on the north side of the chancel an organ-chamber and a vestry. There was, too, only one entrance to the church—that from the north side—but an entrance has now been formed at the west end, approaching to the south aisle, whilst a porch is being added to the original entrance. Beginning with the church, we may first of all state that the Rev. W. T. Wyld has presented to the church a stained-glass window representing the Crucifixion of Christ. Over the altar-table is a stone cross, and in the chancel new oak benches have been constructed for the choir. The chancel walls have not been removed, but a new coating of stone has been put outside, and a new roof covering the old one. Coming to the nave there has been the same alteration. A new outside roof has been constructed over the old one, so as to preserve the old building as much as possible, and new seats of stained deal have been provided. They are open and free. When the architect came down to examine the edifice preparatory to commencing the restoration, he found that the south wall consisted of three arches, with short stone pillars supporting them. These arches were built up, but the material was removed from them, and thus the south aisle was enabled to be added. The pillars were strengthened, and the walls supported from the roof by beams. Mrs. De Windt, of Blunsdon Abbey, has presented a stained-glass window representative of the Resurrection, and which window has been placed on the east side of the south aisle. On the north side of the nave there are two other stained-glass windows, which have been made up of the glass found in the windows of the old edifice, and some which has been made to imitate it. The edifice is heated by Porritt's (Lancashire) apparatus, and the church is lighted in a very primitive fashion, viz., by the aid of candles. As to the exterior the walls have been strengthened, Bath corner stones have been used plentifully, new red tiles have been put on the roof, a turret over the west end for a couple of bells has been erected, surmounted by a pinnacle and vane. Two Maltese crosses are placed, one over the chancel and the other over the nave. A new porch is being made on the north side. The stained-glass windows are the work of Messrs. Lavers & Barrand, from the design of Mr. Butterfield, who is the architect of the church. The work has been carried out by Mr. W. Morris, of London; and Mr. Smith, of Highworth, the builder and contractor.

Harleston (Suffolk).—The parish church of Mendham has been re-opened. We gave an account of the restorations of this church, from designs by Mr. Phipson, in our last volume, page 551, along with other church restorations, in East Anglia.

Bishop Starford.—The ratersayers at a recent meeting unanimously resolved that the whole of the parish church shall be thoroughly restored so far as the work is not already done. Mr. Pritchard has made estimates of various restorations that are requisite, and a committee has been appointed to ascertain the amount of subscriptions likely to be raised.

Poplar.—St. Matthias's Church has been re-opened, after having been closed five weeks. The side galleries and the old high pews have been entirely removed, and new flooring and open seats substituted; also memorial stone re-laid. The church is heated with new hot-air apparatus, and lighted by gas standards fixed on backs of seats. The entire works have been executed by Messrs. Crabb & Vaughan, under the superintendance of Mr. Teulon, architect. Mr. Coleman was clerk of works.

Hernhill.—Through the exertions of the vicar, the chancel of the church here has been re-restored, at the cost of the Ecclesiastical Commissioners. The old rectorial pew has been moved, the pavement has been relaid with Minton's tiles, the roof re-fitted, and the walls re-plastered. The alterations have been effected under the management of Mr. W. Judges, jun., of Boughton-under-Blean. Coincident with the restoration, two painted windows by the Messrs. O'Connor, of London, have been inserted. The subjects are, in the two windows, the four Evangelists, with their emblems or symbols, and scrolls bearing the verses, "Ask and it shall be given you," "Be not afraid, only believe," "But one thing is needful," "God is love." There was already a window at the east—the subject, the Crucifixion, by the same artists.

DISSENTING CHURCH-BUILDING NEWS.

Balby.—The new Wesleyan chapel erected at Balby, during 1867, was from the plans of Mr. W. Watson, architect, Wakefield; and was built by Mr. Haxell Arnold. It is of Chasic design; the two fronts and sides are of red stock bricks, relieved with bands, strings, and arches of ornamental white bricks and stone dressings. The front towards the low road is of two stories, having the schoolroom in the lower part: the chapel is entered on the higher road, on the level of the road; and communicates with the schoolroom by a staircase. The gables are carried up in an ornamental manner, and finished with fancy brickwork and stone coping; the roof is covered with blue Bangor slates. The inside measurement of the chapel is 42 ft. by 37 ft., and is capable of seating 250 persons. The roof is open, and the timbers are divided into panels, stained and varnished. The internal fittings are of red deal, stained and varnished. The windows are glazed with ground glass. The schoolroom, of the size of the chapel, and 12 ft. in height, is adapted for public meetings, &c. The entire cost has been 1,000l.

Helidon.—St. John Baptist Church, Helidon, was some time since re-opened, after enlargement. When the church was re-opened, a re-rod for the east end was in the course of construction, but was not then completed; this has now been erected, according to the *Northampton Herald*. It is the work of Mr. Butterfield, the architect of the church. It consists of a centre, filling the space immediately behind and above the Communion-table, and two wings on a level with the table, extending to the north and south walls of the sanctuary. These wings consist of a zig-zag pattern, in Minton's coloured tiles and Bath stone. The central portion, behind the holy table, consists of a back-ground of Bath stone, inlaid with a cross of red Langmedoc marble, in relief, resting on a slab of the same material (under which lies a base of blue marble), and surrounded by circlets in green glaze-ware. The remaining space on either side of the cross is filled in with a rosette in coloured tiles, and the letters alpha and omega, each within a circle of blue and red marble, while the whole is flanked on north and south with a pinnacle of red Kenilworth stone.

Swansea.—The contract for the erection of the new Congregational Chapel has just been let to Messrs. Thomas, Watkins, & Jenkins, and they have commenced harricating and otherwise

preparing the ground for a commencement of the work. The chapel will be built upon Walter-street, Fynone.

Henley.—By the liberality of Mr. G. F. Muntz, of Umberslade, the members of the Baptist denomination in Henley-in-Arden have obtained a new chapel in place of the unpretending brick building which formerly occupied the same site. The new chapel has been opened by special services. The chapel is built of blue Wincoboe stone, with Bath stone dressings, and is constructed to hold 200 persons. The interior dimensions, exclusive of the apse and porches, is 42 ft. by 27 ft. 6 in. The roof is open timbered, and is supported by ribs springing from carved corbels. The ceiling is of stained hoards, and not carried up to the apex, a portion being flat, in which is made provision for ventilation. The front, which is gabled to the street, contains a wheel window over the porch, of large dimensions, filled with geometrical tracery. The north-east corner of the front is flanked by a small tower, surmounted by a spire reaching 60 ft. from the ground level. The entrance is through an open porch at the front, leading to the two inner porches, so as to prevent draughts. A small choir gallery is provided over the front porch, in which it is intended to place an organ. The seats are of stained pine, and open at the ends. The baptistry is open, and is placed at the front of the pulpit. Vestries, with connecting lobbies, are provided at the rear. The whole building is warmed by heated air. The building, which is Gothic in style, has been erected from designs and under the superintendance of Mr. George Ingall, architect; Messrs. Clark & Smallwood being the contractors.

STAINED GLASS.

Coggeshall Church.—The window just placed in this church, in memory of the late Mr. Arthur Gardner, is one of Messrs. O'Connor's works. The subject is the Transfiguration. The window is in three lights. The whole of the centre light is occupied by the figure of our Lord.

Church of St. John the Baptist, Chester.—The west window of the south aisle in this church has recently been filled with memorial painted glass. The subject is our Lord's Baptism in the Jordan, set in an Architectonic framework. The opening is a single lancet. The work has been executed by Messrs. Ward & Hughes, Soho-square, London.

Miscellaneous.

CONCRETE WALLING AND THE BUILDING ACT. The Metropolitan Board has granted leave for the erection of dwellings with concrete walls. Some correspondence on the subject appeared recently in our pages.

THE SHEFFIELD ARCHITECTURAL SOCIETY.—The inaugural meeting of this new society was held in the School of Art on Thursday, the 6th instant. A large number of members and their friends were present. Around the platform were exhibited several objects of archaeological interest, including the cast of the shaft of an old cross now at Westbourne; the indented chevron pattern stone found during the recent alterations in the tower of the parish church; a portion of an ancient quern, or hand-mill, found a few days ago at Wath Cemetery; some Roman coins found in the neighbourhood of Sheffield, and a number of rubbings from fine monumental brasses. The Hon. F. S. Wortley took the chair, and Dr. Arveling gave an address on Architectural and Archaeological Science.

GAS.—The Brecon gas company have declared a dividend of 10 per cent.; and the Frodsham one of 7½ per cent. The Frodsham company, says the reporter, "began its career with gas at 8s. 4d. per 1,000 ft. It then and for several years divided 2½ per cent. But one or two individuals contended that there would be no decided improvement until the price was reduced. This has gradually been done, and the price now stands at 5s. 10d. per 1,000 ft., and the dividends have also gradually improved so that for two years respectively 7½ per cent. has been divided among the shareholders." The Bridgewater gas company are about to reduce the price of their gas from 5s. to 4s. 6d. per 1,000 cubic feet. The Kidsgrove gas consumers are trying to obtain a reduction of the price of their gas from 5s. to 4s.

A MASONIC TOWER OF BABEL.—The Masonic brotherhood of Philadelphia are about to build a granite structure, it is said, 250 ft. long by 150 ft. wide, with a tower 300 ft. in height. It will cost nearly 1,000,000 dollars.

"THE DUST REALLY LAID AT LAST."—Under this title the *Parochial Critic*, speaking of Mr. Cooper's new patent, already described in the *Builder*, for watering the streets, with a simple and harmless deliquescent solution, which will keep the roads always moist, yet not wet,—thus ridding them both of dust and mud, at a saving of 20 per cent. to the ratepayers, exclusive of saving to the roads and comfort to shopkeepers, householders, and passengers,—says:—

"Mr. Cooper's proposals are being eagerly accepted by the vestries and other governing bodies. St. Pancras has given him a contract for the whole season for a portion of the parish, comprising the macadamized and the paved granite. The Marblebone vestry has allocated to Mr. Cooper one-fourth of their important parish. He is also in treaty with the City authorities, who are favourably impressed with the improved system. Clerkenwell has also requested Mr. Cooper to tender, while the aristocratic parish of Kensington has entered into a contract for some of their most important roads. The Government has also given permission to the patentee to experimentize in Hyde Park, and before the Horse Guards in Parliament-street.

We hope no prejudice or pressure on the part of interested parties will be the means of depriving the ratepayers of the boon, especially in those districts where the traffic is great and the rates oppressive. Let the vestries defer entering into any contracts for watering until they have received a tender from Mr. Cooper; for apart from the saving that will be effected, will be the future absence of those complaints which tradespeople and others are constantly making to the vestries during the dry season."

Dr. Odling, F.R.S., who has chemically examined the patented substance, certifies that it seems well calculated to effect the object in view, and that it is composed of perfectly harmless ingredients, which "do not exert any influence upon the atmosphere, and are altogether devoid of corrosive or otherwise injurious action upon carriages, wheel-tires, boots and shoes, horses' hoofs, or any substances likely to be brought into contact with the solution." There is a good prospect, therefore, now, of the dust being really laid at last.

FACT AND IMAGINATION.—An admirable lectures on this interesting and important subject was recently delivered in the Ipswich Mechanics' Institute, by Mr. T. S. Gowing:—

"What," said the lecturer, "do I mean by fact? What by imagination? A definition of fact appears to be one of the easiest of tasks. Everybody will tell you 'a fact is a fact'; and yet, when you inquire about the simplest circumstance, what different versions are commonly given! A fact should be an ascertained truth relative to a deed, a point of time, an event, &c. Strictly speaking, we are not justified in calling anything a fact which is not absolutely true and indisputable; but, popularly speaking, everything is fact which a man from his own point of view conceives to wear the appearance of reality. Imagination will, in this lecture, be regarded as that faculty of the mind by which physical or mental objects are vividly perceived, not merely in their simple relations, but in accordance with the laws of mental association and affinity, and therefore so arranged in the mind, that the objects themselves, when recalled, can be reproduced with life-like clearness and force, and represented either in their simple forms or in new yet appropriate combinations. Science is not merely a knowledge of facts, but of the principles which govern facts: for to know a fact is not necessarily to know that of which the fact is significant. It is not, therefore, by multiplied collections of facts made easy that science can hope to advance; but by a clear perception of what may be deduced from one or more unexplained facts. A well-understood principle is an absolute accession to our knowledge, and is commonly applicable to a wide range of phenomena; but a mere fact can never have more than a limited and relative value. . . . In what is called invention or discovery, contrary to the accumulative course of the mere factist, it is from a few carefully-observed facts, in some cases even from a single fact, that brooding genius has often leaped forward in the twilight, which we name invention or discovery. I have used the expression 'twilight,' because there are generally dawnings of light from various quarters, heralding the meridian glow of new truths. In this, the first or anticipatory stage of discovery, it is my belief that imagination is the chief agent; and that the logical faculty is never employed in discovery or invention till the imagination has first struck out the thought at a heat, which it is the subsequent province of the logical faculty to correct and verify."

Great discoverers and inventors have often urged similar views, in contradiction to the priggish, superficial, and shallow notions of mere fact-mongers; but no one has better defined the important office of imagination in scientific pursuits than Mr. Gowing has done; although, amongst our modern men of eminence, both Faraday and Tyndall have done so. Coleridge, in speaking of it, compares it to "an *à priori* light" which every successful interpreter of nature must have, otherwise he is a mere groping and grubber in the dark amongst the host of facts whose bearings and relationships are totally *unseen* and *intently unknown*, although the hard and stubborn facts themselves may here and there be *felt* and *handled*. We have often urged these views in the *Builder*.

BATH ABBEY RESTORATIONS.—This work continues to progress. The third bay of the groined ceiling of the nave and aisles is now completed. The fourth bay is to be immediately proceeded with. Had the funds been sufficiently promising, the fifth bay in the nave would have been ordered also. The stained-glass windows in the aisles are being gradually filled in, and it only needs increased liberality on the part of the public to insure the opening of the nave for divine service during the present year. Mr. J. Bell, of Bristol, has just completed a stained-glass window, intended to be placed in the north side of the choir in the Abbey Church. The window consists of five lights, and the subject of the whole is Christ reading in the Synagogue. The tracery above is illustrative of the verse "The spirit of the Lord is upon me," &c. (Luke iv. 18), which is quoted beneath the subject. There is a foliated haemost and canopy. The window measures about 16 ft. high, by 12 ft. wide, and contains a large number of figures.

NEWCASTLE MECHANICS' INSTITUTION BUILDING.—The new Mechanics' Institution in New Bridge-street, Newcastle, has been opened. The old building was in Blackett-street. The foundation-stone of the new building was laid by Sir George Grey nearly three years ago. Its erection was much interfered with by the protracted masons' strike. It is not quite finished yet, according to our authority, the *Gateshead Observer*, but the lecture-room and the library-room are completed, and the other parts of the building will ere long also be ready for use. The front is in the Palatial Italian style of architecture; and the whole of the ornamentation has been put into this part. It is adorned with three carved heads, representing Literature, Science, and Art. The stairs are 6 ft. in width. The lecture-room is 70 ft. by 40 ft., 23 ft. high, and capable of accommodating 600 persons. Over the lecture-room is the library and news-room, which is similar in size. Both these rooms are of a semi-circular form. The site is within the moat of the old town wall. The foundation was laid with concrete. The architect is Mr. Oliver. The cost of the building will be about 4,000l.

PECULIARITIES OF BRICKMAKING.—Few things would be more trying to the constitutions of those who had not properly graduated, than the tramping all day with naked feet on the cold wet clay, as do the brickmakers; there is no wonder that they are devoured with rheumatism—such, at least, as live to be old men, and these do not form a large proportion of the number. Continually handling the clay, too, is quite as trying to a stranger—indeed, the men themselves consider it the worse. Their feet get so hard from continually tramping the "stuff," as they call it, that they are horny all round, and when the season is over, and the men have to wear their hoots all day, they are sadly inconvenienced. Some of them are quite crippled, as the effect of the unaccustomed covering is to make the outer skin peel off, leaving a soft skin, which is very easily galled by the hoots, and the men can hardly limp along. To most persons the strong and somewhat pungent smell arising from a brickfield is very disagreeable, and when this is the case it is naturally supposed that the odour is unhealthy. I have never, however, been able to trace any practical effect on the health of the neighbourhood of a brickfield is often condemned as a nuisance. Like other nuisances, however, if it be one, those who come after it has been established have no right to complain, and some years ago advantage was taken of this fact in a manner which would do credit to American shrewdness. The lease of a piece of ground at the west of London was offered for sale by auction, and one of the conditions of sale imposed a penalty of 1,000l. on any attempt to turn it into a brickfield. The lease was sold to a gentleman for 1,200l., and on signing to complete the purchase, he handed the agent a cheque for 2,200l. "The sum is only 1,200l.," said the man of business; "here is a mistake of 1,000l." "No mistake at all," said the huyer, "I am going to turn it into a brickfield." And turn it into a brickfield he did, although threatened with innumerable actions by the residents around. The fact was, he had discovered that once a part of it had been used for that purpose, and so he could not be indicted by those who came to the nuisance. From this very field is built a great part of our noblest metropolitan suburbs.—*Cassell's Magazine*.

CRYSTAL PALACE.—The newly-built Tropics End, having been completed, will be thrown open to the public on Saturday. The erection has been undertaken by the Hamilton Windsor Iron-works Company, Liverpool, under the direction of Mr. Edwin Clark. The finishing of this portion of the Palace has afforded the opportunity of locating the show of British and foreign birds there.

EXPLOSION IN A CHURCH.—A serious gas explosion has occurred in the Parish Church at Ripley, near Alfreton. On a lucifer match being struck in the church, a violent explosion immediately ensued. Every window in the building was smashed to atoms; and the organ, which has recently been repaired at much cost, was very much shattered. Many of the pews and other parts of the church were also damaged. The explosion must have resulted from an escape of gas from one of the pipes. It is said that the damage done by this explosion is estimated at 450*l.*, which is covered by insurance. The explosion took place at the west end of the church.

FIRE AT ST. NICHOLAS'S PARISH CHURCH, LIVERPOOL.—A fire, resulting in very considerable damage, has occurred in the parish church of St. Nicholas, Chapel-street, Liverpool. The part attacked was the roof, which was completely burned through, while the falling debris and water did considerable damage to the walls, floors, pews, cushions, &c. The organ was also materially injured, more, however, by water than fire. We are informed that plumbers had been engaged at work on the roof; but whether the fire was caused by the falling of lighted cinders from fires used by them in their occupation; whether it arose from the overheating of the fire of the vestry; or to what other cause the occurrence is due, remains to be inquired into.

HEARTS OF OAK BENEFIT SOCIETY.—From the official auditor's report on the financial operations of this Society for the year 1867 it appears that the "Hearts of Oak" began the past year with 12,000 members, and finished it with 15,500. The income for the year was 26,801*l.* 5*s.* 7*d.*, or 2,238*l.* per month, while the income for 1866 only averaged 2,000*l.* per month. The amount thus received appears to have been disposed of as follows: out of every 100*l.* received 73*l.* 1*s.* were distributed in benefits to members; 2*l.* 2*s.* were spent in postage, reports, &c.; 5*l.* 12*s.* were spent in management expenses; and the remainder, viz., 18*l.* 12*s.*, was added to the reserve fund, which now amounts to only a few pounds short of 50,000*l.*

A YANKEE STEAM "MAN."—Every one has heard that in the progress of steam, as a locomotive power, and long before the "iron horse" was matured, attempts were made to work a predecessor of his upon four legs. This old English notion has become a new Yankee notion, only our cousin has the ambition of a Frankenstein, and has made a steam man, who walks upon his two legs, though he "works like a horse," or, rather, like three horses. Mr. L. Dedrick, a machinist, of Newark, U.S., is the inventor. The man walks or runs (in stabs) as he is bidden, in any direction, and at almost any rate of speed, drawing after him a load whose weight would tax the strength of three stout draught horses. He stands 7 ft. 9 in. high, the other dimensions of the body being correctly proportioned, and his name is Daniel Lambert. He weighs 500 lb. "Steam is generated in the body or trunk, which is nothing but a three-horse power engine, like those used in our steam fire-engines. The legs which support the automaton are complicated and wonderful. The steps are taken very naturally and quite easily. As the body is thrown forward upon the advanced foot, the other is lifted from the ground by a spring, and thrown forward. Each step or pace advances the body 2 ft., and every revolution of the engine produces four paces. It is proposed to run the engine at the rate of 500 revolutions per minute, which would walk the man at the modest speed of half a mile a minute. The fellow is attached to a common rockaway carriage, whose shafts serve to support him in a vertical position. The boiler and such parts as are necessarily heated are to be encased in felt or woollen undergarments. The cost of this 'first man' is 2,000 dollars, though the makers, Messrs. Dedrick & Grass, expect to manufacture succeeding ones, warranted to run a year without repairs, for 300 dollars." Our American friends, in losing the nigger, as a slave, are fortunate in obtaining the "steam man."

ROYAL SOCIETY CONVERSAZIONI.—The president has issued cards for two conversazioni at Burlington House, on March 7th, the other April 25th. Winter has slipped by and "the season" is again in view.

THE INSTITUTION OF CIVIL ENGINEERS.—On February 4th, Mr. C. H. Gregory, president, in the chair, the paper read was on "Floods in the Nerhudda Valley; with Remarks on Monsoon Floods in India generally," by Mr. A. C. Howden.

VOLUNTARY ARCHITECTURAL EXAMINATION.—With reference to the voluntary architectural examination appointed for the second and third weeks of May, we are able to say that it will be held if the application of even one candidate be approved by the council.

THE ASSEMBLY ROOMS, READING.—The Rooms in Friar-street, formerly known as "The Town Rooms," have been entirely re-arranged and re-decorated by Messrs. Green & King, of London. By the use of movable partitions, the new Assembly Rooms are made capable of accommodating either large or small audiences. The decorations are of a light Italian character, and are described by the local journals as tasteful.

HUNGARIAN JOURNAL OF CIVIL ENGINEERING.—The Hungarian Society of Civil Engineers issue a periodical six times a year, in parts, containing each from five to six sheets of letterpress and three or four plates. The publication is intended, in the first place, to acquaint the Hungarian reader with the progress realised abroad in the science and practice of civil engineering; and, in the second place, to afford the profession in foreign countries, as far as may be done by engravings, an account of important engineering works carried on in this country.

MR. HENRY LESLIE'S CONCERTS.—The concert on the 6th was very successful. The opening piece was Mendelssohn's music to Sophocles' tragedy of *Edipus Colonus*, composed in 1845. This fine work was capably performed by a first-rate orchestra, including a number of the best men in the profession. The dialogue, in this version of Mr. W. Bartholomew, was declaimed by Mr. Lin Rayne. The solo parts were entrusted to Mr. W. H. Cummings, Mr. Frederick Walker, Mr. Chaplin Henry, and Mr. Lewis Thomas. The concert on the 13th consisted mainly of madrigals. On the 20th Mr. Sims Reeves is to assist.

NATIONAL FREEHOLD LAND SOCIETY.—The eighteenth annual report states that there has been an increase during the past year in every department of the society's business. The deposits have exceeded those of the previous year by 178,888*l.*, whereas the withdrawals also only exceeded those for the same period by 32,369*l.* The "members' capital" has increased by 210,799*l.* The assets amount to 1,010,312*l.* The directors have added 5,000*l.* to the reserve fund, which now amounts to 10,000*l.* A further sum of 27,337*l.* has been added to "convertible securities," increasing that fund to 129,186*l.* The net profit this year (after deducting the 5,000*l.* carried to the reserve fund) is 21,829*l.*

LABOURERS' DWELLINGS FOR CROYDON.—New buildings have just been completed in a poor district of this town, and are now open to receive tenants. They have much less of the bar-rect style of architecture than usual. There are ninety-two rooms, divided into tenements of from one to three rooms, to meet the requirements of all, as far as can be ascertained at the outset. The single rooms are much in request by those who are unable to pay for more, or whose families do not require more. There is a good demand for rooms, and it appears that the benevolent projectors will receive a dividend as well as do great good to the working classes in the neighbourhood. Each living-room is provided with an oven and large cupboard, and every room has a fireplace; by this and other means the ventilating arrangements are admirable. Provision is made for all tenants to place flowers in the windows, by means of a water-tap; also they are provided with a dust-shaft. The whole of the stone staircases and landings are lighted with gas. A washhouse, with six boilers and large drying-ground, is provided. There is also a large or common room in the centre of the buildings, where the various agencies connected with the poor may be carried on. The buildings have been erected from the designs of Messrs. Beck & Lee, of Finchbury-circus, by Messrs. Colls & Son, the builders, of 28, Moorgate-street, and Camberwell.

DESIGNS FOR TILE-PAVING.—We go a little out of our way to point attention to an advertised set of designs for the arrangement in patterns of ordinary red, black, and buff tiles. They show cleverly what a varied tone may be played on three notes.

FIRE IN THE OXFORD MUSIC-HALL.—The well-known "Oxford" Music-hall, in Oxford-street, has been gutted and unroofed by fire, which broke out early on Tuesday morning, after Monday evening's performance. How the fire originated is yet to be discovered. Some say it broke out first in the roof, and at all events the burning of the roof first attracted attention from the outside. Others strangely say that it originated in the cocoa-nut fibre with which the seats were stuffed, and which was covered with canvas, and the canvas with damask. Even though a burning cigar-stump, as is supposed, had penetrated to the fibre, it is known that this fibre is scarcely combustible at all, and a red-hot coal has made its way to the centre of a mass without setting it in a blaze. Besides, in the seats it must have been well matted together.

PRINCESS'S THEATRE.—The revival of the "Octoroon" here, with a strong cast, is likely to prove very successful. Mr. Vining plays admirably the scoundrel *McClosky*, Mr. J. S. Clarke *Salem Soudair*, with much discretion, but less force than was originally given to it by Mr. Bouicault, who now presents picturesquely the Indian, *Wahnote*. The *Pets* of Mr. Dan Leeson is very effective, and Miss Sanger and Miss Simms add in producing an effective whole. Mrs. Bouicault sustains the part of *Zoe* with pathos and grace as of old. Mr. F. Lloyd has painted some exceedingly good scenery, especially a sun-rise over the *Atakapas*. "Arrah-na-Pogue," with an equally strong cast, is played with the "Octoroon," and makes a remarkable evening for visitors to the Princess's.

TENDERS.

For Independent Chapel at Ivy Bridge, South Devon. Messrs. Ambrose & Snell, architects:—

Bramblecombe & Triggs	2350 0 0
J. Bramblecombe	800 0 0
Marshall	757 0 0
Hurrell	742 0 0
Jenkins	736 0 0
Clarke	729 0 0
Finch	717 0 0
Ellford	715 0 0
Crispitt	705 0 0
Channon	685 0 0
Cornish	640 0 0

For two houses in Notts-street, Plymouth. Messrs. Ambrose & Snell, architects:—

Finch	2948 0 0
Olwyn	910 0 0
Corden, Brothers	825 0 0
Clarke	815 0 0
Verden	793 0 0
Ellford	791 0 0
Channon	787 0 0
Marshall	785 0 0
Call & Felick	769 0 0
Elliot	768 0 0
Price	759 0 0
Reed	749 0 0
Slade	705 0 0

For building the Primitive Methodist Chapel at Wisbech. Mr. James Kerridge, architect:—

Bennett	21,565 8 3
Girling (accepted)	1,545 0 0

For repairs to thirty-nine houses in Albany-road, Camberwell. Mr. Lewis H. Isaac, architect:—

Cohen	21,540 0 0
Nixon	1,361 0 0
Simpson & Son	1,375 0 0
Langmaid & Way	1,375 0 0
Butler	1,360 0 0
Phillips (accepted)	1,267 0 0

For fittings, &c., at No. 7, Fishery-square, for the Planet Building Society. Messrs. Pocock, Corfs, & Parker, architects:—

King & Sons	2325 0 0
Newcomen	298 0 0
Heathrow	257 0 0
Prince	209 0 0

For building two houses and shops in the Britton-road, for Messrs. Nichols & Sainsbury. Mr. C. H. Driver, architect. Quantities by Mr. R. O. Harris:—

Maxwell	43,418 0 0
Masley & Rogers	3,948 0 0
Taylor	3,897 0 0
Jackson & Shaw	3,837 0 0
Axford	3,769 0 0
Thompson	3,770 0 0
Perry	3,833 0 0
Nutt & Co. (accepted)	3,430 0 0

For alterations, &c., to Nos. 1 to 8, Winchester-court, Moorgate-street, for Messrs. James & Williams. Mr. B. Tabberer, architect:—

Bostel	21,338 0 0
Palmer & Son	1,320 0 0
Heaven	1,150 0 0
Prince	800 0 0
Lark (accepted)	874 0 0

For new schools and chapel-keeper's house, Sansonwalk, Worcester, Mr. G. Johnson, architect—

Hemming & Son 2,500 0 0
Beard 1,500 0 0
Kendrick 1,397 0 0
Higgs 1,199 14 0

For house at Barnet. Mr. A. Rowland Barker, architect—

Smith & Son 2,128 10 0
Brown & Sons 1,600 0 0
Scrivenor & Stephenson 1,160 0 0
Stringer 959 16 4

For dwelling-house in Portpool-lane and Half-moon-yard, Gray's-inn-road, for Mr. W. Jarvis—

Laugmead & Way (accepted) £2,000 0 0

For alterations and repairs to three houses, Charlotte-street, and No. 1, Devonshire-street, for Mr. Watson and others. Mr. E. F. Holworth, architect—

Mathews 2,190 0 0
Eyre 1,870 0 0
Hookham 1,862 0 0
Kelly 1,533 0 0
Manley & Rogers 1,790 0 0
Clark & Manooch 1,436 0 0

For building new workshops in Griffen-court, Shepherd's Market, for Mr. Wolmerhausen. Mr. Joseph S. Moya, architect—

Foster 2,735 0 0
Spawell 728 10 0
Fish (accepted) 680 0 0

TO CORRESPONDENTS.

Terms: Cotton.—Unavoidably postponed.
P. W.—do. do. G.—J. R.—A.—S.—T. L.—H.—W. B.—A.—W.—
H.—A.—S.—H.—B.—S.—O.—P.—T.—W.—G.—S.—R.—W.—P.—R.—T.—M.—
—C.—R.—G.—R.—S.—O.—H.—N.—S.—C.—T.—O.—M.—P.—R.—T.—M.—
—W.—H.—W.—L.—G.—E.—S.—J.—C.—R.—K.—S.—S.—G.—R.—C.—D.—G.—
—H.—V.—M.—R.—B.—T.—B.—R.—S.—C.—P.—T.—W.—J.—D.—C.—G.—R.—B.—H.—S.—
—L.—&—S.—M.—R.—Brothers.—R.—H.—E.—L.—N.—F.—R.—M.—(all in
—right).—W.—P.—(we will editting look at the models, if submitted, in
—R. S. (would depend on information not given).—J. R. (in type).—A
—Constant Reader ("comparisons are odious").—G. S. (nominous stairs
—don't apply).—H. B. (the inquiry being by a builder, the observation does
—not apply).
Note.—Architects who are unwilling (as we are) that their names
—should not accompany lists of orders with which they are concerned,
—may prevent the omission by sending lists themselves. We cannot
—repeat lists on the ground of such omission.
We are compelled to decline pointing out books and giving
—addresses.
All statements of facts, lists of Tenders, &c., must be accompanied
—by the name and address of the sender, not necessarily for
—publication.
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MR. LEWIS, Solicitor, of 36, Northumberland-street, Strand, undertakes the RECOVERY of all Book Debts without any charge beyond the mere ordinary fee of court. Composition deeds prepared; criminal and county courts attended; and such an arrangement as to arrest or execution on goods obtained within an hour after application; advice free; to short all legal business attended to on very moderate terms. Office hours Ten to Five.

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EDWARD CHALMERS, Town Clerk. Town Clerk's Office, Hanley, 12th February, 1868.

BOROUGH of NEWCASTLE-UPON-TYNE.—TO ENGINEERS and TOWN SURVEYORS.—WANTED, a BOROUGHER ENGINEER and TOWN SURVEYOR for the office staff being provided by the Corporation. The person appointed will be restricted from following any other employment than that indicated by his appointment, which will include the entire management of all the engineering, building regulations, sanitary arrangements, sewerage, and road-making throughout the Borough, and together with any other duties that he may be directed to perform. Applications for the appointment, detailing nature of qualifications, and enclosing testimonials, addressed to the Town Clerk, Council Chamber, Town Hall-buildings, will be received up to and including MONDAY, the 21st day of FEBRUARY, instant.

R. F. PHILLIPS, Town Clerk. Newcastle-upon-Tyne, 7th February, 1868.

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TO BUILDERS and CONTRACTORS. WANTED, a RE-ENGAGEMENT as GENERAL FOREMAN, or Charge of a Job, in town or country. Has just completed extensive vineyard works. Testimonials furnished. Security required. Address, B. HOTTEN, 6, Walby-terrace, Colindale-road, N.

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WANTED, by a Young Man, who wishes to ARTICLE HIMSELF for three years in a good firm, to learn the CARPENTERS BUSINESS. Willing to pay a small premium. Address, W. T. 4rley Wood, Mount-street, W.

TO SURVEYORS, BUILDERS, and OTHERS. WANTED, a SITUATION as CLERK of WORKS, or to take Piece-work. A Carpenter and Joiner by trade, having a thorough knowledge of all the different branches, Furniture, Carpentry, &c. Address, A. Z. 2, care of Messrs. New & Canning, Surveyors, 31, Edgware-road, W.

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TO NORLEMEN, GENTLEMEN, and ESTATE AGENTS. WANTED, a RE-ENGAGEMENT, by a GENERAL FOREMAN, of great practical knowledge. Thoroughly acquainted with the routine and details of work necessary in the erection and repairs of estate work generally. Will render in the use and conveniences of all kinds of material. Can make plans and working drawings, estimate, and make up work. First-class references. Age 39. Married—no Family. Address, H. 30, Stanhope-street, Hampstead-road, London, N.W.

TO BUILDERS and DECORATORS. WANTED, by the Advertiser, a SITUATION, or Job, as PAINTER and GLAZIER. Can do graining if required. Midland counties preferred. Address, 671, Office of "The Builder."

TO BUILDERS. WANTED, by a steady, practical Man, a Joiner, a RE-ENGAGEMENT as WORKING or SHOP FOREMAN. References from last employers. Address, W. B. Briar Cottage, Woodford-road, Essex.

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WANTED, by a Gentleman, aged 26, a RE-ENGAGEMENT in an Architect's Office. Has had considerable experience both in town and country. Address, A. Z. 2, care of Mr. Theaker, Kew-street, College Green, Bristol.

TO BUILDERS, CONTRACTORS, &c. WANTED, a RE-ENGAGEMENT, to DO BRICKWORK, CUTTING, or POINTING, as Piece-work labour only, or a Foremanship. References. Address, G. MILL HOUSE, 47, Star-street, Edgware-road, London.

TO BUILDERS, CONTRACTORS, &c. WANTED, by a steady, energetic Man, an ENGAGEMENT as GENERAL FOREMAN. Will set up settling out work, keeping accounts, superintending men, &c. Has been accustomed to all branches of the trade. Carpenter and Joiner by trade. Good references. Age 35. Address, A. W. 355, Canberwell-road, S.

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WANTED, by the Advertiser, a Mason by trade, the CARE of a WHARF or YARD, having a thorough knowledge of the business. Unobtrusive measuring, &c. Refer to drawings. Salary moderate. Address, M. 15, Mount-terrace, S.W.

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TO PLUMBERS and BUILDERS. WANTED, by a Young Man, a constant SITUATION as PLUMBER and GAS-FITTER, &c. No objection to a little painting. In town or country. Address, A. M. No. 4, Thames-row, Old Brentford, Middlesex.

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TO PLUMBERS and BUILDERS. WANTED, by the Advertiser, who is a good PLUMBER and can do Gas-fitting, a JOB or SITUATION. Address, A. T. W. 25, New-street, St. John's-well, N.W.

TO BUILDERS and PLUMBERS. WANTED, a SITUATION as FOREMAN of PLUMBERS, or Charge of a Job by a first-class Plumber. Wages not so much an object as work. Good references. Address, 694, Office of "The Builder."

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TO BUILDERS, PAINTERS, &c. THE Advertiser, a Young Man, aged 36, a PLUMBER, PAINTER, and GLAZIER. Good references. Address, K. W. 10, Oxford-road, Colindale-road, Islington, N.

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EVENING EMPLOYMENT WANTED by a Young Man engaged in a draughtsman's office, aged 25. Will do accounts, book-keeping, &c. Discharged after six months' notice. Terms moderate. Address, H. Post-office, 141, White-church-road, E.

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TO CARPENTERS and BUILDERS. EMPLOYMENT WANTED, by a Young Man, aged 22, as IMPROVER. Could act as timekeeper if required. Address, K. P. 31, Oxford-terrace, King's-road, Chelsea.

TO ESTATE AGENTS. A SURVEYOR of much experience in designing and superintending the erection of villas, farmsteads, improved cottages and road-making, drawing, &c. OPEN to an ENGAGEMENT. Address, 671, Office of "The Builder."

TO ARCHITECTS and BUILDERS. A CLERK of WORKS of great experience is open to an ENGAGEMENT, or as Foreman. Good references. Address, W. P. Post-office, Westbourne-place, Bishopsgate.

A BUILDER'S General and Estimating CLERK is open to an ENGAGEMENT. Thoroughly understands the business throughout. Can give estimates and carry required materials. Address, No. 677, Office of "The Builder."

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TO SURVEYORS, ENGINEERS, and OTHERS. A CIVIL ENGINEER, of experience in a Colliery, Mine, and Land Surveying, is desirous of a SITUATION as PRINCIPAL SURVEYOR. Has possession of the highest testimonials, and has obtained a degree for scientific instruments and a new system of "submerged surveying," which is very valuable and useful to all kinds of business. Address, A. F. care of Humphreys & Co. 31, King-street, Chespie, London.

A BUILDER'S MANAGING CLERK, of a great practical experience, desires an ENGAGEMENT. Well up in estimating, measuring, making out accounts, and the general routine of a contractor's office. First-class references and testimonials. Address, C. B. Post-office, 368, Kingsland-road.

A THOROUGHLY practical CLERK of WORKS requires a RE-ENGAGEMENT. Just finished extensive works. Good references and testimonials. Address, J. S. 15, Caville-terrace, Nottingham.

TO BUILDERS, DECORATORS, and CONTRACTORS FOR PAINTING. AN EXPERIENCED FOREMAN in the above branches is open for an ENGAGEMENT. Has a practical knowledge of the Decorative Department, and the general routine and alterations to House Property. Desirable references. Address, 35 E. care of Mr. French, 23, Adam Street, Edgware-road, W.

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TO ARCHITECTS and BUILDERS. A THOROUGHLY experienced Man requires a RE-ENGAGEMENT as a BUILDER'S CLERK. No objection to go abroad. Address, 681, Office of "The Builder."

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The Builder.

VOL. XXVI.—No. 1307.



Memorials of
Westminster Abbey.

IN former times, sovereigns brought offerings to Westminster. The Dean of Westminster, the modern representative of the great abbots of old, reversing this precedent, has just laid at the feet of our Sovereign Lady the Queen a choice offering.* It is a comely volume, telling the history of the great centre, or core, of all Medieval expression of regal and ecclesiastical magnificence, — Westminster Abbey. The Dean sketches the thorny morass on the bosom of the Thames, once haunted only with the stampee of herds of wild oxen and red deer, that ultimately became the site of the abbey. Then he builds up the fabric, first in the old Saxon days when the island was a bright green spot upon the river. With silvery phase, with a mellow musical ring, he tells of the coronations that have fitfully filled the edifice with splendour and acclamations to leave it quiet, cool, and grey again; of the many other incidents in the lives of our successive kings associated with the abbey, such as the deposit of the Scone Stone in it, or the placing of Llewellyn's crown, the death of Henry IV. in the Jerusalem Chamber, or the sanctuary enjoyed by the wife and widow of Edward IV.; of the successive additions made to the fabric by royal piety and munificence; of the royal burials, now of a warrior king and anon of a queen consort, perhaps, like Philippa, asking as her last prayer that her lord would choose no other sepulchre but hers; then of tiny princes and princesses; and of the monuments of other celebrated persons. And this story of the aims and ends, the loves and lives, of so many of the great ones of our land he lays at her Majesty's feet, "with every sentiment of loyal and respectful gratitude."

Through this great theme the Dean skillfully draws two stout wefts. One of these, which he may deem incumbent upon him by reason of the traditions of his office, is an assertion of the thorough independence of the collegiate body. In old times this assertion was maintained by the account of supernatural appearances which no one could gainsay, and then by references to the legends thus received. On the eve of the day when all things were prepared for the consecration of the church, a fisherman deposed that as he was casting his net into the waters, he per-

ceived a bright light on the Lambeth shore. He crossed over to it in his boat, and found a venerable stranger in foreign attire, who requested to be ferried over to the new building. As soon as the stranger landed, the air became full of celestial splendor, in which angels could be discerned descending and ascending, carrying sweet odours and bright lights, with whose assistance he proceeded to consecrate the church with much solemnity. On returning to the boat, he revealed to the fisherman that he was St. Peter, and left with him a message for the Bishop of London, who was to have consecrated the building on the following day,—"When Mellitus arrives to-morrow, tell him what you have seen, and show him the token that I, St. Peter, have consecrated my own Church of St. Peter, Westminster, and have anticipated the Bishop of London." And to be independent of the Bishop of London, and of as many other authorities as possible, as well as to maintain the high claims of the abbey, has ever been the persistent aim of the whole line of abbots and their representatives. Never, with their consent should St. Peter be robbed to pay St. Paul. When the monks of St. Paul's boasted that their cathedral covered the site of a temple dedicated to Diana, those of St. Peter's were ready with a statement that their abbey covered the site of a Temple to Apollo; in like manner every vaunted superiority was met with a contrary attraction. In modern times, when Nelson was buried in St. Paul's, and crowds flocked thither to see his funeral car, to the comparative desertion of St. Peter's, the officials of the latter caused a waxwork figure of the hero to be made, and dressed in clothes that he had worn, as a counter-charm. The same irrepressible spirit may be traced in the protest made by the deans when convocation sits.

The other weft we see interwoven here and there throughout these memorials is the identification of the abbey with royalty. The abbey is the outward and visible sign of the union of Church and State. The Abbey Church and "our Palace of Westminster" are with the Dean synonymous terms, as they are literally in the present day in the gazettes proclaiming the coronations. "The head, crown, and diadem of the kingdom" is the olden description of the Church he most fully acknowledges: it is this character of the fabric that he delineates with most delight; this aspect that he presents most forcibly. With much the same feeling that induced William the Conqueror to stand upon the gravestone of his predecessor, Edward the Confessor, whilst the rite of Coronation was taking place, the dean looks round upon the Abbey Church, and its associations and contents, as the chief seat and expression of the continuity of royalty. "The English kings," he says, "as soon as they became truly English, were crowned and lived and died for many generations at Westminster." Unlike the French monarchs who were crowned at one place, lived in another, and were buried in a third, the mediæval kings of England stepped over the graves of their ancestors to receive their crowns, and lived and died in immediate proximity to these and their own final resting-places. It was the Abbot of Westminster who was charged with the duty of preparing the successive kings for the rite of coronation; and it was his hand that was authorized to administer the chalice to the king and queen in token of their conjugal unity. These offices are still the peculiar privilege of the Protestant deans of Westminster; as is that of the burial of great personages. On one occasion only could the Primate of Canterbury or the Bishop of London take his place as by right in the choir of the abbey: this was on the solemnization of a coronation, when the Archbishop of Canterbury was always the first ecclesiastic, and the Bishop of London usually preached the sermon. The Reformation, perhaps, by reason of this semblance of the abbey

to a large chapel-royal of the palace, did not make so decided a transformation here as elsewhere. The abbot became the dean; the monks were supplanted by twelve prebendaries; mass was still said three times a day; and on the anniversaries of Henry VII.'s death dirges were still sung and tapers burned in his chapel. Continuity rather than catastrophe asserted itself even at this crisis. Quietly and gradually the change came about. The brass lecterns and copper-gilt candlesticks and angels were sold in the reign of Edward VI., and the proceeds applied to the library and purchase of books; the word communion was silently substituted for mass; and "surplices and hoods" were written in place of the "ancient vestments." In due time, just as quietly, the old order of things was reinstated. The prebendaries conformed to the faith of Queen Mary; the chapter was dissolved, and the convent was restored. The Confessor's shrine was set up, and his holy replaced in its ancient sepulchre, whence it had been torn. The altar was enriched with jewels, sent by the queen; and a large paschal candle installed upon it, with a ceremony at which the masters and wardens of the Wax Chandlers' Company assisted. The retrograde movement was but of short duration. Fuller tells us how Queen Elizabeth's messenger found the abbot setting elms in the orchard of the abbey, where there are elms to this day. "Coming afterwards to the queen, what discourse passed between them they themselves know alone. Some have confidently guessed she proffered him the archbishopric of Canterbury, on condition he would conform to her laws, which he utterly refused." The first Elizabethan dean, William Bill, enjoyed the revived dignity only for a short time. It was his successor, the Welshman, Gabriel Goodman, of whom Fuller wrote, "Goodman was his name, and goodness was his nature," who perfected the rehabilitation of Protestant worship, and left us the order of the service as we now know it.

The researches of a lifetime, without assistance, could scarcely have compassed the number of minute facts grouped in the Dean's pleasant work; we are therefore not surprised to hear that Mr. Joseph Burt, Mr. Frank S. Haydon, and Mr. E. Rhodes, of the Public Record Office, have rendered valuable aid. The archives preserved in the muniment chamber of the abbey, beginning with the charters of the Saxon kings; the chapter books dating from 1542; the Consuetudines of Abbot Ware, long considered illegible, but restored to recognition within the last two years by a chemical process; the burial registers and preceptors' book all require the well-accustomed eye to master their contents. And when we come to the bewildering amount of printed authorities, assistance is again imperatively called for, though on other grounds. Although the memorials are not treated from an architectural point of view, the works of Camden, Keepe, Crull, Dart, Widmore, Akerman, Neale, Brayley, G. G. Scott, Cunningham, Ridgway, as well as of the topographers and historians of Mediæval times, have been all duly considered. The charming pages of the "Spectator," the "Citizen of the World," and Washington Irving's "Sketch-Book," too, have been also laid under tribute; and the letters of Horace Walpole, and those of the large circle of his brilliant contemporaries, examined for new lights. Gatherings from this immense reservoir of reading and reference flow in a sparkling stream of narrative from the Dean's pen, full of grand scenes, processions, vivid pageants, bright colours, cloth of gold, and all the pomp and circumstance of Mediæval life, save when the section of his subject requires more sombre tints. His references are indefatigably minute: his appreciation of the romance, poetry, magnificence of his theme is intense, and yet when any writer has been over the same ground before

* Historical Memorials of Westminster Abbey. By Arthur Penhryn-Stanley, D.D., Dean of Westminster. London: John Murray, Albemarle-street, 1868.

him, as in the word-spectacle of the coronation of Anne Boleyn, he reticently prefers that account to his own. In this way his work is studded with some of the best passages of our best authors.

It is suggestive to consider, with the confidence we may feel from the amount of care our author has taken, how much of the august ceremony of a coronation is a legacy of the earliest times. Tradition says King Arthur was crowned at Stonehenge. Standing in that grand sky-canopied temple scarcely "made with hands," this Celtic monarch left a precedent that we have not yet cast aside. Seven of the Saxon kings were crowned standing on the King's Stone, still to be seen in the highway of Kingston-on-Thames; and, although the sanctuary of the House of Cerdic, the Cathedral of Winchester, became the scene of the coronation of the rest of the Saxon kings, the impression implanted that a particular and holy stone must form part of the ceremony, showed itself again in the fact that the grave-stone of the Confessor was chosen as the spot upon which his "inheritor" William was crowned; and still more forcibly in the removal of the Stone-stone from Scotland by Edward I. Again, the ceremony of anointing kings is very ancient. Charlemagne was anointed from head to foot; and some of our own kings have sat stripped naked down to the waist before the congregation in order that the sacred oil might not be impeded in its course. Notably, Henry IV. and his queen sat, on a platform raised above the altar, stripped from the waist upwards, the king surrounded by dukes, the queen by bishops and ladies. The regalia are relics of Saxon times, and bear Saxon designations. The king's crown was that of Alfred or the Confessor; the queen's was that of Edith, wife of the Confessor; the sceptre with the dove was an emblem of the peace that prevailed after the defeat of the Danes; the gloves were a souvenir of the abolition of the Danegelt; the ring, according to Planche, was the ring of the pilgrim; the stone chalice holding the sacramental wine belonged to the Confessor's time; and the oath, which endured down to the reign of James II., was to observe "the laws of the glorious Confessor." We have a detailed account of the ceremony of the coronation of Richard I. The principal features in it have been preserved in the rite still in use. The difference of the times, however, is well marked in the alarm that the entrance of a host occasioned, especially when it flew round and round in circles over the king's throne, and in the consternation that ensued when the bells began to ring late in the day without any orders from the authorities; as well as in the still more momentous attack upon the Jews that took place as part of the rejoicings. Of the coronation of Henry III. we know still more. As Westminster was in the hands of the Dauphin of France on Henry's accession, he was crowned first at Gloucester, and again, four years afterwards, on the restoration of the place, in the Abbey. Impressed with the attributes of the ceremony and its scene, he is said to have asked of the greatest theologian of the day, Grossete, Bishop of Lincoln, "What was the precise grace wrought in a king by the motion?" When he was answered, with what Dean Stanley calls "truly episcopal discretion," "The same as in confirmation."

It was the enormous sums lavished by this prince upon the rebuilding of the abbey that called into existence the House of Commons. The first sittings of this body were held in the Chapter-house. Before the separation of the Lords and Commons, Westminster Hall was their meeting-place; but the Commons were called alone to the Chapter-house, and the Lords met ever afterwards in the Painted Chamber, known as St. Edward's chamber, from the fact of the Confessor having died in it. The meetings of the Commons were often stormy in those days. The Dean tells us—"On a few occasions they were assembled in the vast oblong hall of the refectory. There, in a chamber only inferior in beauty and size to Westminster Hall, was impeached Piers Gaveston. There, in an assembly partly of laity, partly of clergy (but apparently chiefly the latter), Edward I. insisted on a subsidy of half their possessions. The consternation had been so great, that the Dean of St. Paul's had, in his endeavour to remonstrate, dropped down dead at King Edward's feet; but 'the king passed over this event with indifferent eyes,' and persisted the more vehemently in his demands." In the reigns of Richard II., Henry IV., and Henry V., the Commons were occasionally convened in the refectory, but the

house of the Chapter was the usual place of meeting. In the reign of Edward III. this building was decorated with paintings that have not yet altogether faded away. We may picture the speaker taking the abbot's stall, which faced the entrance, whilst the members ranged themselves around on the seats intended for the monks. "To the central pillar were attached placards, libellous or otherwise, to attract the attention of the members." The Jerusalem Chamber has ever since been used by the abbots and their successors, the deans, for the transaction of the business of the convent or collegiate body. By virtue of this arrangement the Chapter-house, though long outgrown by the Commons, remains public property. The mention of Edward's demands reminds us of the conspicuous figure he makes in the history of the abbey. He and his good queen, Eleanor, were the first king and queen who were crowned together. Then, he left for our delight Queen Eleanor's monument and the tombs of his father and uncle. He extended the building westwards, and the Confessor's chapel, in which he kept his vigils before his knighthood, he filled with tokens of his conquests; the great stone on which the monarchs of Scotland were crowned, and the fragment of the cross from a Welsh shrine. Moreover, he caused his little son to hang up with his own hands upon the shrine of the Confessor the golden crown of the last Prince of Wales. Then we come to his own unfinished tomb, and the story of the grim promise he exacted from his son to boil the flesh off his bones, and carry them before his army into Scotland. The dean accounts for the plain tomb as a facility for the fulfilment of his wish should the opportunity have arisen to carry it into effect. Every two years, till the fall of Richard II., the tomb was opened and the wax of the regal warrior's cerecloth renewed. In 1771, in the presence of the Society of Antiquaries, the tomb was again opened, and the old Plantagenet belongings scrutinised.

"The king was found in his royal robes, wrapped in a large waxed linen cloth. Then for the first time we saw that figure, lean, tall, and erect as a palm-tree, whether running or riding. But the long shanks, which gave him his surname, were wrapped in the cloth of gold; the eyes, with the cast which he had inherited from his father, were no longer visible; nor the hair, which had been yellow or silver-bright in childhood, black in youth, and snow-white in age, on his high broad forehead. Pitch was poured in upon the stripes, and, as Walpole comically laments, in deploring the final disappearance of the crown, robes, and sceptre, 'They boast now of having enclosed him so effectually that his ashes cannot be violated again.'"

The name of Edward, says the Dean, loyally, is the one royal name that constantly re-appears to assert its unchanging hold on the affections of the English people. Mention of Richard II. fills the abbey, too, with Plantagenet memories. He was crowned, married, and buried in the abbey. He rebuilt the great northern entrance, and in many ways displayed great affection for the fabric. When his queen died he caused her to be buried there with the greatest pomp, and erected a monument to her memory, on which reposed his own effigy by the side of hers, with his hand clasping hers. As we gaze upon it we call to mind, with satisfaction, that Henry V. brought back Richard's body from Langley, whither Henry IV. had carried it, and placed it in this tomb. We have his portrait, too, that celebrated picture which is considered the oldest contemporary representation of any English sovereign, which hung for so many years in the abbey, and was so frequently painted over, to be skilfully cleansed of its superfluous coatings, by an accomplished artist of our own day. The funeral of Henry V., who performed so graceful a tribute to the memory of this beautiful but unfortunate prince, was the grandest that ever took place. He died at Vincennes, and the procession which accompanied his remains to Westminster, headed by James I. of Scotland, and Catharine, of Valois, started from Paris. All the clergy went out to meet it as it approached London:—

"His three layers were led up to the altar, behind the effigy, which lay on the splendid car, accompanied by torches and white-robed priests innumerable, and which was now for the first time seen in the royal funerals; previously the king himself had been exhibited in their royal attire. To give a worthy place to the mighty dead a severe strain was put upon the capacity of the abbey. Room for his grave was created by a summary process, on which no previous king or abbot had ventured. The extreme eastern end of the Confessor's chapel, hitherto devoted to the sacred relics, was cleared out, and in their place was deposited the body of the most splendid king that England had, down to that time, produced; second only as a warrior to the Black Prince, second only as a sovereign to Edward I."

A chantry was erected for the performance of masses for the repose of his soul, which mate-

rially altered the contour of the Confessor's chapel, and encroached in the most ruthless manner upon the tombs of Eleanor and Philippa. In this recess were hung his shield, saddle, and helmet, and the sculptures around the walls were made to depict his great achievements. His recumbent effigy, carved in oak, was plated with silver-gilt, except the head, which was of solid silver. The latter has long since disappeared. When the Spectator and his friend, Sir Roger de Coverley, were inspecting the monuments, this last theft especially moved the worthy Tory knight's ire. "Some Whig, I'll warrant you; you ought to look up your kings better; they'll carry off the body, too, if you don't take care." Referring to the want of consideration for the integrity of the Confessor's chapel, hitherto deemed sacred, displayed in this instance, we must note that modern clearances and barbarisms have not been more sweeping or scornful of the remains of past ages than were the many alterations and rebuildings made by successive monarchs in the days of old. Henry III. nearly obliterated the first building without scruple, and his successors made nearly as free with his improvements. The arrangements of an ancient temple, from their sacred passages, have been compared to those of a vast slaughter-house, and those of a Dominican church or Nonconforming chapel to a vast preaching-house, in contradistinction to those of Westminster Abbey, which have been likened to the arrangements of a vast tomb-house. A contemplation of the fabric in this aspect, apart from the royal tombs, brings the Dean to a comparatively modern period: to the companionship of the statesmen, warriors, men of letters, and men of science of the last century and our own. It is this aspect of a Pantheon, a Valhalla, and a Santa Croce, as he says, more than any other, which won for the venerable pile the visits of Addison, Steele, Goldsmith, Charles Lamb, and Washington Irving, described so delightfully in their respective works, which prompted Nelson to cry, "A peerage or Westminster Abbey?" and Macaulay to enshrine in it some of his most elegant passages, and which gives most promise of the endurance of the abbey in the hearts of the people. Here we have no isolated manœuvres of kings as at St. Denis, the Escurial, Vienna, Moscow, and St. Petersburg; but just as the kings gradually grouped round the Confessor's grave, so have the chiefs of the court and camp grouped around those of the kings, and, subsequently, other centres have been formed in like manner. The northern transept remained comparatively unoccupied till the death of William Pitt, Earl of Chatham, who being interred there after much entreaty that St. Paul's might have the honour of receiving his remains, formed the centre around which have grouped all subsequent statesmen, giving to this part of the edifice as distinctive a character as Poets' Corner enjoys. In the aisle of the same transept lie the great Indian statesmen. It was Geoffrey Chaucer who formed the centre around which the poets were subsequently grouped in the south transept. The first to follow was Spenser, whose epitaph originally stated that it was the vicinity of Chaucer that caused the selection of his burial-place. Then came Drayton. Writes Fuller, overflowing with appreciation of all that is good and great, "Chaucer lies buried in the south aisle of St. Peter's, Westminster, and now hath got the company of Spenser and Drayton, a pair royal of poets, enough almost to make passengers' feet to move metrically, who go over the place where so much poetical dust is interred." As our author turns from one monument to another he relates every detail of interest connected with them and their inscriptions, without, however, giving any technical or artistic particulars of them. We meet here Johnson, whom Ronhill called to his aid for the epitaphs of the monuments he put up; Pope, who wrote Row's epitaph; Swift, whose spirit pervades the atmosphere of the whole place; Sir Joshua Reynolds, who fixed the spot for Goldsmith's memorial; and many other of the intellectual athletes of the last age with full working powers, some of whom were not destined to swell the catalogue of the mighty dead deposited around. "I have been told of one Pope," says the Chinese philosopher, slyly deprecating the intrusion of small names and the omission of some great ones in Poets' Corner. "Is he there?" "It is time enough," replied his guide, "these hundred years. He is not long dead. People have not done hating him yet." Purcell

became the centre of the musicians; Casaubon of the scholars; and Newton of the men of science.

Of course the increasing scarcity of space receives consideration at the Dean's hands, for it must be a difficulty that is ever before him. The project for extending the space available for memorials of the great that he seems to favour most, is the erection of a cloister, communicating with the abbey by the Chapter-house, on the site of Abingdon-street, where it would face the palace on one side, and the College Garden on the other. It is, perhaps, too late to talk of extending the nave westwards, now that the prebendal houses have been built; but a grand narthex, or galilee, on account of the inferior height, would not be so inadmissible. And, again, it would be possible to throw out a large mortuary aisle, or series of chapels, between every buttress of the north side of the nave, after the manner of the chapels at Notre Dame. The objections to an extension by way of Abingdon-street are, that it is too far eastward; and in the interior of the building it would be quite out of sight in the *corp d'œil*. For one eye that would fall upon the Abingdon-street cloister, a thousand would see either the galilee or chapels. Few who look up at the western front, by the bye, and shrug their shoulders at Wren's towers, will give them credit for the interest they possess by force of association of idea. Dean Wilcocks, under whose auspices they were completed, was elected a Fellow of Magdalen College contemporaneously with Addison. After being chaplain at Lisbon, and preceptor to the princesses, he held the deanery for twenty-five years. The towers we condemn as a blemish, he considered the glory of his period of office; and "on his monument in the abbey, in his portrait in the deanery, in the picture of the abbey by Canaletto, which he caused to be painted evidently for their sake, the unfortunate towers of Wren appear. He was buried under the southern of the two, in a vault made for himself." When we think of this affectionate pride of the good old dean, whose motto was identical with his constant endeavour, "Let me do all the good I can," the offending features will not be without their interest.

More sombre, less picturesque, perhaps, and less "glorious within," with scarlet and gold, purple and ermine, precious marbles, jewels, and embroideries, is the history of the abbey under the deans, than when every head bowed as abbot after abbot passed on his way, but not less momentous. A refined taste can get as much effect from browns, greys, and neutral tints generally, as from those of the tulip. This our author brings to bear, and more. "Whilst the dignitaries of the ancient abbey, as we have seen, hardly left any moral or intellectual mark on their age, there have been those in the catalogue of former deans, prebendaries, and masters, not to speak of innumerable names among the scholars of Westminster," he writes, "who will probably never cease to awaken a recollection as long as the English Commonwealth lasts." In place of coronations, royal marriages, and burials, we may picture the venerable fabric, which the antiquary, John Carter, rejoiced to record, was *never white-washed*, with grave assemblies of divines. In 1643, the Westminster Assembly met in the choir, both House of Parliament assisting at the opening. Among the divines were bishops, Non-conformists, Presbyterians, and Independents, "dressed in their black cloaks, skull-caps, and Geneva bands." Not since the famous conference in the days of Elizabeth had there been so imposing an assembly. For five years and more this commission laboured, sometimes in Henry VII's chapel, and when it grew too cold there in the Jerusalem Chamber, discussing the thirty-nine articles, drawing up the catechisms, directory, and confession of faith. Here we have the fabric presenting a very different aspect to its former wont. It clashes with our notions of the transcendent earnestness, soberness, and piety of the divines of the Commonwealth, however, to read of their treatment of works of art. It is impossible to admire Sir Robert Harley for taking down the crosses of Queen Eleanor at Charing and Cheapside (and yet this might have been necessary), or for destroying the monument of Edward VI, by Torrignano, in the abbey; or Withere, the poet, trailing about the town with the royal robes and regalia, "with a thousand spish and ridiculous actions." The Dean records to their credit that the monuments and fabric received, in this case, but little injury, the ornaments of the church suffering most. In 1645, the dean and chapter were superseded

by commissioners entrusted with the care of the abbey; and seven Presbyterian ministers were appointed to perform a "morning exercise," instead of a "daily service."

Westminster school and the head-masters, being too closely associated with the fortunes of the abbey to be altogether overlooked, occupy some pages. "Dr. Busby was still there to carry the ampulla of the new regalia at Charles II's coronation, and to escort the king round Dean-yard, hat on head, lest the boys should else think there was any greater man in the world than himself." During the great Plague the school was removed to Obiswick, where, on the walls of the house occupied by Mr. Berry and his celebrated daughters, only the other day, were to be seen the names of some of Busby's pupils; Montagne and Dryden among the number. The elms in the field adjacent to this house are said to have been planted by Dean Goodman, of whom we have spoken before, in whose period of office this sanatorium was secured. At the Great Fire the scholars were marched to the conflagration, and assisted for hours in carrying water from the neighbourhood of St. Dunstan's-in-the-East.

The revolutions of taste, in their effect upon the abbey, afford a most curious study. We know how monumental effigies were at first recumbent, then partly raised, then kneeling, and finally erect. In the beginning of the last century the best judges agreed that nothing could be more stupid than laying statues on their backs. We have come back again whence our ancestors started in this particular. The Confessor's chapel, once looked upon as a sacred spot, became the play-ground of the Westminster scholars, who were allowed to skip from tomb to tomb. Where William the Conqueror trembled, and kings and queens wept over each other's last resting-places, these young "bloods" disported themselves. Then there was a time when the scenes of the Westminster play were kept in the triforium, and a thoroughfare was set up from the Poets' corner to the western door; when, in fine, nearly every sentiment that once prevailed with regard to the sanctity, beauty, and venerableness of the fabric was erased. In the care and solicitude which it now enjoys we have come round again; in a second instance, to the starting-place of our predecessors—who laboured, and into whose labours we have entered. Our author gives many more examples of this revolution as reflected in the history of the abbey. Into the reverence of the institution he does not enter. The many gifts and grants, and the circumstances under which they were made, would have made another pleasant section.

The Dean's melodious diction dwells on the ear after his hook is laid aside; just as we carry away from the majestic pile itself a sense of lingering echoes long after its portals have closed behind us.

PROFESSOR G. G. SCOTT ON EARLY ARCHITECTURE IN GREAT BRITAIN.*

ACCORDING to Mr. Petit and Mr. Fergusson, the Norman is rather an early stage of Gothic than strictly Romanesque; and, though this may be said to be rather a question of nomenclature than of distinctive principle, I am inclined to think there is much real truth in it. I would rather, however, put it thus: that, among the many branches of the great Romanesque tree, this was one,—as the Anglo-Saxon was not one,—of those which contained the intrinsic elements of the future Gothic style. I gave my reasons, in one of my earlier lectures (while not desiring a change of nomenclature), for holding the completed round-arch style to be, in a certain sense, one with the earlier-pointed, and for rather favouring Mr. Fergusson's custom of calling them respectively round-arched and pointed-arched Gothic. It is better, however, in an historical sketch, to view each phase on its own bearing, and not to judge of it by anticipation of its subsequent results.

Norman architecture, then, judging of it from its principles, and throwing aside imperfections resulting from its development occurring in comparatively rude times, may, in the first place, be said to be an almost perfect carrying out into a style of art the arcuated system of construction; using, also, the simplest and most obvious form of arch, the semicircle. Roman buildings, when divested,—as in the case of aqueducts,—of Grecian or traileated accompaniments, displayed

often a perfect system of arched construction; but, in such works, one cannot say that it had been developed into a style of art.

To effect this, both the arch and its supports and accompaniments must be moulded into artistic elements; their natural crumpledness softened; their mere normal character relieved; and each part subjected to a system of decoration suited to its proper character and conditions. The parts, too, which have been thus dealt with, must be studied as to their grouping. They must not be viewed as isolated objects, but as parts of an architectural work; each contributing to the beauty and consistency of the whole; and that also, by such combinations as are dictated by the varied suggestions arising from the purposes and demands of the buildings of which they form parts.

All this required time; and the length of time was, no doubt, increased by the rudeness of the ages during which the process had been going on.

Among the earliest approaches to so reasonable a result, the Lombard style had taken, perhaps, the lead in Western Europe; and, during the days when the three Othos governed Northern Italy as well as Germany, the good seed had spread from Lombardy into Germany, and it there grew into an almost perfect development.

Somewhat similarly, a well-considered development seems to have originated in central France, and spread towards the north. Probably these two varieties may have come in contact, and in some degree influenced each other; for the early Norman architects, though mainly developing upon French models, appear to have been acquainted with those of the Rhine. However this may be, it is certain that they developed for themselves a variety of Romanesque at once eminently reasonable and susceptible of highly artistic treatment and combinations.

The elements of such a style are often not, as taken singly, peculiar to itself, but may be found in other and in earlier works: it is the aggregation of many such elements, and their judicious and artistic utilization that constitutes the merits of a style.

Among the most important of these may be placed the subordination of arches, by means of which, instead of going square through the thickness of a wall, they recede in orders or arched ruins, each narrower than that above it, so as to give the entire arch or section of alternate salient and receding angles. This is the primary element; and it at once produces the second,—the breaking of the section of the bearing pier into a similar form to that of the arch. This, in the Anglo-Saxon style, was hardly known; while in the Norman it is the key-note.

At St. Alban's, where the unmanageable nature of the material,—the Roman brick,—rendering finished architecture unattainable, we find these two principles supplying all architectural requirements, and producing results certainly rude, but not unpleasing in their effect. This building is often said to partake of "Saxon" character. I think the very reverse of this; for the one thing to which it trusts for effect is that which scarcely exists in Anglo-Saxon buildings, while it is the leading principle in Norman ones. This error is the natural result of looking to rudeness of workmanship and homeliness of material, instead of the principles of design, as the evidences of early style.

The next principle is merely the resultant of those already named. It is the decoration by mouldings of the salient divisions of the arch and the substitution of decorative shafts for those of the pier.

These principles do not necessarily accompany one another. An arch-order may be moulded or otherwise decorated, while the corresponding pier-order may remain square, the two being parted by an impost; or the decorations of the arch may, without the intervening impost, be continued through the pier; or, again, a shaft may be substituted for the pier-order, while the arch-order remains plain. The above principles, thus variable in their application, supply the most marked features in the perfected Romanesque style, nor can any arched architecture be perfect without them. To illustrate their effects let us take a doorway of the older English period, and contrast it with a Norman doorway.

The Anglo-Saxon doorway would, in all probability, be an arched opening straight through the wall, the door hanging against the inner fence. It may or may not be relieved by a pilaster strip on either side, and an impost to

* See pp. 70, 80, and 108, ante.

rown the pier, leaving it still a very primitive and inartistic composition, with the door itself dealt with as if it had been forgotten and no provision made for it. We will suppose the Norman doorway to be of the same width and height with the Saxon one. Its reveal, to begin with, is reduced to perhaps one-fifth of the thickness of the wall, and the door itself placed at such a distance from the exterior as the architectural grade aimed at may dictate, and this distance is divided into so many orders or recesses (each some 8 or 10 inches in depth in a moderate doorway) as may be preferred. These arched ribs or orders may be either left plain or may be moulded, or otherwise decorated at pleasure. The jambs of such a doorway may be treated in several different ways. The simplest is to make the jambs continuous with the arch, with or without the interposition of an impost. A second mode is to substitute a shaft or decorative column, for one or all of the orders, excepting, generally, that with which the door itself comes in contact. Add to this an outer or drip moulding to sever the arch from the wall face, and you have the elements of a really well-considered and artistic doorway. Internally, the remaining thickness of the wall is arched in another order (either square or sloping), which has to spring at a higher level to avoid the catching against it of the door while opening.

A doorway thus constructed may be clothed with what decorations you think good; and, if you are working in the Pointed style, the principle applies just as well as in Norman; indeed, we have here the principles of nearly all good doorways, whether Romanesque or Gothic.

I have already described the application of the principle to an archway, which in its elementary form is merely the outer jamb of a doorway repeated on both sides of the wall. A shaft or demi-shaft may be substituted for the central order, or, if the wall be a little thicker, this shaft may be doubled; or, if thicker still, there may be three orders, or other obvious combinations may be made, rendering the archway, instead of a mere crude opening, an artistic composition, though trusting for its effect to a perfectly reasonable constructive system.

I will now suppose two such openings brought so closely together as to leave only a short space of wall between. We have then two systems of recesses brought into close contact, making a pier of comparatively slight form such as those at St. Alban's; or, if shafted, we at once obtain the great feature of Gothic architecture, the clustered pier.

In cases where it was preferred to support the adjoining springings of two arches upon a single column, though the arch was sometimes left undivided, the same system of sub-orders was more usual. If the abacus remained square, its angles, being unoccupied, would present a clumsy appearance. This led to the breaking of the capital into orders, though resting upon a single shaft, or the abacus was made round or octagonal.

Such a column as this often alternated between two clustered piers, making an extremely agreeable group.

The developments I have described, so logical in their motive that one fancies that one might have originated them all by a mere process of inductive reasoning, supply nine-tenths of all the elements of the perfected Romanesque style.

Extend, now, the same principles to a vaulted space which we have hitherto applied only to an arched wall, and we gain another great instalment of the elements of the style by a simple process of reasoning.

The normal form of groined or intersecting vaulting,—the simplest manner in which a large space may be arched over in moderate spans,—is, by the two or more intersecting vaults, springing directly from a square pier. Now, this is not only inartistic, but is bad in construction. The line of intersection is necessarily weak, and requires aid to make it perfect in construction; and this can only be given it in the form of increased thickness, which is at once obtained by altering the form of the pier from a square to a cross form, and applying to the vault the same principle of divided orders as we have done before to arches; only that, in this case the upper order is a vault, and the lower one only an arched rib coming in to aid the vault. The groined vault is thus divided into compartments, and beauty and strength at once provided for. This elementary form may be decorated in a multitude of ways.

The mere addition of an impost and a base to the pier does much to relieve its plainness. We may, however, as in the case of arches, substi-

tute shafts for the divisions of the pier, or double shafts where the ribs are wide; or we may, instead of amplifying the forms of the pier, concentrate it to a column, from whose capital the ribs spring, as we have already seen in case of the double arch.

When groining springs from a wall, nearly the same system applies, excepting only that one division only of the pier is needed instead of all four. Thus the simplest provision is a mere projecting pilaster, carrying the cross ribs, the wall itself taking the place of the lateral ones. This pilaster may be converted into a shaft or a double shaft, or the rib may be amplified by a central semi-roll moulding, and the whole carried by a triple shaft or other combinations, or a corbel substituted for the pilaster or group of shafts. Thus we have vaulting reduced to a principle which, however plain, is at once artistic and constructionally good, and is susceptible of all degrees of ornamentation.

What I have said of doors applies equally to windows, subject to some modifications arising from their practical requirements. The simplest form of an arched opening, going square through the wall, is eminently unsuited to a window; and this is so obvious that it has rarely been used at any period, for the square edges of a thick wall evidently prevent the light from diffusing itself in the interior.

The most favourable forms are those in which the jambs are sloped, either directly from the exterior inwards, or from some intermediate point, both inwards and outwards, so as to give the freest scope for the rays of light. In this respect I have nothing to say against the forms customary in the previous style.

The Norman windows are of great variety. The simplest, which are prevalent in very homely buildings (as may be seen in many extremely humble churches on the cliff between Dover and Deal), is an opening with no external recess, but splaying at some 45 degrees inward, the glass being flush with the exterior. From this we have every variety of architectural grade: first, a chamfer or moulding added to the exterior; then, two orders, plain or moulded; or a shaft may be substituted for the outer order in the jamb, or the same repeated, as in doorways. Internally, the thickness of the walls continues to be played so as to diffuse the light, though in buildings of a high architectural class, mouldings or divided orders (with or without shafts) may enrich the inner angle, or may even take the place of the splay altogether.

In domestic windows two or more openings are often used externally, divided by a little column, the whole being internally united into a single opening. These are sometimes comprised on the exterior under a single arch to increase the architectural effect. The same is also used for bellies and other positions where use dictates it.

I have now shown you that doors, windows, archways, arcades, and vaulting were generated, as to their architectural treatment, simply by the exercise of logical reasoning.

In the general treatment of the exterior of a building the same prevailed. The walls, being thick, needed little buttressing, and this little was supplied, and the flatness of the walls at the same time relieved, by a sort of pilaster or slightly projecting pier placed at reasonable intervals, which were united under the eaves, in many cases, by a row of corbels. The walls were further relieved by projecting base-courses, and string-courses under the window niches or elsewhere; and, in buildings of a higher class, by decorative arcading or other methods of raising its architectural character.

In all the foregoing particulars, it will be observed that I have stated nothing but what could be arrived at by simple and almost abstract reasoning, almost apart from anything which, strictly speaking, belongs to style of art. The results, indeed, apply equally to all the more perfect varieties of Romanesque, and follow from the mere thinking out of the subject; and if we desired to strike out some new variety of arcuated architecture, we could not do better than to start from a point thus logically arrived at. To say that these are the leading characteristics of the Norman style, is saying at once too much and too little; for none of these characteristics would distinguish it from the Romanesque of Central France or Germany, which possess them equally with the Norman, while the latter certainly does possess features which would so distinguish it. These consist, however, for the most part, in the decorative details, and in the general composition of the

buildings, but more particularly the latter; for, if the Rhensish, Central French, and Norman buildings were to exchange details, their composition would still distinguish them at a single glance, and each would be appropriated to its respective district in spite of any doubt about its details. The essential and logically derived elements are the same in all; the details, though united by a common bond of sentiment and feeling, differ in a certain degree,—while the customary forms of composition, though by no means contradictory, still differ so much as to leave no doubt about their being three, though evidently sister styles, or, rather, local varieties of the same great style.

Two very important features which Norman possesses, in common with other varieties of Romanesque, are, first, that, when a column is used for bearing weight, its diameter is made proportionate rather to its load than to its height; and, secondly, that columns are used also in a purely decorative capacity, and their diameter, in that case, is simply such as is best proportioned to their position; and most usually to the size of the arch order they have, apparently, or really, to carry.

We will now go into minor details. The first purely decorative feature which we may imagine to have been introduced,—if the logical scheme I have been supposing had been strictly followed out,—would be the base-course of a wall, the impost to sever the pier from the arch, and the drip, or label, to draw the line between the arch and the wall. These mouldings in their elementary forms are alike. In Anglo-Saxon they were usually square courses; in Norman their simple form is the same with the angle cut off.

This form for the impost and the label was adopted, also, very unusually, for string-courses; but, in all positions, it was soon relieved by additional forms, as the quirk, the quirk and hollow, and the round and hollow, or the cyma. The primary idea of a capital to a decorative shaft is that of a capital block over which the impost returns. It is, in fact, the upper course of the square portion of the pier for which the shaft has been substituted, or out of the substance of which it is cut.

The object, therefore, to be kept in view in designing the capital, is to devise the best method or methods of bringing about a transition from the cylindrical shaft to the square impost or abacus. The simplest form used in Early Norman work is little more than the mathematical solution of the problem, which would be the frustum of an inverted cone, intersected by the faces of the abacus.

The elliptical sections thus generated being unsightly, they would soon be converted into semicircles; and as these will not fit themselves to the true cone, a group of portions of conoids is generated, meeting in an indented angle, such as we always find in these capitals, excepting in the very earliest. At no period, however, were the reminiscences of the Corinthian capital wholly ignored; and we accordingly, even in the earliest examples (and perhaps as frequently in them as in later ones) find a rude imitation of its form. At other times we find the block covered with carved scroll-work; and at others, again, the extreme simplicity is obtained by a mere portion of a cone or a simple moulding intervening between the shaft and the abacus, as in the Confessor's buildings at Westminster, and in the crypt at Winchester. The bases consisted usually of a moulding following the curve of the shaft, and resting upon a square plinth, beneath which was a sub-base. The mouldings of the base were very various: they seem to have been suggested by the varieties of the Roman base; but they often take other forms, as in the Confessor's work at Westminster, where we have a mere splay and a double hollow. The orders of arches were sometimes relieved by being cut into large rolls; or the lower order in arcways had a massive demitroll attached to it. The roll was soon accompanied by a hollow, and these varieties almost exhaust the list of mouldings in the earlier examples, though we shall see that they subsequently increased into great multiplicity and beauty. Mouldings became, moreover, at an early date enriched. Thus we find the chamfers of a string or label relieved with the billet or short piece of roll left projecting from them at intervals. These chamfers are also enriched with chevrons of slight depth such as masons sometimes impress in mortar with the point of their trowel. These simple ornaments, as we shall presently see, soon increased into endless variety.

The figure-sculpture of the period was of extreme uncountness; often so much so as to be nearly unintelligible, though rapidly improving as the style advanced. The tympana of the doorways (which were sometimes filled in to the square, and sometimes to a low segmental arch line) were often filled with sculpture in slight relief. Heads were used as corbels (placed in a hollow moulding), and such rude art was introduced in other positions as might suggest it.

Soon it became frequent to relieve plain surfaces—whether to arch, orders, or elsewhere— with ornaments in very slight relief usually known as "surface ornaments," which had the advantage of imparting decoration without disturbing essential forms. Of this, however, we shall see abundance as we proceed.

Having now traced out, by a system of rational induction, the essential elements of the style, we will proceed to some of the varieties of combination.

Let us take, in the first instance, a portion of the nave or choir of a church.

If this be unvaulted and unvaulted, it is a very simple affair. Windows at a reasonable height, dealt with agreeably to the architectural grade of the building—probably a base-course, a string beneath the eills, and possibly pilaster buttresses between the windows, and a corbel-table uniting the same under the eaves.

If vaulted with a wagon-vault (as, for instance, St. Corneille's Chapel, at Cashel), the walls must be higher, and, it may be, the dead space which this occasions externally may be decorated by arcading. If, however, it is groined, the difficulty disappears.

Again, an aisled but unvaulted nave is of simple construction, but if the aisle be vaulted (unless, indeed, it be a mere demi-vault, which in this country is very rare), a greater complication is brought into existence. The groining requires that the aisle wall shall be fully as high as the crown of the arches between the aisles and the nave; and, as the aisle roof demands some reasonable height, it follows that there must be a considerable space of wall above the arches. This may be dealt with in several ways. If the nave be unvaulted, it is a blank space, or may be pierced by an arcade or other openings. If the nave is groined without a clearstory, the space is partly occupied by the springers of the vaulting, and the intervals may be pierced. If there is a clearstory, the space becomes what we call (though erroneously), a triforium; or (whether there be a clearstory or not), it may be made more of and utilized by raising the aisle walls sufficiently to convert it into a second story or gallery to the aisle.

We possess a most complete instance of such an arrangement (though without a clearstory), in the chapel of the Tower of London, where this space is made a gallery, covered with a wagon-vault, and opens by a second tier of arches into the nave, which is itself covered by a similar vault. Had clearstory windows been in this case denied, the only change requisite would have been to groin the central space and the gallery, instead of giving them plain vaults, and we should then, with a triple more height, have had a model, on a small scale, of the perfected arrangement of a vaulted and aisled church. Most, however, of our Norman churches in England are imperfect in two particulars as compared with this ideal. They have no groining to the central space, nor any vaulting to the gallery over the aisle. Several, as Durham and Lindisfarne, had the former, and Gloucester, and perhaps Tewkesbury, the latter; but I know of no existing church in England, nor of any perhaps of very early date, even in Normandy, which has both. The tower-chapel is the nearest approach; and, strange to say, the pre-conquest example at Westminster appears (if I read the description aright) to have had all these features complete, the central space being vaulted, and the aisle also vaulted in two stories. Such was often the case in central France, even at an early date, as we see in the Church of St. Stephen at Nevers, erected about 1063, where we find groined aisles, aisle-galleries with the demi-vault, a clearstory, and above it a wagon-vault to the nave.

The churches at Notre Dame du Port at Clermont, Issoire, and some others of about the same date in Auvergne, are one point less complete, having all the features I have enumerated, excepting only the clearstory: nor do I know that there is any specimen so complete and of early date in Normandy, so that King Edward's church seems to have gone ahead of its types in

Normandy, and its model not to have been reached by its successors in England.

Those principles of combination being attained, it was easy to carry them out into a complete building.

A nave, such as I have described, may be either continued, with the intervention of a chancel arch, into the choir, and terminated by an apse; or two such ranges of buildings may be made to intersect, the crossing space being surmounted by a central tower, supported on four lofty arches and by massive piers. The east end would usually be terminated by an apse; the cross building, or transept, by gables; and the nave, perhaps, by a gable flanked by two towers, which terminated its aisles, or projected beyond them. Transepts may have two aisles, as at Winchester and Ely; one, as at Durham and Peterborough; or none, as at Canterbury and Norwich. In the latter case, apsidal chapels would probably project from its eastern face; and, if the choir aisle runs round the apse, similar chapels may open out of it.

This gives us the complete mechanical ideal of a great Norman church, though numerous are the varieties which it is capable of assuming.

I have occupied your time so long in my elementary investigation of the style that I must defer till my next lecture any attempt to describe its actual productions.

I will only now say that the vast scale and the endless number of the architectural works undertaken, and, in most cases carried out to completion by the early Norman builders, is such as to fill the mind with astonishment, when we contemplate them. Nearly every cathedral and great abbey was rebuilt on a stupendous scale; new cathedrals and new abbeys founded; and churches of all grades from these vast temples down to the smallest village church erected throughout the length and breadth of the country; while castles of the most portentous magnitude and prodigious solidity rose in all directions: the one class of building appearing to propitiate the divine aid, and the other to defy human opposition, as if the kingdoms both of heaven and earth were to "suffer violence" and "the violent to take them by force."

Few periods, probably, in the world's history have been marked by the construction of buildings more multitudinous and more vast. Their architecture, as Mr. Freeman remarks, "majestic and awful rather than beautiful, no style is more truly religious or more inhaled with the spirit and position of the church" (and one may add of the state) "in its own day," nor has any age "produced structures whose number, size, splendour, and richness bear more honourable testimony to the zeal and bounty of their founders."

THE ARCHITECT OF THE HOUSES OF PARLIAMENT.

We claim the power of stating, of our own knowledge, that the late Sir Charles Barry was the architect of the Houses of Parliament,—an architect, distributions-architect, constructions-architect,—one and indivisible; and in compliance with the earnest personal request of the late Augustus Welby Pugin we feel ourselves bound again to state, that the latter did nothing whatever on his own responsibility at the Houses of Parliament; that his occupation was to assist in carrying out Barry's own designs and views in all respects, everything being submitted to be approved or altered by him; and that any assertions that exaggerated the nature of Pugin's employment under Barry caused Pugin the greatest pain and annoyance.

We mention the two pamphlets on the subject, recently published,* merely that such of our readers as are curious may know that all that has been said on both sides is now obtainable in a convenient form.

Dr. Barry has well brought together such facts of the case as he could command, and, as it seems to us, has made the truth clear.

The apparently strong points in Mr. E. Pugin's statement are certain extracts from a diary for 1835, wherein appear: "April 28. Begon Mr. Barry's drawings." "May 10th. Saw Mr. Barry;" and so on; and the assertion that Barry

* * * Who was the Art-Architect of the Houses of Parliament. A Statement of Facts, founded on the Letters of Sir Charles Barry and the Diaries of Augustus W. Pugin. By E. W. Pugin. London: Longman, Green, & Co. 1867. "The Architect of the New Palace of Westminster. A Reply to a Pamphlet, &c. By Alfred Barry, D.D." London: John Murray. 1868.

paid Pugin a sum of 400 guineas, which must have been for the original design.

This is what Dr. Barry says, in part, as to Mr. E. Pugin's references to the diary:—

"In his first letter he referred to the entries in that diary for 1836, apparently forgetting that the competition drawings were sent in on December 1st, 1835, and that these references were therefore simply absurd! He has since found out his error; he has corrected it without acknowledgment, and now gives a long series of extracts from the diary for 1835. But this leads him to a greater difficulty still; for he asserts that Mr. A. W. Pugin 'began working on the Parliament House drawings for Mr. Barry on the 15th of May,' when it is well known that the conditions of the competition were not announced till the end of July. . . .

What is the explanation of these extraordinary errors? When we examine the quotations from the diary given on p. 15 of his pamphlet, we find (it is true) many entries of 'drawings for Mr. Barry,' but no word about the Parliament House in connexion with them. The fact is that they were drawings of fittings and furniture for the Birmingham Grammar School. Thus Mr. E. W. Pugin might have known, had he compared dates; but it is proved to demonstration by a comparison of my father's diary with Mr. Pugin's.

Thus in the latter we read—April 28th, 'Began Mr. Barry's drawings,' May 8th, 'Left Sarum,' May 16th, 'Saw Mr. Barry.' In the former I find—May 9th, 'Birmingham School, Mr. Pugin here with drawings of furniture.'

Again, in Mr. Pugin's diary I find—May 15th, 'Began Mr. Barry's work,' May 20th, 'Saw Mr. Barry's drawings.' My father's diary says—May 21st, 'Birmingham School, received drawings from Pugin.'

But the most curious point, and one which Mr. E. W. Pugin ought to have understood, is this. In Mr. Pugin's diary I find—September 2nd, 'Saw Mr. Barry's drawings of dining-room to Mr. Barry.' Now, what could the 'dining-room' have been in a general design for the New Houses of Parliament? Turn to my father's diary, and we find—September 24th, 'Arrived at Salisbury from Bowood at half-past four. Mr. Pugin at the White Hart to receive my directions as to designs for the furnishing of Dr. Jeune's house' (at the Birmingham school)."

It appears by Mr. Pugin's diary that Mr. Talbot Bury was engaged from September 11th to October 3rd on Mr. Gillespie Graham's drawings, and Mr. Bury expressly testifies that Mr. Pugin was at work at that very time on drawings for the Birmingham School. "This evidence, coming from a perfectly independent source, proves still more clearly the truth, which might be inferred from the diaries."

As to the asserted payment to Pugin of the sum of 400 guineas, Dr. Barry writes:—

"In our first letters we allowed this to pass, because all my father's cheque-books of that date had been lost, and in consequence of the subsequent failure of his bankers, Messrs. Cockburn, we were unable to ascertain the truth by the banking records. But Mr. T. Bury, speaking from memory, doubted the fact of the payment, and a subsequent discovery of the counterfoils of the cheque-books (in the course of the rigorous search instituted in consequence of Mr. E. W. Pugin's demand of the letters said to have been lent to my father) has confirmed the doubt. In 1835, Mr. Pugin's name does not occur at all. In 1836, I find the following payments—Feb. 10th, 105l.; June 22nd, 60l.; Dec. 19th, 154l. 18s., amounting not to 400 guineas, but to 1834l. 18s., and of this I do not feel sure that some did not belong to the Birmingham Grammar School. In 1837, payments were made to the amount of 1100l., and in 1838 there is a payment of 1200l. 'in full.' It is clear that these subsequent payments were for the assistance given in working out the drawings for the estimate, and no one can think them excessive for a first-class draughtsman. At that time Mr. A. W. Pugin was a young man of twenty-three, known as a man of ability and great knowledge of Gothic detail, but not as the designer of any great building. His time (I have reason to believe) was reckoned and paid for by the day, and such payment was a matter of some consequence to him. The whole theory, which Mr. E. W. Pugin has built up, is coloured by a remembrance of the position which his father afterwards occupied, and is not in the slightest degree based on fact."

It would be difficult to maintain the assertion that Mr. A. W. Pugin "was the sole architect of the Houses of Parliament" (p. 55), even with those who know nothing of the matter themselves, in face of the often-quoted letter addressed to the conductor of this Journal by Pugin. Mr. Edward Pugin, therefore, devotes a portion of his pamphlet to show that the letter was forced from his father; that Pugin returned to Ramsgate after writing it in a frightful state of prostration; and that he told his son afterwards, "Barry said, I must write it, and, if I had it, the whole thing must have been given up—the Houses would have been ruined and Barry's reputation gone."

What were the facts, as shown by some further letters of Pugin's, recently found? Why, that the proposition came from Pugin himself two months before the letter was actually sent to the Builder. Here is what Pugin wrote some time before June 12th, 1845:—

"Morning Steamer, Saturday.
"My dear Mr. Barry,—Since I saw you last night, I have been informed that some most exaggerated statements respecting the nature of my employment at the Palace of Westminster have appeared in one of the papers. I need not tell you how distressed and annoyed I feel at it, for I have always been most careful to prevent any misconception on this head. I have most distinctly stated that I was engaged by you and for you to carry out into practical execution the minor details of the decorations

* * * The italics here are in the original."

according to your designs, that I did nothing *whatever* on my own responsibility, that everything was submitted to be approved or altered by you; that in fine, my occupation was simply to carry out your views in the practical execution of the internal detail. I can assure you, I wish to serve you in this work with the greatest fidelity; no one else can better appreciate your skill and judgment than myself, and no man has ever borne more sincerely and willingly testimony to them than myself. Now, if you think right, I will make a formal denial of these statements to put an end to all nonsense. I have no objection, but Mr. Crace told me that one of your clerks had mentioned it to him; it will therefore be easy to know when and where it appeared, and I really think it would be as well to state the real state of the case. I will send you my contradiction for your approval. I am sure you know me too well to imagine that such statements would give me any thing but great pain and annoyance; but I should like at once to disabuse the public, and let them know the true nature of my employment at the Palace. Pray let me hear from you about this."

Then comes the following, with the postmark of Ramsgate, June 12, 1845:—

"My dear Mr. Barry,—I enclose you what I think will be a sufficient contradiction, and being short and simply worded is more likely to succeed in your hands."

2. I have at last succeeded to my entire satisfaction in the enamel colouring of the armorial plates; the enamel is now sunk below the surface in hollows, and the effect is very rich and good. You will soon have a perfect panel up. I think we shall do this time.

Ever yours, most sincerely,
WALTER PUGIN.

"The *Builder* has now a rather extended circulation [1845], and amongst that class of people whom you would not wish to be wrongly informed on the subject. But I leave the matter entirely in your hands."

[Enclosure.]

"Sir,—My attention having been drawn to an erroneous paragraph which appeared in your journal, relative to the nature of my employment at the New Palace at Westminster, I take an early opportunity of stating that I am not engaged in any work connected with that building on my own responsibility, but am simply superintending the practical execution of the internal details and decorations of Mr. Barry's design. Nothing is done without his entire knowledge and approval, nor is anything put into execution that has not been previously arranged and designed by himself.

I remain, Sir, your obedient servant,
To the Editor of THE BUILDER.

It will be seen, by the first letter, that the notion of denial arose in Mr. Pugin's own mind, without any communication with Mr. Barry; that Pugin himself suggested taking some public steps, and offered to send for approval a formal contradiction. "It will be seen, by the second letter," says Dr. Barry, "that Mr. A. W. Pugin actually does (what Mr. E. W. Pugin suggests that he would have done, were our statements true) write himself a plain straightforward letter, absolutely denying the truth of the report." I presume that my father did not at this time accept the offer so unhesitatingly made. Subsequently, on the revival of the report, the letter of Sept. 6th, 1845, was written,—differing from Mr. A. W. Pugin's own proposed form only in stating more emphatically what Mr. Pugin did actually do, and being certainly less treacherous and emphatic. I do not know whether any impartial person ever has accepted Mr. E. W. Pugin's theory as to the letter; but, if so, his acceptance will hardly survive the comparison of the private and public documents."

Mr. Edward Pugin maintains, further, that in writing his letter to the *Builder* his father did not deny that he "was the author of the original designs for the Houses of Parliament." Of course he did not: because no one had said that he was. And read what Pugin wrote in a letter endorsed by Barry "16th June, 1844:—

"I got your letter at Nottingham. I am sure I can never do you real service except in absolute detail; you should fully make up your mind as to every arrangement and then turn the small work over to me. It is next to impossible for me to design any abstract portion of a great whole in the same spirit as you have conceived the rest, and I know it is only a waste of time in me to attempt it."

"I can do you far more service by adopting the best examples and getting them carried out in execution than by making a lot of drawings which could never be worked from. Remember, I never made a drawing which was of any real use to you, and it is a very useful way of time to me, necessarily occupied as I am with church work, to attempt it. As I said before, I can do you no good except in actual detail, and in that more by ferreting out the fine things that exist than composing new ones. I expect to be in town by Tuesday, and will come over to you immediately; that is, if I am strong enough to travel.

Ever yours most sincerely,
A. WILBY PUGIN."

A body of evidence is given by Dr. Barry to show how correctly Pugin had set forth his real position. Mr. J. L. Wolfe, the constant friend of Barry, his "familiar" as he was called, who knew not merely what he did, but what he thought, says distinctly:—

"Soon after our return home [from Belgium] Barry sent a copy of the instructions issued by the Commissioners of Works, &c. for my consideration; and then, after several preliminary discussions with me, and in my presence, he made the first sketches which comprehended the entire design and contained the germs of all that followed.

Long before Barry sought Pugin's assistance, the entire

design had been not only worked out in his own mind, but committed to paper in a series of plans, elevations, and sections, all drawn by his own hand, in his well-known and admired style of pencilling. These drawings, though on a small scale, were so minute, intelligible, and expressive, that any able assistant could, under Barry's eye, have worked out the details.

In general character the elevations differed little from less ornate; indeed, those of New Palace-yard were in harmony with the entrance front of Westminster Hall. I had thus ample means of observing the progress of Barry's design in the great work he had in hand, it will not be thought surprising that I can now, after the lapse of so many years, make the present statement with confidence."

Mr. B. Ferrey, Mr. Talbot Bury, and Mr. C. J. Richardson, testify, as we have done, to the indignation denied by Pugin of the report that he was the author of the building; and Messrs. R. R. Banks, C. Barry, E. M. Barry, E. C. Pressland, John Gibson, G. Somers Clarke, W. H. Brakspear, G. Penrose Kennedy, W. Wright, F. H. Groves, T. Grisell, Thos. Quarm, R. Layton, J. Birnie Philip, J. R. Clayton, and Sir S. M. Peto, all engaged upon the work in different capacities, assert emphatically the right of Barry to be considered the architect of the Houses of Parliament, and Barry alone. The public, we have no doubt, will think with them.

MUSEUMS OF INDUSTRY.

PERHAPS Englishmen have never been at any time more unanxious in acknowledging a defective system than at the present moment. Paris has taught us a needed lesson, and proved to us that with all our great natural advantages, wealth, enterprise, and boasted intelligence, we are going into the rear. There are, of course, men to be found who refuse to see the fact in this light, and, hugging the consolation that we are not actually retrograding, think there is not much to grumble about. But at the present epoch coming to a stand-still, or any thing approximating to a stand-still, is a retrogression, and a very serious one. We are all looking anxiously round for the cause of this defect, but the last fifteen years furnish us with no great calamity upon which we can lay the weight of blame. No costly and ambitious wars pulling us back, no plague, no famine; nature has performed her part of the task well, and leaves us with the unpleasant conviction that we have only ourselves to cavil with over our own shortcomings. It is somewhat remarkable that every thinking man who has written or spoken upon this subject unhesitatingly attributes the cause of failure to the unhappy relations existing between capital and labour; indeed, when we reflect upon the trade strikes which have convulsed and unsettled this country for years past we may wonder how the result could come otherwise.

If we are to go forward again with the same strong and robust strides as of yore, this open wound must be healed up, and the gulf between them safely bridged over; one must be made to feel and work with a just interest in the other, they must meet oftener upon neutral ground where these vexatious "questions" cannot enter, and by that means establish a better feeling between them. When this is done, we may safely venture to hope that things will wear another complexion five years hence. With this aim in view, I wish to make a few observations, which, if they bear any value at all, must be received as coming from one whose experience is entirely of a practical nature.

I have no doubt that many besides myself have observed, while mixing intimately with the working men of this country, a certain devil-may-care feeling among them respecting their employer and his property, as if they were conscious of being looked upon by him as no more implements of labour, and of no more consideration to him than his horses or engines, only that intellect had made them a little more dangerous to deal with. Whether there be a just foundation for their harbouring this thought I must leave others to decide; but no one can help lamenting that such a feeling should exist. We all know there is latent in every human heart a certain ambition—a yearning to be recognized—which gives a little honest praise a greater value than gold could ever buy. It is a purely healthy and honest thought, and one which, if properly cultivated, may be made of great good to the cultivator. Such ambitions may be humble, but they are none the less intense; and it would be

well, perhaps, to bear in mind, that the rustic stone on the grave of the cottager is reared by the selfsame feeling as that which in "the morning of the world" built up the mightiest pyramid,—a love and a longing for recognition and remembrance. Surely it would not be difficult, dangerous, or unprofitable to break up this coldness existing between the contending sides? Since it is nothing but natural that a man should wish for a state somewhat higher than a working automaton, it is worth while considering how such a desideratum could be brought about. We have seen lately a great deal of what is called working-men's exhibitions, and, with all their imperfections, they have doubtless done a great amount of good in this country. The inducements they held out have taught many men, for the first time, how much they could do with a little independent, earnest study, and proved to them what a wonderful and fruitful mine the brain is when properly worked. They were certainly a move in the right direction; but unfortunately there are many working men who, from the very nature of their work, are shut out from them altogether.

This is a hitch where the co-operation of the employer is wanted. Happily we have now in every industrial town of any importance a free industrial library, and the corporations of such towns have taken them into their hands, with power to weed them, or add to them as circumstances may require. Then why not in the same centres, and under the same keeping, establish a museum of industry? A hall where the workman, if necessary with the help of his employer, could show his handiwork. No one could be so unreasonable as to ask a machinist to lend an engine for such a purpose; but it would not be a very great sacrifice to lend for a few weeks, or in some cases a few months, some of the component parts of one. A crank fresh from the hammer of some excellent forgerman, a cunning joint from the fitter, a faultless casting, with the names of the workmen attached, together with that of the employer, would be everything desired; or gun implements, heavy steel toys and tools in their various stages of workmanship. Such an exhibition would be of the highest interest to all members of these various trades, though the articles may not be of a nature to charm the ordinary longer. Still there are others who could, under such a system, bring something for even this butterfly to dwell upon; chasers, jewellers, engravers, designers, painters of china, carvers, and countless others in such variety as each town or district could afford. Many such exhibits would of course have to be portions of orders then being executed by each firm; but they would take no more harm in being placed before the public for a few days than in lying aside in the warehouses, and still be giving the workman that justice which many think he is entitled to, a means of having his merit recognised. Such a system would give life and vitality to the museum, and by the constant change of articles prevent that stagnation of which so many things of the kind pine away and die. It would be of great advantage to labour; but would it not benefit capital much more, while it spread a sure and effectual incentive to emulation and improvement, and at the same time engendered a warmer and more reciprocal feeling between the two? Besides this it would form a much needed receptacle for the useful fruits of the intelligent workman's leisure hours, always taking care to exclude those useless and hideous cork models of existing buildings, toy ships in full sail, bank notes in pen and ink, and such like ruins of murdered hours and wasted intellect. Accepting only those contributions wrought in downright earnestness, and aiming at some practical end; allowing no exhibit to remain longer than three months. If a mixed committee of workmen and employers were formed to make a quarterly report upon the town exhibition, giving every meritorious work its meed of praise, it would be a means of placing in the hands of deserving men a recommendatory proof of their excellence, and I trust I am not too sanguine in hoping the time would come when a man would be held in little consideration who did not possess some such proof of his skill. There would also be afforded a means of giving distinction to the different grades of talent, and the formation of first, second, and third class certificates would form a sound basis for the better regulation of payment of wages, and be the means of striking a fatal blow at the present rule of equalised remuneration,—a system the

laid; that 17 new street-lamps have been fixed and lighted; that an increase of 343 public lamps has been supplied; and that 116,994,500 cubic feet of gas had been manufactured during the year 1867, being an increase of eight millions over the year 1866.

The gasworks at Ticebrist have been opened. Mr. Porter, of Lincoln and London, erected the works, at a cost of 1,680*l.*, on a portion of land near the tollgate. The shareholders calculate to receive at the end of the first year interest on their money at the rate of about 7 per cent. The newest and most useful gas apparatus are said to be employed in the erection.

MR. PEABODY'S GIFT TO THE POOR OF LONDON.

THE annual statement of the trustees for the year 1867 shows that the original fund has been increased by rents and interest on unexpended capital to the extent of 20,042*l.* 6*s.* 4*d.*, making the sum total at the end of December, 1867, 170,042*l.* 6*s.* 4*d.* The total population in all the buildings erected by the trustees is 1,583.

The cost of land and buildings at Spitalfields is 27,314*l.* 11*s.* 8*d.*; the gross rents from which for the year amounted to 1,050*l.* 11*s.* 8*d.*, and after deducting 359*l.* 10*s.* 10*d.* for working expenses, insurance, taxes, alterations and repairs, there remains a net return of 690*l.* 12*s.* 10*d.*

At Islington the amount invested in land and buildings is 40,897*l.* 2*s.* 1*d.*, and the gross rents for the year were 1,694*l.* 7*s.* 6*d.*, deducting 699*l.* 13*s.* for working expenses, taxes, insurance, alterations and repairs, there remains a net return of 995*l.* 14*s.* 5*d.*

The investment in land and buildings at Shadwell is 1,828*l.* 13*s.* 5*d.* (the dwellings being but partially occupied), and after deducting 540*l.* 17*s.* 9*d.* for working expenses, insurance, taxes, alterations, improvements, and repairs, there remains a net return of 447*l.* 15*s.* 8*d.*

According to the intention of Mr. Peabody, his second donation of 100,000*l.* will be available for objects of the trust in July, 1869.

Is the gift benefiting "the poor of London?" Well, that will be a very proper subject for inquiry.

THE CONDITION OF THE NEIGHBOURHOOD OF THE SHADWELL PEABODY BUILDINGS.

SIR,—I do not know upon whom lies the blame of the horrible state of the ways about the above four costly structures, whether on the parish of Shadwell, the Limehouse District Board of Works (which includes the parish of Shadwell), or on the Metropolitan Board of Works, but probably upon all three. There is filth of the most disgusting character; in one way, mountains of mud! There are other abominations (as pitched up cowhouses, &c.) by the dozen. It really seems a shame when so many millions are being spent by the Central Board, that this part of London should be left as it is. It would not take a very large sum to make a level road in continuation of Glamis-road, through that vile Sun Tavern gap, to come out exactly opposite the end of Hardings-street. Three very old poor houses, 161, 162, and 163, High-street, Shadwell, would require removing, and at the other end two houses, Nos. 4 and 5, St. James's-terrace. The few intermediate buildings are of no great value, but most of course come down. When a man like Mr. Peabody does such good work the parishes should strive to meet him in goodness. No attempt, however, seems to be made. If the site of the two houses I have named in St. James's-terrace were the line of road, there would be a clear way from Churnington's brewery, Mile-end, to Craneworth's Wapping; that is, if the small block at the top of Hamhall-road, Mile-end, were removed. The present opening from Sun Tavern Gap to St. Mary's Church should be built on, and a new opening made three houses further east. This is a local matter, but yet not local. The question is, shall the neighbourhoods of Mr. Peabody's princely gifts be left as disgraceful as they can be, or shall they not? Seeing a few days since a report for the year 1867 of Mr. Peabody's donations, I went down to see the Shadwell buildings, which cost 45,000*l.*, and I send you the above notes for publication if you think they will do good. A. WARDEN.

ST. MARY'S, ITCHENSTOKE.

THE recently consecrated Church of St. Mary the Virgin, at Ichenstoke, in the valley of the Itchen, about five miles east of Winchester, consists of a narthex, vaulted and roofed with Bath stone, a nave of four compartments, and an apsidal chancel vaulted in stone. The exterior view shows the western façade and the outside of the narthex, with the southern flank, the bell-turret, and a portion of the chancel. The shafts of the western doorway are of red Mansfield, and the capitals of grey Mansfield, as is also the statue of the Good Shepherd in the niche above. The narthex is entered through sliding oak doors, ornamented with iron scroll-work. In fine weather these are pushed back, and a sliding wrought-iron grille drawn out in

their stead, thus ventilating the church, and rendering its interior visible from the churchyard.

The interior of the narthex is divided into three compartments by two transverse arches of two orders. The mouldings of these archways are of the same character as those of the external doorway, and rest on foliated capitals which surmount sixteen polished shafts, alternately of green marble and red serpentine; the vaulting of the central compartment is quadripartite, and the two lateral compartments are tunnel vaulted; the ribs in all three compartments are deeply moulded; round the three sides of each of the lateral compartments runs a stone bench, and between these seats and the vaulting the walls are diapered, the pattern being taken from the spandrels of the nave arches of Westminster Abbey. At each end of the narthex is a cross-shaped opening (shown in the exterior view). These are glazed, with a cross of ruby glass, having a crown above, and with the legend underneath "Christi crux est mei lum."

The nave is entered from the narthex through swing-doors, covered with chocolate baize, and with large plate-glass panels. These doors open both ways, or are folded back and secured within the thickness of the western wall. The interior corresponds in richness with the porch. The western façade of the interior is framed, so to speak, in the arched roofing rib glowing with gold and colour of the half-principal against it, which arched roofing rib is supported, like all the others in the nave, by shafts extending from the roof to the pavement. This arch encloses the rose window, which is shown in the exterior view. This is filled with thirteenth-century stained glass,—a memorial to the late Lord Ashburton, and the gift of his widow. Below the window is an arcade, supported by shafts of polished Sicilian marble, intended to contain monumental inscriptions.

The two spandrels between the rose window and the string-course above the arcading is enriched by rosettes, each consisting of a large central boss of emerald glass cut into facets on the back, surrounded by eight pear-shaped bosses of ruby and emerald glass alternately, the whole set in a frame of stone carved and gilt. These carry down and balance the colour of the rose window. Beneath this arcade is a larger one of five openings, of which the central and largest encloses the doorway. All the plain portions of the western wall and of the side walls are diapered like the narthex.

The nave consists of four compartments; the greater portion of one of these is shown on the left-hand of the interior view. Each compartment contains three similar lancet lights. Beneath these, and above the seats, the wall surface of each compartment contains three panels of diaper, enclosed in glazed tile borders, designed for the purpose. The character of the roof is seen in the interior view. All the principals correspond with the half-principal shown above the chancel arch. The arched ribs of the roof rest on roofing shafts carried down to the pavement: the ribs are 8 in. thick.

From the portion of one of them as shown comparatively near to the eye, in the upper left-hand corner of the engraving, it will be seen that its profile consists of three filleted rolls, separated by deep hollows, the latter filled in with "pellets." The vaulting ribs are of the same profile and width, but with greater depth.

The ground of the panels is the natural tint of the material (yellow pine), varnished but unstained. The principals are similarly treated, but having been exposed to the weather for some time before the building was covered in, are of a darker tint.

The five-leaved flowers with which the panels are "sown," are purple, with white eyes and margin, the latter carried between the leaves, and all round them. The colouring of the rolls and hollows, of the moulded stiles, separating the panels, and also those of the ridges and cornices, and of the ribs, is from the old Cathedral of Carcassonne (St. Nazare), a good example of the thirteenth century coloured decoration.

The fillets of the rolls of the arched ribs and of the ridge are gilt. The pellets with which the hollow between them is decorated are formed of spheres of pale yellow glass (blown with cylindrical slanks for fastening into the ribs), with metallic silver precipitated in their interior. These pellets are, therefore, golden, and have a lustre very valuable in ornaments thus situated in a hollow, which lustre, however, does no more than bring them up to the tone of the

gilt fillets of the rolls, between which they are placed. The chancel arch fills up the whole width of the nave, and its springing is at the same level as that of the arch-rib ribs with which it is also concentric. All the windows, both of nave and chancel, spring from the same level: the more prominent fillets of the moulding of the chancel arch are also gilt.

The organ and choir are accommodated in the easternmost compartment of the nave, which thus serves as a chorus cantorum.

The sacristy is circular in plan: its pavement is a reproduction, with slight modifications, in glazed green and chocolate tiles, of one of the concentric labyrinths (called Heavenly Jerusalem) which so frequently occur in the pavements of the early French cathedrals.

The arrangement of the apse is fully shown in the engraving. It will be seen that the capitals of its vaulting-shafts are on the same level as those of its window mullions, as in the apsidal chapels of the cathedrals of Beauvais and Trèves. The fillets and pellets in the vaulting ribs are gilt, and the foliage of the bosses, &c., picked out with gilding, as also the most prominent fillets of the chancel-arch mouldings.

The five windows of the chancel are filled with stained glass copied from Mans and Auxerre. Beneath the windows is an arcade of three openings in each of the five bays. The three under the central window form the pinnacles, and are filled up with glass mosaic by Powell. The remaining twelve form sedilia, encircling the apse as in the early basilicas. These sedilia are backed by slabs of polished marble. The shafts are of Californian marble,—a new and beautiful material diaphanous, and resembling the so-called Algerian agate.

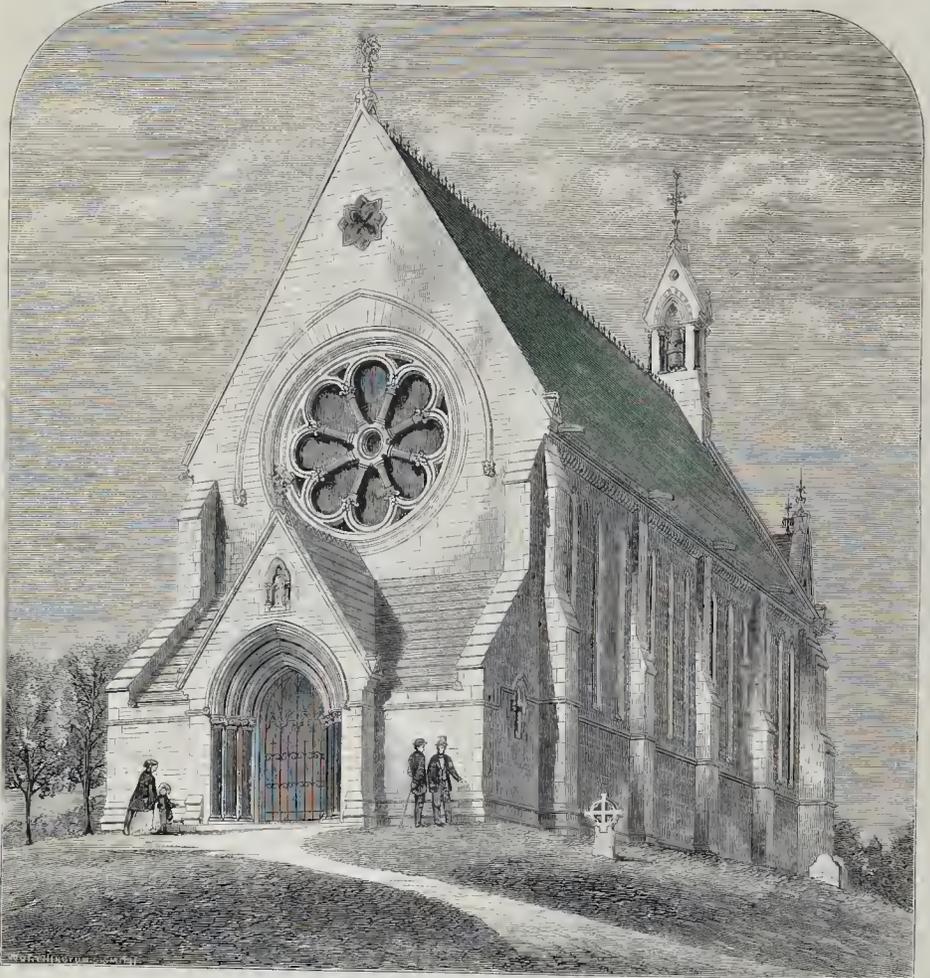
The pulpit, which is of wood, is shown in the engraving. It is entered from the vestry. Its sides are recessed into five sunk panels, each filled with scroll-work and foliage in gilt metal, designed and treated as metal. All the bench ends are similarly treated.

The eagle is of brass, with a jewelled crown and collar. The character of the font is rich. From a circular step of polished black marble, 4 ft. 6 in. wide and 7 in. high, rises a polished circular plinth of the same material, on which stands a black marble shaft, with eight smaller shafts of Californian marble clustered round it. The bases and foliated capitals of these eight shafts are gilt. On the capitals rests the bowl of the font—an octagonal block of polished black marble, each face of which is a perfect square. Into the centre of each square is sunk a jewelled rosette of gilt bronze, similar in character to those in the spandrel under the rose window; a border of smaller jewels, emerald and ruby alternately, each in a gilt cup-shaped setting, surrounds the four sides of each square. And there is a row of similar and similarly set jewels, but larger, disposed vertically down the centre shaft of black marble between each pair of the smaller shafts. The idea of thus combining coloured enamel gilt bronze, and black marble, is taken from the tomb of Mary of Burgundy, in the church of Our Lady at Bourges.

The church contains thirty-two windows, all of which are filled with stained glass; the capitals inside and outside are all different, and are carved from natural foliage, duly conventionalized to suit the material (Bath stone).

The bell turret contains two bells, which are swung and rung by levers. The eight shafts at its angles are of polished red Serpentine, and the arch above inlaid with glazed tiles, green and chocolate alternately; the cross which surmounts it is topped with gilt intercup-leaves, and the cock is from La Sainte Chapelle. The cresting of the nave roof is of intercup-leaves; that of the chancel has also its upper tier of leaves of the same character, the two lower tiers being from exotic types of foliage; the roofing is of purple and green grey slates disposed in patterns.

The principles on which the architect claims to have designed this church are as follows:—
1. That in designing a church the paramount object to be kept constantly in view should be to obtain the highest possible interior effect, treating the exterior composition as altogether subservient to that of the interior, and not to sacrifice one jot of the dignity or unity of the interior effect in order to break the exterior into picturesquely disposed masses, or to spend money on any merely external features, such as spires or pinnacles, until a splendid interior has been fully provided for.
2. That the most effective position for the entrance to a church is the west end; and that in our inclement climate it is always



ST. MARY'S, ICHENSTOKE.—VIEW OF WEST END.

desirable that a western porch or narthex should be interposed between the auditorium and the outer door. A vestibule is invariably deemed indispensable in the case of public rooms intended for secular uses, and they are certainly not less requisite for places of public worship, where attendance in all weathers is deemed not so much a matter of choice as of duty. The earliest Christian churches were almost invariably provided with a narthex.

Thirdly, that there are, as regards the interior effect, certain definite principles of composition and certain definite proportions of height to width and length to height, which cannot be ignored without most grievously falling short of the maximum of aesthetic effect of which the style is capable, some of the principles of which are as follow:—

That the only form of roof, whether of stone or timber, compatible with perfect Gothic, is one apparently supported by a series of Gothic arched ribs; and that the height from the top of the bench-ends to the springing of these arched ribs should (in interiors without a clearstory) be at least equal to the span of such arches; and that, in accordance with the principle of decorative construction (which consists in providing an apparent as well as an actual support to

every visible weight or thrust), and to that of "vertical or pointed composition" (which requires that all horizontal lines should be stopped by preponderating vertical lines), that these arched ribs should be supported by shafts extending without interruption from the ribs to the pavement, and stopping all horizontal lines they meet; also that the length of the nave should be at least twice its height, the latter being measured from the pavement to the vertices of the arched roof ribs.

That the chancel should possess every grace of which the style is capable; that one of the noblest and most distinctive of these is loftiness of proportion, and therefore that the modern practice of making the chancel so much lower than the nave should in all cases be avoided. That such practice is also objectionable on other grounds; for one of the chief aims in interior effect should be to create an impression of length, and this requires that the eye in ranging eastward should not be arrested by a dead wall-space over the chancel arch, which space has, moreover, in general a most eccentric contour: thus the chancel arch should be carried to the full height of the nave, and should fill up its entire width: that it should have its springing line at the same height, and should also be con-

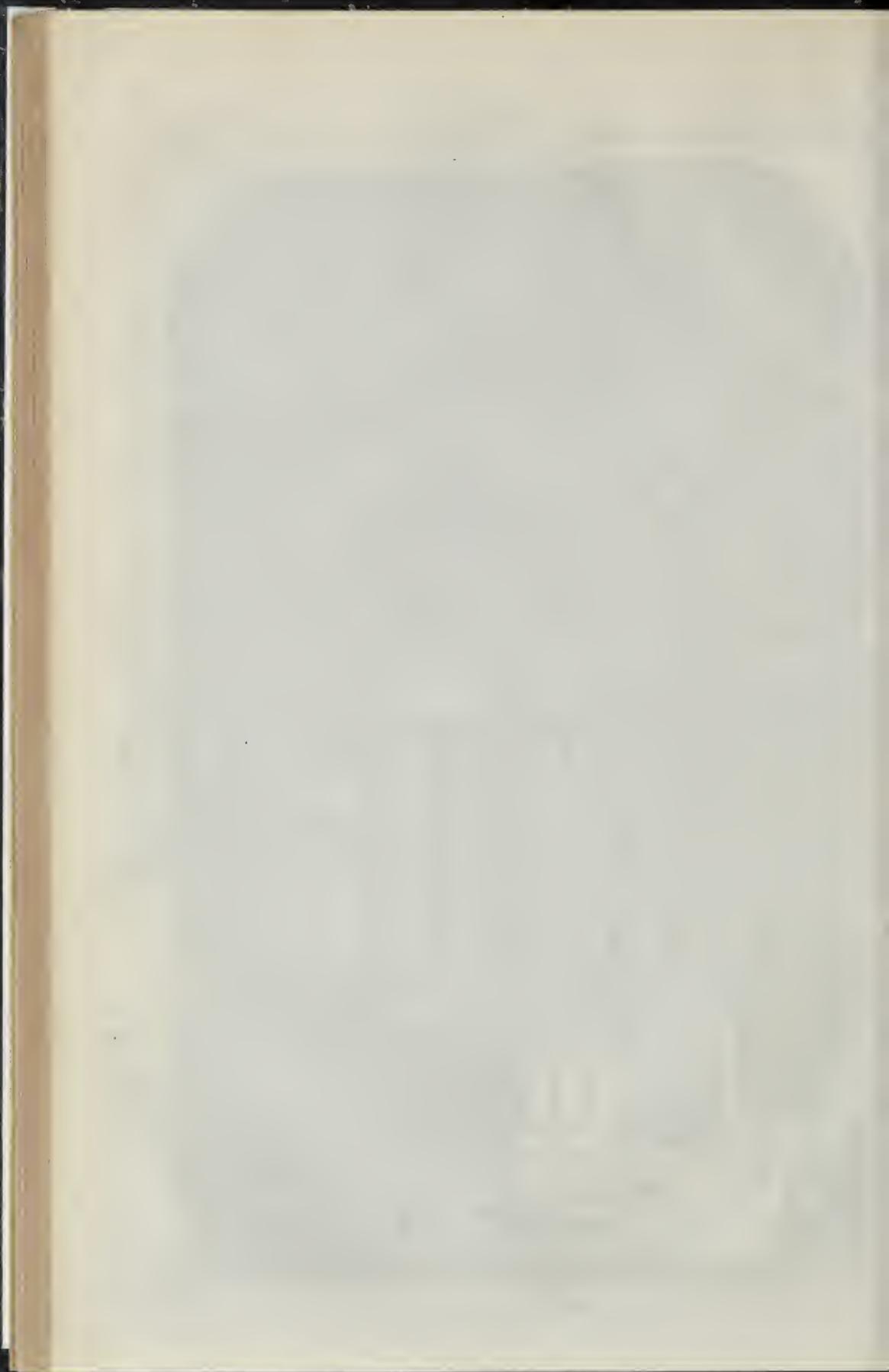
centric with the arched ribs of the roof; that the projection of the chancel arch beyond the side-walls of the chancel should be small as compared with its projection beyond the walls of the nave, whereby the eastern windows and altar are rendered more visible from the body of the church.

Also that the apse, when loftily proportioned and vaulted in stone, is the most effective eastern termination for a church; but when of low proportion, or ceiled otherwise than by stone vaulting, is merely a waste of force, and very inferior to the ordinary rectangular termination. Also that it is most conducive to an effect of harmony and repose in the interior, to keep the capitals or springing of the roofing shafts, vaulting shafts, chancel arch, and of the nave and chancel windows at the same level. And, in conclusion, that all these principles admit of being as fully carried out in a small parish church (like the present example), as in a cathedral.

The church has been built almost entirely at the expense of the incumbent, the Rev. Charles Conybeare. Mr. Henry Conybeare was the architect. The chancel is intended as a memorial of the late Mr. Markland, well known as an ecclesiologist.



ST. MARY'S, ICHENSTOKE, NEAR WINCHESTER.—VIEW LOOKING EAST.—MR. HENRY CONYBEARE, ARCHITECT.



INSTITUTE OF BRITISH ARCHITECTS.

On Monday evening last Mr. George Grove, Honorary Secretary to the Palestine Exploration Committee, read a paper on the "Exploration of Jerusalem and the Holy Land," and in the course of it described what had been lately done, with which our readers are acquainted. It was proposed, he said, to investigate the whole system of sewerage and water supply in ancient Jerusalem, and also that remarkable live rock, some 60 ft. by 40 ft., which contained a cave in which Constantine believed that our Lord was buried. These explorations would doubtless be most interesting to the members of the Institute of Architects, for they would inevitably throw a much-needed light on the history of a great era of their art. Herod was a building Prince, and Jerusalem was the great centre of his enterprise. Among the questions which would arise to them would be the following:—Did he employ Roman workmen? and if so, what influence did the climate and customs of the country exercise on the works of the builders? The Palestine Exploration Fund was extending its work, and he asked the assistance of the Institute to promote it.

TERRA COTTA.

THE ARCHITECTURAL ASSOCIATION.

At the ordinary meeting of the Architectural Association held at the House, in Conduit-street, on Friday evening (the 31st ult.), the president (Mr. R. Phéne Spiers) in the chair, a paper was read by Mr. Gilbert R. Redgrave "on Terra Cotta, and its Employment as a London Building Material." Having referred to the use of terra-cotta by the Egyptians 4,000 years ago, and by the Greeks and Romans at later periods, Mr. Redgrave proceeded to give a brief account of the revival of its manufacture and employment in London. About the commencement of the present century, Messrs. Croggan had an establishment in Lambeth Marsh for the manufacture and sale of artificial stone ornaments; and a writer of the period described the process as very similar to that which he had observed in Mr. Chantrey's workshops in modelling designs in clay, remarking that the durability of the material was fully equal to the ordinary kinds of stone; and that, in his opinion, when the power of the composition to resist the influence of the weather was fully ascertained by a longer experience, it would encourage a more general use of it, and give employment to a higher class of workmen. The manufactory known as Croggan's subsequently came into the hands of Mr. Coade, but the terra-cotta used in the decoration of New St. Pancras Church, in Euston-square, was executed by Messrs. C. & H. Rossi at a cost of 4,300l. The capitals of the columns and around all the external ornamental enriched mouldings, &c., were of terra-cotta. Imitations of Greek tiles in terra-cotta were arranged along the coping of the side walls, as well as round the circular part of the east end. The colossal statues, females guarding the entrance to the catacombs, were of terra-cotta formed in pieces, and connected together round pillars of cast-iron, which in reality supported the entablature. The whole of the exterior of St. Pancras Church was faced with Portland stone ashlar work, and the sharpness and freshness of the terra-cotta enrichments contrasted advantageously, with the worn, bleached, and disintegrated appearance of the generality of building stones used in London. Another building, in which terra-cotta had been employed, was All Souls' Church, Langham-place. The capitals of the columns here were supplied by Messrs. Coade, in 1822. The quaint basso-relievo inserted in the Haymarket front of the recently destroyed Opera House, was modelled by Mr. Bubb, the sculptor, in a substance called "Lithargolite," or artificial stone. This material was added to the old Opera House, by Mr. Nash, in 1820, and the lithargolite was dated 1821. There were, no doubt, many buildings in London of this date, the enrichments of which were executed in terra-cotta. In the struggle with the various cements which were introduced at the commencement of the present century, and the object of which was to convert brick walls into sham cement, terra-cotta was favoured, probably owing to the fact that, as the early manufacturers aimed at assimilating their productions to stone, a much more perfect resemblance could be obtained with stucco than with burnt clay; and, in fact, the quality

which was now so much admired in terra-cotta, namely, its colour was that which in the earlier stages of its London career proved its ruin, and hastened its downfall. That terra-cotta could effectually resist exposure to the atmosphere in our climate, was proved at Sutton-place, near Guildford, a Tudor building, of the most elaborate kind, the ornamental parts of which were of red and white terra-cotta. This house was built in 1559, by Richard Weston, brewer to King Henry VIII. A still older example, and within easy access of London, was to be found in the walls of Hampton Court Palace. This terra-cotta, which was very hard, and of a light red colour, had been fairly exposed to our climate for 350 years, and was certainly of a date coeval with the building. It had been attributed to Master Georgione, who was in this country at that time. Having said thus much, how eminently terra-cotta was worthy of extensive use in London! Mr. Redgrave next proceeded to point out the methods which he had found most desirable in preparing and arranging the material for the manufacturer. These observations he divided into three heads,—1. Terra-cotta considered with reference to the architect; 2. With reference to the manufacturer; and 3. With reference to the builder. The quality which caused the architect most trouble with regard to terra-cotta was its shrinkage, which varied from $\frac{1}{4}$ in. to $1\frac{1}{2}$ in. in the foot. In order to arrive at a fair conclusion as to the scale of shrinkage, and at the same time to obtain a genuine sample of the material, he had found it advisable to prepare a plaster cast of some simple ornament, and to deliver copies of the same to the manufacturers invited to supply the terra-cotta, requesting them to make a model from the cast, and impressing upon them the necessity of using an exact sample of the clay which would be used for the whole of the work, and to burn the clay blocks in various parts of the kiln with the customary heat. These trial pieces, together with the plaster cast, ought then to be returned to the architect. Having before him these samples, the architect could make his choice and select the one which in colour, hardness, and squareness of form seemed to be the best: he could then proceed, by a simple rule-of-three sum, to ascertain the scale of shrinkage. Assuming that the detail drawings of the terra-cotta work for a large building had to be prepared, he might add that, until the decimal system was introduced into England, there was no scale more intelligible and satisfactory for details than $\frac{1}{2}$ in. to 1 in., or $1\frac{1}{2}$ in. to the foot, and to this scale the small-sized terra-cotta drawings, showing the relative position of the block, should be prepared. With regard to the size of the blocks, it was impossible to produce them beyond a certain limit of dimension on account of the difficulty of manipulation in the manufacture and of the danger of imperfection in the firing, but he thought the limit should be placed at a contents of 4 cubic feet, or thereabouts. This size would show the nature of the material used, and avoid, on the one hand, the massiveness of stone and on the other the pettiness of brick-work. If these dimensions were exceeded the blocks would twist and sag in drying, and the mouldings would lie uneven and defective. It was also very desirable that great accuracy should be observed in the drawings for terra-cotta, as otherwise the blocks might become absolutely useless. With regard to designing ornaments for terra-cotta work, the material in which the design was wrought was so perfectly adapted to the skill of the modeller that the highest effort of the sculptor's art might be obtained; and in cases where only a few copies of the work were needed, they might be actually modelled in the clay which was to be burnt, and thus the artist's own handiwork might be preserved. When many copies were wanted, with good moulds, and workmen who knew how to let the clay alone after it had left the mould, a very near approach to the sculptor's own work might be expected. Indeed, the approach was nearer than in stone carving, where a weak resemblance to the model was obtained in a material whose qualities and methods of making were so essentially different from the sculptor's clay, that a sort of education in the art of interpreting modelling into stonework was all important to the stone-carver. The motto for the terra-cotta modeller should be, "Work in low relief and avoid under-cutting." Having considered terra-cotta in reference to the manufacturer, Mr. Redgrave explained the steps taken at the Horticultural Gardens, South Kensington, to test the strength

of the material. A weight of 20½ tons had been sustained by a column, under somewhat adverse conditions, and he had no doubt that a column 15 ft. high, and 1 ft. 6 in. in diameter would carry a weight of 25 tons with greater and more permanent safety than a cast-iron column or core 8 in. in diameter and 1 in. thick. Advertising next to the special advantages of the use of terra-cotta in London, Mr. Redgrave contended that it was eminently adapted to receive a glaze, and expressed a hope that enamelled terra-cotta,—the Della Robbia ware of the old Italian times,—would be the material destined to beautify and decorate the London of the future. In glazed terra-cotta was to be found the *panacea* for all the evils which caused the failure or the ill-success of our modern London architecture. Victorian architecture relied to a very great extent upon colour for its enrichment and for its effect. At present the costly city banks, public buildings, and warehouses had, after a few months of splendour, fallen a prey to soot. Indeed, it was humiliating to think that, with the exception of polished granite, every material used in our metropolitan architecture succumbed after a brief struggle to fogs, smoke, and London atmosphere. If, however, good terra-cotta were used, it would defy our climate, and, at the same time, preserve that good rich colour which our architecture so much wanted. Glancing, in conclusion, at the price of terra-cotta, Mr. Redgrave remarked upon the discrepancy which existed between the prices of the same article from producers in different portions of the country. A variation of 200 per cent. was by no means uncommon, and furnished a convincing proof of the ignorance and uncertainty which prevailed with reference to the subject. The average price of terra-cotta in the neighbourhood of London was from 4s. to 8s. per foot cube, and in the coal districts of Staffordshire and the north it varied from 2s. to 5s. per cube foot. He felt certain, however, that in a few years terra-cotta of excellent quality, made where coal and clay abounded, would be sold in London at from 1s. 6d. to 2s. 6d. per foot in cases where a considerable number of the blocks of each pattern were required. This last proviso, however, was a very important one, as regulating the price of terra-cotta; for one of the principal expenses of the manufacture consisted in the preparation of the models and the moulds, and where only a small number of blocks was required from any given pattern the preliminary expenditure formed, when divided, a heavy item in the ultimate cost of each block. Terra-cotta ornamented work contrasted very favourably with stone carving in point of price,—the modelling being set down as the same in each case. In using stone it was necessary to allow a large sum for the labour of carving, while in the case of terra-cotta the only labour consisted in forcing the clay into the mould and placing it in the kiln. In the South Kensington Museum there were exhibited two ornamented mullions, one carved in stone and the other executed in terra-cotta. The relative prices were ascertained with accuracy, and the result was that the stone cost 5l. 8s. and the terra-cotta but 2l. 3s.

Mr. Watson inquired whether it was not the practice to provide in shafts for columns a chipping piece to meet the case of shrinkage. In his opinion it would not be desirable to place a great weight upon terra-cotta pillars, but to reserve it for light arcades, subdivision of arches, and the like.

A member thought terra-cotta might be advantageously employed in decorating London exteriors, but not for constructive purposes. In Northern Italy it was extensively used for ornamental purposes by letting it into the walls. This subject, introduced by Mr. Redgrave, was most interesting and important at a moment when public taste was setting in favour of colour, and when it was becoming more and more necessary to devise something that would defy the London atmosphere.

Mr. Perry saw no reason why burnt clay, highly glazed, which was, in fact, majolica ware, should not be extensively used, when bedded in cement, for decorative purposes in street architecture.

Mr. Blashill said he would be sorry to advocate the use of terra-cotta in a decorative sense only, and not as a material for construction. In his opinion, terra-cotta was very suitable for the decoration of brick buildings. He could see no objection to the use of bright red bricks with terra-cotta dressings, which could be washed occasionally with a steam jet and hot water and

soap, as was done in Paris. With regard to the use of the material in pillars, he saw no objection to it, as he believed that if properly made and fixed, a terra-cotta pillar would bear a considerable weight with perfect safety.

Mr. J. D. Matthews observed, that few persons were aware that terra-cotta had been used so largely in the decoration of St. Pancras Church as Mr. Redgrave had described it to be, and that the architectural student would henceforward examine the building with greater interest. It seemed to him that the great objection to using terra-cotta constructively, was to be found in the difficulty of getting truly horizontal lines in small blocks. This difficulty would, he apprehended, be a drawback to its general adoption. With regard to shrinkage, however, he did not attach much weight to it, as if proper drawings making due allowance for shrinkage were prepared, the difficulty could be got over. Great care would, however, have to be exercised in this respect, and also as regarded the firing of the blocks, otherwise the architect would be dissatisfied, and the builder could not get on with his work.

Mr. J. S. Quilter called attention to the importance of insuring a uniform colour, as otherwise the terra-cotta would look patchy. He thought the architect ought not to be expected to deal with the question of shrinkage; but that it should be left to the potter, who was naturally better acquainted with the matter.

A member said that the deeper the clay was got the less would be the shrinkage.

Mr. Canning (Messrs. Gibbs & Canning, of Tamworth), stated, that as a maker of terra-cotta, who could bear practical testimony to its great strength, the white sorts were made from fine clay of the purest description and texture, and free from iron, and admitted of the hardest burning, while at the same time it exhibited the minimum of shrinkage.

The Chairman.—Could not the figures at St. Pancras Church be made able to support the weight of the entablature without the iron columns inserted in the interior?

Mr. Canning.—I think they could.

The Chairman, commenting upon the value of the paper read, as emanating from a person who had had much experience in the use of terra-cotta at South Kensington, observed that in the buildings in Northern Italy which had been referred to, iron supports were unnecessary, as the pillars were used only for light arcades, and had no great weight upon them. There were, he thought, two great advantages in the use of terra-cotta. The first was that its lasting and durable properties exceeded those of stone, and the second was, that its highest artistic skill might be obtained at a moderate price. He confessed he should have liked to have heard more about the application of it to London buildings, and a discussion of the question as to whether it should be used merely in an ornamental and not in a constructive sense. He hoped, however, that should it be generally introduced it would not be in the shape of a glazed covering for buildings, for which our climate was wholly unfitted. In the few cases in which polished stone was used in London buildings reflection, and not light, was the result.

Mr. Redgrave said that so far as crushing weight was concerned terra-cotta would compare favourably with any building stone now in use. It was, however, to a certain extent a treacherous material, as if a piece were imperfectly fixed it might endanger the safety of the portion of the building in which it was used. At the same time, in discussing its advantages and disadvantages as a building material, it would be necessary to bear in mind that the manufacture was still in a crude and unsatisfactory state, and that eventually it would probably be brought to such a state of perfection, that iron supports might be entirely done away with. With regard to the Italian buildings in which he had seen it employed, it was used in small pieces on flat surfaces, and had not any weight to support. If, however, the material were to be so perfected in the manufacture as to come into general use, the architecture might be tempered to it. With respect to the question raised by Mr. Quilter as to whether the architect should prepare the drawings for the terra-cotta, he made them so as to provide for shrinkage, he saw no reason why he should not do so when the amount of shrinkage could be ascertained to a nicety.

A member observed that, whatever difference of opinion might exist as to the merits of terra-cotta as a decorative or as a constructive mate-

rial, there could not, he fancied, be any with reference to its applicability to the interior decoration of buildings,—as, for instance, in halls, corridors, staircases, and public rooms. The room in which the members were then assembled and which always struck him with amazement as a type of what British architects were able to do under severe pressure, might be greatly improved if a band or string-course of terra-cotta enrichments were carried under the cornices, or if the windows (which were now nothing better than glazed holes) were ornamented by its agency. He found, however, that in this case, as in all other innovations, no matter how simple or obvious, the client and the architect would be met by the old cry of expense, which was always cropping up whenever we went a quarter of an inch out of the beaten track.

The Chairman remarked that the new town-hall of Berlin was built of terra-cotta and brick. It was a building of enormous size, and the Prussian Government had resolved that it should be composed exclusively of those two materials.

MONUMENTAL.

At a recent meeting of the Doncaster Town Council, designs were received from Messrs. J. Athron, W. Potter, and T. & C. Anelay for a monument to be placed over the grave of the late Mayor (Mr. H. Woodmansey). The committee recommended the design, No. 2 upon the sheet, furnished by T. & C. Anelay. It was stated that the height of the monument would be 10 ft., and its cost £81, which came just within the limit of the sum specified. The recommendation of the committee was, therefore, adopted.

A monument to the late Mr. Jackson, of Bradford, has been erected in Undercliffe Cemetery, under the ash tree where the remains were buried. From a pedestal of Bolton stone rises a shaft of the same material, clear and close in the grain, presenting four faces, pointed and carved in the common Gothic style. These faces are separated from each other by four small columns of polished red or Peterhead granite; and the whole culminates in a short pyramidal spire, closely covered with inverted leaves. The inscription states that the deceased was "composer of the oratorios 'Deliverance from Babylon,' 'Isaiah,' and other musical works;" and that the "monument is erected by the Bradford Festival Choral Society in affectionate memory of him, their first conductor." Messrs. Staké & Co., of Bradford, executed the monument.

MANCHESTER TOWN HALL COMPETITION.

The designs for the new town-hall submitted by the selected architects are now being hung in the present town-hall. All the available wall-space in the hall, as well as two additional screens placed across it, will be required to arrange them in a satisfactory manner. It is matter for regret that a better-lighted room has not been chosen. Messrs. Donaldson and Street will assist the committee in making the selection.

ACCIDENTS.

In the vestry of the Priory Church, at Malvern, an explosion of gas has taken place; the clerk having inconsiderately taken a lighted candle to discover the spot where an obvious escape of gas was occurring. The vicar, clerk, and vergers were all injured by the explosion, and damage done to the floor, the organ, and other property to the extent of more than 100l. A similar explosion, it will be recollected, took place at Ripley Church a week or two ago.

St. David's Church, Merthyr, took fire the other day in the roof from the old grievance, an over-heated stove flue. There was some difficulty in putting out the fire by means of fire- hose. The church was flooded, and the molten lead fell amongst the people as they rushed out wildly, and were arrested by the difficulty of getting through the doors, which opened inwards.

A fire has occurred at Wynyard Hall, near Stockton, the seat of Earl Vane, from a beam, it is believed, getting ignited in a chimney of the servants' apartments. The roof fell into the

kitchen, but the fire was kept from the main building by the use of the Hall fire-engine, supplied from a pond, and other means.

By the fall of the wall of a warehouse at Brighton, a child has been killed. The recent gale, it is said, had previously brought down a portion of the walls of the same building.

At Scarborough recently a man was killed by the fall of a chimney belonging to a new building. At the coroner's inquest the jury, after examining several witnesses, including the borough surveyor, the architect of the buildings, one of the workmen employed with the deceased man, and a surgeon, returned a verdict of "Manslaughter against John Land, the builder of the house in which the accident occurred." This verdict was repudiated by the coroner; and the jury, after being locked up for some time, embodied their conclusions in the following form:—

"That the death of Henry Moore was caused by the fall of a chimney of the house in which he was working on Saturday, February 19th, 1868. From the evidence that has been brought before the jury, they are of opinion that the fall of the said chimney was owing to the culpable negligence and disregard of John Land, the builder of the house, to certain conditions required by the Scarborough Local Board in consideration of the safety of life and property. The jury attached to this their verdict their earnest opinion and conviction that the conditions required by the Local Board are not sufficiently exacting and particular, especially with regard to the inspection of buildings during their erection; and the jury strongly recommend that increased powers be granted by the Board to their surveyor or some other officer for the purpose. And, with regard to the building in question, the jury further express their opinion, that it is not only desirable, but absolutely necessary, for the future safety of the public, that that building be further and fully inspected on the authority of the Board by one or more efficient surveyors; and that Mr. Land shall be directed to complete the building (if at all) either according to the plans as originally approved by the Board, or such modifications thereof as the Board may approve."

STYLES NOT INVENTED.

SR.—It is extraordinary that a man so well acquainted with the history of architecture as Mr. Fergusson, should have fallen into the error of supposing it possible to "invent" a new style. No style of architecture has ever been "invented," but has always developed, and, what is more remarkable still, is the fact that new styles have always arisen from copying the works of a former age, exactly what Mr. Fergusson finds fault with architects doing at the present time. Whence came the Grecian architecture?—from copying the works of the Egyptians. The Roman?—from copying the Grecian. The Byzantine and Romanesque?—from the Roman. And what is Gothic architecture but a development of the Romanesque?

Now, in each of these cases the style was for many years only "copywork." By degrees, after centuries of toil, the new style became gradually "developed," and this development generally took from three to four hundred years. In the case of the Gothic style, it took over six hundred years. The earliest Romanesque buildings were erected about the sixth century, and Pointed architecture did not develop itself into a new style till the thirteenth century.

Now, if Mr. Fergusson could live for five or six hundred years he might create a new style. I have the greatest possible respect for Mr. Fergusson, and I think he has done much for architecture, but I can hardly wish him to live long enough to "invent a new style."

H. W. BREWER.

THE DISPOSAL OF SEWAGE QUESTION.

SR.—In the very neat summary you gave in the *Builder* last week of several ways of dealing with town sewage, you mentioned a pamphlet by Mr. Slagg, "On the Principles of Town Drainage," in which he says that towns ought, for the purpose of disposing of their sewage, to be individualized and not combined, as has been often put forward as being the best way of getting out of the difficulty that has been recently thrown upon the towns in the Thames Valley, and will be repeated, probably, all over the country where rivers are polluted by town sewage. In addition to the reasons therein set forth for this individual mode of dealing with the subject, I think another may be stated. Surely, sir, we, the town surveyors of England, if authorised to carry out our own ideas of how to get our towns out of this difficulty, could and would quickly do it. We have not all had sufficient experience to undertake this work with confidence, but I am sure those who have not

ould readily acknowledge it, and make way for
assist those who have.

If it be thought better to have our plans sub-
mitted to a standard authority before being put
practice, by all means let it be so. The Presi-
dent of the Institution of Civil Engineers, Mr.
Lawson, or some other gentleman of eminence,
could quickly detect anything wrong in principle
in detail in the plans submitted to him. On the
other hand, we should have the advantage of any
new idea of any value that might be broached
put into train for a practical trial, and
timely the country would gain by such a
course.

It will hardly be contended by any disinterested
that we ought to rest satisfied with the present
practice of town drainage as a final measure
sanitary science. And I think we ought, at
onset, before we are further committed to
principles which may not prove to be the best,
to establish what ought to be done, both in principle
and practice.

I acknowledge the value of the information
furnished by the Royal Commissioners lately, but
do not think their "conclusions" ought to be
conclusive. By leaving the work of disposing of
the sewage to the town surveyors, with the ad-
vantage of a reference to, and consultation with,
our eminent engineer, we shall more quickly
arrive at the best thing to be done than by any
other means. A TOWN SURVEYOR.

ARCHITECTS' FEES IN COMPETITION.

Sir,—I beg to hand you the following advertisement
which has this morning appeared in one of the local
papers, thinking that, as a specimen of the sublime
genius of the Sculptors guardians, it may be somewhat
interesting to your professional readers:
"Sculptors Union.—To Architects.—The guardians of
the above union, being desirous of making certain alterations
and additions in the workhouse, will, on Tuesday
next, be prepared to receive tenders, stating for what sum
architectural plans of such proposed alterations and addi-
tions will be prepared. The premises may be viewed, and
instructions for plans received from the committee, who
will be in attendance at the workhouse, from ten to
one o'clock on Thursday next. The tenders must be
delivered," &c.

Among the number of those who profess and call them-
selves architects, how many will be found with virtues
enough to hold to this remarkably tempting invita-
tion to self-sacrifice is yet to be seen.

KINGSTON HULL.

GREENOCK HARBOUR AND DOCK.

Sir,—Many of your readers have doubtless applied for
the "particulars" respecting the proposed dock and
harbour at Greenock, and have done so, and the particulars
are so inconsistent that I find it impossible to define
it is really required. The instructions require two
harbours or wet docks (but do not say which); also
a wet dock, sea wall, and embankment, together with
a railway communication; whereas the sections of the Har-
bour Act to which competitors are referred only authorize
the construction of one small dock (according to the
provisions therein delineated) and the graving dock
at a given position; the instructions also authorizing its
being placed in another position, if the competitor can
show "valid reasons" for doing so.

The instructions and the clauses of the Act appear con-
sistent with each other, and other discrepancies being
identical between the former and the plan furnished, I ap-
plied to the clerk for further particulars, but can get no
reply. I should feel obliged by these facts being made
public, because they lead me to believe that the competi-
tion may not be a bona fide one, or worst wasting time
and money. C. E.

GREAT BELLS: WOBURN NEW
CHURCH, &c.

Sir,—Mr. Walsely, to whose general campanological
knowledge I would pay all due respect, thinks that a new
bell of 55 cwt. at Woburn, Beds, will be the heaviest
cast in this country. I venture to doubt this, by fancying that
there may be several latent heavy bells of little more than
usual cognizance and fame; as even that of Sherborne ap-
pears to have been but little publicly known till lately. There,
at least, near forty years ago, a statement of all at
one parish church in Gloucestershire, weighing 8,000 lbs.
was in a village tenor of six in Oxfordshire, I am pretty
certain near Witney (else Banbury), undoubtedly weigh-
ing fifty-six cwt.; also in a village church of East-
Hampton, Beds, being on good authority to weigh 50 cwt.
Some correspondents might, doubtless, elucidate these or
other examples, to Mr. Walsely's satisfaction also.

The "Bells" of the little town, under
1,000 inhabitants, is of course a lawful one, which none
are entitled to evil at. This same new church at Woburn
possesses, however, so strange a tale—perhaps utterly
unprecedented, and unexampled, at least, in such a
parish, that it may invite notice from the mere singu-
larity of the case, little as may be the likelihood of
occurrence of a similar astonishing "blunder."
The "Bells" of the little town, under the
Woburn, was a pretty one, and a great favourite of the
present duke's esteemed grandfather, who liberally and
generously ornamented it. It was pulled down, against the
wishes of the "regular" old church, and some "mono-
theists" (his present Grace being, unhappily, an absentee)
little inhabitants—Churchmen and Dissenters; and, after
being sacrificed (with a handsome neighbouring parson-

age), it was discovered that there was *not* room where they
had calculated on rebuilding!—too justly styled by the
old inhabitants a "cruel blunder." This necessitated
building at some distance, leaving, instead of a time-
honoured existing church, a heavy "waste," leaving the
old tower, and a new "sepulchral chapel," rendered also
necessary through their "management," in the centre of
the little old town, at which any "Kip van Winkle" of the
old "coaching" days might almost discredit the evidence
of his senses.

A few years ago, it was stated in the *Builder*,
that the "poorest almshouses in England" were supposed
to be, now, those at Woburn, founded by the Bedford
family, though in "exchange" for some charity lands
bequeathed by others long before, in which twelve poor
inmates receive one shilling a week each, not augmented
in about a century, and without other perquisites. The
case seemed more regrettable, as there are several well if
not excellently endowed almshouses in neighbouring
towns. These poor folks at Woburn will now have the
common privilege of hearing the "great bell," but might
they not be more grateful for a few additional shillings a
week each, than even living under its sound, however
otherwise imposing? VERUS.

CROSSINGS.

Sir,—Much having been lately said about the applica-
tion of bridges and tunnels for the convenience of foot-
passengers at the crowded thoroughfares, it struck me
that lifts might be advantageously employed for the pur-
pose. It is not worth while for me to enter into details;
but I hope an engineer will take up the idea, for I am
satisfied that there are no objections which might be
surmounted by ingenuity and perseverance. A bridge,
with lifts in the form of the letter H, would occupy less
space, and the fatigue of climbing stairs be avoided. The
police-station already situated at such crossings could regu-
late the machinery, so as to secure the preponderance of
the descending party. Pedestrians would then walk into
the box containing any six, be raised to the level of the
bridge, walk across, and in turn by their weight, assist in
raising the ascending followers. CICEROUS.

COMPARATIVE ALTITUDES.

Sir,—It is very satisfactory to see the question of
"comparative altitudes" treated practically by your corre-
spondents "A. J." and "B. E.," who have done good
service by their communications.

I hope, and believe, I am giving utterance to the feel-
ings of many, when I express my own sense of gratitude
for these contributions, and give an assurance that it
would be a matter for regret if the subject were allowed to
rest there. May I be excused if I also express my own
opinion that the observations would be really valuable for
scientific purposes, as well as for certain practical opera-
tions, if some common datum were agreed upon and
adopted throughout the country. It must be evident to
all persons directly and indirectly concerned that this
should be the mean level of the sea.

Anxious not to trespass too much on your space, I will
restrict myself to one or two suggestions of the advantage
of such a course. To many geological students who have
not time and opportunities to do much field-work, such
tables of comparative altitudes as those commenced by
"A. J." would be very valuable, having the end-level
datum. In the promotion of great sanitary improvements
such general levels would probably prevent many blunders;
and the same remark would apply in all cases where
land drainage on a large scale is contemplated.

With most of the remarks of "B. E." in your last
number I entirely agree; but would proclaim the impor-
tance of uniformity in taking the altitudes, and the adop-
tion of a common datum. "B. E." rather objects to the
term "mean level of the sea," as being ambiguous; and I
beg, therefore, to suggest, that the uniform datum should
be the average low-water level, which is adopted as the
zero in all Admiralty as well as land and estuary surveys on
the eastern coast. JAMES WYATT.

METROPOLITAN BOARD OF WORKS.

A SPECIAL meeting of this Board has been held for
the purpose of receiving a report from the Works and General
Purposes Committee on the subject of a draft bill with
reference to the loans and funds for carrying on the works
under the existing Thames Embankment and Mansion
House-street Acts, also the works for the Thames Em-
bankment approaches, the Chelsea Embankment, and the
Park-lane improvement, and to enable the Board to
charge in aid the rates of the metropolis and the general
properties of the Board under those Acts. Mr. Freeman,
in moving the adoption of the report, said that their
object was to get the necessary capital for the works,
and that at the lowest possible per-centage. They had
sufficient capital to pay for the net cost. If they could
get the guarantee of the Government, they would be able
to raise the money at a lower per-centage. A short dis-
cussion followed, in the course of which it was stated that
the amount was 2,100,000*l.* Upon the resolution being
put, twenty members voted for it and three against,—the
latter being Messrs. Healey, Roche, and S. Taylor.

ST. PANCRAS INFIRMARY COMPETITION.

THE Guardians of the poor of St. Pancras have pur-
chased, for 4,200*l.*, four acres of land, situated at Highgate,
near the Small Fox Hospital and the Cemetery, for
the purpose of building an infirmary for the poor of the
parish distinct from the workhouse, in accordance with
the provisions of the Metropolitan Poor Act, 1867. The
competition for designs for the building, we are told, is
limited to a number of architects who have been accu-
tomed to design buildings of a similar class. For the
three best designs the Guardians offer premiums of 150*l.*,
100*l.*, and 50*l.* The successful competitor, if required, is
to carry out the works for the payment of 300*l.* less the
amount of premium; and this is to include all travelling
expenses and attendances, and the supply of all plans,
drawings, &c., that may be required, but he is not to be

entitled to any premium or payment unless a substantial
contractor will undertake the work at a price not being
more than ten per cent. above the estimate accompanying
the design. Every part of the building is to be of the
plainest design consistent with the same being thoroughly
substantial and suitable for the purpose required, and no
money is to be expended in ornamental work of any kind.
Accommodation is to be provided for 500 patients, and the
buildings are to be so arranged as to be easily capable of
extension at a future period. The Guardians proposed
that from 1,000 to 1,200 cubic feet of space should be
allowed to each patient, but the Poor Law Board con-
sidered 800 "quite sufficient." The building is to be
rendered fireproof as far as possible, and facilities for
the escape of inmates in the event of fire considered.

FLOATING BASIN AT BREST.

FOR several years past the floating basin of the port
of Brest, constructed in the sixteenth centu-
ry, has been wholly inadequate to the require-
ments of a station of such strategic and military
importance. On the proposition of M. Duprey
de Lôme, director of the *matériel* of the Imperial
Marine, the minister of marine ordered, in 1863,
studies to be made, and the works of enlarge-
ment were subsequently undertaken. But, the
contractor not having been able, even after six-
teen months of persevering efforts, to render the
dam water-tight,—the fundamental basis of the
constructions,—was obliged to abandon the en-
terprise.

After new studies, M. Collignon, inspector-
general of maritime works, suggested the use of
compressed air, as at Kehl Bridge and else-
where, and that course was decided upon. The
project adopted was that of M. Castor, who had
already a practical acquaintance with the system.
He proposed to form a dam by means of an im-
mense iron caisson, and to make it descend
5*l.* 6 in. below the highest tide-level. The
author of this project was entrusted with the
execution of the works, which were commenced
in February, 1867.

The caisson has a capacity of 3,174 cubic
yards. Forty workmen, relieving each other
every four hours, work day and night in the
compressed air extracting the enormous quantity
of stuff to be excavated (rock, wood, and stones),
of which more than 392 cubic yards have been
taken out. The total number of men employed
is 150.

The weight of the caisson, of its materials,
plant, machinery, &c., amounts to 3,000 tons. A
thirty-horse power engine sets in motion a
blowing-engine, which maintains the air at a
constant pressure, and continually renews the
air vitiated by forty men at work. At present
the caisson has arrived without accident at a
depth of 20 ft. 4 in. below the zero of the mareo-
metric gauge; and there is every reason to
expect that this difficult undertaking will be
brought to a successful close before the end of
the present February.

PROVINCIAL NEWS.

Doncaster.—The Doncaster Market Committee
have opened the tenders sent in for the exten-
sion and improvement of the markets. They
were in two sets, viz., for builders' and con-
tractors' work, and for smiths' and ironfounders'
work. The first were required for constructing,
erecting, and completely finishing three new
slaughter-houses, pens, and boundary-walls in
connexion therewith; and for laying out a new
cattle-market adjoining the slaughter-houses,
constructing the roads, laying pen-floors for
about 5,000 sheep with asphalt, and for 750 pigs,
with paving bricks; for making and pitching
the pen-floors for about 120 fat beasts with ran-
dom Mount Sorrel pavours, for forming the
various drains, erecting sheds and boundary
walls, and for providing the stone kerbs and
plinths, and letting in the ironwork of the pens,
&c." The second set of tenders were required
"for the cast and wrought iron work necessary
for constructing and erecting pens for about
5,000 sheep, 750 pigs, and 120 fat beasts." Be-
tween the highest and lowest tenders for the
builders' and contractors' work there was a
difference of 1,068*l.*, that sent in by Mr. W.
Huddleston, of Lincoln, being the lowest,—
4,298*l.*; while Messrs. Pattisons, of Ruskington,
was the highest,—5,366*l.* The tender of Messrs.
Kirk & Parry, of Steaford, was 4,872*l.* For the
ironwork the lowest and highest tenders were,
York Railway Plant Company, 1,020*l.*; and
Messrs. J. Clift & Co., Bradford, 2,050*l.*—a
difference of 1,030*l.* Messrs. Robey & Co., and
Messrs. Kirk & Parry sent in tenders,—the for-

mer offering to do the work for 1,625*l.*, and the latter for 1,542*l.* The committee have recommended that the tenders of Mr. Huddleston and the York Railway Plant Company be accepted.

Salisbury.—The committee appointed to take the preliminary steps for the enlargement of the Salisbury Infirmary report that subscriptions to the amount of nearly 5,000*l.* have already been received. The total amount required is estimated at about 10,000*l.*

Keyham.—The new north basin at Keyham yard has been opened, the operation of floating the caisson into its position on the western boundary having been successfully performed in the presence of the admiral superintendent and officers of the Devonport and Keyham yards. The basin is 900 ft. long, 400 ft. broad, and at the opening the water was 32 ft. deep in it.

Yarmouth (Isle of Wight).—We are informed that another new town, similar to that of Bouldnor, is proposed to be carried out in the watering-place known as Totland Bay. A number of workmen are already engaged for the erection of brick-kilns, in order to commence operations.

North.—The subject of widening Neath Bridge over the river has been discussed in the Town Council. The Mayor explained the original plan, which was accompanied by sections and specifications, showing how a footpath 5 ft. wide on each side of the bridge could be thrown out upon brackets. The plan received the unanimous consent of the Council. The county magistrates have agreed to give 350*l.* towards the expense, and other contributions are expected.

THE CO-OPERATIVE MOVEMENT.

The attempt of shopkeepers of different classes, such as butchers, grocers, &c., to combine in trades unions, for the purpose of plundering the public to an unconscionable extent, is recoiling with a vengeance on their own heads, by the spread of the co-operative principle on the part of consumers. The shopkeepers now threaten to combine against wholesale dealers who shall continue to supply the co-operative stores, but they will only thus hasten their own downfall; because it is evident that co-operation can support a wholesale trade no less than a retail; and, indeed, as their customers are not credit but cash ones, they are in a much better position to do so than the usual wholesale houses themselves. There are far too many shopkeepers in London. They are destined to be greatly thinned in number, and all but a remainder will find it necessary to turn to industrial pursuits of a more productive kind than merely standing behind counters, and handing over goods from the producer to the consumer, after appropriating a lion's share to themselves for doing so. A movement which necessitates a return from credit to cash cannot but be a wholesome one, whatever may become of the credit givers.

The London lawyers are in for the movement. They have started "The Legal Co-operative Supply Association," whose stores are in the Euston-road. The London clerks have not only started their own restaurant, but a "Clerks' Supply Association," under the management of clerks connected with some of the most respectable firms, but not restricted to clerks; and they have made a contract with the London Parcels Delivery Company for the delivery of goods at reduced rates. The Civil Service Co-operative Society have found their premises in Alban-place, a little back street near her Majesty's Theatre, already too small, and have just taken larger premises in the Haymarket, and opened a store there. All day long the place is crowded with purchasers, and outside there is quite a string of carriages, whence it will be inferred that even the upper classes are not insensible to the advantages of household economy, and peevishness have been seen there making out their own invoices, and taking away their own parcels. Another similar association opens its doors wider, and admits any one who is introduced by a civil servant. The society has its store—a very large one—in Monkwell-street, but it is not necessary to deal at the store; arrangements have been made with tradesmen in various parts of London to supply members of the association at reduced prices. This contract answers the tradesmen's purpose, because they are thereby secured a large number of additional customers who pay cash, and with whom, therefore, there is no risk.

The *Globe* newspaper has some remarks on

this movement, from which we may quote a passage—

"The high prices of London tradesmen have caused the co-operative system to prosper immensely, and we are informed that a single store is doing a business exceeding 400*l.* a-day, which is rapidly increasing. At these stores the customer has not the numerous conveniences offered by the private tradesman; there is no calling for orders; he must make up his own bill and take away his own parcel. Yet, with all this, the advantages offered are so great that they draw away sufficient custom from the retail tradesmen to give them serious alarm. There are too many retail tradesmen. The number of shopkeepers, as Mr. Mill has shown, is everywhere in too high a ratio to the number of producers. And the general collapse in credit begins to make this felt. The eddy that began in the City, the centre of commerce, is extending throughout the nation. There has been too much credit; there is now too little for the public convenience. Cash is wanted everywhere: when men have to pay cash, they begin to think seriously about prices. Hence, retail trade, like the great speculative enterprises, is in a state of transition. Co-operation is its most formidable rival. It is easy to anticipate the time when co-operative stores and a much smaller number of first-class tradesmen will occupy the whole field. The disappearance of a great number of petty shopkeepers will be no great loss, except to themselves. And they will have no more right to complain than had the wigmakers when people took to wearing their own hair. The first-class tradesmen will maintain their stand. An opulent aristocracy will always pay for easy service; and the *jeunesse dorée* will always require credit, and will always be willing to pay for it. All these things are inevitable. Still, the present movement, by which cash payment is likely to supersede credit, in the vast majority of cases, is undoubtedly a healthy one for society. Those shopkeepers are most likely to retain their position who adapt themselves to it in time, and are content with moderate profits when customers pay ready money."

We observe shops with large bills in the windows offering goods at co-operative prices. The public should of course be on their guard against imposition in such cases; but still there are instances in which shopkeepers do give goods to members of co-operative associations at reduced prices, on a previous understanding with them; and some shopkeepers may desire to give the general and cash-paying public also, as well as themselves, the benefit of such an arrangement, by competing against other shopkeepers, instead of combining with them against the public.

The check to adulteration of all sorts is not the least of the benefits likely to be conferred on the public by the co-operative movement.

CHURCH-BUILDING NEWS.

Frampton (near Dorchester).—A new reredos has lately been placed in Frampton Church. The design comprises the feature of three rich gables, carved in Caen stone, over the altar, the central one being a little the highest, flanked by an ornamental arcade on each side. Under the latter is an inlaid diaper, formed of bands of white alabaster, incised with black lines and green marble eyes, the ground being a brown mottled alabaster. The portion of the reredos over the altar is lined with Maltese alabaster from Gozo, the central panel having a fioriated cross, composed principally of a rich creamy yellow marble, also from Malta, closely resembling gold in colour. The shafts and spandrels of the arcade on each side of the altar are composed of marbles of various tints. The greater part of the inlaid marble and alabaster work was selected by Mr. R. B. Sheridan, M.P., of Frampton Court, when on a recent visit to Malta, and was prepared there. Mr. Earp, of London, carved the ornamental Caen stone-work, and also the arcade and marble diaper-work underneath it, and fixed the reredos in its position. The design was prepared by Mr. Ferrey, architect. The reredos is intended as a memorial of a relative of Mr. Sheridan, who has borne the entire expense.

Tawstock (Devon).—The Church of St. Peter's, Tawstock, has been restored under the direction of Prof. G. G. Scott, architect, at a total cost of 1,800*l.* The expense of the chancel has been defrayed by the rector, the Rev. H. B. Wrey, who has placed stained glass in all the windows, in memory of deceased members of his family. The ancient fourteenth-century roofs have been repaired and freed from the plaster by which they were hidden. The nave and aisles have been re-seated with open benches of wainscot, and a vaulted oak ceiling fixed in the tower. Many curious mural paintings have been discovered, representing Scriptural subjects and ecclesiastics. One, supposed to represent Baalam and the Ass, was overlaid with an inscription recording the names of seven persons who died 1573. The church is noted for its monuments erected by the Bouchiers, Earls of Bath. The holy of the ancient oak pulpit was discovered, and has been refixed. The transept roofs yet remain unfinished. The contractors were Messrs. Dendle

& Pulsford, of Barnstaple; Mrs. Beer, of Exeter supplied the stained glass, and Messrs. Peard Jackson the artistic metal-work. Mr. The Leigh, of London, was the clerk of the works.

Wells.—The effects of high wind on the 18th of January are plainly apparent in the west front of the cathedral. The two niches in the upper part of the north-west tower are almost entirely deprived of their sculptured canopies. This was not wholly the work of the tempest. Several large fragments having fallen, and other portions appearing to have been loosened, the dean and canon in residence deemed it necessary to order a considerable space of ground to be enclosed, whilst a man descended from the top of the tower, by means of a rope, to examine the state of the stonework, and to remove any particles to be dislodged. The statue of Bishop Bulwih is in a sad state of decay.

Lynn.—The new spire of St. Nicholas Church, Lynn, has recently been completed. Some year back, it was considered desirable to take down the old spire on account of its dangerous state, and for many years the old tower was without a spire. A committee was formed, and a subscription obtained, to erect a new spire. Mr. C. G. Scott, designed the spire, to be erected similar to the new lantern tower of Ely Cathedral, with oak framing covered with stout lead. The builders of the Ely lantern tower, Messrs. Freeman, were also employed to erect this spire in height 200 ft. from the ground-line.

Acot.—The late Mr. William Rogers, of Shorliff Court, had for a considerable time been labouring to obtain the erection of a new parish church, on land which he had purchased, and intended to present for the purpose. The preparation of the plans and designs were entrusted to Mr. W. L. Sear, of Margate. His design consisted of a building, a portion of which only it is proposed to erect at present, which will be sufficient to accommodate 300 persons, but to which when funds will allow, it is proposed to add a second portion, entirely in keeping with the original design, in which other 300 persons can be seated. There will be a bell-tower at the north-west angle, and a spire rising to the height of 100 ft. The design of the building is in the Perpendicular style, and it is proposed to be built of bricks (to be made on the spot), faced with Kentish rag, and covered with slating in ornamental courses. The structure will be extremely plain.

Nidd.—The church of Nidd, built at the expense of Miss Rawson, of Nidd Hall, has been consecrated and opened by the Bishop of Ripon. The present building is on the site of an old church, which had fallen to decay, and the foundation-stone was laid in August, 1866. The architects were Messrs. T. H. & F. Healey, of Bradford, and the contractors Messrs. Favcett of Harrogate. It is built in the Early Decorated Gothic style, with plain simple nave and chancel. The pulpit, lectern, and chancel-fittings are of a less plain character. Open moveable benches of oak form the sittings. The floors are laid with Maw's Staffordshire tiles. The east and west windows are of stained glass. The tower at the west end contains a peal of five bells, by Messrs. Mears & Stainbank, of London. The walls internally are of Burton Leonard limestone. The roof is hoarded, and a tower with a groined ceiling is used as a baptistery, the ancient font being retained. A hot-air heating apparatus by Messrs. Haden, of Trowbridge, is laid down.

Wansford, near Driffield.—A new church has been consecrated here. Sir Tatton Sykes, bart. laid the foundation-stone on the 29th of September, 1866. The site, with the surrounding burial-ground, was presented by Sir Tatton, who also defrays the whole cost of the new church, which was designed by Mr. G. E. Street, of London, and occupies the site of a demolished chantry-chapel, founded by Elias de Wansford early in the fourteenth century, and of which only the font remains. The old chapel was dedicated to the Virgin, as is the new church. By the liberality of Sir Tatton large schools have been built in the village likewise.

Eastbourne.—The chancel-stone of St. John's Meads, has been laid. The want of a church at Meads (which is a district entirely separate from the Old and New Towns, and situated at the foot of the breezy downs, commanding view of the town, the sea, the hill, and the neighbouring country), has long been felt by all classes; the nearest place of worship being more than a mile off. A subscription was consequently set on foot, headed by members of the Brodie family, and it was contemplated that the sum required to build a church, a residence for the minister

d to establish a small endowment, would be about 6,700l. Of that sum 5,370l. have been allocated, and the erection of the church and organ commenced on a piece of land given by the Duke of Devonshire, the patron of Eastbourne. The architect is Mr. H. E. Rumlh, and the builder, Mr. James Peeres; both residents of Eastbourne. The church is intended to afford accommodation for 450, and the style is Decorated. The edifice will consist of a chancel, nave, tower, spire, and aisles.

Bishop Stortford.—Mr. J. Clarke writes that he is preparing the plans and reporting on the proposed works here for the restoration of the parish church.

Hull.—An influential meeting has been held here for the purpose of considering the best means of completing the restoration of the Holy Trinity Church. The meeting was attended by the Archbishop of York, Lord Wenlock, Mr. C. Kes, M.P., Mr. W. H. H. Broadley, high sheriff of Yorkshire, &c. Resolutions were agreed to regarding the meeting to form a fund of 20,000l., for the purpose of restoring this, one of the largest parish churches in the kingdom, and which is now in a very dilapidated condition.

Books Received.

Wholesome Fare; or, The Doctor and the Cook: a Manual of the Laws of Food and the Practice of Cookery. By EDMUND S. and ELLEN J. DELAFORE. London: Lockwood & Co. 1868.

NOTWITHSTANDING the abundance of cookery books, the waste of food from bad cookery does not seem to diminish. This is a subject of great importance to the poor, but, unfortunately for them, the cookery books are generally prepared for another class of persons. It is not amongst the poorer classes alone, however, that there is bad cooking; and were the middle classes better instructed, good cookery might soon descend to the lower orders. The work under notice is intended for the middle classes, and it is not a mere collection of receipts for dishes, but an enlightened treatise on hygiene as well as cookery. The more immediate object of the work, according to the authors,—

"is to show that the real essentials of a good dinner,—a few good dishes,—may be had by those who have means to will it. . . . Other points which we have been anxious to insist on are the hygienic effects of cookery, and the relative value of the different kinds of food. . . . The class whom we address are above the prejudices entertained by the labouring population of England and Scotland, if not of Scotland, who will only cut what they eat and what they are used to. . . . Our readers will not be offended at being reminded why some articles do not eat good, others indifferent, and others bad,—that popular belief may be sometimes mistaken in the nutritive and it attributes to certain articles,—that jellies and root-rot pap are not nourishing, while prase soup and stinging, head-four, out-of-the-way, and dried harricots, made into a stew decidedly are. Besides the passages relating to what may be fairly called the philosophy of cookery, it is hoped that useful suggestions will be found in the pages devoted to the sick, the sedentary, and the invalid."

As a specimen of the style of the work, we may transfer two or three of the passages marked by us for use in this notice. In treating of the two essential principles of food, aliments and combustion and aliments of nutrition, the authors remind us that,—

"The fat of living animals is a stock of combustibles, stored away by the blood against a rainy day. Fat in the circulation's savings bank. There it puts aside its little perquisites, knowing well where to find them in case of need. Witness the fat pig mentioned by Lucretius, which, covered by a heap of fallen ruins, was found alive and well three days afterwards. As a matter of course, he was fat longer; but, even had the length of the feast been less, the blood is able to find in the fat. For the pig had not certainly continued to breathe from the first to the end of those 180 days. His fire of hydrogen and carbon never went out for a minute, and a lucky thing it was that the pig that he had put something by in his time of plenty. The principal sufferer was the owner of the pig, who reckoned on the luxury of rasher and ham. On this occasion pigs literally ate his own bacon. . . . But all that we eat is not burnt to keep us warm; it would the continual wear and tear of our organs? Our food, therefore, may be divided into two distinct kinds: the kind intended to be burnt within us, which may be called *aliments of combustion*; the other destined to nourish the body, which may be called *aliments of nutrition*. The flour of wheat, of which bread is made, contains both these elements."

There is no need to be over-anxious about the bodily health of the man who has plenty of good bread to eat, who has sufficient starch to keep himself warm, and salt to enable him to sustain his strength. It is only his palate that will be inclined to grumble.

When the distinction which has been thus fully explained between aliments of combustion and aliments of nutrition is never to be forgotten by the home-physician, the nurse, the doctor, and the house-keeper. It should guide

every individual's bill of fare. For what can he clearer need of additional material to build up their frame than the adult or the aged, to whom the same supply of growth-making material is not only superfluous, but positively adverse? That amongst adults the hard working man, the sportsman, the traveller, have greater need of repairs than the gentleman who leisurely sits at home at ease? That even sedentary persons make different expenditures of exertion, which require to be replaced accordingly? The statesman who composes a novel, or the customer who writes a book, the business man who manages a concern, draw more freely on their strength and nervous energy than the lounging who skims the daily papers, the reader who whiles away an hour with a novel, or the customer who purchases an article at a shop.

The distinction is likewise of great importance both to persons who are Too Fat, and to those who are Too Lean. The former have had their ailments attended to by medical writers, both in England and France. The latter, if enjoying tolerable health in spite of their leanness, will be wise to let well alone, consulting themselves with the sportsing proverb, "A lean dog for a long heat." If they feel unwell and weak, let them consult some respectable, properly-educated physician, and beware of the arts of unscrupulous advertising practitioners.

For some time past it has been a well known fact that dry bread and pure spring water constitute a diet whose fattening effects had either been ignored or remained unknown. The grog fed, who are advised to drink water and fermented beverages, and to eat abundance of farinaceous and starchy food. To grow thin, drink very little, confining that little to unwatered wine, coffee, and tea, and abstain from all aliments containing starch.

Literary and other sedentary persons cannot too often be reminded of some wholesome truths as regards regimen and other subjects relating to their special habits.

"Animal fibre becomes hardened by exercise. The whole bodily man, as he grows older, harder, and old age is a general conversion into horn. With workmen, the cooking members are incriminated; with literary persons, it is the brain that works; and often do they become incapable of connecting their ideas, and grow old before their time. In children the brain is still too soft; in old people, it has grown too hard; and either excess is an equal hindrance to the complete exercise of its proper functions. The memory, the first to give the signs of failing, presages the weakness of the other faculties."

Over-activity of mind and inaction of body are the principal causes of disorder with literary persons; but they are not the only ones. The student's very attitude cannot be otherwise than injurious to health. The folding and compression which the vessels suffer, in a sitting posture, at the upper part of the thigh and beneath the knee, impede the circulation in the lower members, one of the consequences of which is cold feet and legs. The action of the body affects the abdominal viscera, and is an additional cause of indigestion; the stomach is doubly a sufferer. Hence, not a few literary men have wisely performed their work in an erect position, by means of a desk which they can stand and write. A standing-desk is useful to have in one's study, if only for the purpose of varying the disposition of the limbs during a spell of work.

Night-work may be regarded as a fourth exciting cause of madness in learned folk. A man who has been working during the day, toils much too hard if he continues to work during a part of the night. The time allowed for sleep is unduly shortened, and an instrument to repair the previous wear and tear. Moreover, the sleep which follows long-continued exertion is never calm and tranquil. It does not produce the effect it ought, because the brain continues in a state of excitement. It is found impossible to break the thread of thought; the over-early labourer cannot sleep, or if he do, it is a state of half-sleep and half-awake, during the course of which restless ideas increase fatigue without rendering any service. The ancients were well aware of the danger. Aminus Pollio, consul and orator, who was the first in Rome to collect a library, was so conscious of the risk of evening studies, that he would never read his letters after the tenth hour; that is, two hours before sunset.

Of all the functions, when once disordered, sleep is the most difficult to re-establish. We lose it gaily, we lament it bitterly, and almost always uselessly."

"Literary persons should pay attention both to the selection of their food, and to its quantity. Errors in either respect produce bad consequences; but, of the two, it is better to make an injudicious choice than to exceed a due allowance as to quantity."

Improper aliments are,—all fat and greasy things, which further relax the fibres of the stomach, deaden the action of the saliva and the gastric juice, and occasion heaviness in the stomach, in consequence of the slowness with which they are digested.

All viscous, pasty, glutinous things act nearly in the same way as greasy things. Amongst these are included fried things, pancakes, fritters, creams, the feet of animals, &c., certain fish,—as eels, skate, cuttle-fish, &c.

All meats which are either hard naturally, or are hardened by salting and smoking, on which a weak digestion acts too slowly,—rest a long time in the stomach, and irritate it by their weight and their acrid qualities. Pork, sucking-pig, ducks and geese, are not usually aliments adapted to the digestive powers of sedentary, convalescent, or literary persons.

Their most proper aliment consists of,—the young and tender meats of the animals which are usually sent to table; scaly fish, whose flesh is firm and delicate, whether from the sea, the river, or the lake; the cereal grains, such as the different varieties of wheat, rye, barley, oats, and rice; those vegetables which are neither too saline nor too acid; most of the common garden-roots, which, besides their farinaceous elements, contain a proportion of sugar and flavoured matters, whose effects are very beneficial; bread, with its common basis of the food of every civilized nation; eggs, milk, well-ripened fruits.

Meat should be eaten either roasted or cooked in a very small quantity of water, when boiled in a large quantity of fluid, many of its nutritious particles go into the broth. Tender beef, good veal, mutton fed in dry pastures, chicken, capons (when not too fat), the guinea-fowl, young partridges, and leverets, are the proper meats for delicate persons, and which, perhaps, they would do right in confining themselves. Fish is never more wholesome than when it is boiled.

In the choice of food, precautions have to be taken which cannot be laid down in general rules, but which everybody ought to discover for himself, by observing what things

suit and what disagree with him. Some people digest meat more easily than vegetables, which cause a disagreeable sensation at the pit of their stomach; whilst others find them lighter than meat, being less liable to cause sleepiness and feverish symptoms. Some literary persons feel easily after eating bread, so that they are obliged to restrict themselves to a very small quantity. Milk does not suit everybody, and eggs disagree with many people, without its being possible to assign a reason. In short, in respect to food, it is absolutely necessary to consult each individual stomach.

Men of letters (which includes women of letters), like Augustus Cesar and all other delicate persons, cannot bear severe cold, nor great heats, which try them sorely, because it is more difficult to protect one's self against them than against cold. Milton, in summer used to fall into a state of prostration which bordered on intellectual dulness. Less illustrious instances are far from rare."

On the whole this is a much superior "cook-book," as the authors have it, than the general run of what one is wont to see, whether new or old.

Practical Plane and Solid Geometry, especially adapted for Science Classes. By WASHINGTON HUDSON, Government Science Teacher. London: Whittaker & Co. 1868.

SEVERAL works on geometry have been published lately (some of them noticed in our pages), and we are very glad of it; it is a good sign. Mr. Hudson's intention, in issuing the quarto of thirty-five pages of letter-press, and sixteen pages of plates, now before us, was to supply what, as a Government science teacher, he has always felt, the want of a cheap book upon geometrical drawing, which would combine all branches of geometry, and be couched in the simplest phraseology. This want he seems to have supplied. The book unites plane and solid geometry, with perspective projections, and may be bought for its workmen in many branches of trade would find the study of it of great assistance to them.

VARIORUM.

"TELEGRAPHIC Communication with India." By Francis Gishmore. Stanford, Charing-cross. In this pamphlet a short account is given of lines at present available for Indian messages, and an explanation of the arrangements lately entered into with the Governments of Prussia, Russia, and Persia, for carrying out a new line through these countries, to be exclusively devoted to the transmission of Anglo-Indian and other Indo-European messages. The working of this line has been entrusted to Messrs. Siemens & Halske, of London, Berlin, and St. Petersburg, electrical engineers and contractors, who propose to delegate the office to an English company. The proposal is to construct a two-wire line from London to Teheran in Persia, where the lines of the Indian Government to India commence. The line will run from London, via Hamburg, Warsaw, Odessa, and the Black Sea, to Tiflis and Teheran.—"The Transference of the Telegraphs to the State." By John Stephen, electrician. London: Longmans & Co. In this pamphlet a sort of gossipy advocacy of the proposed transfer of the telegraph lines to Government is given.—"Hints to Certifying Surgeons under the Factory Acts." By George Greaves, consulting surgeon, Chorlton Union Hospital, &c. Knight & Co., Fleet-street. The chief object of this tractate is to aid certifying surgeons in respect to the physical signs of age in the young, and especially on the dental tokens, so as to meet the requirements of the law. It also treats of indications of contagious disease, delicacy or deficiency of health, accidents, &c.

Miscellaneous.

THE ANCIENT CHURCHES OF THEFTORD.—An archaeological fact has just come to light in the identification of the architectural remains of the crypt of a church, forming the wine-vaults of a dwelling-house situated near the Market-place, Theftord, as the ruins of St. Laurence church, one of the many that formerly ornamented this ancient town. The roof of the portion which remains is scarcely above the level of the present street of Theftord, but the freestone columns, &c., are still in a good state of preservation. This completes the local knowledge of the sites of the churches of St. Mary the Great, St. John's, St. Nicholas, St. Ethelred or St. Audry's, St. Giles's, St. Andrew's, Trinity Church, St. Mary Magdalen, St. Helen's, St. John's, and St. Augustine's. Those remaining to be traced are the sites of St. George's, St. Benet's, St. Edmund's, St. John's, and St. Margaret's.

DURHAM UNION WORKHOUSE.—"Fairplay" has sent us a reply to the letter in our issue of February 8th, signed "William Fox," but no public advantage would result from its publication.

THE THREE S'S.—Every one knows of the three R's in the educational question, Reading, 'Riting, and 'Rithmetic. We are now to have three S's in the railway question,—“ Signals, Safety, and Sivilty,” at least, so said a learned director at a dinner t'other day.

VALUE OF SEWAGE MATTER.—The sewage of Mansfield has been for years applied to upwards of 900 acres of pastures belonging to the Duke of Portland. Since the irrigation was commenced the duke has saved 1,400*l.* per annum, formerly expended on bone manure, and the water flowing from the meadows is returned clear and pellucid into the river Maun.—*Nottingham Journal.*

CHESTER TOWN HALL.—At a meeting of the Corporation, held on Wednesday, a resolution was passed that the tower, which forms the most ornamental part of the design for the new town-hall at Chester, should be built. The Corporation had it in their contract with the present builder to have it built for the sum of 1,980*l.*, and the building will be at once commenced.

BOILER EXPLOSIONS.—The report of the chief engineer to the National Boiler Insurance Company has been issued. There was only one case of explosion in boilers insured by the company, but the reporter records the occurrence of 49 explosions during 1867, against 74 in 1866. The cases, however, have been of a more fatal character in 1867 than in 1866. No less than 58 persons were killed and 81 seriously injured. The explosion of the insured boiler is said to be the only occurrence of the kind in the experience of the company. We observe just now from the newspapers that a locomotive boiler has exploded near Bolton, severely injuring the driver; and a dyework boiler or pan has exploded at dyeworks near Bacup, killing one man and injuring another, besides damaging the dyeworks to the extent of 400*l.*

FALL OF A RAILWAY TUNNEL.—An accident of a serious character, but fortunately unattended by loss of life, has happened on the Knighton and Central Wales branch of the London and North-Western railway. This line extends from Craven Arms to Llenydyd, and in a distance of a little over 48 miles passes through three tunnels. For the last two months a gang of men have been engaged at every favorable opportunity in casing with brick the tunnel near Llanynllo station, a costly work undertaken by the company as a means of giving additional strength to the arch. The precaution has been justified by the sudden collapse of a portion of the tunnel at the Knighton end, which had not yet been reached by the workmen. The tunnel is nearly three-quarters of a mile in length, and was constructed about four years ago.

POSITION OF GATESHEAD.—The local *Observer* says,—“We would that it could be our duty to defend our borough from the attacks of contemporaries; but when truth shines upon truth contradiction is not advisable. The *Builder* of Saturday contains an article in reference to our borough. The allusions are, we say it with respect, painfully true. Perhaps if there is one slight error, it is concerning the townhall. Our contemporaries will be pleased to note, as well as ourselves, that that question is now settled; designs have been approved of, and a tender for erection accepted. This of course was not known until the 6th inst., and in all probability the *Builder's* article would be written previously. Unpleasant and uncheerful as the picture may be, we feel it is our duty to give it *in extenso*,” and thers it is given. Elsewhere we find, in comments on the same article,—“However gloomy the writer of the article in the *Builder* may have pictured our borough, we can at least hope for better things. New, young, and vigorous men are now pushing their way in the council chamber, men who do not adhere to the old ways of transacting business, and do not approve of the see-saw committee to committees work; but men who will, I hope, act as stimulants to the older members, and stir them to do all they can to amend their ways. The poet remarks that ‘discretion is the better part of valour,’ but the discretion of our town councillors has been so unsatisfactory for some time, that a little valour at the present moment would not be an improper proceeding.”

TRADE UNIONS AND MR. GLADSTONE.—The conference, of which much has been said, took place at Mr. Gladstone's residence, Carlton-gardens, on Tuesday morning last, according to arrangement.

SANITARY MATTERS AT OSSETT.—Some ill-considered and unwise opposition to the introduction of the Local Government Act at Ossett is being made, but it is to be hoped will not be successful. The *Ossett Observer* combats their statements with much spirit and intelligence.

THE BALCONIES OF THE TRAVELLERS' CLUBHOUSE.—We are glad to hear that in consequence of the representations that have been made to them, the committee of the Travellers' Club have determined to restore the balconies of the south front of their club-house to their original condition, as designed by the late Sir Charles Barry. The work of reconstruction will be deferred till the autumn to avoid inconvenience to members of the club.

STRIKE AGAINST FOREIGN OPERATIVES.—A large proportion of the workmen engaged at the extensive spliter works Messrs. Vivian, Swansea, have struck, owing to various alleged grievances that the native workmen complain of in several respects. It appears that Mr. Disme, a German gentleman, is at the head of one department, and, owing to certain reasons of his own, he has recently engaged some twenty or thirty of his countrymen, who have been introduced to the works. This gave great umbrage to the English, Welsh, and Irish operatives, who aver that the foreigners, although paid a higher rate of wages than the natives, are inferior to them in physical and other respects.

THE HERTFORD BUILDING COMPANY.—The annual meeting of the shareholders of this association for the improvement of the dwellings of the poorer classes has been held. The mayor presided. Among those present were Mr. R. Dimsdale, M.P., Baron Dimsdale, and various other influential gentlemen. The report, which was adopted, showed that the past year's proceedings were satisfactory, and that a dividend of 4 per cent. was available. The paid-up capital of the company was all exhausted, and they possess at the present time twenty-six tenements and a lodging-house. They propose to dispose of them on a benefit building society scheme to working-class tenants, payable in rent for a given number of years. The financial affairs are said to be in a healthy condition.

LONDON AND MIDDLESEX ARCHEOLOGICAL SOCIETY.—An evening meeting of this society was held last week at its rooms, 22, Hart-street, Bloomsbury, Mr. Henry Campkin, F.S.A., in the chair. Mr. T. Milbourn, Hon. Secretary, read a paper “On the Church of St. Mary, Somerset, Upper Thames-street” (about to be pulled down). He said it was dedicated to the Virgin with the additional epithet of Somerset from its proximity to a port or haven in olden time called Sumer's Hot or Hibe, resembling that of Queenhithe. It is of early foundation. After the Great Fire the church was rebuilt and finished in 1695 on the designs of Sir Christopher Wren. Mr. W. H. Hart, F.S.A., exhibited and described four MS. Books of Hours of the Virgin in good preservation. Mr. T. Gunstan exhibited Roman antiquities from Tokenhouse-yard, and Mr. J. E. Price examples of ancient pottery from Old Ford. Fragments of Samian ware, lately discovered in Fenchurch-street, were contributed by Mr. Ivatts.

YORKSHIRE ARCHITECTURAL SOCIETY.—The annual meeting took place in the York School of Art, when the Rev. Canon Hey occupied the chair. The Rev. G. Rowe (secretary) read the annual report, and the Rev. T. Bayly stated that the balance last year in favour of the society was 98*l.* 5*s.* 1*d.*, whilst this year, with 160 members, who brought in an annual income of 80*l.*, the balance in their favour had increased to 128*l.* 2*s.* 1*d.* If they ever became a society having the object of making grants, he said they should possess at least five times as many members as at present, whilst its income should be at least 300*l.* a year. The Rev. G. Rowe moved that local secretaries be appointed for the districts of Leeds, Doncaster, and Sheffield, and that the secretaries of these places respectively should be the Rev. Mr. Gott, of Bramley, the Rev. G. H. Phillips, and Mr. Joseph Fawcett. The resolution was carried. It was explained that the general meetings would be held alternately at each of the above places.

THE LATE SIR DAVID BREWSTER.—The name of this eminent philosopher have been laid Melrose Ahey. He was born in the Canonry of Jedburgh, on the 11th December, 1781. His father was teacher of the local Grammar School which at that time was held in the Lady Chapel of Jedburgh Ahey. It was in this place that James Thomson, the author of “The Seasons” received part of his education.

FIRE AT THE CHARING-CROSS RAILWAY STATION.—The roof extending over the entire length of the station has sustained considerable damage from fire, originating about the clearing-ho. Strangely enough, a second accident has occurred at the station, an explosion of gas having taken place in the eastern lodge of entrance-gates of the terminus. It seems that a lad went down into the basement of the lodge to turn on the gas. It is presumed that he had a light, and, as the gas had been escaping, explosion resulted, and the lad is seriously injured. An examination of the lodge disclosed that the interior was completely torn up.

DINNER AT THE CITY TERMINUS HOTEL, CROWN-STREET.—On Wednesday evening about 100 surveyors, including a few barristers, dined together in the great hall of this hotel. Mr. J. Lloyd presided; and the vice-chairs were occupied by Mr. Clark, Mr. Horsey, Mr. Ryde, Mr. Buckland, Mr. P. Vigers, Mr. Watney, and Mr. Lee. Among the general company were Mr. Garth, Q.C., M.P., Mr. Keane, Q.C., Serjeant Parry and Robinson, Mr. J. A. Russell, Q.C., Mr. John Clutton, Mr. H. A. Hunt, and the majority of the leading London surveyors. Among the principal toasts were “The Surveyors of England coupled with the name of Mr. Clutton,” and “Our Committee and Mr. Ryde.” A glee party was attended.

SINGULAR SUBSIDENCE OF AN HOTEL.—An extraordinary casualty is taking place at Desenzano, in the province of Brescia, in Italy. The Hotel de Porta-Vecchia, built upon piles on the shore of the Lake of Garda, is gradually sinking at the rate of about 6 in. a day; the ground floor has already disappeared. This immersion is taking place imperceptibly, and without a shock. Every means of preventing it have been employed, but without avail. The proprietor of the hotel, who was at first in despair at the misfortune, at length determined to charge a fee for admission to the house, and has already received a sum of money which will go far to compensate him for his loss. A scientific commission is about to visit the spot to open an inquiry.

TENDERS.

For alterations and additions at the parish school Lower Norwood, Surrey, for the Board of Guardians of the parish of St. Mary, Lambeth, built upon piles on the chert. The quantities were taken out by Mr. Gould-wardle & Baker

Wardle & Baker	23,050 0 0
Tilley	2,987 0 0
David	2,987 0 0
Prebble, Brothers	2,930 0 0
Heshaw	2,921 0 0
Thompson	2,920 0 0
Carter & Son	2,898 0 0
Gannon & Sons	2,777 0 0
Lacey & Flaxman	2,700 0 0
George	2,697 0 0
Nixon & Son	2,697 0 0
Eustace	2,690 0 0
Stevens	2,633 0 0
George	2,632 0 0
Knight	2,598 0 0
Nutt & Co.	2,521 0 0
Pozon & Smith ..	2,445 0 0
Cooper & Cullum (accepted) ...	2,389 0 0

For building a rectory house at Bealby, near Grimby, Messrs. Thomas C. Hine & Son, Nottingham architects.

Dunkley	£2,450 0 0
Tucklepenney	2,398 0 0
Kidd	2,199 0 0
Fender	1,954 0 0
Hollingworth	2,100 0 0
Sutton & Lyman	2,072 0 0
Bar	1,990 0 0
Lipper	1,995 0 0
Ellis	1,985 0 0
Nigge & Lewis	1,979 0 0
Couson & Haywood ..	1,871 0 0
Thompson	1,824 0 0
Lilley (accepted)	1,730 0 0

For the erection of villa residence at Normanton, near Derby, for Charles Brentnall, Esq. Messrs. Thomas C. Hine & Son, Nottingham, architects.

E. Thompson	£1,577 0 0
Humphries	1,566 0 0
Brigart	1,492 0 0
J. W. Thompson	1,433 0 0
Lilley (accepted)	1,420 0 0

For alterations and repairs to house in Charlotte-street for Mr. M. Gabriel, Mr. W. A. Baker, architect. Quantities furnished by Messrs. Richardson & Waghorn.

Brown	£489 0 0
Ward	565 0 0

for two houses, Mile End-road, for Dr. Todd, Mr. Smith (accepted), £1,080 0 0

for new shop-front, Shepherd's Bush, for Mr. Phillips, Taylor, architect:—

Taylor	4239 0 0
Norton	262 0 0
Lasells	250 0 0
Smith (accepted)	277 0 0
Roper	220 0 0

rebuilding 22, Queen's-road, Baywater, Mr. C. G. architect:—

Clemence	£2,195 0 0
FAson	2,176 0 0
Aldred & Doulton	2,167 0 0

or the erection of two shops in Euston-road, for Mr. Aldridge, Mr. W. A. Baker, architect. Quantities issued by Messrs. Richardson & Waghorn:—

Hatchman	£1,837 0 0
Clemence	1,787 15 0
Easton & Chapman	1,769 0 0
Cooper & Cullum	1,660 0 0
Scrivener & White	1,624 0 0
Edly & Wether	1,574 0 0
Mitchell	1,495 0 0

or erection of detached residence in the Underhill, Mr. Charles Dunn, architect. Quantities issued by Messrs. Richardson & Waghorn:—

Mitchell (accepted)	£1,197 0 0
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or converting Coombe-street House into a chapel, at Mr. Charles Dunn, architect. Quantities issued by Messrs. Richardson & Waghorn:—

Easton	£620 0 0
Bray	500 0 0
Milner	459 3 0
Scadding	450 0 0
Westlake	445 0 0

or the erection of board-room, offices, &c., for the Board of Health, at Harrow, Mr. A. H. Jacob, architect:—

AVEY	£1,080 0 0
Crash & Ogilby	988 0 0
G. Webb	986 0 0
Lauder	982 15 0
Taylor	977 0 0
W. R. R. R.	950 0 0
Gibson, Brothers	948 0 0
Nightingale	947 0 0
King & Son	946 0 0
Wool	946 0 0
Uphurch & Hanks	886 0 0
Shurmer	853 0 0
Smith & Summers	849 0 0
Salter	845 0 0
Woodbridge	804 0 0

or rebuilding the Dog and Fox Hotel at Wimbledon, Messrs. Young & Bainbridge, Mr. G. A. Young, architect:—

MASON	£3,550 0 0
Avias & Son	3,265 0 0
Nicholson	3,236 0 0
Adamson & Sons (accepted)	3,160 0 0

or restorations, &c., to Christ Church, Essex, Mr. H. K. architect. Quantities by Mr. Bachellier:—

HINT	£3,257 0 0
Gibbons	2,500 0 0
Rumacle	2,445 3 0
Roberts	2,410 0 0
Bracher & Son	2,300 0 0
Glascock	2,109 0 0
Bell & Son	1,960 0 0
Crutcher & Whithead	1,906 0 0
Brown	1,896 0 0
Tooley	1,850 0 0
Mason & Green	1,709 0 0

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Answers.—Architects who are unwilling (as we are) that their names should accompany lists of tenders with which they are concerned, prevent the committees sending of lists themselves. We cannot be so compelled to decline printing out books and giving notices.

Statements of facts, lists of Tenders, &c., must be accompanied the name and address of the sender, not necessarily for publication.

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ALFRED TRENKLE, Clerk of the Board.

Office of the Board, No. 15, Great-Albion-street, Whitechapel, February 19, 1868.

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R. F. PHILIPSON, Town Clerk. Newcastle-upon-Tyne, 7th February, 1868.

WANTED, by an ARCHITECT in the City, an ASSISTANT capable of making plans from rough sketches, perspectives, and able to measure and make plans of old buildings, and with a fair knowledge of the superintendence and general routine of an Architect's Office. A middle-aged Gentleman not objected to.—Address, W. S. Kirkdale Villa, Leytonstone.

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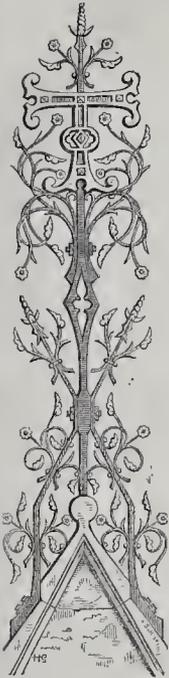
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The Builder.

VOL. XXVI.—No. 1308.



Cottage Hospitals.

THE first attempt to establish a cottage hospital was made at Cranley (by some spell Cranleigh) in 1859, and we lost no time in bringing it under the favourable notice of our readers. Since then many others have been established, and in seven years, or in 1866, there were sixteen in full work and no less than sixty-seven in course of establishment. Nevertheless, a great many more are needed throughout the country. It has been calculated, on satisfactory data, that to supply the proper amount of hospital accommodation in rural districts,—setting aside London and the six principal cities,—one bed to every thousand inhabitants is the requisite proportion. Taking Mr. Swete's statistics

as the basis of the calculation, it appears that there are (or were a year or two ago) no less than nine millions of people in Great Britain unprovided with hospital accommodation. To meet this state of things 9,000 more beds are required; and allowing six beds, on an average, to each hospital, there is scope and necessity for 1,500 cottage hospitals, scattered throughout the country, to meet the demand.

The advantages of cottage hospitals in villages and even towns are many. Besides those which affect the patients themselves, of which we will hereafter speak, there are other benefits which ought not to be lost sight of. Country surgeons and physicians are too often obliged to send off their poorer patients to some county hospital where they and their cases are lost sight of either partially or entirely, and valuable experience is thus lost to country surgeons and physicians which they might bring to bear upon any class. It is thus decidedly for the interest of the well-to-do classes in villages and small towns to support any movement for the establishment of a cottage hospital where it may be requisite in their own immediate district. The bringing of patients near the local surgeons and physicians where cottage hospitals are conveniently situated, is an important point too. As regards the patients themselves the advantages are various. It cannot be promotive of cure in many cases where patients are not saddened by isolation from every relative or friend in a town or county hospital, even were their position equally favourable otherwise to their restoration to health; but of this there is good reason to doubt. We find it stated by some authorities that the proportion of deaths in cottage hospitals is no

greater than in the London hospitals, where the most eminent and experienced surgeons of the day are engaged. This itself is much to say, but we are not inclined to accept it as anything like all that can be said in favour of cottage hospitals. Even were no larger proportion of cures effected in them than in London hospitals, a most important question to the poor man remains to be investigated, namely, how long time on an average it will take to cure any given case in a London hospital by comparison with the time requisite for just such a case in a cottage hospital. Of course much depends on stamina, and on other conditions; but something like reliable statistics, we think, might be ascertained on so material and important a point to the poor head of a family. The assertion that as many deaths in proportion occur in cottage hospitals, with some half-dozen patients in each, as in the London hospitals,—for that is what the ostensible recommendation, to which we have alluded, of cottage hospitals by comparison with London hospitals comes to,—we are by no means inclined to rest satisfied with in the face of the following declaration—not as to cases in cottage hospitals certainly, but as to those in cottage and other homes, to which the nearest thing is a cottage hospital. The cases referred to are not such as are casually treated in cottage hospitals neither, nor indeed in London hospitals with certain exceptions: they are cases of child-birth in cottage and other homes on the one hand, and in town maternity hospitals on the other. The difference of mortality in these respectively is enormous, and we cannot think that as between cottage hospitals and town or county hospitals in other cases such a difference can be all at once reduced to *nil*. Sir James Y. Simpson, one of the highest authorities in the kingdom on such a subject as that of which he writes, says, in a letter to the *Times* on "Hospital Reform":—

"In my address to the Public Health Section of the late Social Science Congress at Belfast I stated, as the result of Dr. Leon Le Fort's semi-official investigations, that, out of 934,781 parturient women delivered at their own poor and often very wretched homes, 4,409 died, or 1 in every 212; while out of 888,513 delivered in maternity hospitals, where every kind of professional care and comfort was bestowed upon them, 36,394 died, or 1 in every 24. These statistics apply to hospital practice as compared with dispensary or home practice among the same class of women in the leading cities and medical schools of Europe. To the general law of the excessive mortality of hospital as compared with home practice, London is no exception. I find from the statistics published by Dr. Barnes that out of 4,000 women confined in the four chief maternity hospitals of London, 142 died, or 1 in every 28; while out of 18,383 confined at their own homes as dispensary or out-patients in connexion with the hospitals of St. Thomas and Guy, 83 died, or 1 in every 246."

That something similar must occur in any extensive enough statistical comparison of the general mortality in London hospitals on the one hand, and cottage hospitals on the other, we have no doubt.

Considering the good they do, cottage hospitals are most economical and easily supported establishments. In an account of them by Dr. Andrew Wynter, in *Good Words*, for May, 1866, he gives the following statement of the receipts and expenditure at the Cranley Cottage Hospital during four years, from 1859 to 1863, for 100 patients:—

Receipts.	
Donations and subscriptions	£342 5 5
From patients	131 4 6
	£473 9 11
Expenditure.	
For patients, salaries, wine, beer, &c. ..	£411 5 5
Insurance, printing, &c.	34 17 5
Repairs and improvements	73 11 4
Furniture	82 11 4
	£612 12 6

If we divide the total expenditure by four, we find that the annual cost, including furniture and repairs, was but little more than 150*l.* per annum; and, indeed, that the cost of the patients but little exceeded 100*l.* for the treatment of twenty-five patients, or 5*l.* as the total cost of each case. This cost is not all paid by subscription or donation: on the contrary, the hospitals

are made as far as possible self-supporting, after they are once established, by weekly payments from the patients or their friends, who, under careful supervision, are also allowed to provide food, &c. In this case the sum contributed on the part of the patients themselves was 131*l.*,—an example of independence to our London artisans and others of the poorer classes.

There should be a cottage hospital in every village, ten miles distant from a town or county hospital.

With regard to the expense of fitting up an hospital for six beds, Mr. Napper, whose experience in the matter, at Cranley, gives great weight to his opinion, places the cost at 70*l.* The cost of fitting up each bed he places at 9*l.* 7*s.* 5*d.* = 56*l.* 7*s.*, leaving about 13*l.* for a kitchen-range, dresser, bath, clock, an easy-chair, table, &c.; but in the estimate no mention is made of crockery, cooking utensils, and some other minor articles. Dr. Waring estimates the cost of furnishing at 80*l.* This sum, added to 20*l.* for repairs, will give a total of 100*l.* With this amount in hand (raised by private donations, sermons, bazaars, or otherwise), any one would be fully justified in at once establishing a cottage hospital of six beds (inclusive of one for the nurse), in any district with 5,000 inhabitants placed beyond ready access to another hospital.

Cottages, of course, can often or generally be had for the purpose ready built, at rents of 12*l.*, as at East Grinstead, where Dr. Rogers presides, to 16*l.*, as at Tewkesbury; but it is not considered advisable to exceed the latter sum except under special circumstances. One great fear which those experienced in the working of cottage hospitals have is, that the system may be elaborated into some costly or ponderous arrangements which would diminish the chances both of the multiplication of such hospitals, and of effecting all the good of which the more primitive and economical system is capable. The subject of fever cases has been considered, but it has been thought better to exclude these, and to rent temporarily a separate cottage for any special occasion of the kind. Memorial cottage hospitals are not a bad idea if the limits be not extended, and the purposes be confined simply to the cure of such cases as those undertaken at present in cottage hospitals.

When the erection of a cottage hospital is contemplated, the best plan is to place the matter in the hands of a respectable local architect, with instructions to conform as nearly as possible to the character of the neighbouring cottages, striving, however, for as much air and light as practicable. The rooms required, according to Dr. Waring,* are,—

"Upstairs: 1, men's ward for three beds; 2, a women's ward for two beds; 3, a small ward, with one bed, for a case requiring separation; 4, a nurse's bed-room; 5, an operating room (lighted from above), to contain the medical and surgical stores; and 6, a bath-room. On the ground-floor: 7, kitchen; 8, scullery; 9, sitting-room; 10, store-room and larder; and 11, water-closet. In addition to these, there should be a small mortuary chamber with a skylight, and sheds or cellars for coal and wood. Such a building, he adds, I am informed by those capable of judging, should cost about 400*l.*; but this would differ according to the price of materials, which varies much in different localities."

The surroundings of cottage hospitals, drainage, &c., ought to be carefully looked to.

A proposal was made last year by Mr. Horace Swete to establish a National Cottage Hospital Association. He considered that such an association would be of value—1, in starting new cottage hospitals; 2, in framing a general scheme of rules for their more effectual operation; 3, in diffusing through their means a sound knowledge of sick nursing and sick cookery; 4, in helping, by a central fund, poorer districts to commence cottage hospitals; 5, in arranging meetings of cottage hospital medical officers annually, for the discussion of matters

* Cottage Hospitals. By E. J. Waring, M.D. Churchill & Sons, 1867.

connected with this class of institutions; 6, in undertaking the arrangement of questions affecting poor law unions, &c.; 7, in publishing a quarterly paper with information as to the progress and working of the system; and 8, in furnishing plans for building, and other such information as might be required.¹

ON THE UTILIZATION OF SEWAGE BY IRRIGATION.

Introductory.

THE records of all countries which, in the history of the world, have arrived at any prominent degree of civilization, bear witness to the important consideration which has ever been bestowed upon the subject of the drainage of cities. A comprehensive digest of these ancient records, such as has yet to be written, would, indeed, form a most valuable addition to what is already known on a subject so full of interest, and concerning which there is such a diversity of opinion. As populations increased, and a certain degree of refinement became a necessity, the rude and primitive habits incident to savage life were cast aside for the systematic purging of great communities of the accumulations of residue and filth which mark the gregarious condition of man. Hence originated that important branch of modern science,—hydraulic engineering.

Much as we are apt to pride ourselves on the development of the infinite resources of our modern civilization, it cannot be doubted that even our most advanced hydraulic works must yield in solid grandeur of design and execution, if not in scientific perfection, to many whose ancient splendour may still be traced through all the ravages of time. When we compare the precarious water-supply of modern London, estimated by Mr. Bazalgette at 5 cubic feet, or 31-25 gallons per head per diem, and by Messrs. Hoffman & Witt at 7 cubic feet, or 43-75 gallons per diem,² with the supply of ancient Rome under the Emperor Nerva, which is recorded in a treatise by his inspector of aqueducts, at 50 cubic feet, or 312 gallons per head per diem, it is difficult to overrate the advantages of the Roman in this respect.

Where, also, the supply of the pure element was so prodigious, there was equal provision for its drainage after being rendered subservient to the uses of man; so that it is not too much to say that in spacious magnificence the *cloaca* or sewers of imperial Rome have never been surpassed. In other countries of antiquity—Greece, Egypt, India, and Assyria, as well as throughout the whole of those nations of Southern Europe assembled under the imperial domination—we have similar instances of the high estimation in which water supply and drainage were held. That which, in a sparse and scattered population, and under the rudest periods of the human intellect, was not deemed, nor was in reality, a nuisance, became, by the concentration of people in cities, with their multiplied wants, a matter which thrusting itself upon the public attention, could no longer remain in harmless obscurity, but loudly called for proper treatment. It is true we have no authentic instance of the application of sewage to the soil on a scale approaching to that upon which it is now proposed to deal with this commodity; nor, perhaps, would there be the need of such a measure under the ancient condition of things; for, when we consider the almost unbounded dilution of sewage, where a daily bath was indulged in by every member of the community, gentle or simple; where the very highest had at his service bathes of such extraordinary magnificence that modern Europe can, by comparison, form no adequate conception of them; when we recollect that water-closets were unknown, and that the more solid and offensive parts of sewage were conveyed and distributed over the land,—it may readily be conceived that the blending of riverine

and drainage waters would not be attended by any such disastrous results as occur in the present age. What was passed into the broad streams upon whose banks all large cities of antiquity were built, mingled with their strong currents, and was swept so rapidly down to the sea that time was not allowed for decomposition.

Moreover, it must not be forgotten that, although the ancients were by no means, as is often erroneously stated, ignorant of the principles of hydraulics and hydrostatics, yet a knowledge of the natural laws of fluids, unaccompanied by the resources of modern invention in mechanical appliances, would in many cases form an insuperable drawback. Had the engineers of ancient Rome commanded the agency of so powerful an auxiliary as the steam-engine, or could they have obtained cast-iron pipes capable of resisting the pressure of a column of water of indefinite height, doubtless they might have solved many a problem which has puzzled later ages, and have dispensed with those stupendous arched aqueducts which are at once the envy and the theme of criticism of their modern successors.

But although the drainage waters of towns may not have been turned to account for agricultural purposes, yet from time immemorial water-irrigation,—its kindred science,—has been practised in all warm countries which have attained any degree of advancement in the tillage of the soil, and it may reasonably be asked why, if pure water alone be beneficial to the land, water containing the undoubted elements essential to the growth of vegetation should not be more so. Before, however, we enter into an inquiry as to the effect of sewage applied to soils, it will not be irrelevant to take a brief view of those causes which in this country have led, we may say so suddenly, to the eminent importance of this subject; from which we may perhaps see that, despite our ingenuity in striving after cleanliness, we have as yet merely succeeded in shifting the locality of the disease, without in any degree eradicating it from the constitution; or as some hold, that in efforts to rid our habitations of their necessary refuse with as little delay as possible, we have converted a transitory sore into a fixed and dangerous ulcer of the gravest kind.

Town Drainage with reference to Water Supply.

That "cleanliness is next to godliness" is a saying for which we have very high and ancient authority, and if we consult the records of religious ordinances from the earliest ages we find that in the performance of sacred rites frequent ablutions form a never-failing ingredient. In Holy Writ we are told that such ablutions were strictly enjoined under grave penalties, and the washing of feet was an invariable act of hospitality towards the wearied traveller. It is true that the climate in some degree necessitated a certain standard of cleanliness, more especially as touching the curse of leprosy; and that the Hebrew of colder countries has not always been distinguished for his impartial observance of this duty; but, nevertheless, the very existence of such ordinances appears to point out the fact that uncleanness of the body was deemed unholy and incompatible with devoutness of the soul. In all Mahometan and Oriental countries these rites are held in the highest respect, and the neglect of them, which travellers occasionally notice, arises chiefly from the scarcity of the precious liquid under a burning sun. In our own country, as in all modern nations, it is only of late years that a frequent use of water has become at all tolerated, and even yet the great masses of the population of Christendom are far behind the followers of the Prophet in this regard, and are not untruthfully described as the "great unwashed." So advanced, indeed, is the Oriental of higher rank, even beyond the fastidious cleanliness of the English gentleman, that in his ablutions running water alone will serve his purpose.

Until nearly two centuries ago and a half ago there was no regular supply of water to the metropolis, and the construction of the New River works, by Sir Hugh Myddelton, was considered a prodigy of human skill. Since then there have been sundry additions made from time to time by way of auxiliary supply; but until a period within the recollection of the present generation there was no marked alteration in the water supplies of our towns. The use of the bath was a luxury, and as such, unknown to nineteen-twentieths of the population; water-closets were still in futurity; manufactures by steam-power had not arisen from their infancy;

and what was sent through the miserably incomplete systems of drainage then extant was in fact little else than the household drainage and a portion of the rainfall. So slight an admixture of sewage in the large volumes of our rivers was therefore comparatively harmless; and up to a very recent period their waters, with a few exceptions, such as in the clothing districts of the West Riding of Yorkshire, were clear and pure, and abounded in fish.

But when the requirements of modern civilization caused the erection of water-closets, and were supplemented by an increased water-supply to the towns; when new and complete systems of main drainage were adopted, by means of which masses of filth, which before had been allowed to stagnate and rot under the noses of the inhabitants, until hoisted into the farmer's wagon, were swept down into the nearest water-course, then the attention of the public became drawn to the baneful results of river pollution.

The defiling of the great source of our water-supply is indeed the price we pay for the abolition of the pestilent dung-heaps, reeking gutters, and other unclean and unsavoury practices of our ancestors, such as in Smollett's time were to be found in Edinburgh, and which would shock the nice manners of the present day. Cesspools were at first instituted, and in many towns it was made a punishable offence to allow water-closets to drain into the sewers. It was not long, however, before the authorities discovered that, in avoiding Scylla, they had lighted upon Charybdis; and with improved sewerage it was found better to suffer fecal matter to pass into the drains and so into the rivers, than to harbour in the vicinity of each dwelling the ever-accumulating abominations of the cesspool, which were enough to poison the water of every well in their neighbourhood, and breed a pestilence in the land. Speaking on this subject, Mr. Rawlinson, principal inspector in the Local Government Act Office, says:—"The most dangerous condition for a cesspool is for it to be covered; if you are to have cesspools, the safest plan is to take the top off, and let the gas be constantly diluting. In Paris, cesspools are constructed under the superintendence of the authorities, who profess to make them water-tight by hermetically sealing them. This is a fallacy, as the gas escapes at the joints."³

The failure of cesspools to meet the sanitary requirements of a town, has mitigated the prohibition clauses in Corporation Acts, and the discharge of water-closet refuse into the sewers has become wellnigh universal. The influx of so enormous a volume of organic matter, rendered doubly pernicious by the immense increase of manufactures, and the numberless river-weirs, which in dry weather divide them into long, stagnant reaches, has had its due effect on our rivers; so that in all our populous districts their one-time pure waters have been converted into so many masses of unsightly sewage, whose sight and smell are offensive, and whose effect is to breed subtle and dangerous epidemics.

Let, however, there should be any misunderstanding in the minds of the reader as to the just proportion of the effect of manufactures upon river waters, it must not be omitted to state, that although positively the effect of all foreign and discolouring matter is to deduct from their wholesomeness, yet relatively it may be otherwise; as when a certain kind of pollution may be neutralised by the introduction of polluting matter of a certain other kind, which is undoubtedly the case in regard to the infusion of the acid refuse of dye-works amongst currents polluted by town sewage and other animal refuse. The statement of the Rivers Pollution Commissioners, in their report on the Aire and Calder rivers, vol. 1, page 14, sets this matter in a clear light:—

"The dark and foul appearance of the West Riding rivers is mainly due to insoluble dye-matter discharged from the works; but dye refuse in general, though in this sense highly objectionable, really tends, to a considerable extent, by the disinfecting action of the mineral ingredients and acid it contains, to neutralise the corruption of town sewage. Where, on the other hand, this dye refuse is not discharged in sufficient quantity, that offensive matter deposited on the beds and banks of the streams, becomes, in dry weather, putrid and stinking."

In many parts of the West Riding clothing districts, where large and increasing towns are situated on the banks of comparatively small streams, recourse is had to reservoirs. Periodically, once a week, or once a month, these are flushed out, generally on a Saturday afternoon, and the whole of the deposit of "sludge" and refuse is sent down the stream. During these

¹ The experiment made by the Marchioness of Ailesbury in establishing a cottage hospital at Bevernake, near Marlborough, appears to have succeeded admirably. At the annual meeting held under the presidency of the Marquis of Ailesbury, K.G., the report was read by the Rev. J. O. Stephens, honorary secretary to the institution, and the document showed that during the past year an addition of 154, had been made to the endowment fund. It was also reported that seventy-nine cases had been received into the hospital (making up nine beds only), forty of which were discharged cured, twenty-eight were relieved, two pronounced incurable, and two fatal.

² Report on Metropolis Sewage, 1864. Mr. Ellis's evidence: 174.

³ Rep. Metropolis Sewage, 1864: 4219, 4220.

flushings the water of the stream is defiled to such an extent as can hardly be realised by those who are non-resident. The neighbourhood of Bradford, Dewsbury, Batley, and Heckmondwike, is especially distinguished by this characteristic.

How, then, to deal with an evil so gigantic and so rapidly increasing, is a matter which has naturally attracted the attention of the scientific men of the time, and innumerable remedial schemes have been proposed. In order to form a correct estimate of the most prominent of these, it will be proper to ascertain, as far as possible, what its sewage is; what are its constituents, what its capacities, and what is its commercial worth.

Sewage: its Constituents and commercial Value.

In the earliest stages of the inquiry into the best means of restoring our rivers to their pristine purity, the chief source of encouragement was the fact that the liquid hitherto wasted to the detriment of the public, contained all the most valuable elements of manure, which but required to be applied in a proper manner to become a permanent source of revenue. In spite of the example of the Edinburgh meadows, where for nearly two centuries sewage has been profitably utilized, many schemes for merely purifying the liquid, without any view to turning the residue to account, have been entertained, adopted, and in almost every case abandoned, to the neglect of the sounder principle of utilisation.

Perhaps the best definition of sewage in its present application is, the condition of water after it has served all the purposes of mankind, and contains the impurities disgorged by water-closets, kitchens, washhouses, hospitals, tanneries, slaughterhouses, knackers' yards, dye-works, and manufactories of every description, the washings of streets, housetops, &c. That this refuse holds in solution the most essential ingredients of fertility in the form most adopted to their beneficial application, is a fact now established in the opinions of those who, as chemists, agriculturists, or engineers, have especially devoted their studies to the development of this branch of political economy; the chief exceptions being on the part of those who advocate the dry-earth system of closets, and those who are interested in the production of artificial manures. But the history of sanitary reform for the past quarter of a century shows how slow this truth has been in gaining upon those whom it most concerns.

During that period time, money, and careful research have been abundantly bestowed upon experimental dealings with sewage, chiefly in pursuit of precipitates, mediums of filtration, and similar remedies. But it can be no error to state, that notwithstanding the manifold inventions, which from time to time have been set forth, a practical and undoubted remedy of this nature has yet to be produced; on the other hand, the practical results of sewage irrigation would appear to have placed the theory of utilization upon a solid basis of fact—an eminence which no other remedy has reached.

Careful analyses by some of our most eminent chemists have shown that town sewage contains ammonia, phosphoric acid, potash, and other fertilizing ingredients, which, having been abstracted from the land in the process of agriculture should logically be restored in their transmitted form.

Professor Way, consulting chemist to the Royal Agricultural Society, says that the average of ninety-three analyses of Rugby sewage showed 7½ grains of ammonia to the gallon. He made similar experiments with London sewage at different points, and found it to vary from 7½ to 18 grains per gallon; but the results appear inconsistent, as the same gentleman states that the value of London sewage, as compared to that of Rugby, is as 60 to 100, or six-tenths.¹

Mr. J. B. Lawes, manufacturer of artificial manures, appointed by Government to conduct experiments in sewage at Rugby, found, in 1861, that the proportion of ammonia in a gallon of Rugby sewage was 6.39 grains; 1862, 6 grains; in 1863, 6.75 grains, besides potash, phosphoric acid, and a variety of valuable salts. The quantity of ammonia given would amount to three or four ounces to the ton, and he valued it at 8d. per pound.²

Boussingault says, that supposing the excreta of man to amount only to 1½ lb. per day, and that they contain 3 per cent. of nitrogen, in one

year they will amount to 547 lb., containing 16½ lb. of nitrogen,—a quantity sufficient to yield the nitrogen of 800 lb. of wheat, rye, or oats, or of 900 lb. of barley.³

The agricultural value of these manorial ingredients has been variously estimated by a host of authorities, some of whom base their calculations on analytical results, some on actual experience, and some on a well-digested combination of the two. These estimates are given below; and, in order that a definite conclusion may be found as to the gross value to the nation of this important commodity, we prefix the annual quantity of London sewage, as estimated by Mr. Bazalgette, Captain Galton, and Mr. Ellis:—

Mr. Bazalgette	155,544,000 tons.
Captain Galton	215,762,000 "
Mr. Ellis	266,000,000 ⁴ "

Baron Liebig is of opinion that the value of sewage is 1½d. per ton.⁵

Sir Charles Fox places it at the same figure, but says that 1d. per ton is more than can be obtained.⁶

Mr. B. Latham stated, at the sewage congress at Leamington, 1866, that 6s. per head of the population contributing to contributing to the sewers had been realized at Croydon and South Norwood.⁷

Messrs. Hoffman & Witt state that 1,250 tons of sewage contain as much fertilising matter as one ton of guano, the value of guano being from 11s. to 14s. 10s. They also estimate the money value of the excreta of each person, based on the analyses of Liebig, Way, Wesarg, and others at 10s. 10d. annually.⁸

Mr. Ellis, taking Messrs. Hoffman & Witt's estimate, calculates the gross value of the London sewage at 2,793,000l., guano being taken at 11l. per ton.⁹

Mr. Lawes's estimate of the London sewage is 1d. per ton; its value as compared with guano as 1 to 3,000.¹⁰

Professor Way considers the value of the ingredients of Rugby sewage to be from 1d. to 1½d. per ton, but does not consider the ingredients of London sewage to be worth so much. He also affirms that the chemical value of the ingredients cannot be taken as a test of the commercial value of the sewage itself.¹¹

Mr. Hope says that the theoretical value of the manorial ingredients of sewage, based upon the opinions and analyses of the chief scientific authorities, is on the average 6s. per annum per head of the population.¹²

Dr. Thudichum finds, by careful analysis, that the annual solid and liquid voidings of an adult male are worth 10s.¹³

Mr. George Shepherd estimates sewage to be worth, in wet weather, 1d. per ton, and in dry weather 2d.; and on the average, 1½d. per ton.¹⁴

Mr. Lawes, before the Royal Commission, stated in evidence that the application of 1,000 tons of sewage to the soil would result in the increase of milk to the value of 5l. 19s. 10d.; from which it would appear that one ton of sewage represents a value of 13d.¹⁵

Mr. C. W. Johnson, chairman of the Croydon Board, considers that, according to analysis, the sewage of Croydon and that of London are of the same strength.¹⁶

The evidence laid before the Commission on Metropolitan Sewage, 1864, led it to the conclusion that the manure which sewage contains can be applied in the cheapest manner when conveyed in water.¹⁷

From the statements collected above it will be seen that, although there appears to be a diversity of opinion as to the precise monetary value of town sewage, yet the one least favourable,—that of Mr. Lawes, an extensive manufacturer of artificial manures,—tends to show that in fouling our water-supply by the discharge from sewers, we are, in a pecuniary sense, as well as in a sanitary sense, carrying out a suicidal policy. It is no new discovery that our present supply of manure is but from hand to mouth; that guano is yearly increasing in price

as it is decreasing in quantity, and will be exhausted in another generation; that our bone-manure manufacturers are so hard put to it that even the pits of Sebastopol have been stealthily disgorged to recruit the impoverished soil of this country;¹⁸ and if it be an axiom in political economy that in all the bare necessities of life a nation should be self-supporting so far as within it lies, it is certain that we can strike no heavier blow at the foundations of our national welfare than by undervaluing a matter of so great importance; a policy which, if persisted in, cannot fail to throw this country, year by year, into deeper dependence upon foreign nations, which are thus empowered, in any period of strife, to deprive us of the very elements of existence. The sewage of a nation upon whose soil the progress of agriculture is yearly making heavy draughts, may be said to represent its food in another shape, and in casting it away to reclaimable loss the natural reproductive powers of the land are rendered impotent, and, without foreign importation of fertilizing matters, exhaustion ensues.¹⁹

That country in which this policy is pursued may be likened to one of those vast inland seas of North-western America, which, having at some bygone period been severed from the ocean by the upheaval of the bed or channel of communication, and being without other sufficient source of supply, is gradually diminished by evaporation, until at last a dry stratum of salt alone indicates its ancient condition. It cannot be supposed that even should the wealthy pre-eminence of this country be sustained in future ages, we shall always be enabled to import the materials of fertility at will; and when once the balance of giving and taking between the soil and its inhabitants is overcome to the prejudice of the former, a national atrophy must set in,—a result which a timely wisdom in the matter of the utilization will avert. It is a truism in agriculture, that if all the refuse of the products of the soil be restored to it, land is self-supporting. Belgium, a more thickly-populated country than our own, where sewage is generally utilized, is stated to import none of the chief staples of food, whilst already in this country the sum of 30,000,000l. in hard cash is annually paid for foreign supplies.

The agriculture of the empire of Japan, which, perhaps, affords the only complete system of the utilization of sewage in existence, may also be fairly pitted against our own. That remote country, of similar extent to Great Britain and Ireland, and one-half of which is unfit for cultivation, not only maintains a larger population than the United Kingdom, but maintains it without the introduction of any foreign supply of food, and we are even told²⁰ that it actually exports considerable quantities.⁴ M. P.

THE CAPABILITIES OF ARCHITECTURE AS A DISTINCT BRANCH OF INTELLECTUAL RESEARCH.

THE relation of architecture to history is no recent discovery. It is true that, with every fresh contribution afforded by the enterprising and the patience of modern explorers to our increasing knowledge of the past, the value of this relation becomes more apparent. Every ancient building that is distinctly and satisfactorily investigated adds a new chapter, not indeed to history itself, but to what our clear thinking neighbours call "*Mémoires pour servir à l'histoire*." The exact date of the foundation of the structure, the obvious purpose of its erection, the mode by which the architects of that date dealt with problems that, under any phase of civilisation, recur within certain limits, are matters requiring a careful study, the chief disturbing element in the course of which arises from doubtful questions as to restorations and alterations. The

¹ Times, 23rd Dec., 1860.

² Rep. Metropolis Sewage, 1864, p. 334, appendix.
³ Rep. Metropolis Sewage, 1864, pp. 388-90. Mr. Ellis's calculation is based upon that of Mr. Bazalgette, adding thereto two-thirds of the estimated rainfall.
⁴ Rep. Metropolis Sewage, 1864, p. 1267.
⁵ Leamington Congress Papers, p. 22.
⁶ Rep. Met. Sewage, 1864: 1736-80.
⁷ Rep. Met. Sewage, 1864: 1767.
⁸ Rep. Met. Sewage, 1864: 4590-4632.
⁹ Rep. Met. Sewage, 1864: 4892, 4843.
¹⁰ Rep. Met. Sewage, 1864: pp. 456-6, app.
¹¹ Rep. Met. Sewage, 1864: p. 301, app.
¹² Rep. Met. Sewage, 1864: p. 1618.
¹³ Rep. Met. Sewage, 1864: p. 438.
¹⁴ Rep. Met. Sewage, 1864: 2306.
¹⁵ Rep. Met. Sewage, 1864: p. iv. Introductory Report.

¹⁸ "Of all the elements of the field which, in their products, in the shape of corn and meat, are carried into the cities and there consumed, nothing, or as good as nothing, returns to the fields. It is clear that if these elements were collected without loss, and every year restored to the fields, these would retain the power to furnish every year to the cities the same quantity of corn and meat; and it is equally clear that if the fields do not receive back these elements, agriculture must gradually cease."—Baron Liebig's letter to the Times, Dec. 23, 1850.
¹⁹ "Report on Japanese Husbandry." By Dr. H. Maron, Member of the Prussian East Asiatic Expedition. *Vide* Liebig, in the "Natural Laws of Husbandry," app. pp. 368-398. Dr. Maron's report contains a graphic and interesting account of the Japanese method of dealing with fecal matter.
²⁰ To be continued.

¹ Rep. Metropolis Sewage, 1864: 4533, 43, 90.
² Rep. Metropolis Sewage, 1864: 4334-35-40.

distinct and minute examination of a single building of architectural magnitude and of known antiquity, when the dates of the several portions of the structure can be ascertained, and when the efforts of the restorer or the adaptor are absent, or are to be distinctly traced and accounted for, may be more valuable, as providing an exhaustive monograph, than many a wider and more ambitious description of a collection or of a series of buildings.

It may be said that we are speaking not of architecture, but of archeology. We will not pause to quarrel about terms, but it must be admitted that unless the word architecture be held, in its highest and most comprehensive sense, to include the whole doctrine of human structural abode, we are in want of a term that shall comprehend all the branches of that study. The decorative and the structural portions of the building art are in themselves separate branches of the subject, and, although the highest excellence must be thought to be attained when structure is decorative, and when decoration is structural, this happy result can only be arrived at by a full mastery at once of the science, and of the art, of architectural design. Historic architecture is, no doubt, properly neither a science nor an art, but a method of investigation. It is, however, a necessary portion of the full knowledge of the subject of building, and a broad and marked line may be drawn between this portion of antiquarian research, and that which inquires into the weapons, the food (and therefore the habits of hunting, of pasture, or of agriculture, indicated by the relics of consumption), or even into the sepulture, of ancient races. It is, therefore, rather to maintain distinctness of expression than with the view of attempting any redistribution of terms, that we speak of the study of architecture, in the highest sense, as including the archeology of building.

Thus far we shall, no doubt, have the assent and the sympathy of all those who like to think on the subject. But we wish to carry the antiquarian portion of the subject a step further, and to refer to the value of architecture as a distinct method of intellectual research, one capable, if properly pursued, of obtaining results not dissimilar to those with which the study of philology is now extending the limits of our knowledge of the past. We cannot admit the claim of Professor Müller to call his favourite pursuit an independent natural science; but the difference, after all, is rather in expression than in idea, and as a distinct and in some sort independent portion of the natural history of mankind, philology is no doubt assuming new and most unexpected proportions. But if speech, so far as its gradual transformation can be now recalled, and as it were, disinterred, by the labours of the philologist, be an external sign of the intellectual, moral, and social state of those whose utterance it formed, no less importance must attach to the similar indication of what has been committed to architectural record. The mind of the architect is, to some extent, reflected in his building; it is the outward expression of a set of the habits and requirements of the age, of its intellectual progress, as marked by the mode of dealing with the known difficulties of the structure, and, more than all, of that advance either in general professional culture, or in the culture of the individual architect, that gives the impress of character to his works.

Again, in the study of spoken language, difficulty arises from many casual and incidental causes which may altogether escape the researches of the inquirer, although their results may so materially influence the state of the subject of his investigation that ignorance of them will altogether mislead him. Thus the habit of certain tribes of occasionally dropping words altogether from their language, and of replacing not only these words, but their component sounds or syllables when they form part of another word, by something of corresponding meaning, but of altogether different vocal formation, if undetected as a fact, would never have been imagined as a possibility. The name of a king, for example, on his accession or on his death, is thus "tabooed." Early and simple names are invariably significant, and the forbidden sound is thus replaced by one which has no vocal relation with its character, but more or less corresponds with its meaning. It is as if, on the accession of the Norman Conqueror, not only the sound "will," and all its compounds, but the sound itself as a syllable had been suppressed in this country, excepting for the sole duty of indicating the sacred name of the sovereign; and not only should we speak exclusively of a last

"testament," in referring to the devise of property, but we should call a willful man a "testament-fal" man, or a willing horse a "devising" horse.

Against the result of vagaries of this sort, the investigator of the historic teaching of architecture is entirely protected. Casual disturbance, so to speak, is generally of local origin in individual buildings; and thus, from the permanence of the cause, tends to explain itself. Brick may be substituted for stone. The reason will be evident from examination of the site. Material of an unusual description may offer itself to the hand of the builder. The result is to be traced in a richness of ornament, or in a severity of design, that is unusual for the date, but that is at once understood by one familiar with the locality. Thus the stone palaces of Lecce, and some neighbouring cities and towns on the Adriatic sea-board, burst on the eye with a bold luxuriance of ornament which is peculiar to the locality. You trace on the door-jambes of the humblest houses foliage and arabesques fit to adorn a highly-finished mansion. The gargoyles of the ancient monastery which now forms the palace of the prefect of Lecce start from the wall as life-size, half-length, human figures. The ornamentation of the entire facade is of corresponding boldness, and of admirable finish. You look for the cause, and you find it in the character of the stone quarried on the spot, soft as ebk beneath the knife or chisel when freshly brought to the air, and gradually and permanently hardening into a most excellent and durable stone. Material such as this irresistibly tempts the mason to become a statuary. Thus a difference between a church or palace of a given date in the city of Lecce, and a specimen of similar and contemporary buildings some forty or fifty miles distant, which would perplex the student who learned the details from the pencil of others, ceases to require any explanation on a visit to the spot. While, therefore, the casualities that beset the subject of the research of the philologist are such as often to mock his utmost skill, those which render the work of the architect *hazardous* or abnormal may generally be traced to their actual source, and thus cease, instead of interfering with, the amount of knowledge obtained by the inquiries.

When positive historic date can be assigned to an ancient building of importance, when questions of restoration and alteration can be eliminated, and when to the local circumstances tending to impress a special and peculiar character on the work due importance has been assigned, we see, in the form and details of the building, evidence of two distinct elements. The first is the social indication which it affords. In size, in position, in arrangement we see the marks of the state of society for which it was designed. Is it a lonely and carefully strengthened tower, erected on an inaccessible hill?—we see marks of a state of civil discord, of the rule of the strong hand, and of the habits of the "robber chivalry," who ensconced themselves in stone for their dwellings as they did in iron for their garments. A spacious church tells of a people whose time, and whose devotion, would allow and would impel them to worship beneath its roof, and to swell the processions of the clergy. Such a simple matter as the direction in azimuth of the plan, or the exact orientation of the building, may tell of the religion of those who built sepulchres, or of the astronomical knowledge of those who raised pyramids or obelisks. At Cumæ three stories of sepulchres are superposed. Each series differs as much in its orientation as in its structure. The lowest, the rudest in construction, and the rudest also in the relics which they contain, follow no fixed rule, but appear to have been dug as caprice or convenience dictated. Then came a race who laid their dead with their feet to the south; then one who turned their *fast* couches towards the east. It is clear that a large amount of indication of the social state of mankind is to be drawn from a knowledge of what, at any period of their history, they expected from the art of the builder.

Intellectual progress and status, on the other hand, is shown by the manner in which the architect met the requirements of the day. This, indeed, depends on two conditions,—the general and the special state of his knowledge. To a certain extent the architect is always conventional; he arrives at given results by a customary mode. His individual genius may improve this mode, his poverty of spirit may fall short of its best expression; but, on the whole, his work will prove an intellectual gauge of the professional

merit of his period. Thus he has a space to cover, with superincumbent weight to support. He begins by the use of ponderous and misshapen lintels, after abandoning the simple inclination of two jambs towards a vertical line. Then he dresses his lintels and stepped them so as to throw their weight in part on a second course of masonry. Then he hollowed them from below, and produced a pseudo arch. Then he vaulted from pier to pier, with small and timid span, indeed, but with a firm grasp of that master-principle of masonry which later, in its bolder applications, produced structures that so far excited the wonder of those not initiated in masonic science as to be pretty generally attributed to the agency of Satan. You may not be able to detect how far each step in the steady and long progress is due to each worker in the series; how much of the advance is due to the pupil, and how far to the master. You may hesitate, for instance, whether to admire or to blame Brunel for the first arch he threw over the Thames at Maidenhead; but if you compare the freedom of the present structure, over which such heavy loads are whirled with such immense velocity, with the steep ascent and the numerous and picturesque arches of a old road bridge over the same river close by, it is impossible to disguise the fact of the immense difference of intellectual level at which the successor of Brunel must start as compared to the successor of the architect of the earlier bridge.

With the change in the requirements of social life, and the advance in the scientific and practical power of the architect, we can at times also trace the history of the development of principle, and of the gradual transformation of idea,—a class of observations of extreme interest in dealing with the intellectual history of mankind. Thus, at a time when the column in Roman architecture had been most thoroughly conventionalized, and when proportions had been fixed within distinct dogmatic limits, we find the simple columnar pier of the Saxon or Early Norman architect constructed on a no less definite rule, but one which he had not borrowed from the Roman masters. It was a structural not a conventional rule. The Italian architect, if he had only to support a trellis-work of wood for the training of his vines, and thought fit to do so by columns of marble or of stone, proportioned their diameter to their height in exactly the same manner as if they had been intended to support a solid and ponderous pediment. The Gothic workman proportioned the diameter of his column to the weight it had to sustain. As the heavy and solid arch of the earlier builders became lightened by recessing, and gradually became architecturally divided into separate members, the sustaining pier split into clustered columns. The same structural idea seemed to be present, the law that each superincumbent piece of work must have its own support. If the low heavy arch require the squat pier, each of the many moulded groins and ribs must be supported by its own graceful but appropriate shaft. With the advance of practice, and with some increase of knowledge of the transformed Oriental style of the Sarsenic builders, the arches and vaults of our cathedrals became lighter and bolder. The indispensable shaft would interfere with some other feature or requisite of the building if it sprang from the ground. It was made to rise, in such a case, from a light corbel instead. The principle was preserved, though modified in its application. A step further, and the original idea has become so entirely conventionalised that the object for which it was introduced as a canon has entirely disappeared. The shaft clings to the rib, but it is as a weight and not as a support. In the form of a penile shaft, or a pendant or of a boss, entirely unsupported, it has become at the same time a quaint and effective architectural ornament, and a structural defect. It weakens the arch which it professes to strengthen. Thus, while the rule has been unsustained, the reason of the rule has been abandoned, and an architecture founded on the idea of a just and exact proportion of support to superincumbent weight has been gradually transformed into a style that aims at destroying the sense of weight altogether, and suspends over the heads of astonished admirers a rich canopy of stone, soaring high, as if upheld by celestial supporters, and actually weighted and pulled down by bosses and pendants, where it would, in simpler times, have been supported by shafts.

The instances in which we can thus distinctly trace the rise, development, conventionalisation,

and final obliteration of a great idea or leading principle, are extremely rare. Hardly any, if any, branch of human study affords so ready a means of investigating a case of the kind as that which we have pointed out as falling within the province of architectural study. Some of the most curious problems in human history arise from the conventionalized form in which a new idea is first to be detected by the light of the present state of our erudition. The form of the square Hebrew letters is a case in point. They are called Chaldean. They differ from the Phœnician, while there is a close family resemblance between the Samaritan or general character of Palestine, the ancient Greek—the Phœnician of the Jewish coins of the date of the Maccabees,—and very possibly the rudimentary forms of the Sanscrit. From all these the Hebrew letters differ—not only in finish and detail, but in being written the reverse way. But almost every ancient Greek letter presents a distinct resemblance to an impression of an incised Hebrew letter of corresponding value. The literal hieroglyphics throw no light on the subject. The most learned and approved theory is, that the square Hebrew letters were those used by the Chaldean men of learning, and that they were brought back from Babylon by Ezra, who is generally made to stand godfather for the whole Jewish literature of a date preceding his own. Unfortunately we have, since this theory became orthodox, found out what letters the Chaldean scribes *did* use, what letters were in use in Mesopotamia from the days of Abraham to those of Nahonadius. And these letters present no resemblance whatever to the square Hebrew character, which thus remains an instance of a set of signs first known to human history in a full-grown state of maturity, as to the origin of which we have no light whatever.

Heraldry is another case in point. According to all the theoretic explanations of the origin of heraldry, charges, as the heralds call them, lions, eagles, representations of natural objects, should have been the earliest bearings. Those familiar with genealogical study know that the contrary is the case. In Continental heraldry charges seem mostly to have been originally borne as differences. Where they are known to have been augmentations, they are known to be the original bearings. The sixteen eaglets of Montmorency were four at an earlier period. The ancestors of the "premier Châtelain," who assumed the four birds at a date heraldically determined, bore the plain red cross. Again, in the arms of Lorraine, the first bearing of the House of Austria, the three alerions are attributed to the time of the Crusades. The bend claims a higher antiquity. The honorable ordinaries are older than the charges; or, in other words, heraldry, when first known to history, was as thoroughly conventionalised as it is at the present day. The pale may denote the lance, the bend the scarf, the fess the belt, the chevron the saddle; but we have not the smallest certain knowledge of the manner in which a broad line across a certain part of the escutcheon came to have such an import. Heraldry comes into history full grown, as Minerva sprang into the midst of the gods.

This view of a great capability of historic architecture should stimulate the exertion of those of the professors of that noble art who have time as well as knowledge at their command. It is only necessary for such men to bring to bear on this novel branch of their study the patient and untiring energy by which the philologists have lately won such brilliant triumphs, to take place by the side of the latter discoveries with no secondary lustre.

SOUTH KENSINGTON MUSEUM.

SOME eleven or twelve thousand persons are visiting the museum weekly just now, instead of the ordinary average of about ten thousand, chiefly on account, we suppose, of the loans and purchases from the recent Paris Exhibition. These are exceedingly interesting, and will give pleasure and advantage to all who rightly examine them. The inlaid and carved cabinet of various woods, manufactured by M. Fourniois, of Paris, was purchased, and rightly, as the piece of furniture of highest class exhibited. This cabinet extorted the admiration of the English artisans who have reported to the Society of Arts. The carving, says one of them, is "not planned on, but inlaid, the wood being quite cut through, and, when all glued to-

ther, it forms one solid mass. This piece of work I consider to be the perfection of cabinet work." If we understand it rightly, the carving is cut in as marquetrie, allowed to project as required, and afterwards carefully modelled and worked down to the ground, the inside being afterwards veneered. Where the carving is put upon thick pieces, it is let in with chisel and gouge about 3-8ths of an inch. Another of the reporters, while expressing great praise of this cabinet, gives the palm to Messrs. Jackson & Graham's exquisitely made ebony and ivory cabinet, of which we spoke with great admiration, even before it was sent to Paris. The French cabinet, however, involves art of a much higher order, in the shape of sculpture, and must be placed first. The majority of the figures and all the heads are admirable and beautiful in the highest degree; the general tone of colour, too, is exceedingly agreeable, and the whole is a delight. The authorities have wisely inclosed it in a glass case, to protect it from soot and dust, not to be avoided, especially in a glass-covered building.

We should like to see the same care immediately bestowed on the truly lovely ebony and ivory pavilion-cabinet from Italy, which has been lent by its makers, the Signori Alessandri. Unless this be covered, our terrible dust and smut will ruin its pure fresh beauty. Being entrusted to us, it would be discreditably if we allowed any damage that could be guarded against to befall it. Some of the groups are exquisitely carved.

The spinet of pear-tree wood, carved, and encrusted with ebony, ivory, lapis lazuli, and other rare materials, should not be overlooked by those who are technically interested in cabinet-work and its connexions. The centre-piece for a table and large ewer, in Rock Crystal, from the Imperial treasury, Vienna, are more remarkable than beautiful. These were executed in the seventeenth century for the emperor Rndolph II., and are lent by the present Emperor of Austria. The term "crystal" has been so bandied about, from cups and chandeliers to palaces, that it was not surprising to us to hear a man of position and education describing these articles as "of a peculiar kind of glass"—glass, certainly, but having Nature for its maker. Rock crystal is a transparent variety of quartz.

The collection of cheap gold-work and jewelry as worn now by the Italian peasantry, is suggestive, but should scarcely be laid out "as examples for art-workmen," without cautionary remark. The great curiosity of the new acquisitions, however, is what is termed the "Treasure of Petrossa," a collection of ornamental objects in solid gold, found by peasants near Petrossa, in Roumanis, in the year 1837. The inscription upon them says they were probably manufactured by the Gothic tribes of Dacia, from 400 to 500 years after Christ. In one of the pieces (if not in others), a circular dish, with a sitting statuette rising from the centre, Byzantine influence is visible. Without assenting wholly to the date ascribed, these works are very early and very remarkable; and what a story they suggest! Dacia, the land of the Gætas, was the last of the Roman conquests in Europe. This was effected by Trajan, A.D. 104, and the chief events of the campaign are shown on Trajan's Column in Rome. A lump of masonry on each side of the Danube, near the village of Scala Gladova, shows where stood the enormous bridge built by Trajan. The Romans ceased to be masters in the year 275, and left Dacia to the Goths. After the death of Attila came varied rulers, and then it fell to Charlemagne. The Dacian tribes supplied the Roman circus. Every one will remember Byron's reference when describing the fall of a gladiator in the Colosseum:—

"He reek'd not of the life he lost, nor prize—
But where his rude hut by the Danube lay,
There were his young barbarians all at play,
There was their Dacian mother,—he, their sire,
Butcher'd to make a Roman holiday—
All this rush'd with his blood,—Shall he expire,
And unavenged? Arise! ye Goths, and glut your ire!"
Childe Harold, stanza cxi.

A good account of this Treasure of Petrossa, and the circumstances attending the find, would be interesting.

IMPROVEMENT OF DWELLINGS IN BELGIUM.—A joint-stock company for the erection of working men's dwellings has just been founded in Brussels, under the patronage of the Belgian Immobilière. The King has taken a hundred shares of 500 f. each, and the Count de Flandre fifty. The capital is to be 5,000,000 f.

PROFESSOR G. G. SCOTT ON EARLY ARCHITECTURE IN GREAT BRITAIN.*

HAVING now given a general outline of the intrinsic principles of Norman architecture, I will proceed to offer a few brief descriptions of some of its earlier creations, or rather of a selection of such of them as have come down to our own day, or of which we have sufficient information to make the consideration of them profitable.

I have already spoken at some length of Lanfranc's Cathedral, at Canterbury, and of its identity, in general design, with the Conqueror's Ahhey Church of St. Etienne, at Caen. I shall have to revert to this cathedral more than once in describing additions and alterations of later date; but there are no remains of Lanfranc's original work of sufficient importance to warrant me in occupying your time upon it.

I have also alluded to the chapel in the Tower of London: of this most perfect and typical example of the very early Norman, I exhibit some illustrations. Severely plain, as befitting the chapel of a fortress, it is, nevertheless, as complete and as well designed a building as could well be produced. Apical with continuous aisles, in two stories, and vaulted throughout the central space and the upper aisle by unriched wagon vaults, becoming in the former case semi-domical on reaching the apse, and the lower aisle groined, it is more perfect in ideal than the choir of any English or Norman church that I am acquainted with of its period, and is parallel in this respect with the great churches of Auvergne, only needing the clearstory to render it a complete type; a model of a perfect choir, with an entire absence (excepting in the capitals of the columns) of ornamental detail. Several of these capitals are like those which prevail in St. Etienne at Caen, and which appear in Remigius's work at Lincoln: they are a dim reminiscence of the Corinthian capital, with a cross-formed block representing the rosette in the abacus; for, he it always remembered, that the abacus of a Corinthian capital was not the prototype of that of a Romanesque one, in which a substantial impost is superimposed upon the delicate abacus of the classic column. I give drawings from Caen, from the Tower, and from Lincoln, to explain the identity and peculiar characteristics of these capitals. The common cushion capital is also freely used.

I will next go to St. Alban's: not that I can distinctly assert it to be the next in date; but because it stood first in rank among ahheys, as Canterbury among cathedrals; because it was built by the friend and companion of Lanfranc; and because the crudeness of its material, by divesting it of all decorative features, renders it a more purely typical and elementary example than any other we possess.

Founded only ten years after the Dioclesian persecution, when St. Alban became the protomartyr of Britain,—destroyed during the invasions of Pagan Saxons, and refounded as an ahhey during the last years of the eighth century by Oifa, king of Mercia,—the church of St. Alban had become famous throughout Christendom.

The two last Anglo-Saxon abbots having determined on its reconstruction, had incurred great labour in excavating among the ruins of the adjacent Roman city of Verulam to procure materials for the work; but a dreadful famine, followed by the Norman invasion, had prevented the realization of their intentions.

In the year 1077, Paul, a monk of St. Stephen's, at Caen, and a relative of Lanfranc, was appointed to the ahhey; and, during the first eleven years of his tenure of office, he had "constructed the entire church" "of the stones and tiles from the ancient city of Verulam." I presume, however, that this statement of Matthew Paris must be taken with some abatement, as we do not find the dedication to have taken place till 1115.

The church thus erected, though homely in material and of simple workmanship, was stupendous in its scale and prodigiously massive in its construction.

It is curious that, while the Ahbot of St. Stephen's, when made Metropolitan of all England, was content to copy his ahhey church for his metropolitan cathedral, a plain monk of the same monastery, when made head of the first

* Lecture III. at Royal Academy, February See pp. 70, 80, 108, and 127, *ante*.

English abbey, should go so far beyond his former church in the scale of his new one.

A glance at the two plans will show the extent of the difference. While at St. Stephen's the nave (including the façade) has nine bays, that of St. Alban's has thirteen; while each transept of the former church had two bays and one apsidal chapel, those of the latter had each three bays and two chapels; and, while the choir at Caen had only two bays besides the apse, that at St. Alban's had four.

The western façade, too, differed in that while that at Caen had towers which closed in the ends of the aisles, those at St. Alban's projected wholly beyond their side walls; thus increasing the width of the front by double that of the aisles. The effect of all these changes upon the dimensions of the buildings was that, while St. Stephen's was only 300 ft. long, St. Alban's was 465; that, while the transept of the former measured 140 ft. in length, that at St. Alban's was 210 ft.; and that the widths of the two western façades were respectively 88 ft. and 155 ft.

The design, though of the most rigid and almost granite simplicity, was admirably proportioned; and, when compared with Norman churches of more kindly or more finished structure, the case of this was the use, almost to the entire exclusion of finer material, of the Roman tiles from Verulam. With these, not only a great part of the mass of the walls, but the pillars, arches, windows, string-course, and other parts normally formed of stone, are almost exclusively constructed.

One might fancy that a vast structure erected of such materials, might have a very picturesque appearance, and that the rich and deep red of the brick, alternating with an equal quantity of coarse mortar in the joints, and interspersed with rough flint work, might give to the general colouring of the edifice a warmth of tone, and a richness of texture which, on a general view, might more than make up for its æsthetic plainness. But, oh! tell it not in the streets of our Tyburnian Asclon! These Norman builders, like too many of their descendants in our own day, had no such artistic notions, but resorted to encrusting the whole,—within and without,—with one uniform coating of the smoothest and whitest plaster! St. Alban's, when viewed from the ruins of Old Verulam, must have looked like a sort of "Moel Wynn,"—*a white mountain*; or, like the creation of a spell of Merlin,—born out of a single block of marble! Our romantic old Mediaevals were not proof against such fascinations, for we found St. Wilfred glorying in having washed the York Minister of his day, "whiter than snow;" and at Peterborough, it was the boast of one of the abbots, that he had so skilfully whitewashed his cathedral, that it appeared as if cut out of a single stone! But let us take comfort. Abbot Paul had not sunk to so low a depth! He had an eye to the sister arte; and we find him recorded as having enriched with painting the vaulting of the apse behind the high altar. Nor did he stand alone in his taste for such decorations; for we find now that every part of the plain old plastered walls, pillars, arches, and vaulting has been so enriched at different periods, the western side of the great piers of the nave being richly painted with figures and subjects as the retables of the altars placed against them.

With such artistic relief as this, added to the stern and massive grandeur of its parts and the stupendous scale of the whole, and adding also the gorgeousness of the shrine of the Protomartyr, and of the numerous altars and other objects which imparted beauty and solemnity, one may well imagine that the internal effect, notwithstanding the absence of architectural detail, was as noble as it must have been unique.

The roofs, internally, may be proved to have been masked by level ceilings, no doubt gorgeously painted like that which still remains over the contemporary church at Hildesheim in North Germany, or that but recently executed by Mr. Burgess, aided by the charming art of Mr. Poynter, over the nave of Waltham Abbey. The present painted ceilings are, no doubt, the lineal ancestors of the Norman ones.

In the midst rose the stupendous piers and arches which sustained the tower, between which the open lantern soared high above the church, while beneath this lofty centre of the stupendous cross were ranged the stalls of the monastic choir.

I illustrate this wonderfully dignified and impressive structure by several drawings of the whole and of parts. It will be seen from this how simply and almost exclusively it trusts to the most elementary principles for its architectural effect. First, to its general grouping and proportions, which are a perfect model of a typical Norman church, bereft of its usual details; and, secondly, to the simple principle of divided orders, which I have before explained, but used in nearly all instances without the aid of decorative shafts of mouldings.

The proportions of the internal elevation are such that, if the entire height of the wall be divided into nine parts, four go to the main arcade, two to the triforium or gallery, and three to the clearstory.

The arches of each are of three orders, and are, for the most part, without shafts; the section of the jamb and arch being the same, severed only by a simple impost. A broad pilaster buttress runs up the face of each pier from floor to ceiling.

In the transept, however, the triforium is differently designed, being sub-divided into coupled arches, and supported by stone shafts. Many of these shafts are balusters (most likely of Offa's church) made use of again, with the addition of a Norman capital and base, and sometimes eked out in length by the interposition of Roman tiles. Like the balusters I have had at Jarrow, they bear evident marks of having been turned in a lathe.

The outer wall of the gallery story has been removed, but of its former existence there is distinct evidence; the mark of the roof, as seen against the transepts, showing that the walls have been lowered by some 8 ft. or 9 ft. Only three bays of the aisles remain their vaulting, which is of the most typical form of groining. It is capable of almost certain proof that the roofs were throughout devoid of parapets. The transept fronts were divided up the middle by a wide pilaster buttress, and flanked by similar ones. Their windows, as nearly all others, are of the greatest simplicity; three recessed orders in jambs and arches alike, with impost to the two outer ones: above the springing line, however, of the gables, were ranges of double windows divided by stone shafts. Each transept has a staircase in its western angle which runs up into an ornamental round turret, with four double windows in its upper stage, and was most likely crowned with a cone. These staircases led into the triforium passages and into the roof.

The tower has three stages above the ridges of the roofs. The lower one has plain windows lighting the lantern; the second has, on each side, two pairs of double windows; and the upper story has two such windows of large scale. The tower is flanked with pilaster buttresses merging in the upper story into round turrets.

I will next take Winchester Cathedral. York would have claimed precedence as a metropolitan church, but its Norman remains are so small in extent as to neutralize its claims. I may mention, however, that Professor Willis (whose marvellous perception of antiquarian evidence enables him to describe, almost with precision, buildings of which the common observer would conclude that no relic or evidence exists) has shown us that the Norman cathedral at York (begun soon after 1070) was a structure of prodigious magnitude, and exceeded in the width of its nave any church in England; measuring 60 ft. from centre to centre of its piers.

Winchester may be said, in these early days, to have rivalled London as the capital of England; for it had been the capital of that Saxon kingdom which brought all the others into subjection, and whose kings became kings of England; while London—the capital only of Essex, a kingdom subordinate to Kent—owed its greatness simply to its river.

We have already seen that the cathedral, founded by Birinus in the seventh century, had been rebuilt by Athelwold and Elphege in the tenth century.

Bishop Walkelyn, a chaplain and relation of the Conqueror, about 1079, began to rebuild it, and finished his work about 1093.

Walkelyn's Cathedral exceeded in vastness even Abbot Paul's stupendous work at St. Alban's. Its nave was of eleven bays, besides two vast western towers. Its transepts each had four bays; its eastern arm four bays, besides the apse, which had a surrounding aisle, and was flanked with two small towers.

Its length, independently of an eastern chapel,

was 485 ft.; or, including this chapel, 530 ft. The length of its transept was 225 ft. (it was double aisled, that at St. Alban's being unaisled), dimensions which exceed those of St. Alban's, and leave those of Lanfranc's metropolitan church far in the background. The width, too, of the nave and its aisles was greater than that of St. Alban's.

The architecture of this vast temple was of stern simplicity, though, being carried out in stone, it was much more fully developed than that of St. Alban's. It was, in fact, a full and typical development of the Early Norman, with every feature complete, though all in their plainest garb.

All which now remains of this date is the transepts and the crypt of the eastern arm, and they may be described as the text-book of Norman in its earlier form. The transepts, as before-stated, were doubly aisled, and (as at Canterbury and at Caen) a gallery crossed the outer bay of each, supported on a massive round pillar, so as to render the upper aisle continuous.

The plan of the piers of the transept, which probably gives us also that of the rest of the church, is very perfect and typical.

Their figure may be generated by the process I have described in my last lecture. Take a block of wall about half as long again as its thickness; cut out from each of its angles the recess of an order; substitute half or three-quarter shafts for the part which supports each order; and the pier proper is complete. It still needs, however, supports for the vaulting of the aisle on the one side, and for the central roof on the other. The former is given by adding to that side a pilaster of equal size with the transverse rib of the vaulting, and substituting for its front portion a demi-shaft; the latter (as a similar projection with the addition of two smaller shafts on its flanks. Nothing could be more perfect or more typical than this arrangement. The capitals are everywhere of the cushion type, in its simpler form. The arch-orders square, and without labels. The entire height of the wall being divided into three, the upper, or clearstory, may be said to occupy one-third; the remainder being divided between the great arcade and that of the gallery or upper aisle in the proportions of about four and three.

The gallery, or triforium pier, is similar in plan to that above, but the arch is divided into two widths, in the sub-order, by a central shaft bearing two smaller arches. The clearstory, in its more typical hay, is divided into three widths by small shafts, the side spaces being low arches, and the central one being considerably elevated, and containing the window.

Through this story passes the passage through the thickness of the wall, which ought more properly to be called the triforium.

The transept elevation is divided vertically into two compartments by a large pilaster buttress, both without and within, and is externally flanked by similar buttresses. In height it is divided into three stories, ranging with those of the interior, already described, the aisles naturally containing two of these stories; the upper of which has small windows in the sides, and large ones in the gables. The windows are (as a rule) shafted singly, without and within, with a deep layered jamb filling the interval. Those of the upper story of transepts fronts are arranged internally to correspond with the clearstory. The gable of the south transept is enriched with intersecting arcades.

Unfortunately, the central tower, of the Early period, fell shortly after its erection, rebelling, as it was thought, against the ungrateful task of overshadowing the body of the detested Rufus.

This untoward behaviour has had the effect of rendering the work imperfect; for, had the crossing remained, one could supply the choir and nave with a fair amount of certainty. As it is, we cannot make any imaginary restoration, for the whole of the centre, with the adjoining bays, has been rebuilt in a Later Norman style, influenced by a morbid fear of a second catastrophe, which led to an undue bulkiness in the piers, where better foundations and harder material would have supplied sufficient security. Let us hope that no second Rufus may be buried beneath the shadow of our precious monuments of art-history! The tower, however, as rebuilt, is a noble work, though of small height. That such sturdiness of proportion was not viewed as essential to the style, we have practical proofs at St. Alban's, Tewkesbury, and Norwich; so we may safely conclude that, like the needless bulk of the renewed piers, it was the result of the

feared that their tower would again refuse to canopy the red-haired king, who still lay in the midst of the church, though removed a few feet from being under the tower.

The crypt, which gives us the form of the original sanctuary and eastern chapel, is a fine example of the Early Norman where used for simple purposes. The columns bear some resemblance to those of King Edward's work at Westminster, though much lighter. Their proportions, however, cannot be seen, owing to their being buried deep in earth, which is, I am sorry to say, not the only barbarism for which the chapter there are responsible.

The nave, as is so well known, was converted into another style by Wykham and his predecessor, Eddington; the last-named of whom must, I suppose, have destroyed the two western towers, if ever they had been carried up. We know them only by their foundations.

In the same county are the two noble ministers of Christchurch and Romsey, the former of which I will mention presently; meanwhile I will carry you in thought to Ely, where Wallydn's brother, Abbot Symeon, undertook, a little later and in his extreme old age, the reconstruction of his abbey church on a vast scale. The parts built or commenced building by Symeon were the eastern arm, the transepts, the central tower, and probably a bay of the nave; for, he remembered, the eastern arm was, not in those days, as afterwards became customary, the choir, but rather the sanctuary, or, more correctly, the sanctuary and presbytery conjoined. The choir,—that is to say, the stalls for the monks or canons who sat in choir,—was under the central tower, and often ran a little into what we call the nave. It resulted from this that, in cases where funds did not permit the completion at first of the entire building, it was customary to build from the east end up to the second or third pillar of the nave, so as to provide for the actual requirements, and also to give an abutment to the central tower.

Abbot Symeon's plan was formed on the largest scale. His transepts had each four bays in length, and, like those of his brother's church at Winchester, were aisled on both sides. He also built the gallery across the transept, as at Canterbury and at Winchester. His eastern arm was of four full bays, added to which was a smaller bay and an unaisled apse. The aisles of the eastern arm were square-ended. The pillars of the transept were generally round, though in some cases clustered, and their capitals were totally different from those used by his brother, being a quaint reminiscence of the Corinthian.

The proportions of the interior, in point of height, differ from those of Winchester; and it would seem, that the height being divided into three, one was here given to the gallery or triforium, the remainder being divided between the great arcade and the clearstory, with proportions of 4 to 3; so that the main arcade retaining the same proportion as at Winchester, there is more triforium and less clearstory, differences which were increased in building the nave.

The galleries originally built across the ends of the transept were removed during later, though still Norman, times; and an arcade of slight projection substituted. The clearstory differs from Winchester in the arches of the three openings springing at equal height, and the plans of the piers differ considerably. Those in the transepts (as before said) are round and clustered, the latter consisting of the customary group of three shafts on its lateral faces, with a single shaft at hack and front, for the vaulting and the roof, making together a perfectly uniform group of four larger and four smaller shafts. The round columns have a shafted pilaster attached to them on the side facing the aisle.

The nave piers are of alternating forms. The one is founded on the circular column, but has, not only the shafted pilaster at the back, as those in the transepts, but two shafts, to carry an extra arch order, in front, and a group of three running up to the roof. The other form of pier is like that at Winchester, with the addition of an extra order, and has the triple shaft running up to the roof, as that last described.

The triforium piers are very similar, though lighter, excepting that the round pillar has lateral shafts to carry the subarcuation. All the orders are moulded.

How far the general plan was laid down from the first by Symeon is not known, but it differs from other cathedral and abbey churches in having a magnificent transept at the west end. Whether what we call the foundations of towers

at Winchester may have been a foreshadowing of the arrangement I cannot judge; but from its extraordinary scale (far exceeding that of western towers in general), I think it not unlikely. There was also some distant resemblance to this in the façade at Bury. Though, judging from the number of its bays, one would think the size of Ely and Winchester not very different, there is a disparity in the essential scale, which causes it to fall far short of the dimensions of Walkely's church. The widths of naves from centre to centre of piers are respectively, 42 ft. 6 in. and 37 ft. 6 in.; and that of the bays, similarly measured, are, about 22 ft. and 19 ft. 9 in.

The nave is of thirteen bays, besides the western transept. These parts were added in the course of the twelfth century, making the whole length (not measuring the west porch added in another style), about 420 ft., the transept measuring about 190 ft. in length.

There was, of course, a central tower as usual, but there was a second tower of great size, and probably of greater height in the middle of the western transept, which transept was flanked at its angles, with vast polygonal stair turrets, and had large and noble apsidal chapels projecting from its eastern sides. These parts are in the transitional style, which I do not touch upon during this session; but I may here say that, whether projected from the first or not, a more magnificent addition to the usual features of a great cathedral or abbey church, can hardly be imagined, though what its effect was when the central tower existed, and the western one was crowned by a vast leaded spire, one can hardly now appreciate.

Abbot Symeon's tower had the same radical weakness with that built by his brother, and though it lasted longer (having no Rufus heathen it) it at length gave way, and was succeeded by the remarkable structure now forming the unique centre of the glorious temple. The transept and elevations are not unlike those at Winchester in general distribution of parts.

Of doorways, windows, &c., I will not now treat, though some of the latter are of great beauty. Were it not that I limit myself during the present lecture to buildings begun during the eleventh century, I should here have noticed Peterborough, whose eastern end was a manifest imitation of that of Abbot Symeon. I exhibit some excellent illustrations of the architecture of that magnificent church, but must reserve my description of it for another lecture.

Abbot Symeon died at a hundred years of age in 1093. Of what a long course of events had he been a contemporary or an eye-witness! He might have remembered the congratulations called forth by the failure of the prognostications of the world's ending in the year 1000. A relative of the dual family of Normandy, he might have witnessed, when in early manhood, the arrival of Ethelred and Emma with the destined king, confessor, and saint, when they fled from the ravages of King Swayn; and he might have even directed the education of the Confessor-King. In architecture, he might have watched almost from its rise the development of the Norman style, and have assisted, when at early middle age, at the consecration of Duchess Judith's Abbey Church at Bernay, which is now our earliest specimen of what was then the rising art of Normandy, and long subsequently became that of England, and of which he and his brother,—now in their old age,—had become respectively the founders of two of the noblest examples.*

COMPARATIVE ALTITUDES.

I beg leave to supplement the article on comparative altitudes, by drawing attention to some places that have escaped the notice of "A. J.," and which, with some additions, I will endeavour to make by running up the levels along the different lines of railways and canals, we may arrive at the comparative altitudes of the principal places in the country; and if, perhaps, from untoward circumstances, I am unable to complete the series, perhaps some of your scientific readers will render us aid, so that your journal may possess a complete record of the altitudes of the cities, towns, &c., throughout the country.

Should we succeed in obtaining this information, on correct and trustworthy data, it is to be hoped that the surveyors of the different towns

* To be continued.

will make the addition to the sections of the towns by adding the sea level as a common datum, where sections exist, as in several cases that have come under notice it has been found that the inclination is only marked on the plans, and sections are altogether dispensed with. This is one of the serious innovations introduced by the staff of the late General Board of Health.

I have carefully looked through the reports of the general Board of Health for the year 1849 and subsequent years, and find no allusion made, except in one instance in the report on Penrith, to the subject of the altitudes of towns, although that must be matter worthy of consideration, and must exercise a marked effect on the public health, as it seems to regulate the state of the atmosphere, the hygrometric condition of the air, the rainfall, and other meteoric causes; and it would be a subject of curious and interesting inquiry to make a careful analysis of the death-rate in our towns, looking more particularly at their physical site and their comparative altitudes. On the subject of altitude and climate, an eminent medical authority observes, there are three degrees of altitude in eminences to be considered, namely, the moderate mound, the high hill, and the lofty mountain: the mound is a small eminence, while the hills in England rise to varied heights. According to their heights so the air differs in degree of temperature, which is readily ascertained by a barometer.

But we have no instrument to ascertain in what degree one air differs from another in medical quality, since the composition of the atmosphere appears to be merely the same on all parts of the earth and ocean; but we know from observation that there are great differences in the air as well as climate, as far as the effects on the human frame are concerned. When the hill is of moderate height, lying open to the south, and backed by others in the form of a crescent, such a spot would be pronounced salubrious and bracing; when it is lofty, open, and exposed, such a situation would be severely felt, and on the tops of the mountains it would be insupportable, arising from the lightness of the atmosphere.

The objections to climates in valleys are,—they produce many complaints when shut in with high ridges of barren sides, the cold draughts and the reflected heat of the sun produce a variety of diseases, the high ridges prevent free circulation, and the hot sun beats down and creates a complete focus of heat, and extracts from vegetation and humidity a prodigious amount of malaria.

The place is not open to those objections where the ground gradually slopes to the south, with a gravelly substratum. There the climate is thoroughly beautiful; but when it is low and flat, and on a clayey soil, it is then objectionable and unhealthy.

But this is subject matter, I fear, that has not been sufficiently considered by us, nor dreamt of in our philosophy in the consideration of, and in the selection of the sites for, our cities and towns; and we are now many of us paying the penalties this ignorance and want of foresight has entailed, as just now in the middle of the nineteenth century we are endeavouring to remedy gross sanitary abuses, that are rendered difficult, if not almost impossible, by the injudicious sites and physical climates selected for our towns.

"To build, to plant, whatever you intend,
To rear the column, or the arch to bend,
To swell the terrace, or to sink the grot,
In all let Nature never be forgot."

I beg to add a few additional altitudes I have obtained, and hope shortly to send you others procured from the ordinates and levels of our railways and canals:—

Boston	30 ft. above sea level.
Gosp. rt.	30 "
Plymouth	30 "
Chiswick	25 "
Tottenham	50 "
Penzance	40 "
Whitehaven	30 "
Chipping Wycombe	150 "
Swansea (summit)	150 "
Wellingborough	160 "
Grasmere	180 "
Keswick	258 "
Swadham (summit)	300 "
Bury	300 "
Hungerford (Berks)	320 "
Hyde	320 "
Fairfield	320 "
Belton	320 "
Do. Belmont Reservoir	351 "
Rockdale	500 "
Marple	531 "
Lanark (Scotland)	600 "
Chapel-en-le-Frith	1121 "

ACKNOWLEDGING with thanks your aid in launching this subject, and gratified by the remarks educed, I wish to explain the "some-what ambiguous term" alluded to. "The mean level of the sea at Liverpool," to which my figures all refer as a common datum level, is a plane as nearly as possible 10 ft. below high water-mark, and 10 ft. above low water-mark. If, therefore, "B. B." will add 10 ft., he will find that his figures and mine very nearly agree. For comparative altitudes it matters not what datum level is adopted, if that one be adhered to. The figures I have given before, and now append, will probably incite some in *stati pupillari* to level across to other points, and thus information may be extended beneficially. It has always seemed to me that several considerations are involved in this question of altitudes, and I hope to treat the subject comprehensively very soon. Meanwhile I shall be glad to see facts, figures, and opinions from correspondents. The statistics which accompany this letter, grouped as before, show at a glance the undulating features of this island, which is called flat. Certainly it is unlike Abyssinia, where our troops have had to mount 9,000 ft. before they really entered the country; but probably very few who have read Her Majesty's book know that Balmoral Castle stands 900 ft. above Buckingham Palace.

Bridgwater	Trinity Chh.	25
Doncaster	Market House	38
Howden	Grand Stand	35
Ilfracombe	St. George's Chh.	48
Newcastle-upon-Tyne.	Market Cross	18
Plymouth	Chh.	21
Selby	Broad-street	22
Stirling	Road, nine miles from Barn-	604
Taunton	Milk Market	25
Tewkesbury	Blenheim-street	154
Truro	Ottagon	6
Tunbridge	Royal Hotel	32
Warrington	Chh.	22
Azmitcher	Market Cross	23
Godalming	Bridge	35
Oundle	Union Hotel	68
Thrapston	St. Mary Magdalene Chh.	60
Wilton	Market House	62
Virginia Water	Market House	44
Bromsgrove	Abbey Chh.	46
Dorchester	Bridge	14
Edinburgh	St. Mary's Chh.	19
Sheffield	Town-hall	85
Tavistock	Grammar School	164
Wellingborough	Butter Market	25
Wellington (Som.)	St. Paul's Chh.	136
Brentwood	Market House	131
Liskeard	St. Mary's Chh.	102
Luton	Bridge	121
Rugby	St. Peter's Chh.	138
Asby de la Zouch	Town-hall	149
Macclesfield	Chh.	163
Mauchline	Market-place	101
Newcastle-under-Lyme	Chh.	110
Sanquhar	Chh.	178
Wootton Bassett	School	181
Chipping Norton	Christ Chh.	135
Gleesop	Bridge	147
Selkirk	Market House	273
Sevenoake	Market House	280
Oldham	Chh.	223
Rowes Chh.	Market House	248
Llanfair Chh.	St. George's Chh.	238
Gleashie Chh.	Music-hall	225
Balmoral Castle	Fruit Market	205
Breemar Castle	St. Peter's Chh.	257
Linet Farmhouse	Market-place	267
Lord Fitz's Hunting Lodge	Chh.	271
Lord Fitz's Hunting Lodge	Town-hall	201
On Glesop-road, ninteen miles from Sheffield	Market House	246
	Chh.	257
	Chh.	358
	R.C. Chapel	302
	Fish Market	444
	Chh.	350
	Town-hall	360
	Hotel	374
	Chh.	377
	Irish-hoie Lane	403
	Chh.	432
	Palace Inn	472
	St. Michael's Chh.	498
	Chh.	467
	Toll-house	478
	St. Giles's Chh.	419
	Town-hall	428
	Chh.	467
	Town-hall	479
	Chh.	419
	Town-hall	491
	Chh.	567
	Town-hall	615
	Bridge	515
	Chh.	505
	Town-hall	590
	Main street	602
	Chh.	619
	White Hart Inn	618
	Townhall	673
	St. Mary's Chh.	702
	Chh.	971
	Chh.	981
	Chh.	1,075
	Chh.	1,355
	Chh.	1,318
	Chh.	1,469

EXCAVATIONS ON THE PALATINE.

BEFORE the commencement of the works on the Palatine Hill, 4th November, 1861, in that Farnese estate purchased from the ex-King of Naples by the Emperor of the French, at the price of 18,000l. sterling, little of systematic or persistent effort had been dedicated to the search after antiquities on that classic site. It appears that the buildings here served for the last time as a royal residence A.D. 500, during the brief stay of the Ostrogoth Theodoric in Rome; but it is supposed that, till so late as the twelfth century, the newly-crowned German emperors used, in some instances at least, to hold their state banquet, after the coronation ceremony at St. Peter's, in these decaying halls. The general conclusion is that, from some period within the eighth century, the aggregate of these imperial edifices was abandoned to the natural process of decay, already, no doubt, despoiled of its portable treasures in the invasions of northern barbarians; but, as we may affirm with like certainty, exposed to much greater injury, affecting all that remained in ancient architecture, at all serviceable, from the deliberate and cold-blooded spoiliations by Roman citizens, the turbulent baronial families, and perhaps, also, some of the Popes, alike unscrupulous, within Mediaeval periods. It was about the year 1536 that Paul III. founded the villa, with extensive gardens and a summer residence called, after his family, "Orti Farnesiani," for which Vignola, Sangallo, and Brambrotti were engaged to make designs, and in which that pontiff accumulated great store of artistic wealth, sculptures from the Antonine thermae, and from other classic ruins; a museum, all whose contents were finally transported to Naples after the Farnese line had become extinct, and its property then inherited by the Bourbon dynasty of the Two Sicilies. The only noticeable works for antiquarian objects carried out on the Palatine by the Farnese owners were those ordered by the Duke of Parma, 1720-28, and described in the "Palazzo de' Cesari," by a learned prelate, Mgr. Bianchini (Verona, 1738), subsequently to which nothing of the kind was attempted on this part of the Imperial Mount, till it had passed into other hands. Adjoining this Farnese estate is the villa, with large gardens, formerly of the Dukes Mattei, but later purchased by an Englishman, Mr. Mills, who built the ugly and conspicuous mansion called after him, and now owned by a consequence of which proprietorship neither honors nor grounds can now be visited by the public. According to some learned writers, and inferable also from the character of the ruins here brought to light, that same Villa Mills occupies the site of the palace of Augustus, built for him by public subscription after the modest mansion of his forefathers had been destroyed. Curious is the story of explorations on that now conventual estate, exemplifying the unsystematic senseless manner, though with some fits of transient zeal, in which such undertakings used to be carried on in Rome. Among other eye-witnesses, Flaminio Vacca tells (in his "Memorie," written 1594), of a gateway with marble jambs, 40 ft. high, a niche lined with African marble, and a colossal head of Jupiter in basalt, found here in his time; that bust having been purchased by himself, and therefore lost to the Roman public. Santi Bartoli tells of diggings made about the middle of the seventeenth century, that led to the discovery of a spacious hall, subterranean, entirely hung with tapestry of woven gold, but which discovery was soon reduced to dust on the admission of the outer air; also another chamber, with walls encrusted with finely-beaten laminae of silver, that seemed to have been ornamented with designs or reliefs, but all which precious material passed into the hands of traders, or into those of a certain cardinal's servant, the first purchaser to present himself! And the same antiquarian writer mentions also the mutilated statues, the fluted columns of *giallo antico*, seen by him among this treasure-trove—all eventually swept away!

The first published plan of the Palatine ruins was drawn up, but far from completely, by Buffalmi, about 1550; the next, with more exactness, later in the same century; another, satisfactory in regard to what had hitherto been discovered, by Bianchini, in his above-named "Palazzo de' Cesari"; and lately, we have seen the map of the buildings, with the entire ground, now the area of the works ordered by Napoleon III., prepared with skilful execution by Sigismondo Rosa, director of those works.

To conclude our survey of discoveries on the Palatine in past time. Most important were those due to the undertakings of a French abbe, Rancoreil, 1777, in the Mattei (afterwards Mill's) Villa, reported in the "Monumenti Inediti," v. ii. Behind this mansion were opened, at some depth below the actual level, buildings of such extent and character as to give the idea of a residence truly imperial, in two stories; among the numerous chambers being found four circular, one octagonal, also two circular edifices with fountains in the midst, two atria with colonnades, three spacious interiors with hemicycles or exedrae, on opposite sides, and with tiers of niches along their lateral walls; three quadrilateral halls, also provided with rows of niches (no doubt for sculpture), a small but richly-ornamented bath-room, six chambers entered from a ovoidium, a peristyle communicating with other interiors,—in fact, such a labyrinth of buried and magnificent as the explorers might have fancied themselves in an enchanted palace. Beautiful also were the remnants of art in these underground retreats, the fragments of statuary in the circular halls, the stucco ornamentation of vaults, and the paintings, Tritons, Sirens, and flowery patterns on wall-surfaces, besides numerous capitals, friezes, and remains of pavements in precious coloured marbles. Two statues of Leda (the finest of which found its way to England) and the Apollo Saurochthonos were the most precious and best preserved of artistic treasures thus disinterred. The illumination of the lower story by skylights with marble gratings seemed to confirm the notion that that part had from the first been subterranean, and used for refuge from the summer heats. Will it be believed that, though an intelligent ecclesiastic was directing these works, almost the whole aggregate of moveable objects,—capitals, friezes, cornices, pavements in rich materials,—was carted off to be sold to marble-cutters on the Forum? And the French abbe, strange to say, caused the entire upper story of those ruins to be demolished, the greater part of the lower to be again filled with soil (as when first opened), and only three among the principal halls left disencumbered,—these being now accessible to the Visitandine nuns alone. The estate on the north-western slopes of this hill was purchased by the Russian Government; but some years since given back to the Roman, by whose order works were soon afterwards undertaken, and slowly carried on in ensuing years on that ground. Here was laid open, 1847, a considerable extent of walls in enormous square-hewn blocks of lioid tufa without cement, supporting the declivity like a buttress, and evidently the remnant of fortifications, which, whether or not actually referable to the city of Romulus, are assuredly the most ancient ruins of this character in Rome; and later we have seen the soil several small chambers, supposed to have been the lodgings of soldiers, with curious graffiti, proper names, and sentences in Latin or Greek, scratched on their walls; among these, that extraordinary representation so much noticed at the time, referred by archaeologists to the time of Septimius Severus, and since transferred to the Museum of the Collegio Romano, a caricature of the Crucifixion, with a figure standing below in act of saluting, the victim on the cross having an ass's head, and the words rudely traced below, in defective Greek, "Alexamenos worships his God!" With the recent works on this side of the hill should be classed those under the neighbouring church of St. Anastasia, where a large extent of chambers and passages, referable to different dates, have been opened; most noticeable of all things here found being other portions of fortifying walls in stonework masonry,—the best preserved, and in every sense most important remnant of the ancient civic defences, no doubt among those of highest antiquity, yet known to explorers. Along the southern and much of the western slopes of the hill extend several gardens and vineyards held by different proprietors, in great part by the English College, till purchased; a few years ago, by the Roman Government, in order to the carrying on of works here also, and in the result of which much that is interesting may now be reported. Within the estate formerly owned by that college rise the noblest and most conspicuous ruins, that so imposingly crown the western hill-side above the road towards the Porta Appia, and are probably the latest among additions to the imperial buildings, due to Septimius Severus, and the last inhabited in Mediaeval periods.

Encouraging proofs of awakened interest and enterprise have, at all events, been supplied, with promise of ample reward both to French and Roman undertakings on this classic mount, beyond what could be foreseen in the days when Goethe roamed at large over solitary kitchen-gardens planted with artichokes, helping himself *ad libitum* to the precious marbles strewn at his feet on the Palatine in the year 1786.

Rome.

BRITISH ARCHAEOLOGICAL ASSOCIATION.

At the meeting of the British Archaeological Association, on Wednesday evening last, Mr. G. Godwin, V.P., in the chair, Mr. Vanderpent exhibited a bronze urn, said to have been exhumed in the Etrurian Necropolis at Perugia. It consists of a small oblong tomb, containing an urn, and surmounted by a seated female figure. Only one other similar urn is said to be known, and this was in the museum of the Hermitage at St. Petersburg. The urn exhibited was supposed to commemorate Tanagulla, wife of Tarquin, the fifth king of Rome. Some doubts were expressed as to the genuineness of this object. Mr. E. Roberts said some of the letters of the inscription were not Etruscan, and some of the ornamentation did not seem of the time supposed. Doubts as to the composition of the bronze were also expressed; and the discussion was adjourned to the next meeting. Mr. Holt exhibited two fine wood carvings, which had been presented by the carver, Hans Springenkle, to Albert Durer on his fifty-third birthday, 1523, and read a paper upon them. Mr. Cuming exhibited the wedding-ring of Martin Luther, which was adorned with Christian symbols, and engraved within with the names of Martin Luther and Catharine Boven. This ring belongs to Mr. Frederick Gause, banker, of Vienna, and has been in his family for 250 years. Mr. Irving read a paper on seals of the borough of Lanark, on one of which was a falcon, which he supposed to refer to forest-rights. Mr. Planché thought the bird to be no falcon, but a spread-eagle,—a two-headed eagle, in fact,—which it was now well known had had its origin in the division of arms; being, in truth, the putting together of two similar halves of an eagle. Mr. Greville read an interesting account of the remains of a Roman villa at Chedworth, where he seemed to think there were strong traces of early Christianity. The chairman announced that the Annual Congress would be held at Cirencester, from the 3rd to the 8th of August, and that Lord Bathurst had undertaken to preside.

GLASGOW ARCHITECTURAL SOCIETY.

The usual monthly meeting of this Society was held on the 17th inst., Mr. Honeyman, president, in the chair. A paper was read by Mr. W. Forest Salmon, architect, "On Roofs and Chimney-heads." He thought it a mistake to regard the cornice as the finish of a building, above which any kind of ugliness might be placed; it would be much more conducive to pleasing picturesqueness and variety if no attempt were made to make street buildings harmonize with those adjoining them. Each building should be treated independently, and the parts above the cornice should bear an important part in the expression of its individuality, and were therefore worthy of most careful study. He alluded more particularly,—1, to the junction of roof and walls; 2, to the roof itself; 3, to chimney-heads; and 4, to the junction of buildings of different heights.

Mr. A. Thomson thought that where it was practicable one design should embrace a number of houses, and that breaking up the sky-line by irregularities was not desirable where it could be avoided. He thought that practically the design was crowned by the cornice, and that any building which was much indebted to its roof for effect could not be of a high style of art.

Mr. Douglas did not agree with Mr. Thomson in this last remark; at the same time, he admitted that in the grandest architectural remains the roof is utterly ignored. In regard to towns in general, and Glasgow in particular, he might say that practically we had no choice, we were so tied down to uniformity by feu charters and dean of guild court regulations. If a man proposed adding a story to his house he was

at once interdicted; and perhaps it was as well, because such varieties could not be indulged in without great risk of making a blow down in our neighbours' vents, and then the chief variety of sky-lines would be produced by very picturesque arrangements of chimney-cans!

Mr. Bromhead thought that the cost would be found to be the great difficulty; and in this Mr. Howatt agreed, pointing out that the chief ranges of buildings were got up by speculating builders, without the assistance of any architect; and that the cost was slaved down to the last farthing.

Mr. Kennedy thought that the erection of a blocking or parapet along streets should be made compulsory.

The Chairman remarked that he could not understand Mr. Salmon's remarks as applicable to the streets of a city generally. Obviously there were localities where a picturesque style and treatment was not only admissible but most appropriate; and others where anything of the kind would be quite out of place. We should study the requirements of each, recognising the propriety of a difference. He thought a striking instance of a total disregard of this, and the result, was to be seen in the business part of the city of London, which has in so great a measure been reconstructed of late years. He could not understand how any man in his senses could design a magnificent Italian palace, with elaborate frieze and hold overhanging cornice, for an insignificant strip of frontage of 25 ft. or 30 ft. in a narrow street.

NORTHERN ARCHITECTURAL ASSOCIATION.

The annual meeting of the Northern Architectural Association was held on Tuesday, the 18th, in the Old Castle, Newcastle-on-Tyne, Mr. Green, the president, in the chair. The report, read by the secretary (Mr. Thos. Oliver), stated that the number of members amounted to 51. The income of the year had been 13l. 10s. 11d., and the expenditure, 9l. 8s. 5d., leaving a balance of 4l. 2s. 6d. in the hands of the treasurer. The arrears in subscriptions amounted to 25l. 15s. 6d.

The secretary said that between 2,000 and 3,000 persons were, through their respective associations, in connexion with the Architectural Alliance, and all of them adopted one uniform scale of charges. Prior to the Alliance adopting that scale every town had its own scale; but now they had uniformity of practice, and did not undersell each other. The Alliance had also taken up the question of having a uniform mode of measuring artificers' work throughout the United Kingdom, but the matter was in abeyance. Another subject which had been considered was the insertion of an arbitration clause into contracts, and of quantities forming part of contracts; but this matter was also in abeyance.

A subscription of 5l. 5s. was voted to the Architectural Museum, London.

The president delivered an annual address, and concluded by suggesting the formation of an architectural library, a school for drawing, modelling, and carving—say in connexion with the School of Arts,—the formation of classes for obtaining a complete mastery of the natural sciences and of languages, in order that they might be able to keep ahead of the time.

Mr. F. R. Wilson, of Alnwick, read a paper on "Dangerous Methods of Construction in the North." He said he would not have taken upon himself to point out some important errors in the present modes of construction in use in the building trades, if he had been, as it were, to the manner born; but having had considerable experience in construction in the South, the imperfections in question, more especially the want of extra care to meet climatic conditions, struck him more forcibly than they might otherwise have done. They were bound to protest against the use of any mode of construction that did not fulfil every condition likely to insure stability and prevent casualties. He first referred to a common method of building stone walls, which was fraught with much evil. Leave a builder alone, he would build up the wall hollow within, throwing into the interstices loose rubble as he went on, which should never be done in this climate. Every course should be well grouted together. He found that some North-country builders, in building brick walling, after a few courses, laid their

bricks only at the edges of the wall for a height of a foot or more, and filled up the hollow space with loose rubbish; and then, after another course of solid brick-work, would repeat the hollow one. It had been more than once called to an alarm of fire in consequence of this mode of forming boxing for hearths with wood. A crack in the hearthstone, or a widening of the division in it when formed of two stones, admitted of hot ashes falling through on to the timber, till at last it smouldered. Hearthstones should be of one piece, and should always be laid upon brick or stone arches. Chimney-stacks should be made more substantial, and slates should be fastened more securely on roofs. In this humid climate, and with the porosity of all the stones of the North, no external walls, or walls communicating with external walls, should be plastered on the inner side without being stoothed, in order to do away with damp walls. He also advised more attention being paid to gutters and drains. These, he said, were some of the items of construction in every-day use among builders, which militate against the interests of the architect, and which were fraught with danger to the public; and the unfortunate system which had grown up of reducing the cost of everything to its uttermost limit was the moving cause of the defects he had noticed.

FROM SCOTLAND.

Edinburgh.—Mr. Dobie, painter and decorator, offered, some months since, to the journeymen house-painters and decorators of Britain a number of prizes for the best designs for wall-decoration. A large number of competitors entered, and their productions have been on view for several weeks, and have attracted much attention in the trade. The drawings were submitted to the following gentlemen, who acted as judges: Messrs. J. Dick Peddie, James Ballantine, John Nisbet, Edinburgh; R. Dow, Perth; and J. B. Bennett, Glasgow. Their decisions were as follows:—

Drawing Room.—1st prize (20 guineas), William Lucifjens, Glasgow; 2nd (10 guineas), Alexander Girldwood, Edinburgh; 3rd (5 guineas), Matthew Hislop, Langholm.

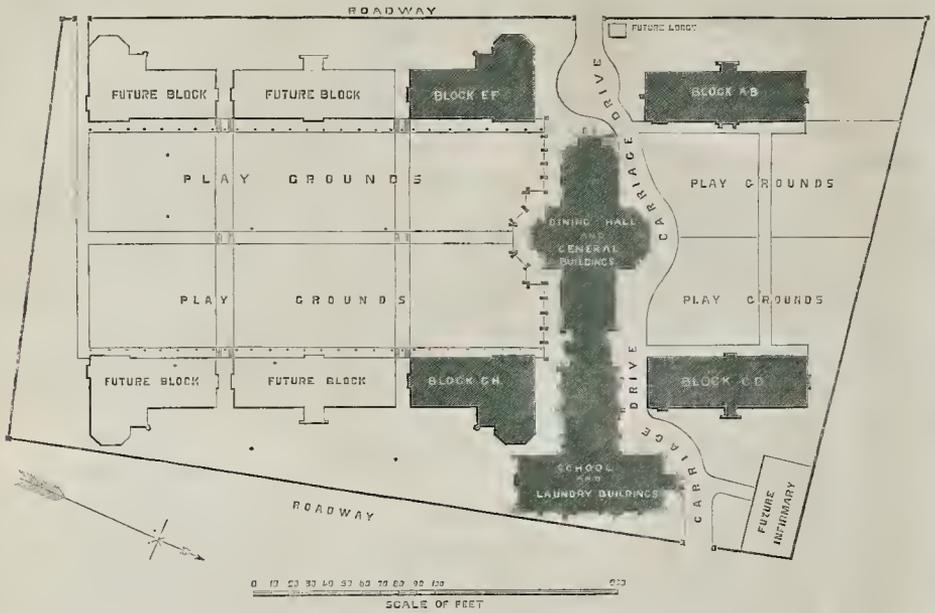
Dining Room.—1st prize (10 guineas), Alexander Girldwood, Edinburgh; 2nd (5 guineas), William Lucifjens, Glasgow; 3rd (2½ guineas), Andrew Wells, Glasgow.

—The committee of the Scottish Society of Arts or Technical Education have arranged that a conference shall be held in Edinburgh, on Friday, the 20th of March, and an invitation will be issued to those gentlemen who take an interest in technical education.

Glasgow.—The proposal, which originated in the town council some months ago, to open two new galleries in the Corporation Buildings with an exhibition of portraits of worthy citizens and distinguished countrymen, now deceased, has been successfully carried out. The walls of the five new rooms and galleries are nearly all occupied by the paintings. There are 392 pictures in oil, 26 in water-colours, 15 in crayons, and 26 busts or medallions, executed principally by the best Scottish artists of this and preceding generations. The works of several eminent English artists are also represented. The Exhibition has been formally opened to the public.

SCHOOLS OF ART.

The Wolverhampton School.—A few gentlemen interested in this institution have met at the school, in Darlington-street, to distribute the prizes and certificates of merit among the more successful students during the past year. The distribution was made by Captain Loveridge, the president, Mr. Vincent Jackson, the hon. secretary, and Mr. Gunn, the head master. Captain Loveridge made a few appropriate remarks in reference to the importance of such an institution in a manufacturing town like Wolverhampton, and recommended the pupils to continue to attend the classes regularly, and to endeavour, by setting forth the utility of the institution to their friends, to induce them to become students. The local *Chronicle* says,—“The fact that this school is so little appreciated is almost unaccountable. It reflects no credit on many of the parents and young men, showing, on the part of the latter, a disinclination to improve themselves, and either unwillingness or inability to recognise the importance of endeavouring to maintain that superiority which English manufacturers have attained in



ALEXANDRA ORPHANAGE FOR INFANTS.—Block Plan.

foreign countries. One would think that as the subject of technical education is earnestly engaging public attention greater interest would be taken in the School of Art, and that there would be an increasing attendance of students."

The Sheffield School.—The annual conversation of this school was attended by a large company. The council, with the efficient help of Mr. Soules, the head-master, had gathered together a considerable number of first-class paintings and drawings for exhibition. The distribution of prizes took place in the large room on the ground floor. Mr. F. T. Mappin, the president of the council, occupied the chair. Mr. Bowler (of the Department of Science and Art) having been introduced by the president, referred to the action of Government. He reminded the audience that when the Sheffield School was founded it was one of a very few, but since then other schools had sprung up, so that where there were formerly some eighteen or nineteen receiving Government assistance, there were now about one hundred. The Government could not continue giving to individual schools of this increased number grants so large as the Sheffield School formerly received, although it was giving a larger aggregate amount. This had been the real reason for the change. The people of Sheffield had only to say the debt of their school should be removed, and the Government would help them. He believed the Government would pay 500l. towards it. As to the deficient annual income, the Lords of the Council had come to the conclusion that it was desirable to give further aid, and new minutes had been published within the last few weeks. This he hoped would increase the grant to the Sheffield school by about one-third. Possibly, if the debt were paid off, the council might, with this help, make both ends just meet, but the wealthy town of Sheffield ought to feel it a duty to increase its support to that institution.

ARCHITECTURAL EXHIBITION SOCIETY.—The annual general meeting of this Society is to be held at the House in Conduit-street on the 4th day of March next. A report and balance-sheet for the session 1867 have been issued.

THE ALEXANDRA ORPHANAGE FOR INFANTS.

The Alexandra Orphanage was founded in October, 1864, under the patronage of Her Royal Highness the Princess of Wales, who gives it its name. The charity originated in the thoughtfulness of a few friends for a long period interested in the welfare of the orphan poor. It was seen, in carrying out the designs of the Orphan Working School, that there was great need of a charity for the infant orphans of respectable but poor persons, whose incomes were insufficient to permit of their making future provision for their families; and this consideration determined those who first met in conference to convene a meeting of friends, which resulted in the formation of a committee, half of whom should be members of the parent society. In the space of two years and a half ninety infant orphans have been presented for admission, of whom sixty have been elected. The purpose of the charity is to receive orphan children from earliest infancy to the age of five years, and to board, clothe, nurse, and educate them until they are eight years of age. The object and design of the founders of the Alexandra Orphanage being that its benefits shall be extended to all necessitous infants, it is to be distinctly regarded as of the very essence of the charity that at the present time and in all future times no religious distinction of any sort shall be introduced, either as a qualification for admission or after admission; and that while it is fully intended that the children shall have a Scriptural education, no denominational rules or catechisms whatever shall be adopted.

The institution is situated on the rising ground of Hornsey, occupying an area of about 500 ft. by 300 ft., with a rapid descent of 60 ft. from the high-level to the base of the hill.

The desire being to provide for separate sectional supervision, closely allied with a centralization of the whole, as the first requirement, the ground is allotted for separate detached buildings of cottage blocks, arranged symmetrically in the form of a double quadrangle, of which the main buildings, for dining-hall, schools, and offices, form the central point and feature of the design.

The cottages are arranged in couples, providing separate homes for twenty-five infants each, having its own accommodation separate and distinct, and arranged with playground or garden, terraced, to meet the accommodation level in the face of the ground. Each cottage provides a day-room, two dormitories, with nurses' rooms, lavatories, and bath-rooms: provision is therefore made for a total accommodation of 400 infants, when the whole scheme is carried out in the sixteen proposed cottages.

The quadrangle provides to each block a separate recreation ground, and access to a covered corridor communicates with the school-rooms and dining-hall in the centre.

The central buildings include the principal centre of dining-hall, matron's house, and domestic offices, on a terraced level with a cloister, communicating immediately with the cottage corridors. The schools on the east are approached in the same way, and will shut on the Sunny-side-road.

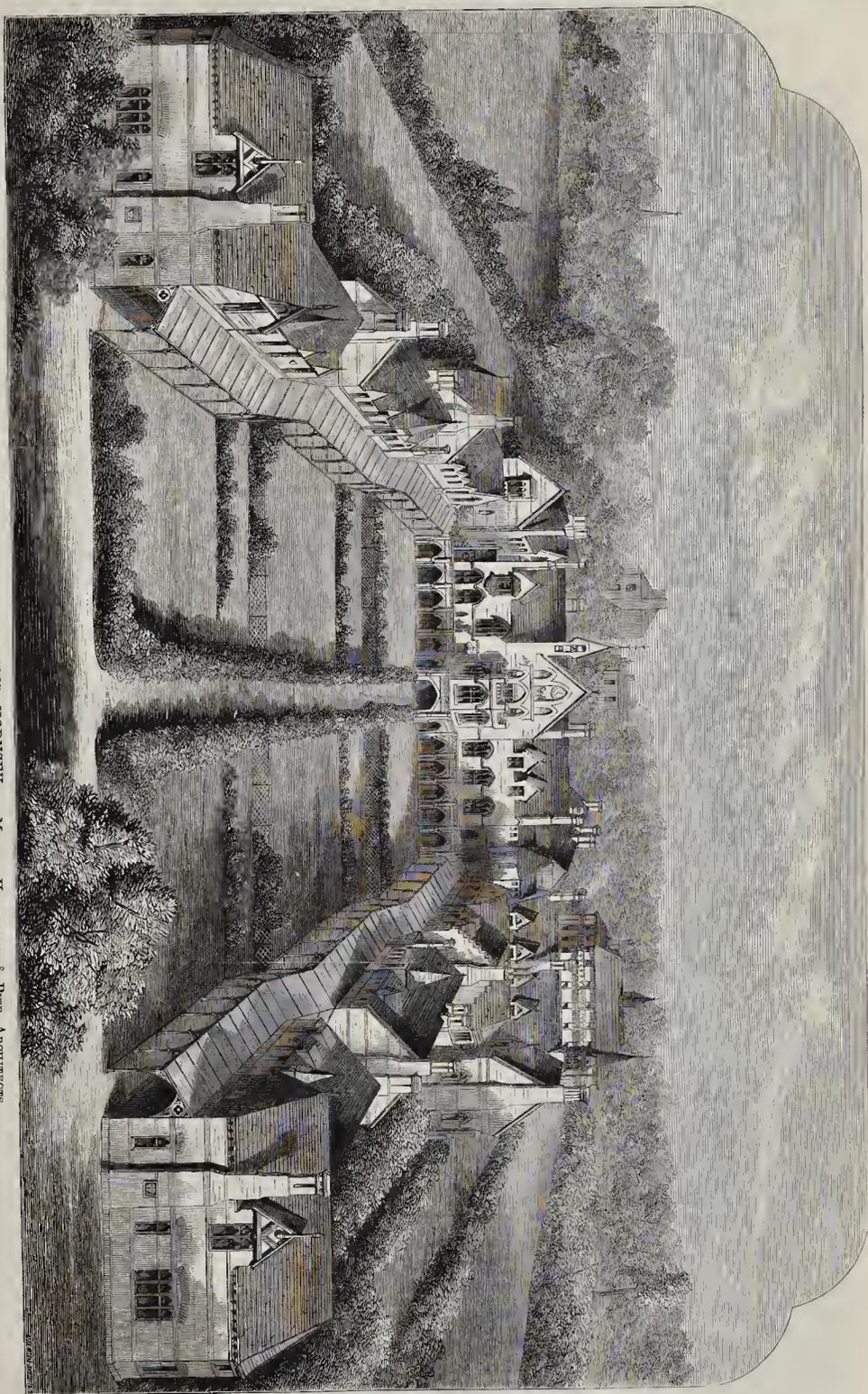
The infirmary is placed at the extreme boundary of the freehold property, and is to be erected on the principle of adapting a Swiss cottage exterior and plan to the requirements of the institution. This building will have a verandah, carried up to the eaves of the roof, and giving to three separate floors independent access, by external staircases, to the three wards, so that in all contagious and epidemic diseases the separation may be perfect, and consistent with the requirements of such an institution.

The general style of the buildings is Domestic English Gothic, of varied character to each block, the whole being proposed for execution in ordinary brickwork, with freestone dressings.

The estimated cost of the present undertaking is 15,000l.; while eight cottages will yet remain for future addition, at an estimated cost of 500l. each. Messrs. W. G. Habershon & Pite are the architects.

The first stone of the eight cottages now erected was laid by the Duchess of Sutherland, on the 6th of July last, when Earl Granville took a considerable part in the proceedings.

We have pleasure in mentioning Miss Elizabeth S. Soul as the indefatigable hon. secretary of the ladies' committee.



ALEXANDRA ORPHANAGE FOR INFANTS, HORNSEY.—MESSRS. HADENSON & PITT, ARCHITECTS.

ACCIDENTS.

The Fire at Charing Cross Railway Station.—In the half-yearly report of the South-Eastern Railway Company, the directors state that the cost of restoration and improvements (by the use of unflammable materials and otherwise) rendered necessary by the fire at the custom-house building at Charing Cross Station on Tuesday last, as estimated by the engineer, will not exceed 4,000l.

Fall of a large Chimney at Halifax.—A mill chimney, in course of erection, and which had attained an altitude of 40 yards, has fallen at Lee Bank, Halifax, doing much damage to two adjacent mills. The accident happened on the premises of Messrs. W. H. Rawson, who have just completed a seven-story mill, which, with an adjoining mill, are about to be occupied in cotton spinning. Until within a few minutes of its fall, the chimney was considered quite safe. It, however, was observed to oscillate several times, and two masons were in consequence called from the top. They had been down only about ten minutes when the chimney fell at its full length. A slip at the foundations, it is thought, must have led to the fall of the structure, which was of stone, having a 6-ft. flue.

Accident at the New Exchange Works, Manchester.—The site of the intended building is one immense sand-pit, and workmen are now engaged in excavating the sand and carting it away, for the purpose of allowing the foundations to be put in. Adjoining Market-street the foundations are carried to a depth of about 20 ft. below the level of the street. Three excavators were engaged in one of the sandpits when a huge mass of sand slipped, causing the wooden supports to give way, and the three men were buried up to their waists in the sand. Fortunately, the wooden supports fell in such a manner as to serve as a protection to the heads of the men. Mr. Marshall, the clerk of the works, and Mr. J. Alcock, the gang foreman, with a number of men, set to work and rescued the three men from their perilous position.

Fire at the Limerick Gas Works.—During the prevalence of a most violent squall from the south-west, with vivid and constant flashes of lightning and a deluge of rain, the immense gasometer of the United General Gas Company, which contained 200,000 ft. of gas, was ascertained to be in flames, which burnt for an hour. The accident was occasioned by a strong gust of the wind having caused the gasometer to cant over against the gable of the wall where it was set; the wall gave way, and then the gasometer was blown entirely upon its side, the hasement stonework making a large breach of several feet near the lower water-rim, from which the gas rushed out, and, coming in contact with a lamp, caught the flame and lighted up. Nearly all the gas was burned out.

THE CONSTRUCTION OF VITRIFIED PORTS.

At a recent meeting of the Glasgow Architectural Society, Mr. Galloway in the chair, Mr. Honeyman read a paper "On the Construction of Vitrified Ports." After referring to the various theories of construction which have been propounded, he remarked that these entirely failed to account for the phenomena presented in the remains. He then proceeded to describe the vitrified fort on Dunskeig Hill, at the entrance of West Loch Tarbert, and certain peculiarities of construction there, which, with other examples, led him to the conclusion that the walls—some of which are fully 10 ft. in thickness and vitrified throughout—were constructed by a series of furnaces on the walls, not by the application of heat to the external surfaces. The paper was illustrated by numerous specimens of vitrified work, many of which were from the collection of Mr. W. Keddie. It is evident, he said, from the condition to which the most intractable rocks have been reduced—mica slate being frequently found converted into a material resembling pumice stone, light and porous; while green stone has been completely liquified, so as to glaze over and agglutinate the looser materials over which it has been melted—that the holders of these curious structures must by some means have applied an artificial blast to their furnaces. Mr. Honeyman suggested that the natives may have pressed into their service the gales of such a season as this. He thought some light might be thrown on the mode of construction if geo-

men who had an opportunity of visiting the remains would observe:—1. If the stones composing the walls had been broken down, or if they were smooth and round like boulders or stones worn by the action of water. 2. If they adhered in consequence of fusion, or because agglutinated by a fused material of a totally different character. 3. If the vitrification were more complete towards the outside, or otherwise. 4. If the walls showed any evidence of horizontal courses. 5. If there were any indications of transverse or longitudinal portions more completely calcined than the rest of the work; and 6. If the walls were more completely vitrified towards the north and east than towards the south and west.

A discussion followed, conducted by Messrs. Hart, Galloway, Mackinlay, A. D. Robertson, Michael Connal, and other gentlemen. It was considered desirable that the subject should be further investigated in the light of Mr. Honeyman's theory.

COMPETITIONS.

Darlington Union Workhouse.—On the 24th instant the Board of Guardians met, and decided the above competition. Mr. Wm. Lee, architect, London, was called in to assist in the selection, and the designs bearing the motto "Nota Bene" were selected as the best. The first premium of 40l. was awarded to these plans, and the author of them, Mr. Charles J. Adams, of Stockton-on-Tees, was appointed to carry out the works, which are to cost about 10,000l. The second premium of 30l. was awarded to designs under motto "Economist;" the third premium to motto "(A)" A in a circle.

St. Mary's Church, Lichfield.—The design selected for this church is by Mr. James Fowler, of Louth, and we understand it will be carried out at once under his direction.

THE ARCHITECTURAL ASSOCIATION.

The ordinary meeting of members was held at the Hoare in Conduit-street on Friday evening, the 14th instant, Mr. Lacy W. Ridge in the chair.

The following gentlemen were elected members of the Association:—Messrs. T. E. Cole, Alfred Bovill, and B. A. Mayhew.

Mr. J. D. Mathews (hon. secretary) explained, with the assistance of the black board, a plan which he had under consideration for improvements in the warming and ventilating of private houses by the introduction and circulation of waste heat from ordinary stoves. He also described (in connection with the same subject) certain improvements in the construction of gas-chandeliers, by which the light could be concentrated without shadow, while the noxious properties of the gas would be carried off without discolouring ceiling or spoiling furniture, pictures, &c.

The Chairman observed that the subject was one of such great importance, both in a sanitary and economical point of view, that he hoped the Association would be able to devote an evening to the discussion of it.

Mr. Tarver read a paper on "Symmetry from a Gothic Point of View," in which his object was to prove that the study of Gothic architecture relied as much on an observance of symmetry as Classic architecture, which he considered out of place in England, but to which the term is generally thought exclusively applicable; and he believed it was the too easy acceptance of this inference that had led to the astonishing vagaries in much modern Gothic work. By analyzing the terms "balance," "proportion," and "symmetry," he pointed out that the first referred to an instrument for testing the relative weights of two bodies, as, for example, to a centre flanked by twin masses in episcopio, and so to the design of most Classic buildings (Mr. Lovesdale supplemented this remark by the instance of a steel-yard, in which two bodies of different weights counterbalanced each other by being placed at different distances from the centre, as was the case in some Gothic examples); that "proportion" dealt with single features as much as could be comprehended in one glance; but that the term "symmetry" meant literally "measuring together," and might be taken in a more comprehensive sense than the others. He thought that balance was right when there was no reason to the contrary;

but that we should recognise the principle that symmetry should not be confined to the subdivision of a façade into two equal halves, or even to façades at all; but that it should guide the distributive form and size of every limb and feature of a building.

Mr. Potter, observing upon the new public Offices in Downing-street, designed by Mr. Gilbert Scott, said that in the upper rooms there was not that abundance of light which Lord Palmerston had declared to be so essential in all public buildings in this country.

Mr. Quiller contended that symmetry in Gothic architecture was not the balancing of the parts, but the proportioning of all the parts, so that the entire building might be harmonious.

Mr. Redgrave, while declaring himself unprejudiced as regards the rival claims of Gothic and Classic art, could not agree with Mr. Tarver in condemning the design of St. Pancras New Church, built by Mr. Imman. The spire was not, he held, so incongruous as it had been represented to be; although he was prepared to admit that the jumble of spires in the metropolis was anything but agreeable to the educated eye. Sir Christopher Wren's city spires were no doubt the most successful; but those who condemned St. Pancras spire on the ground that it represented one temple upon another, ought to know that there was a precedent in ancient art for such an arrangement. In his opinion the description of Classic architecture which ought to be encouraged was the Renaissance. There were many fine buildings in Italy in that style which would suit our climate very well, and which would be more appropriate than designs borrowed from the rigid antique of Greece. On the whole, however, he thought that Gothic architecture was that best suited to our climate. It had, no doubt, faults, but these might be avoided; and he held that it would be better for architects to study so as to avoid those hominies rather than to adopt a manner which might be described as a jumble of many styles.

THE INSTITUTION OF CIVIL ENGINEERS.

At the meeting on February 18th, the paper read was "On the Supporting Power of Piles; and on the Pneumatic Process for Driving Iron Columns, as practised in America," by Mr. W. J. McAlpine. The first part of this communication related principally to the experience gained in driving 6,539 piles, an average depth of 32 ft., for the foundation of the Government graving dock at Brooklyn, N. Y., when the support was mainly derived from the adhesion of the material into which the piles were driven, and slightly from their sectional area. The piles were in rows 2½ ft. apart, and at transverse distances of 3 ft., all from centre to centre; intermediate piles of tough second-growth oak being frequently employed. The main piles were chiefly round spruce spars, very straight, from 25 ft. to 45 ft. long, and not less than 7 in. in diameter at the smaller end, and on an average 14 in. in diameter at the larger end. From a record kept during the progress of the work, it was ascertained that it took two and one-third blows to drive each foot of pile, and that the distance moved uniformly diminished from the first to the last blow, ranging from 8 in. at the beginning to no movement at the end, the average distance moved by the last five blows being 1 in. A considerable number of the piles were driven by a Nasmyth steam-piling machine, with a ram of 3 tons, and a stroke, or fall, of 3 ft., and making from sixty to eighty strokes per minute. The other machines were generally operated by steam-power, giving an average of a blow per minute; but occasionally the hammers were hoisted by manual and horse power. The rams in the latter machines were of cast-iron, swelled out at the bottom to concentrate the weight at that point, and weighed about 2,200 lb. each, though some were used of 1,500 lb.; the fall being 30 ft. It was observed that the heaviest ram, when striking blows of the same effect as lighter ones, did the least injury either to the head of the pile or to the protecting iron ring, and this injury was still less with the Nasmyth hammer. It was also found that no advantage was gained by the fall of the ram being more than 40 ft., as the friction on the ways then prevented any increased velocity to the ram when falling from a greater height. With the Nasmyth hammer, piles were driven 35 ft. in seven minutes, while with the other machines similar piles required one hour, or more, to drive them the same distance.

Experiments were made at different times to ascertain the weight which the piles would sustain. For this purpose a long lever of oak timber was employed, with a number of the foundation and coffer-dam piles of nearly the same size, and driven under exactly similar conditions, were withdrawn. It was thus ascertained that a weight of 125 tons was required to move a pile, driven 33 ft. into the earth, to the point of ultimate resistance, with a ram weighing 1 ton, and falling 30 ft. at the last blow. These

trial piles averaged 12 in. in diameter in the middle. From a number of other experiments, it was believed that the extreme supporting power of the pile, due to its frictional surface, was 100 tons, or 1 ton per superficial foot of the area of its circumference. From an analysis of the experiments, the following general laws seemed to have prevailed in these cases:—1st. That the effect of lengthening the fall of the ram was to increase the sustaining power of the pile in the ratio of the square root of the fall. 2nd. That by adding to the weight of the ram, the sustaining power of the pile was increased by 0.7 to 0.9 of the amount due to the ratio of the augmented weight of the ram. 3rd. That a pile driven by a ram weighing 1 ton, and falling 30 ft., would sustain an extreme weight of 100 tons. The formula based upon these data, as applicable to rams weighing from 1,000 lb. to 3,000 lb., falling from 20 ft. to 30 ft., was $X=80(W+0.228\sqrt{F}-1)$, in which X was the supporting power of a pile driven by the ram W, falling a distance F; X and W being in tons, and F in feet. The author was of opinion that, under the most favourable circumstances, the pile should not be loaded with more than one-third of the result given by this formula; and when there was any danger of a future disturbance of the material around the pile, or when there was any vibration in the structure which might be communicated to the piles, the load imposed should not exceed one-tenth.

The bearing support due to the sectional area of the pile had not been considered in the preceding inquiry; but numerous experiments had been made, which gave results of from 5 tons to 10 tons per square foot.

THE FITTINGS OF COTTAGES.

A LADY, dating from Quebec, favours us with some observations on the planning and fittings of economical dwellings for working men. We print the portion relating more particularly to the second part of the subject.—It has been proposed by some architects, who carried their ideas of economising space to an extreme, to make the drawers under bedsteads available by having drawers to slide under the bed. This is by no means advisable. The space beneath the bedstead, for the sake of health as well as of cleanliness, should be open, and daily subjected to the supervision of the broom.

In domestic architecture it has been much the fashion of late to have no closets. This omission entails much expense on the occupants of houses, and is eventually injurious to the landlords, as bringing in and out large articles of furniture, such as presses and wardrobes, can seldom be done without damage to the walls. The open dressers, so ornamental with their rows of plates and dishes, have generally given way before the swarms of flies which seem ever to increase and multiply; and although it has been stated that the presence of these insects is so beneficial in some respects that Europeans in New Zealand carry them in boxes to localities where they were formerly unknown; yet, whatever their qualities may be, it is desirable to keep things as much as possible from their touch, and to this end closets in kitchens are indispensable. Closets are more easily cleansed than drawers; and it was no improvement in finishing to expel the old-fashioned linings, which formed a defence against the entrance of vermin. Closets are convenient even in the dining-rooms of the opulent; they are *requisites* in the apartments of the working-classes. In sleeping-rooms, the closet should, if possible, be large enough to stand in, have rows of shelves transversely from the floor to the ceiling, at the sides, with a long shelf lengthways, under which should be rows of pegs. If recesses by the fire-places do not admit of closets in the kitchen, they should be put up as fixtures.

The problem how to dispose of what may be termed the refuse of human life is a disagreeable but most important one. The waste in cookery and preparing food may be reduced by good management; rags may be kept for the rag-gatherer; bones, and fragments of metal and crockery, which so frequently disfigure the roadsides, may be given to collectors of such things; but still there must be refuse, there must be a dunghill, and this, with other nuisances, should be removed at short intervals to serve for manure.

Doubtless, those houses should be most healthy that have no drains passing under them, as the

vapours and had air fall not to penetrate above, and the most costly appliances of luxury do not always obviate such inconveniences; but round the habitations of the poor, without care, damp and dirt gather fast, and the question still remains how to dispose of the waste water without a sink or waste-pipe. Can it be safely enfolded to be thrown out into the yard or the field, and suffered like the rain to permeate the soil? Perhaps a small tiled drain to carry off soaped and greasy water is as good a way as can be devised to keep the surroundings of the houses of the working-classes dry.

A labouring man who has to leave home early, and at a regular hour, requires a meal speedily and comfortably prepared; when he returns, he wants refreshment and repose in comfort. Now, very few articles are required for actual comfort, and every article not necessary for personal convenience and enjoyment gives trouble, and is in the way, when there is only one pair of hands to keep all in order. In selecting furniture what is strong and durable should be chosen. Cleanliness is the grand element of comfort; and unpainted wood being most easy to keep clean, is the nicest for the living-room. Wooden-seated chairs wear best, and are the healthiest. The little round claw-table is pretty, and suitable for the mother's afternoon work; but it must not be spersed the deal-table, 4 ft. long, indispensable for meals, for the preparation of food, and for ironing. Bedsteads, with laths that can occasionally be taken out and washed, are preferable to those with ticks or close boards. Curtains are quite unnecessary. In the climate of England hair mattresses are more to be recommended than wool mattresses, or any mixtures of *lock*, but ticks filled with straw, and pillows stuffed with chaff, are very good. Fine shavings make excellent beds. Where the father or the boys have the valuable knack of carpentering, a few boards and two or three harrels can be made very serviceable.

A bedstead can soon be knocked together; one harrel can serve as a washhand stand, another as a side table; a harrel can be cut into two seats for children, and a barrel can be made into a commodious arm-chair, and with a little ingenuity made to look well. For the floor, cleanliness is the best ornament; and to insure this it is not requisite that a woman should go down on her knees to scrub. The process of cleaning the floor may be rapidly and effectually performed with an iron mop. The only coverings requisite are large mats at the doors, and rugs before the fireplace and by the side of beds. Tin kettles and saucepans are less durable than iron, but far more expeditions in cooking, especially in boiling water. Dwellings thus arranged, with as much space as is possible for the living-rooms, and as few articles of furniture as will suffice for convenience, have a better appearance, and will be found more healthy, cleanly, and comfortable than the confined and encumbered rooms in which the working classes usually live.

A. E.

MR. CLADSTONE AND TRADE UNIONS.

SIR.—If any one expected the deputa-tion to Mr. Gladstone would effect the promised object of their visit, he must have been greatly disappointed. The public had been led to expect that a selected number of working men, thoroughly acquainted with the subject, and speaking with authority as representing the whole body, would (as was somewhat boastfully predicted) expose popular fallacies, make clear the benign principles of restriction, elucidate political economy generally, and so enlighten the mind of the statesman that he should humbly acknowledge himself to have been entirely mistaken. The further effect proposed was to provide a solid groundwork for legislation, and to gain the sanction of law for what has by some been considered a selfish and odious tyranny. I confess to having looked forward with much interest to this discussion, and have carefully read the report, hoping to find some grains of sound argument amongst the crude mass of mere assertions. In the first place, the deputa-tion evidently were not all of one mind; several individual members stoutly upholding practices which Mr. Potter stated were confined to a small minority of the trades; such as the restriction of apprentices, and the prohibition of piecework. But surely, before undertaking to enlighten an obtuse and supposed hostile public, the members ought to have agreed amongst themselves. Moreover, at a later meeting, it was announced that several large and influential trades altogether repudiated

the self-constituted championship of the deputa-tion. If they really wish to enlighten the public, and to meet the case—as the leader of the deputa-tion said their intention was—"fairly, openly, and without equivocation or reserve," let some one on their behalf publish a collection of trade-union rules, supplemented by a narra-tion of trade-union practices, the materials for which would not be difficult to obtain. Then let him state their case, adduce their arguments, say which of the practices they uphold and approve of, and which they disown and will discourage, and they may rely upon it the public to whom they appeal will give them a fair hearing and pass a just verdict; but the work must be done fairly, honestly, dispassionately, and with a sincere desire to arrive at the simple truth. Anything like an attempt to deny well-known and proved facts, or to throw dust in the eyes of the readers by rhetorical special pleading, will only deepen the feeling they complain of, which, rightly or wrongly, certainly exists, that they practise things which would look very ugly in print. Mr. Gladstone evidently perceived the heterogeneous nature of the body he had to deal with, and that they were so fully persuaded of their power to teach that they had nothing to learn.

AN ENGINEER.

CONSTRUCTION OF FIRE-PROOF DWELLING-HOUSES.

AMIDST all the modern improvements and appliances for home building it appears remarkable that so few attempts have been made to render our dwellings, if not entirely fire-proof, yet not wholly destructible by this insatiable element. Whosoever has been roused out of midnight slumbers by the fearful cry of "Fire! fire!" will need but little advocacy to induce him to adopt any feasible mode in his power to construct a dwelling so far fire-proof that the destruction may be reduced to a minimum, or at most confined to only one apartment, and the loss of life all but impossible.

The common mode of house building is so fraught with danger from fire that the wonder is how any portion of the building or its contents is ever saved from the devouring flame. Indeed I would ask the most superficial observer is it possible to lay timbers for ignition in a more scientific manner than they are usually placed in our common dwelling-house? Is there any kitchen fire-grate laid for the express purpose by our servants so skilfully disposed for the ostensible purpose? First, there are the joists for the floors, then the quarter partitions, then the rafters and battens of the roof, and afterwards the lathing and lathening for papering the walls; also the flimsy staircases, all nicely spaced, and just adapted for burning at a minute's notice. Let any person look through or upward at a house that is what is termed carcassed in, and say whether he could devise anything better calculated for combustion?

And this insecurity exists for the sake of a little more expense in the first place,—say 25 per cent. addition for a first-class house.

In the first place, I propose to arch over the basements, either in the way I shall recommend for the next floor, or in the old-fashioned way of groins. The other stories I should arch over in the same way as a coach-head trimmer, taking a bearing upon all the walls, with a semi-elliptical curve.

The materials I prefer are the common vertically perforated brick laid flat ways, and jointed with Portland cement; it is almost needless to say that these should be laid well and carefully, so as to break joint as much as possible, especially at the groins, or angles.

Over large rooms, or openings, a course of plain tiles may be bedded upon the bricks, but in small spans a rendering over in cement would be sufficient. The reason I prefer the perforated bricks is on account of their being lighter, and they also afford a good key for the plastering underneath.

The joist can be laid into the walls in the ordinary manner, or 4½ in. brickwork may be carried up from the springing of the arches in the spandrels, or, if more desirable, by using a few iron ties the wood joist can be laid independent of the walls altogether.

On coming to the roof, the arch may be varied to any shape, and the rafters bear upon it; indeed, by using ornamental iron ties across the rooms, the roof may be formed without any other covering than the arch, cement, and tiles.

The staircases may be turned upon segment centres, and by working in the arch occasionally course of heading bricks, or laid lengthwise, the corse for the steps may be formed, and may afterwards be lined or cased with wood. At the springing of the arch for the stairs the floor-arch could be strengthened as much as may be deemed necessary.

This scheme would necessitate each story to be carried a little higher, and the walls made about half a brick stouter; but it would save all the lathing to ceilings.

It is obvious that in the event of fire breaking out it would be confined to the room where it broke out, and, indeed, would die of inanition. The advantages for carrying water-pipes, gas, bell-wires, and such like, along the spandrels is too plain to require pointing out.

This is no new idea, although I do not know of any building where it has been carried out in its entirety; and having but a small country business, I have never been able to persuade any proprietor to incur the additional expense required. The objection usually made is the outward thrust upon the walls from the arch; but from the lightness of the materials employed, I think this will be very small, and there are many modes of tying in and counteracting this which will suggest itself in practice.

GEORGE BURCHETT.

hint either to manufacturers, merchants, or workmen, whereby they may profit.

In consequence of the difference in the price of foreign and English-made sheet glass and glass shades, I can venture to affirm that two-thirds of the former are used to one of the latter, thus depriving hundreds of English workmen of labour which naturally and reasonably belongs to them. It is true the English make is superior to foreign make; but what does that signify if the latter is preferred on account of its price, to the former? I think, if the English glass manufacturers would make quantity their first aim, instead of quality, they would drive the foreign glass trade out of the English market, would find work for many of our unemployed, and in the end would supply an equal, if not an increased, quantity of the superior article which they now send into the market.

A WINDOW-GLASS CUTTER IN A CITY HOUSE.

FORTIFYING POLICE STATIONS.

SIR,—Absence from town prevented my noticing the paragraph headed "Fortifying Police Stations," in your issue of the 15th inst., which, from the high position occupied by the *Builder*, is calculated to give an erroneous impression better avoided.

There is no foundation whatever for this assertion that Messrs. Clark are manufacturing shutters for the station at Scotland-yard. The simple facts are these. A shutter was required for a particular room that had no shutter before. I applied to Messrs. Clark for a price, and they handed me also a sample of their manufacture, which they asserted was bullet-proof. This question was disposed of by sending two shots from a revolver through it. Mr. Peard happened to be with me at the time, and proposed to me a much simpler contrivance to meet the same end. A series of experiments were arranged, and as the question of making this shutter bullet-proof had turned up, a section for a shutter that could not be pierced was decided upon. Whilst these experiments were going on, Messrs. Clark produced a second sample, which on being fired at perfectly resisted the shot.

Under these circumstances, I directed Messrs. Clark to fit up one shutter, and Messrs. Peard & Jackson to fit up two other shutters, the latter being less expensive, less liable to derangement, and closed in one-fourth the time.

THOMAS C. SORBY,
Surveyor to the Metropolitan Police.

WITH reference to the paragraph in a recent number of this *Builder*, headed as above, Messrs. Peard & Jackson say,—“That having, somewhat accidentally, been shown the result of an experiment, we suggested shutters of a totally different construction to what had at first been recommended as best adapted to the purpose. Our idea was entertained; and, after some severe tests, approved by the police authorities. We have made and fixed two of these shutters, which are the only ones so constructed that they can be closed almost instantaneously, while they are of themselves ‘proof against any fusilade of small arms;’ and are also adapting the principle to two pairs of ordinary existing box-shutters.”

STYLES NOT INVENTED.

WHEN an architect, such as, for example, the architect of the Temple of Theseus, makes an original design so full of beauty, and so perfect in its proportions, and with such appropriate ornamentation, that hundreds of other architects endeavour to imitate his work, he may be said to invent a style, or, as I should call it, found a school of architecture.

A new school may be founded; but first we must learn how to copy what has been done before. There are two ways of copying, both professing to be the right way.

One is to imitate mouldings and ornaments exactly, without regard to general proportions; and thus is produced in this present century a bawling in the style of another long-past century; and every judge and critic says its mouldings are correct, its ornaments are correct, its tracery is correct; all, all of the same period, all true Gothic, all true Greek, as the case may be.

But some one who is not acquainted with these supposed elements of correctness will say, “That may be; but there is something about the building that I do not like, and cannot say exactly what it is.” In this manner was the Parthenon copied from the Temple of Theseus; the latter of which has the general repute of being by far the best proportioned. And this brings me to the other way of copying, which, and which alone, will lead to the foundation of as many new schools of architecture as the greatest admirer of originality can desire. If I wanted to get an idea from, for example, this said Temple without copying it exactly, I should begin thus:—

The *schobli* is Greek. That I shall copy.

The *mode* is Doric. That also I shall adhere to.

The *order* is —? Well, I must measure its proportion, and fix upon a scale of orders. The lowest order is when the height of the columns is $\frac{1}{2}$ of their distance between centre and centre, as is almost always the case in old English examples of *monostyle columns*. You cannot have a lower order than this, and you cannot have a column of less than one shaft.

Again, in the tetrastyle columns of the English school the height is $\frac{1}{2}$; in the next, the octostyle, the height is generally $\frac{2}{3}$; this is the third order, then. Now, the requirements of my building make it almost imperative to have the height of my columns $\frac{3}{4}$ of their intercentral distance. So my building will be of the fourth order. And you will see, by an extension of this scale of orders that the XX style column would be $\frac{4}{5}$ high. Now count the vertical lines in the columns of the Temple of Theseus; and now measure the height and *mean* distance apart. Now you see why this good old Greek design and these good old English designs are equally pleasing.

To return to my own design. As we have seen, it will have to be duodecastyle to *look well*: too many shafts to have separate capitals, or to arrange in a diagonal square; so we will arrange them in a circle under one capital. There is a reeded column. No, we must not have an entasis or diminution, because we are too far apart for an architrave, but too near to render pointed arches necessary. We must have half-circular arches, as a medium between the two.

Mouldings.—In that temple they are parabolic curves; in our low English orders circular, two extreme conic sections. Then ours must be near conic sections,—that is, ellipses. This system of moulding is carried out in many examples of many schools.

This is the right way to copy, and at the same time the right way to *originate*; for, look at our new design! Where is its resemblance to the Greek temple?—not a feature left to show whence we started! WALTER SCARGILL.

SIR,—Your correspondent, Mr. H. W. Brewer, is surprised Mr. Ferguson should suppose it possible to “invent” a new style, such being always “developed.” Mr. Ferguson, however, says distinctly, “No man or set of men can at once invent a new style. It must be developed out of some previous form, and by a slow and gradual progress of growth.” But is the distinction, after all, of real utility? In his incomparable “System of Logic,” Mr. Stuart Mill forcibly points out, that different words do not necessarily indicate the existence of corresponding different qualities in things; so, I suspect, invention and development are, in actual effect, and so far as practical usefulness is concerned, virtually convertible and synonymous terms, as applied to mental processes touching new styles of architecture; for these—the simple statement of the fact coercing conviction—are both invented and developed. Classic orders and Gothic windows, with round and pointed arches, could scarcely have been at all developed if they had never actually been invented; and, to my mind, development has no precisely distinct meaning beyond aggregating, maturing, and adding to inventions composing styles.

Mr. Brewer’s startling assertions, that “new styles have always arisen from copying the works of a former age,” is more paradoxical than instructive. Whether or not some of the ancients began by copying is perfectly immaterial to the point at issue; for it is manifest that so long as there was “only copy-work,” there could not be any original work at all; and “copying the works of a former age” was thus too antecedent to the new style to be considered in connexion with it, and related, in fact, not to

AIR-OR-NOT COMPANY (LIMITED).

Has the promulgated scheme for laying on country air into London houses (in the same manner as gas and water) *blown up*? Oh, how delightful it would be to repose in a pure atmosphere here within the sound of Bow bells; to be able to dress, toilet, breakfast, and take the country air simultaneously and expeditiously. It would be a boon to mammas, for the winds (from bleak Highgate or sunny Sydenham) could be tempered to the shorn lambs in this nursery; the children could revel in refreshing draughts of half-and-half, and no bother of mud, rain, ditches, &c. Night air is not so beneficial; so someone but daylight-gathered ought to be supplied from odiferous roses and mignonette plantations, and from warm conservatories in winter. I presume the only plant required would be a windmill to work gigantic bellows.

Our commercial atmosphere requires purifying, for it has long been stagnant and in bad odour.

Directors of bubbles, awake to aerology! No company formed to bring it into operation yet? Where are the limited-liability mongers? *Dum Spiro spero*. It is a project that requires ventilating. It is ill wind that blows nobody good; it may to *them*, if it do not to the shareholders for public.

R. T.

FRENCH AND ENGLISH WINDOW GLASS.

SIR,—The Society of Arts, as you have stated, raised a fund purposely to send a select number of workmen to visit and report upon the progress and improvement made in the different branches of industry as shown at the Paris Exhibition. Every workman in the branches of the industry thus represented ought to become acquainted with the reports sent in to and published by the Society of Arts, so that he may learn something new, correct something wrong, or profit by them in some way or other.

The window-glass trade was represented by Mr. Richard Pearsall, glass-maker, near Birmingham. He is a workman of Messrs. Chance, Brothers, glass manufacturers, and no doubt, was recommended by them as a suitable person to be sent to Paris, for the purpose above stated. No report published can be more unsatisfactory than the one sent in by Mr. Pearsall. It is so brief, it covers but little more than one page, and so empty as to be absolutely useless to any one engaged in the trade. The Messrs. Chance, Brothers, have many workmen in their employ who, without going to Paris, could, in their dinner-hour, have drawn up a much better report concerning the manufacture of glass in England, France, and Belgium.

Sheet and rolled plate glass and glass shades are imported into England from France and Belgium, at from 30 to 50 per cent. cheaper than the same kind of articles can be bought from English manufacturers; yet Mr. Pearsall goes to Paris and sees these things exhibited, and to the various manufactories in France where they are made, and in his report there is not a single

the new, but to the old style. As only copies could "arise" from copyism, the invention and development of novel features were consequent, not on copying, but on departing from the old style, and in this way forming a new one.

Finally, Mr. Brewer intimates that as the development of a new style "generally took from three to four hundred years" in ancient days, one "might" now be created in "five or six hundred years." Mr. Brewer evidently thinks we have sadly deteriorated (to about half the value of the old folks), and are in a very bad way indeed. But, setting aside analogies where there are no analogies, perhaps a more hopeful view may be taken. Of course there is no sign of a "new style arising from copying the works of former ages," which we have already done for between three and four (the ancients' allowance) of the (moderns' allowance) five or six hundred years. What is really wanted is a *true* style, reflecting neither Classicism nor Mediævalism, but Modernism, and thus subsidiarily a *new* one. As all archaic styles first arose in comparatively barbarous times, and the true and new style of the future will start from the most civilized of all times, its development will surely be proportionately more rapid. But to attain this consummation we must depart from copyism, and cast aside that undue reverence for antiquity and that singular depreciation of our own powers in this calling, which have rendered modern architecture the reproach and shame, as the one retrograde art, of the age. "For in reality," says Lord Bacon, "as we look for a more mature judgment from an old than from a young man, just so it is fit that much greater things be expected from our age, if it knew its strength and would endeavour and apply, than from the old times, as being a more advanced age of the world, and enlarged and accumulated with numberless experience and observations."

EDWARD L. TARRUCK.

THE GREAT INDIAN PENINSULAR RAILWAY.

SIR,—The state of the bridges and viaducts on this line is far from satisfactory, and unless the company take prompt action, I have no hesitation in stating that the traffic on many sections will be suspended. In several cases the passengers have to leave the trains "and walk across" a distance of upwards of a mile! For an old Indian with something of the Salamannderabout him this is had enough, but for English ladies and their families to walk such a distance in a temperature of 138°, many of them suffering from intermittent fever and ague, without a *tattea*, a *palauquin*, or a *tonjon*, the journey is really perilous and desperate.

The cause of this ruinous condition of the works is obvious, as every European who has travelled over the line can testify. The enterprisers employ too many native inspectors, instead of sending out skilled European foremen to guide and direct the works. Now, as these native inspectors are generally high caste, and consequently devote much time to the worship of the "big God of the Hindoos," therefore the native workmen, many of whom are low caste, scamp the work in their absence. Need a word more be said?

Besides, the native mechanics are, in matters of science, far behind Europeans, as, indeed, Asiatics generally are. Let the company send to India qualified engineers and inspectors, and let the public thoroughly understand that the Great Indian Peninsular Railway is not a huge quantity of mis-spent labour, or the works of Sisyphus rolling up stones to come down again.

Is it not a matter of surprise, when it is considered the numerous accidents through defective workmanship which have occurred on this line between Lamoly (top of the Chants) and the "Snake City" of Nagpore, that the enterprisers should remain like flies in winter—in a state of suspended animation. F. H. ARTHUR.

ST. JOHN'S CHURCH, WEYMOUTH.

SIR,—I regret that Mr. Bury should have made statements in your paper in connexion with the above church which are not correct. I can only say that he is labouring under a mistake, and that your announcement of the 25th of January was quite right. I beg to refer him to the Rev. J. Stephenson, and hope that you will do me justice by the insertion in your paper of this communication.

ROBERT C. BENNETT, Architect.

THE CHANNEL RAILWAY.

SIR,—I beg to forward you a plan for a railway between England and France, the bridges being the mode of communication proposed, this letter relates principally to the piers or supports of such bridge. It is proposed that such piers be built of iron; that they be hollow, and somewhat of the shape of a mushroom turned upside down. The essential characteristic of this plan is that such railway, or rather, the piers supporting the bridge constituting such railway, can be hauled on land, and afterwards floated to their several positions, and then sunk and placed in position, by filling them with water. When so sunk they would remain firm and immovable, by the weight of the water inside them, and the attraction of gravitation. The bottom portion of each pier would somewhat resemble a large gasometer, or a round engine-shaft 300 ft. in diameter; and the top portion the Eddystone Light-house, or an iron column 160 ft. high and 90 ft. in diameter at the top. After such piers had been so placed in position, they would resemble and constitute so many iron islands. Wherefore, a suitable number, say a few scores, of such iron islands being made and existing between Dover and Calais, it is presumed that a road, or a highway, or a railway would simply forthwith follow, as a matter of course. For a comparatively trifling sum, say 50,000,000,—it is believed that the feasibility of this plan could be tried, and tested and verified at once. One of the largest of such piers might be thus constructed (in sections) at Birmingham, sent by its several sections to a harbor, there put together and completed, afterwards floated to its allotted position, half-way between England and France, and then and there sunk and placed in position by filling it with water. When so sunk, the bottom portion of each pier would be in effect something like 100,000 tons of iron, of the shape of a penny-piece, lying flat at the bottom of the sea; but it is believed it would so remain for generations. The top portion being an integral part of and firmly affixed to such bottom portion, would of course necessarily sink with the same, and would so remain being perfectly smooth and round, would consequently offer the least resistance of anything to wind and waves.

J. K. H.

CAN A BUILDER CHARGE FOR MAKING AN ESTIMATE?

SIR,—Some time since I was invited in a limited competition to tender for a church. The committee did not reserve to themselves the right to reject the lowest or any tender. My tender was the lowest, but the amount was more than the committee expected. The architect was instructed by his clients to request me to meet him at his office (at a distance of 100 miles from my place of business), to go through the estimate, and see where it could be reduced. This was done, but after some further correspondence, the committee decided to do the work themselves, under the superintendence of a clerk of works. The foundations were put in, but they found this too expensive; and (through their architect) asked me to go over my estimate again,—this time with a view of adding to the tender in consequence of the rise of wages. I was put to much trouble, but at the last moment, and without any explanation, the committee broke off the negotiations, and gave the work to another contractor, who was in the first competition some 250l. above me. Am I not entitled to be paid for my trouble? and can any of your readers name any legal decision bearing upon the point? If they can, they will oblige.

A BUILDER.

* * Under the circumstances stated above, our correspondent would seem unquestionably to have a legal claim. Much would depend on what was said or written during the transaction.

STAINS ON STONE.

I SHOULD be obliged if any of your readers would inform me of any solution with which a light freestone chimney-sock might be coated, so as to preserve it from injury by higer marks or greasy stains.

S. B.

LETTERS ON MARBLE.

CAN any of your readers inform me, through your journal, of the best, quickest, and most durable method of preparing engraved letters in marble, or any other hard stone, so as to receive gold leaf?

F. M.

DESTRUCTION OF PORTMAN MARKET BY FIRE.

AN extensive fire took place on Sunday morning last in Portman Market, Marylebone, whereby twenty-three shops have been destroyed. The fire commenced in a boot and shoe warehouse, No. 2, in the market, and then laid hold of the adjoining premises, No. 1, belonging to an ironmonger. From these two buildings the flames were forced by the violence of the wind in sundry directions, igniting buildings some distance off, whilst for a time several of the intermediate shops escaped. At one time it was feared that the Marylebone Theatre would also have been destroyed, but several land steam-engines having arrived, they were set to work, and stopped the further progress of the conflagration.

The fire was remotely due, probably, to Saturday night's gale. Just at closing-time the wind blew a shop-blind against a jet of gas. The blind caught fire, was hastily rolled up and put away under a counter, and the shop was closed. An hour after the house was in a blaze, from a few sparks, it is suspected, which may have been left

in the blind when it was put away. Only one of the twenty-three tradespeople burned out was insured; and these represent a total of something like a hundred persons who are now on the brink of destitution. A meeting on their behalf is to be held on this Friday night.

THE ELECTRIC ORGAN.

MR. BARBER, organ-builder, of Paris (inventor of the pneumatic lever), has just patented, in England and France, a system for applying electricity, to supersede the ordinary moving drawstop and key-action in large organs. The patentee has already built an electric organ of forty-two sounding stops and eight couplers for the church of St. Angustin, Paris; also another for Salon, near Marseilles: both are spoken of as successful. As the largest organs may now be played through a cable of insulated wires, positions hitherto impracticable can be turned to a good account. The organist, with his various clavers, can be placed in any direction and at any distance away from the organ, the touch being equally delicate and rapid on every manual, whether used separately or coupled. Messrs. Bryceson, Brothers, & Co., have the concession for working this patent in Great Britain.

Miscellaneous.

UTILISATION OF THE METROPOLITAN SEWAGE.—The report of the Metropolitan Board of Works for 1866-7, just issued, states that the Essex Reclamation Company have commenced the formation of the culvert for taking the sewage down to the Maplin Sands, and for the distribution of so much of it as may be required by the neighbouring farmers in Essex. The Board have had some difficulty in deciding between six tenders received for the utilisation of sewage on the south side of the river, but up to the date of the report they had not come to any definite arrangement.

THE RESTORATION OF ST. NICHOLAS STEEPLE, NEWCASTLE-UPON-TYNE.—At a recent meeting of the Committee of Management of the St. Nicholas' Church Restoration Fund, the following statement as to the financial position of the Restoration Fund was submitted:—The total amount of subscriptions promised was 2,742l. 5s. 6d.; of that 1,020l. 9s. were still unpaid; leaving actual cash received, 1,721l. 16s. 6d. The disbursements had been 1,394l. 4s. 5d.; leaving a balance in the bank of 327l. 12s. 1d. A letter was read from the contractor, Mr. Walter Scott, giving notice that the works comprised in the first division would be completed in six weeks, and requiring to know the decision of the committee as to commencing with those in the second division: the cost of the two combined will amount to above 4,000l. Seeing that only about 2,800l. have been promised, it was resolved that the committee would not be justified in giving requisite authority until supported further by the public. The secretary was therefore instructed to issue an urgent appeal for additional contributions.

VENTILATION OF PUBLIC BUILDINGS.—The Institution of Mechanical Engineers have published a report of their annual meeting, held last summer in the lecture theatre of the Conservatoire des Arts et Métiers at Paris, when a paper was read by General Morin "On the Ventilation of Public Buildings." General Morin, like some others, holds that outlets for the escape of bad air should be at or near the floor of a room, and the inlets for fresh air near the ceiling, or at such a height as to prevent the sensation of a draught. The discharge is best effected by "suction," and to maintain this suction nothing more is required than an ordinary fireplace. This being the case, the same system is applicable to ordinary dwelling-houses as well as to public buildings. The displacement of foul air by the mechanical forcing in of fresh air is, General Morin maintains, far less effectual, and requires more attention than the suction system, which is in use in the lecture theatre where the paper was read, as well as at the Théâtre Lyrique, and in certain public schools, where its operation is said to be satisfactory. By passing under the seats of the lecture theatre the General stated, "he had felt completely stifled by the poisonous atmosphere drawn off from the room."

SOCIETY OF ENGINEERS.—At the next meeting, 2nd March, a paper "On the Surveys of proposed Lines for a Ship Canal between the Atlantic and Pacific, on the Panama Railroad, and on the Darian Ship Canal," will be discussed.

FIGURED GLASS.—Messrs. Wenden & Fussell have devised a mode of producing ornamental patterns on ground glass, to serve as a hind Though produced without burning, it is stated to be perfectly durable, and to stand the test of sulphuric acid and other chattering agents. The method is applicable to the largest sized plate, and is very cheap.

THE PUBLIC WORKS OF HUNGARY.—Some English gentlemen (amongst whom are a duke and two lords) are expected in Paris, according to the *Morning Post's* correspondent there, in order to examine and take into consideration a concession offered to them by the Hungarian Government for carrying out all the public works of Hungary. Count Karolyi and two other Hungarian gentlemen represent Hungarian interests.

NORFOLK AND NORWICH ARCHAEOLOGICAL SOCIETY.—The annual meeting of the members of this Society has been held at the Guildhall, Norwich, under the presidency of the mayor (Mr. J. J. Colman). The Rev. C. R. Manning, hon. secretary, read the report, after which the sheriff, Mr. R. Fitch, read a paper on the discovery of flint implements at Santon Downham, and the Rev. G. W. Minns one on some panel paintings on the rood-screen in Thornham Church.

SICILY.—In Sicily, on one of the plateaux of the Cassaro mountain, ruins have been discovered which indicate the existence of a great city, whose origin dates from the period when a colony of Syracusans established themselves in this spot. According to the historians, this city can be no other than the ancient Castro. The walls have a development of 2,154 yards, and are 9 ft. 10 in. thick; the materials are stratified marly limestone, well chiselled. The entire circumference of the town is about 6,400 yards. It was divided into many quarters, and in the eastern portion the ruins of a temple are visible. Not far from this city there exists another locality called Castro-Novo, of very ancient origin.

THE BARNSELY NEW WATERWORKS.—These works have been completed. The supply is obtained about nine miles from Barnsley. The water-shed is about 1,700 acres. A storage reservoir, which covers about 70 acres, is 60 ft. deep, and at the present time contains about 40 millions of cubic feet of water. The entire length of pipes is about 3½ miles. The pressure at the town end has been 25 lb. to the square inch. The hardness of the water is about 3 degrees. The contract for the construction of the reservoir was let, in May, 1864, to Messrs. Skelton & Pratt, of Halifax, for the sum of 22,918l., and that of pipe-laying to Mr. Joseph Taylor, of Flockton Hall, for 2,352l. The total amount of money borrowed on account of the water-works is 75,000l.

NEWSPAPER PRESS FUND.—A general meeting of the members of the Newspaper Press Fund took place on the 22nd. Mr. C. Codwin, senior vice-president present, presided. The report congratulated the members on the gradual increase of the Society. The number of members now on the roll-book is 210. In London there are 147, of whom 47 are life, and the remaining 100 ordinary, members. In the country there are 63 members, of whom 9 are life, 17 subscribing 1 guinea, and the remaining 37 half a guinea to the fund. The invested capital of the society now amounts to 3,822l. 11s. 7d., consisting of 3,122l. 11s. 6d. in the New 3 per Cents., and 700l. in the Great Indian Peninsular Railway debentures. Whilst earnestly entreating the members generally to co-operate with them in inducing others of their professional brethren to join the institution, the committee anticipated very successful results (already becoming apparent) from the efforts they had recently been making to acquire a large accession of members from the provinces. The balance-sheet, in addition to the amount specified as being invested in the Funds, &c., showed a balance at the bankers' and in the hands of the secretary, of 425l. 18s. 7d. The report was unanimously adopted. Some alterations were then made in one of the rules, Mr. Mould, Mr. Hyde Clark, Mr. Grunisen, and others taking part.

THE LATE PROFESSOR M'GAULEY.—Her Majesty has, on the recommendation of the Earl of Derby, granted 60l. from the royal bounty fund to the widow and family of the late Professor M'Gauley, formerly editor of the *Scientific Review*, and for some time lecturer on natural philosophy to the Board of Education in Ireland. As the subscription list will shortly close, it is earnestly requested that additional subscriptions may be sent without delay to the treasurer of the fund, Mr. Robert Richardson, C.E., 26, Great George-street, Westminster.

SANITARY REFORM AT DORRING.—Mr. Baldwin Latham, C.E., president of the Society of Engineers, has delivered a lecture on "Sanitary Reform," at the Red Lion Assembly Rooms, Dorking. The Rev. W. H. Joyce presided, and there was a large attendance of the chief ratepayers of the parish. The chairman, in introducing the lecturer, said, from his own personal experience he could speak of the necessity of something being done in Dorking to remedy the defective drainage of the place. Mr. Latham said, on opening his lecture, that he did not intend to speak particularly of Dorking, or to needlessly frighten them with the state of things in existence there, but rather to give them matter for careful thought and consideration, and to lead them to adopt such measures as the light of science had provided to contend with these difficulties.

BOARDS OF ARBITRATION BETWEEN EMPLOYERS AND WORKMEN.—A public meeting has been held in the Guildhall, Derby, at the instigation of the members of the Derby Chamber of Commerce, to hear an address from Mr. A. J. Mundella, of Nottingham, on the growing importance of Boards of Arbitration to adjust differences between employers and workmen, and to consider the expediency of establishing such a board for this town and neighborhood. The hall was crowded with working men, hundreds being unable to obtain admittance, and the proceedings throughout were of the most orderly and enthusiastic character. A resolution was unanimously passed that a Board of Arbitration should be established in Derby similar to that at Nottingham; and arrangements were made for obtaining a committee of workmen. It was stated by a workman that there were no builders members of the Derby Chamber of Commerce.

SODA WATER ON A LARGE SCALE.—A curious geological phenomenon lately took place at the thermal establishment of Saint-Aihon, while a slight repair was being made to the Cesar Well. The water had to be lowered some centimetres, when, all of a sudden, a loud subterranean noise was heard, and the springs, which usually gave off a great quantity of gas, but in a calm bubbling way, were really put in ebullition. The gasometers of the establishment, which ordinarily take half a day to be filled, were all raised to full height in a few minutes. Since this occurrence effervescent lemonades and soda water have been increasingly produced. It is also a remarkable fact, the mineral water has become stronger of the salt, which consists of a mixed bicarbonate of iron and other substances. The village is in the commune of Saint-André d'Apchon, on the left bank of the Loire (Department of the Loire), and contains only 150 inhabitants. It is about 1,300 ft. above the level of the sea.

THE NEW AGRICULTURAL HALL AT WALSALL.—The plans for this building show that the arrangement of the ground-floor comprises a hall 80 ft. by 50 ft., with two ante-rooms and a stage, which, including the orchestra platform, is equal to 36 ft. by 30 ft. The roof is constructed partly of wood and partly of iron, and is in the form of a hexadecagon, or half of a sixteen-sided polygon, and ornamental cast-iron columns are introduced to support the roof in lieu of masonry. Under about one-half of the span of the hall a series of vaults are arranged. The upper floor comprises a secretary's room and retiring-rooms. The side walls of the hall are shown to be of red brick, with bands and panels of white bricks, and the main cornice is to be constructed of ornamental, moulded, and perforated brickwork. The end walls are to be of white bricks, relieved with bands of red bricks. The white brickwork is to be executed with the Hednesford Colliery Company's bricks. The principal entrance has double pilasters, supporting a frieze and cornice, over which is a large semi-circular window. On either side are triple windows, with semi-circular heads. The stonework is to be executed with Hellington, Bath, and Gadsall stone. Mr. Nicholas is the architect.

HYDE PARK DRINKING FOUNTAIN.—H.E.H. the Duke of Cambridge is to open the Hyde Park Drinking Fountain, of which we recently gave a view, on (his) Saturday, the 29th inst.

MASONIC HALL FOR GATESHEAD.—Masonic halls are rising in many directions. The craft is largely supported in Gateshead and neighbourhood, and it is the intention of the freemasons to erect a hall in Gateshead. We learn from "Oberon's" communication in the *Gateshead Observer* that the building will be almost immediately started with; that Messrs. Charles Bass and J. Stokoe are the secretaries; and that the style of the structure will be Gothic. The building will be erected on an open space in West-street.

A NEW CHURCH FOR ST. OSWALD'S PARISH, CHESTER.—The Dean of Chester, in a letter, invites attention to the desirability of building a new church for this parish, and restoring the south transept of the Cathedral. The screen in the Cathedral, he states, which was intended to make it possible that both services should be carried on simultaneously, has fallen in its object; and thus the Cathedral and St. Oswald's Church are inevitably hinderances and annoyances to one another; and every day makes it more evident that the general restoration of the Cathedral, which has long been contemplated, ought to be begun without much delay. Under these circumstances the scheme which recommends is not the building of a chapel of ease on the new site, but the building a large parish church on the new site, where ample space is secured both for vicarage and for schools.

GAS.—The Redhill Gas Company have declared a dividend of 8 per cent. at their eighth annual meeting. The chairman said they had reduced the price of gas to 5s. 6d. per thousand, and he hoped they might soon bring it down to 5s. The increased consumption, he added, justified the remark he made last year, when many of the shareholders asked the directors to wait a little longer before making any reduction. He then stated and estimated that their loss would not be great, if any, and the revenue of last year had more than realised what he thought it would be.—The directors of the Gloucester Gas Company recommend dividends of 10l. per cent. per annum on Class A Shares, and an additional 5l. per cent. per annum in reduction of the arrears of dividends due to this class of shareholders; 7l. 10s. per cent. per annum on Class B Shares, and 2l. 10s. per cent. per annum, being the balance of arrears of dividend due to them. There will besides be left a balance to be carried over to the next half-year of 212l. 5s. 5d. They say the result of the last year's working must be highly satisfactory to the shareholders.—At the annual meeting of the Bodmin Gas Consumers' Company a dividend of 6 per cent. per annum was declared, leaving 51l. to be applied towards plant. The consumption of gas has steadily increased.

ST. JAMES'S TOWER, TAUNTON.—The present position of affairs relative to the destruction of this tower has given archeologists another opportunity to advocate its preservation. The Rev. Thomas Hugo thus writes on the subject: "I have long felt that, until the gentlemen who wished to destroy this ornament of Taunton were beaten by a large majority in a parish meeting, it would be waste of time and words to plead for its conservation. Of that *desideratum* we are now in the enjoyment, and the field is open to one who desires, as a townsman, to urge upon the majority the preservation and not the destruction of a building which possesses for many of us a most sacred interest. Of its beauty I presume it is needless to speak. There is nothing equal to it for many a long mile round. Of its soundness and the consequent absence of any necessity for its removal, I gladly accept the deliberate judgment of my friends, Messrs. Ferrey & Metford, the opinion of either of whom would for me be sufficient, while their united voices are irresistible. . . . What I would very respectfully propose is, that Mr. Ferrey should be commissioned to examine and report on the structure, and that tenders should then be obtained for carrying his suggestions into action. If I mistake not, the result would be very acceptable, even on the score of expense, to the great majority of the parishioners, while not a few outsiders would, like myself, give their ten guineas towards such conservation, and thus lighten the burden, if so it should be called, of those to whom the duty more especially belongs."

EXHIBITION OF FINE ARTS AND INDUSTRY AT LEWES.—The Lewes and East Sussex Exhibition at the County Hall promises to be a success. On the opening day the number of visitors was considered large for a half-crown day, there being 500 present.

THE METROPOLIS SUBWAYS BILL.—Mr. Ayrton has obtained leave in the Commons to introduce a Bill,—similar to the Bill of last session,—to make provision respecting the use of subways constructed by the Metropolitan Board of Works in the Metropolis. The Bill has been read a first time.

WORKMEN'S INTERNATIONAL EXHIBITION, 1869. An executive committee has been appointed to undertake the necessary arrangements for this exhibition by the honorary council chosen at the public meeting in St. Pancras Vestry-hall, under the presidency of the Hon. Anthon Herbert, M.A., on the 14th of October.

NOTTINGHAM LITERARY AND PHILOSOPHICAL SOCIETY.—The annual *conversations* was held on the 19th inst., when the president and others delivered short addresses. There was an interesting collection of antiquities, photos, and so on, including an extensive series of specimens, illustrating the manufacture of Venetian glass, mosaics, &c., from Messrs. Salvati.

GEOLOGICAL STRATA-CUTTER.—A machine, for boring for coal, made by Mather & Platt, of the Salford Ironworks, is being used on the Walton estate, near Wakefield. The coal and other strata come up in solid discs nearly 4 in. in diameter, much as cheese does when cut out by the taster, so that, when put together, these discs show complete sections of the various strata from the top downwards.

CLEANSING STONE BUILDINGS.—Mr. Harwitz is cleansing the back part of St. Paul's Church, Covent Garden, as an experiment, by means of a process patented by M. Nivert, namely, by a jet of warm water from an engine instead of cold. The water is drawn up into the engine and warmed by a jet of steam by means of the "Injector," an English invention. The French patent would seem to be merely for the application of the Injector to this particular purpose. The end of the hose is held in the left hand by a man in water-proof dress, who follows up the application with a scrubbing-brush.

BUSTING OF A CANAL EMBANKMENT AT DUDLEY. The embankment of the canal, near the old workhouse, has given way, at the branch point belonging to Messrs. Dixon, of Horsley. For nearly a mile the canal was drained, and many of the boats were thrown helter-skelter by the rush, and several were broken in half, while all were more or less injured. By the stoppage of the New Horsley furnaces a great number of hands are thrown out of employ. It is supposed that it will be at least three weeks before the damage caused by the outburst can be repaired. The accident, it is conjectured, was caused by the mining operations underneath the embankment.

THE MAGNET AS A STOVE.—An experiment made by M. Louis de Henry is cited to illustrate the correlation of physical forces. If a glass flask, it is said, be placed on a small copper plate, and a magnet with its poles pointed upwards be made to revolve rapidly in a vertical axis below this plate, an increased temperature in the air of the flask will be observed, which may be made sensible by any particular arrangement. It is supposed that, by substituting for the plate and glass a copper vessel containing water, sufficient heat may be generated by the rapid action of the magnet to cause the water to boil. But would not heat be generated in such a case whether the apparatus had magnetic power or not?

LOOK TO YOUR DEPOSITS IN FOUNDATION STONES. A bottle, containing important documents and curiosities, inserted at the ceremonial of laying the chief stone of the Bolton parish church, has been abstracted. It is believed that the robbery must have been committed by some of the workmen on the premises. The few current coins which the bottle contained were only of the value of 1l. 8s. 10½d. Mr. Ormrod, who gave 30,000l. to re-build the church, and who laid the stone, visited the spot; and another bottle, with contents *fac simile* as far as possible, will be prepared. The thieves will thus be prevented, no doubt, from proving to future generations how much churches must have been needed in the nineteenth century.

ARTISANS' ESSAYS.—A second collection of Artisans' Essays on the comparative merits of British and Continental Industry and Manufactures, will shortly be published. These essays will receive the prizes offered in connexion with the Paris Excursion Committee.

THE LATE MR. JOHN HERAPATH.—Mr. John Herapath, proprietor of *Herapath's Railway Journal*, and the cousin of Mr. William Herapath, the chemist of Bristol, whose death was announced a few days since, died on the 24th, at his residence, Catford Bridge, Kent. Mr. Herapath was engaged in completing his concluding volume of "Mathematical Physics" for publication, when he caught a cold which, though it at first appeared to be slight, terminated in his death.

MUSEUMS.—A conference of persons of various classes interested in the provision of museums and libraries for the people, together with supporters of sundry social, educational, philanthropic, and religious organizations, will take place under the auspices of the Public Museums and Free Libraries Association, on the 9th of March, at Stion College, the use of which has been kindly granted for the purpose. The president of the college, the Rev. William Rogers, M.A., canon of St. Paul's, will occupy the chair.

VALUE OF PROPERTY IN NEW-STREET, BIRMINGHAM.—The two shops and houses, Nos. 8 and 9, New-street, were lately offered for sale by auction by Mr. R. Clarke, of Clarke & Barrows. The property consists of two shops with houses, and back premises, comprising in the whole about 400 square yards of land. It is practically freehold, being held on a lease of 750 years, at a peppercorn rent, and produces 470l. a year. The biddings reached 10,200l., but this offer was declined, and the property was bought in at 11,000l.

BLACKHEATH.—In reply to an application to Government for its co-operation in the preservation of Blackheath for recreative purposes, the Office of Woods has stated that the Metropolitan Commissioners Act, 1866, provides a course of procedure in such cases which the metropolitanities must comply with; and that her Majesty is expressly empowered, for the purposes of a scheme under that Act, to let the land to any person, or otherwise make use of it. The popularity of Blackheath as a place of recreation for the working classes may be inferred from the fact that it is frequently visited on a single day by 80,000 persons.

TENDERS.

For sewerage, paving, curbing, channels, and other works, in Victoria-road. Quantities supplied by Mr. W. Rowley:—
 Wainright 21,860 16 6
 Jellies 1,400 9 8
 Beachall 1,331 12 8
 Martin 73 4 2
 Beevons 1,338 6 4
 Booth 1,315 7 5
 Knight (accepted) 1,375 9 7

For tower and spire to Christ's Church, Wanstead.
 Mr. John T. Bressy, architect:—
 F. & P. J. Wood £2,240 0 0
 Reeve 2,174 0 0
 Perry & Co. 2,123 0 0
 Ennor 1,988 0 0
 Hedge 1,956 0 0
 Bians 1,395 0 0
 Mundy & Hutchinson 1,370 0 0

For alterations of shop front and house, 70, East-almost, Brighton, for Mr. Booth. Messrs. Goulty & Gibbons, architects:—
 Chappell £250 0 0
 Cheesman & Co. (accepted) 425 0 0

For St. Peter's Free School, Albion-road, West-end, Hammer-smith. Mr. G. A. Burn, architect:—
 Simpson 3,693 0 0
 Braithwaite 4,817 0 0
 Dove, Brothers 4,119 0 0
 Adamson 3,988 0 0
 Myers 3,888 0 0
 Mansell 3,795 0 0
 J. & E. Bird 3,785 0 0
 Chamberlain 3,657 0 0
 Scrivenar & White 3,677 0 0

For erecting a detached residence and stables at Stamford-hill. Mr. Thomas J. Hill, architect:—
 Mills & Sons £3,470 0 0
 Coreland & Burton 3,300 0 0
 Ashby & Sons 3,125 0 0
 Henshaw 2,958 0 0
 Pritchard 2,991 0 0
 Corder 2,848 0 0
 Webb & Sons 2,929 0 0

For new shop-front and alterations to shop in Exmouth-street, Chelsea. Mr. Dose, Builders:—
 Dose, Builders £369 0 0

For villa residence at Belvedere Park, Mr. Thomas Dowdilly, architect. Quantities supplied:—
 Villa, Fencing, &c.
 Allen £1,000 0 0 2,100 0 0
 Knight 819 10 0 112 10 0
 Cowland 704 0 0 135 0 0
 Nowlan 795 0 0 83 0 0

For new premises, Counter-street, Borough Market. Messrs. Jarvis & Son, architects:—
 Henshaw £1,085 0 0
 Ronald 1,075 0 0
 Rider & Son 1,080 0 0
 Carter 1,037 0 0
 Baguley 1,020 0 0

For new shop-front, No. 85, Borough-road. Mr. William Smith, architect:—
 Crabb & Vaughan £140 0 0
 Saby 129 0 0
 William 125 0 0
 Patterson 88 18 6

For the erection of a pair of semi-detached villas, at Wood-green, Tottenham, for Mr. Robert Bomanis. Messrs. Strudwick & Meenie, architects:—
 Ronald £1,450 0 0
 Eustace 1,339 0 0
 Wardle & Baker 1,308 0 0
 Feard 1,297 0 0
 Shurmer 1,295 0 0
 Bogers & Richards 1,233 0 0
 Perkins 1,270 0 0
 Bidley 1,250 0 0
 Snowdon 1,225 0 0
 Hunt & Elkington 1,200 0 0
 Spurr 1,198 0 0
 Abbott 1,172 0 0
 Aitchison & Walker 1,164 0 0
 Adams 1,155 0 0
 Brett 1,145 0 0
 Keys 1,097 0 0
 Linnell (accepted) 695 0 0

TO CORRESPONDENTS.

L. J.—R. T.—An old brick. T. W.—S. M.—S. D. W.—S. A. M.—P. A.—B. Brookes—J. F.—J. R.—C. J. A.—P. O.—W. C. T.—Mr. F.—R. S.—P. R.—T. J. H.—T. D.—H. N. H.—R. H.—G. B.—E. W. J.—G. & G.—A. S.—G. H. J.—D. G. H.—R. R.—W. & P.—S. & W.—J. F.—J. T. D.—F. M.—R. B. (perfectly suited to this climate. Size and form must be guided by circumstances.) J. O. (the form should be mailed on the owner's side)—W. R. (a list of charges is published by Institute of Architects)—T. W. (in type).

NOTE.—Architects who are unwilling (as we are) that their names should not accompany lists of tenders with which they are concerned may prevent the omission by sending lists themselves. We cannot repeat lists on the ground of such omission.

We are compelled to decline pointing out books and giving addresses.
 All statements of facts, lists of Tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.
 NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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[ADVERTISEMENTS.]

CHURCH, TURRET, and STABLE CLOCKS. J. W. BENSON, having erected steam-power and improved machinery for clock-making, at the Manufactory, Ludgate-hill, will be glad to furnish to clergymen, architects, and committees, Estimates and Specifications of every description of Horological Machines, especially cathedral and public clocks, chiming tunes on any number of bells. A descriptive pamphlet on Church Clocks post free for one stamp. Watch and Clock Makers by Warrant of Appointment to H.R.H. the Prince of Wales, and maker of the great clock for the Exhibition, 1862, 25, Old Bond-street, and 33 & 34, Ludgate-hill, E.C. Established 1749.

The Builder.

VOL. XXVI.—No. 1309.

On the Superficial Remains of Ancient Jerusalem.



THE work commenced at Jerusalem opens up a field of archaeological discovery hitherto entirely untouched, and can only be compared to the exhumation of Pompeii, the extent of the ruins, if fully explored, being probably much greater, though their state of preservation may not be so perfect.

The actual work done is not, perhaps, great as yet, and an obstacle almost insuperable exists in the fact that a modern city stands above the most interesting part of the ancient town, so that in this quarter nothing can be done, at least at present; but still a considerable portion lies without the walls on the north and south, and it is here that Lieutenant Warren has commenced his work, and already made some progress in it. It is not, however, the amount, but the nature of the work which is important. It has been known for some time past that the whole of the present level of the site of Jerusalem is artificial. Drs. Barclay and Robinson have pointed out those mounds of rubbish varying in depth, and sometimes attaining to 60 ft. or 70 ft., which cover the entire surface of the two hills on which the modern city stands, as well as those belonging to the same plateau on which, as is admitted by all, however different their ideas of its extent and boundaries, the ancient city was situated. It has also been found that the soil consisted principally of a fine limestone *débris*, and resembled in character the *débris* formed by the disintegration of limestone masonry, and that the outline of each of the hills resembles rather that of a gigantic rubbish-mound than the natural outline of a limestone range, as exemplified in the Mount of Olives and the chain of Neby Samwil, in the immediate vicinity of the city.

And yet, although whenever, either by design or during the execution of some independent undertaking, this artificial surface has been removed, in every case some relic of the ancient city has been found, the top of an arch or wall, or the upper part of a tower, still it never seems, until quite lately, to have struck any of the writers on the subject, or of the more practical explorers who, during the last fifteen years, have done good service by describing minutely those few remains which still appear above the surface of the ground, that beneath it lay an extent of ruins equal in interest and preservation to those of Pompeii, and sufficient, when coupled with the minute descriptions of the Old Testament and Josephus, to lay at rest at once the controversies which have so long been carried on concerning the extent of the city, and the position and character of its principal buildings.

The first blows of the sapper's pickaxe have demolished one stoutly-contested theory, that of

the course of the southern wall of the city, which nearly all the writers on the subject have agreed in bringing so far north as to reduce the city to an extent about two-thirds of that positively given by Josephus, and have established two important facts,—first, that the extent of the ancient town on the south was much greater than it is at present, and covered the whole of the hill of Zion, the modern wall running nearly over the crest, a course which cost the Arabic architect his life; and secondly, that, instead of the modern level of the Haram, both within and without, being that of the temple inclosure of Herod or Solomon, while the rest of the city has mysteriously disappeared, the whole does in fact exist, but at such a level that it is only the temple inclosure that, owing to its enormous height, can, like the sphynx before its exhumation, keep its gigantic head above the ground.

At such a time, when a new Jerusalem is on the point of being disinterred, when we may say without exaggeration that a long-lost city has been recovered, it will be interesting to describe the few remains which were discovered before the time of Lieutenant Warren, at different periods and by different explorers; and the more so as these remains show a mixture of styles and workmanship which, independently of their special interest, are most interesting and instructive to the architect and the archaeologist. The greater part of these exist in the present Haram inclosure, and have been principally described by Dr. Barclay, Robinson, Catherwood, and most especially by the French architect, M. De Vogüé, whose work on the subject is the most important and perfect hitherto published. Much information is also to be obtained from the Ordnance survey and the photographs which accompany it, as well as from those taken during the visit of H.R.H. the Prince of Wales.

So much attention has recently been turned to this subject that it is almost unnecessary to give a general description of the city and Haram inclosure; although there are the means of obtaining the most accurate measurements of all these remains, moreover the space occupied would be too great for such a review. A few words of introduction will suffice roughly to fix on the mind of the reader the localities of these relics.

The sketch given* shows the general features of the ground occupied by the city.

It will be seen, then, that Jerusalem stands on a plateau divided from the surrounding country by two valleys, originally of some depth, but now much filled up.

This plateau rises into four principal hills—one to the south, nearly circular, though described by the ancient writers as heart-shaped. Hence the origin of many traditions. This is, at present, the most elevated of the four, though probably the *débris* is thickest upon it. Immediately north of it lies a second, which is considerably lower, and answers, as all writers agree, to the Acra, or lower city, of Josephus. East of this is Moriah, the natural shape of which is entirely lost owing partly to its having been altered by Herod and Solomon, to suit their buildings, and partly to the accumulation of rubbish upon it and in the valley below. Its present shape is roughly that of a parallelogram, with a tongue known as that of Ophel, on the south. This, as well as the other hills, has been accurately contoured.

North of these three hills is a fourth, surrounded originally by the third wall of Josephus, though the exact extent of this wall has not been well determined by any writers. This hill is the Bezetha of Josephus, and, as it is of greater extent, it is also much less elevated than either of the other three.

Such being the general features of the site, two points will be sufficient, together with the

outline of the modern city wall marked on the plan, to fix with sufficient accuracy the position of all the remains about to be described. These are the modern church of the Holy Sepulchre on Acra, though no eminence exists there which may be known as Mount Calvary, and the Haram enclosure on Moriah.

The remains in the city are few and imperfect, but those in the Haram are almost intact, and present a jumble of architecturæ which, commencing with the work of Solomon, go down with the additions and improvements of Herod to the patchings and ornamentation of Julian and Justinian, the restorations of the caliph Omar and his successors, and the execrable workmanship of the more modern Turkish and Arabic masons. The preservation and wonderful interest of these are points concerning which very little seems generally to be known, and are confined to those who have made Jerusalem a special object of study.

The ruins of the city itself,—that is, of that part hitherto brought to light,—may be treated of in a few words.

The most important of these is a gateway, discovered originally by Robinson, on the site of the present Damascus gate, the position of which is marked on the map. It consists of the foundations of two towers of an irregular shape, built of huge stones of the rebated style, characteristic of the oldest masonry of the city. These towers are built into the city wall, and but little can be seen of them, as modern masonry covers some part of them.

In one, however, Dr. Barclay found the remains of a winding staircase of remarkable construction, consisting of flights of steps at right angles to each other, the size of the stone being proportional to that of those in the walls.

This ruin, more accurately examined by Lieutenant Warren, concerning whose work it is not our intention to speak here, belongs exclusively to the first or rebated style.

Another of almost equal interest is found in the immediate vicinity of the Church of the Holy Sepulchre, at the east entrance. It consists of a wall of large rebated stones, the foundation being broader than the upper part of the wall, and a pier or buttress projecting from this, flush with the face of the foundation. The recess is not made with a horizontal step, but is sloped off with a course of stones, the face of each block of which recedes at an angle of about 45 degrees.

A precisely similar construction is visible in the wall of the Haram at Bethlehem, in which the whole wall consists of large rebated masonry, like that of Jerusalem.

A third ruin stands a little south of this, consisting of a plain wall of large cut stones, like those of the second style of the Haram enclosure. In this an archway is cut, with a semi-circular arch, and two pilasters of different styles. The arch consists of stones of much smaller size than those of the wall, and is evidently much more modern; each capital of the pilasters is cut out of the blocks of the old wall, one being of Romanesque character, with a bird introduced into the tracery, the other having the peculiar basket-work tracery of the Byzantine capitals; as shown, for instance, in the Mosque of St. Sophia, and elsewhere.

It is also worthy of notice that the courses of stones forming the shafts of the pilasters are not continuations of those of the wall, although of equal size, the horizontal joints not being flush, and several smaller stones being patched in between the pilasters and the wall, as well as round the keystones of the arch, in a clumsy and most inartistic manner.

These two remains were first described by M. de Vogüé, who gives plan and elevations of both to scale. They are most interesting as bearing on the disputed point whether the present Calvary was or was not within the walls

* See p. 174.

of the ancient city, and seem to show from their position east of the present church that both the walls of Nehemiah and of Herod excluded the traditional site of Calvary. The first of these ruins forms part of the entrance to the basilica of Constantine, as restored, apparently with certainty, by M. de Vogüé. From this fact Dr. Robinson thought that he traced the marks of a wall running north, but there seems to be some doubt as to the true character of these indications.

On the southern slope of Zion another ruin exists, consisting of a small square tower with a wall of the second or unrebated megalithic style, and with a fosse. This, with a cistern containing an arched reservoir, completes the list of the few remains of the city itself found before the commencement of Lieutenant Warren's excavations. No account has, however, been taken of the square tower situated at the Jaffa gate on the east wall just above the northern side of Zion, as, although the stones of its walls are rebated, still their very small size as compared with the immense blocks of 40 ft. found in the Temple, together with a want of finish and difference in material, is opposed to the assumption of many authors that this work is the Hippicus of Josephus.

Besides these remains there exists a second class, namely, the tombs around the city. Of these there are two groups, and the date of them is a matter of considerable interest.

The first of these is the so-called Tombs of the Kings, which exhibits the true Jewish character as shown all over Palestine. The principal feature of these is a square rock-cut chamber, communicating by narrow passages with other similar chambers, which have niches or cubical places lengthwise at right angles to the walls, three cubical being the most in one side, and two or three being placed directly above one another: thus the total number of cubical in one chamber, allowing for the passage occupying part of one wall, would be at the most about thirty, and at the least about half that number.

The chambers in this set of tombs are numerous, and arranged in two stories; but they are all of the same character, and this is entirely different from that of any Roman sepulchre, and also from that of the traditional Holy Sepulchre. The entrance to the hall from which the passages radiate is through a small door, communicating with an excavated outer hall, which has an open entrance from the large sunken court, which surrounds the opening. Part of this outer hall has its floor level with that of the court without, but the other part is level with the floors of the first story of the excavated apartments. A narrow channel is cut in between the face of the wall, in which the door leading to the inner hall is cut, and the higher part of the floor of the outer entrance. The bottom of this channel is not horizontal, but has a sensible incline, so arranged that a large cylindrical block of stone might roll along it, and when in its lowest position cover the entrance not closed by any other means. When this block was rolled to its highest position the door was open. This construction beautifully illustrates the passage in the Gospel, in which the rolling away of the stone from the door of the sepulchre is mentioned.

Above the broad entrance of the outer hall is an entablature, which has been a puzzle to many archaeologists. Its general character is similar to that of the Tombs of the Judges, not far distant, but it is more ornamental. In the latter instance, not only is the internal arrangement of the true Jewish character, but the outer face of the rock is channelled in imitation of being megalithic, and from the appearance of the entablature it would seem to be of the same date,—that, namely, of the Jewish kings; but in the tombs in question no such imitation exists, and therefore there is nothing particular to fix the date.

The entablature represents wreaths of laurel, bunches of grapes, and various figures resembling a Y formed of small round globes, perhaps representing grapes, the whole divided by triglyphs, with guttae of Ionic character, and bordered above and below with a band of leaves. Three plasters cut in rock appear to have supported this ornate entablature; but they have entirely disappeared, and the whole is considerably damaged and broken.

The entablature has been accurately photographed, and the tombs explored and planned.

The second group of tombs is in the Kedron

valley, south of the Haram, and on the opposite side on the slope of Olivet. Of these the principal are the so-called tombs of Absalom and St. James, traditional names to which monkish legends are attached. The tomb of Absalom is a square monolith, with an excavated chamber at the top, and surrounded with Ionic pilasters supporting an entablature from which springs a dome almost Saracenic in character, the whole partially ruined, and resembling the curious rock-cut tombs of Petra, in Arabia Petraea.

The tomb of St. James or of Jacob is a rock-cut sepulchre, more resembling the sepulchres of the kings, with an entrance supported on apparently Doric columns, with an inscription in square Hebrew, very imperfect, attributing it to three Jewish brothers, priests, and to two of their nephews. The style resembles that of the Palace of Hycranus, and is supposed by De Vogüé to be of the time of Herod.

Such are the remains in the city itself; but those of the temple are far more numerous and interesting.

The Haram enclosure has of late been often described; and, having been repeatedly measured, though with different results, it will be sufficient to say that it is an enclosure of which the south wall measures about 900 ft.; that on the east, which is at right angles to the first, is about 1,800 ft.; and the northern about 1,000 ft.; while the western wall, as shown by Catherwood and the Ordnance survey, was at right angles to the south wall for some way, but, when past a certain place, about two-thirds of its length from the north, known as the Jews' Walling-place, it bends towards the west and joins the north wall at an acute angle. This latter part seems to be modern.

The interior of this enclosure is considerably elevated above the present exterior level, and covered partly with soil and trees,—partly with flags of limestone.

In the centre, on an irregular trapezoidal raised platform, stands an octagonal mosque of large size, known as Kuehet es Sacra, or the Mosque of Omar. In the centre of this stands the curious hollowed stone which Mr. Ferguson, supposing that the whole of this enclosure is not really ancient, has considered to be the traditional Holy Sepulchre of the time of Constantine.

On the south wall, about a third of its length from the west end, is another large building, now a mosque, but originally a Christian church, built by Justinian and augmented by the Crusaders, the three styles being mixed together, but easily separable. This is the Mosque of El Aksah.

The height of the interior walls, as measured before Lieut. Warren's excavations, was about 60 ft., and 70 ft. at the south-east corner, where the rock was lowest; but he has now excavated to a depth of about 130 ft. below the top of the wall.

Of the masonry, of which these wonderful fortifications are composed, something has been said in the pages of this Journal, and a more minute description given than is here possible. It is sufficient to say that below the more modern Arabic patchwork two dissimilar styles are to be remarked all round the enclosure.

The first consists of gigantic stones hewn vertically from the limestone, which is of a kind hardening with exposure to the atmosphere, without regard to the character of the bed, soft and hard veins being used indiscriminately, and thus the wall presents an irregular appearance, owing to the different amount of weathering of the different blocks.

The upper courses are sometimes deeper than those below, and the joints and the lengths of the stones are very irregular. Those discovered before the investigations now commenced, were all marked with the peculiar ornamentation of a deep rehauting, improperly described as bevelling, which runs round the four edges of the face of the stone, and gives a kind of ornamentation to the face of the wall. The stones since discovered are said to be more roughly worked, the face being uncut, while the former were even polished.

The size of these stones is very great, many being as much as 40 ft. in length and 10 ft. in height. The largest were at the south-east corner, and some in a very good state of preservation. This style is found running round the entire length of the wall on the south-east and that part of the west on which no new buildings have been raised against the Haram walls. The position is always below the stones of the second style. On many of the stones there are small

square blocks placed irregularly on the face, which are supposed to have been used by the builders to attach ropes by which each stone, when finished, was slung, and being moved on rollers up the floor of the cavern (still found with a gentle slope), to have been transported by means of a great number of crossbars, which allowed the distribution of the weight over a large space, and facilitated the transport by a large number of men or beasts. The quarries themselves afford much interesting information, and give many valuable indications of the mode of workmanship and means of transportation used by the builders of this first period. They have been fully explored and described by Dr. Barclay.

The second style shows considerable advance in masonic skill. The stones are nearly as large and more regular in jointing and length; they are not marked by any rebating or other ornamentation, being plain and rather square, resembling the Roman megalithic masonry of Herodion.

The large stones ascribed to Justinian do not equal any of these stones in proportions; and although of a fair size, are decidedly not megalithic. The principal points of interest on the walls of this extraordinary enclosure (for of the interior we know hardly anything as yet) are the Jews' Walling-place, Robinson's Arch, and the Single, Double, Triple, and Golden Gateways. Above ground not a single relic remains of the ancient Temple, and the whole of the present surface is covered exclusively with work the most ancient of which only dates back to Justinian. Beneath, a few vaults remain; but it is worthy of notice that every one of these is built up at the end; so that if it were not for the inflexible opposition of the Mahometan possessors, it is most probable that many interesting relics might yet be found in the heart of the mountains.

A disconnected work of great importance has also been visited by Dr. Barclay, namely, a very large reservoir, with a roof supported by rock-hewn pillars, bearing marks of having been originally covered with metal. This reservoir is placed centrally with regard to the east and west walls, and about three times as far from the north as it is from the southern wall. It communicates with the Brook of Kedron, and with seven other reservoirs or wells. It can at present be only reached from the interior of the Haram.

The Jews' Walling-place, a well-known spot to all who have read any works on this subject, is a portion of the western wall, forming one side of a narrow street. It is here that some of the largest stones are found, both of the first and also of the second style. It receives its name from the practice of the Jews of assembling here once a year to lament the dispersion of their race and the ruin of their city, as they sit on the ground, tearing their clothes, casting dust on their heads, and often placing them in large weathered hollows between some of the lower stones, in which position they often remain lying for some considerable time. The stones here are much weathered, and some almost destroyed.

The arch, which is known at the present time by the name of its discoverer, Dr. Robinson, appears to have formed the communication between the Temple and the city on the south-west; and it is interesting to observe that, taking the longer cubit, as generally determined in English feet, both the breadth of the arch and its distance from the south-east corner, as determined by the Ordnance survey, are such as to mark the continuation of the central cluster of Herod's Temple, the dimensions of which are given by Josephus; this cluster being of different dimensions to those on the north, east, and west, and known as the Stoa Basilica. In this view Mr. Ferguson and many of the best writers on the subject agree.

Of this arch but a trace remains at present. It appears to have been semicircular, and sufficient is left to make the restoration of the span possible, following which indication Lieut. Warren has been able to find a pier of the bridge on the opposite side of the valley, which, even above the present surface of the ground, shows indications of the springing of another arch. The stones of which it is composed are of larger size than those in the wall, and one only forms the thickness. They are not rebated, and are said to be held by tenons into the wall, so as to stand still, though unsupported by the piers. The arch springs directly from the wall, a little above the present level of the ground.

The four gateways mentioned above are by far the most important and extensive remains as yet discovered, and present a jumble of styles from a time before that of Solomon down to the present day.

The Golden Gateway is on the east wall, at a distance from the north-east corner rather less than a third of the length of the wall. It consists of a gate-chamber, whose floor is on a level with the outer ground beneath the Haram wall, some 20 ft. from north to south by 80 ft. from east to west. It is double, and has a double-arched entrance, now filled up. The roof, which reaches a height of about 30 ft., is supported on two pillars and two piers with half pillars, while four pilasters on the north and south walls support four cross arches. Above these transverse arches are six domes with pendentives, of which the two nearest the east are raised to a greater height on drums, and furnished with windows for lighting the chamber, otherwise closed. Above the thickness of the entrance is a tower, which is about 60 ft. in total height.

Here, then, we have a most curious mixture of styles. The domes, drums, and arches are all of modern workmanship, and may be of any date later than Crusading times. The two central pillars are undeniably Byzantine, with the usual heavy capitals and bases. The pilasters on the walls, and the richly-carved entablature which they support surrounding the room on three sides, are of fine Romanesque work, beautifully cut and ornamented to an extent which marks the latest and more degraded Roman style. They are merely ornamental, and do not enter into the construction of the room. The same style of work is observable without, but here the entablature is bent into arches above the entrance, these arches starting from pilasters on each side and in the centre of the gateway. The same ornamentation is found on the outside of the north and south walls, and another double entrance leading to the Haram enclosure. This transitional style, occurring also in the Golden Gate of Spalatro, has been pointed out by Mr. Fergusson as belonging to the fourth century, about the time of Constantine,—a fact which he seems to prove by architectural evidence,—thus making it probable that there are remains of the work of Julian the Apostate, who commenced the rebuilding of the Temple.

It will be worth while to remark some of the details as they recur in another doubtful relic. Among the principal are small deeply-cut dentils, scroll-work with square projecting blocks as the centre of each flower, a larger kind of dentil often found in immediate succession to the smaller kind, and many other nameless ornaments sufficiently characteristic of the style.

But the confusion does not stop here. The piers and walls of the apartment are of enormous stones, of the second style, in a good state of preservation; and, although no masonry of the first style occurs, yet the projection of the lintel internally at the east entrance is formed on each side of two enormous blocks of solid stone, some 20 ft. in height, which have been channelled horizontally so as to represent two or three courses of this masonry. These are unquestionably of greater age than the first style, and must be of enormous antiquity, if we suppose the related masonry to be of the time of Solomon. But a fuller comment on this ruin has appeared at some distance back in the numbers of this paper.

The Single gateway is on the western wall. (This name is that by which it was known before Lieut. Warren in his investigations had discovered another vaulted entrance on the south, to which he gave the same name.) It consists of a single passage, about 20 ft. wide, the sides lined with small stones, and walled up at one end, its total length being about 300 ft., and the height to the centre of the vaulted roof about 20 ft.

The entrance is most remarkable, and externally it is made of an enormous lintel, resembling that at the Gate of Lions at Mycenæ, supported on the wall on either side without any kind of pier. All the stones up to the level of the top of the lintel are rebated, as is also the lintel itself. Its height is double that of the course of stones, and the joint is broken by the prolongation of the lower half of the lintel on either side as at Mycenæ. Above the lintel stones of the second style occur, though of comparatively small size. Internally a very flat relieving arch, or, more properly, a second lintel, slightly curved, is built of five stones of enormous size, and of the second style, a method of taking

the weight of the old stone observed in other parts of the Haram.

The Double and Triple gateways are at an equal distance from each other, and form the south-west and south-east corners of the wall. The Double gateway is the double in all its dimensions of the Single gate, and was first discovered by Mr. Tipping, who, observing part of an entablature and a rebated window, heheld within a large vault, hitherto unexplored; the entrance being covered by modern Arab houses, into which he managed to effect an entrance.

In order to make out any order from the confused mass of ruins and patchwork now existing, it is necessary to begin with the oldest work and proceed to the latest. Of the rebated masonry the remains are perfect. The entrance at that time consisted of a double doorway, 40 ft. wide, with a central heavy pier, on which and on the ends of the two walls the lintel, similar to that of the single gate in form and size, rested. The remains of the second style consist of two low relieving arches in the wall above, taking the weight of the lintels, one of which is cracked across. The walls of the chamber within are also of the second style, with plain Doric pilasters; though there are marks, according to Mr. Tipping, of these stones having been cut down to afford relief to the shafts of the pilasters, traces of rebating being still visible.

Before speaking of the more modern alterations of this simple plan, it will be necessary to give some description of the interior passage. This consists of a room of equal width with the doorway, and about twice the length; being divided by arches, resting on pilasters and three pillars, into four compartments, capped by flat domes with pendentives.

These domes are, however, of very different character to those of the Golden Gate, being composed of large stones and ornamented in a manner foreign to any known style of architecture. The principal feature, besides numerous wreaths of corn sheaves, being a large and irregularly-traced vine, with bunches of grapes, which runs in low relief over the whole dome, and over this are four squares, surrounded with a raised frame, placed on their corners, and filled with various kinds of ornamentation, one being of rose and coffee work, another of intersecting arcs, in high relief. The pendentives are also of a similar character.

The central pillars on which these curious domes are supported are themselves of a unique description. They are both of monolithic shafts and without bases. The more southern has a capital, the outline of which is of an unmistakably Egyptian character, consisting of a bell covered with acanthus-leaves traced in the very lowest relief, with lotus-leaves appearing between the divisions, the whole capped with a thick abacus. The only capital of similar description is found in the Tower of the Winds at Athens, and even this is of a much more decided character; yet it is from this that Mr. Fergusson has deduced the Egyptian origin of the Corinthian style. The second pillar has a plain bell-shaped capital with abacus, resembling the former in profile, but unornamented. The second pillar is placed at the foot of a flight of four steps, apparently ancient, which occupy the half of the passage to the west, while to the east of the pillar a wall of related masonry forms the end of the hall.

Mounting by these steps, a vaulted gallery raised somewhat above the hall is reached, being divided centrally by a row of piers supporting arches,—the whole of smaller masonry, though still of a size larger than usual. The walls are megalithic, and therefore of a different age to the piers, being of the second style. The passage is blocked at the end, but communicates by steps with the interior surface of the Haram.

The present appearance of the gate, as seen from without (the houses built over part of it being removed), is further complicated by the addition, for ornamentation, and in a manner not at all connected with the construction, of an archway resembling a T in shape; the lower side of the entablature being arched out into a double arc, and the line running horizontally above. The whole ornamentation running round this peculiar form is similar to that of the Golden Gate, the same details being observable as spoken of above, and the same order retained. Above this double arch, and at some height on the wall, disconnected from the lower work, and immediately surmounting the relieving arch, is a narrow cornice consisting of two rows of dentils and a moulding which stands out as a string-course from the wall. There can be little doubt

that these added ornaments are of the same date as those on the Golden Gate.

Close to the last-named detail is a curious stone, in size equal to those surrounding it which are of the second style, but bearing an inscription and built reverte into the wall. The time of the inscription is Hadrian's, and it runs as follows:—

“ Tito Zē[ho]i Hadriano
Anonino Aug[usto] Pio
P[at]ri[ci] P[at]rici[us] Pontif[ic]i Augur[um]
D[ecreto] D[ic]cunium.”

The Triple gate is built on exactly the same plan, and finished in the same method by Herod, with the exception that it is triple, and leads to a rock-hewn passage, and that no ornamentation exists on its pillars, face, or roof. To the east of it are a series of vaulted passages, irregular both in width, length, and height,—a series of arches, supporting a vaulted roof, the piers being formed of large stones, apparently taken from the walls, and rebated on one side, while on the other three they are roughly rusticated. Thus they appear to have been made use of after having been taken from the wall, and the whole system is considered to be modern.

It is under these that Lieutenant Warren has just discovered his Single gate, which appears to be undoubtedly ancient.

Although this system of vaults, which has been accurately planned and measured, is apparently modern, there exists at the extreme south-east corner a chamber investigated by M. de Vogüé, which is of similar character with those remains already described. It consists of a roughly-squared room, with a window having a triple opening to the east. The plan of the piers of the window are similar to those of the gateways already described, and in one corner is a winding staircase similar to that in the tower of the Damascus gate. The roof of the apartment is vaulted, and is supposed by M. de Vogüé to be ancient, resembling that at the Double gate.

To the north of the first window, one bay of which is without the wall of the chamber, is another, double, and of the same character. Both of these are at a much higher level than any preceding remains, as is also the floor of the chamber, and seem to have been situated near the top of the ancient wall. On the south side of the chamber is another window, filled up.

Such is a brief description of the few remains which at different times and by separate individuals, have been discovered above the surface of the ground before the work was commenced by Lieutenant Warren. Though few and scattered, they are yet of great value, as showing by their exact coincidence with the description of Josephus, how unexaggerated and truthful his statements are, and how magnificent were those works the immovable foundations of which we must surely find, if we only seek in the proper place. It would be truly a disgrace if such a scheme were allowed to fall through.

It is probable, that if fully carried out, these investigations will lay at rest for ever the controverted points in the topography of Jerusalem. It would be out of place to draw any conclusions from the facts hitherto collected; still, it is well to have an idea of the tendency of all the evidence, and thus to have some notion of where to work and what to expect. It will, therefore, be well to point out the indications of these remains, with regard to the three temples of Solomon, Herod, and Julian. The similarity of the second style to that of Herodium, together with the semicircular arches and square stones, must seem to all who look without prejudice on these relics to point out the origin, as belonging to the time of Herod, while the inferior position, the Egyptian character of the pillars, and the unusual rebating, together with the absence of the arch, will seem to date the first style at the time of Solomon.

The fact that the transition style limits the Romanesque architecture of the Golden and Double gates to a time between that of Julian and Diocletian, when coupled with the known fact that Julian built on Moriah, would seem to be sufficient to fix the authorship of this work.

Of the more modern works of Justinian and various builders, down to modern times, nothing need here be said, as they admit of no dispute, and are only important when considering another branch of this interesting subject—the Mediæval relics of Jerusalem, a subject which has been most fully investigated, and is of great, though separate, interest.

Such, then, are these relics briefly described,

as is necessary from the nature of such a sketch, but of which plans, photographs, and accurate detailed drawings exist. We must await that fuller and more complete investigation which, with proper men and sufficient money, Lieutenant Warren will be able to carry out.

ON THE UTILIZATION OF SEWAGE BY IRRIGATION.*

On the Methods by which it has been proposed to treat Sewage.

EVER since the arrival of Asiatic cholera and other devastating epidemics on our shores a multitude of schemes for the deodorisation, disinfection, filtration, precipitation, and utilization of the offensive matters held in the sewage have been from time to time in vogue. Few of them, however, have been successful, and by far the greater number may be pronounced to be the nostrums of visionary enthusiasts, with no real save that of needless expenditure of time and money.

The following may be considered the principal of these methods of treating sewage:—

1. Filtration through artificial beds.
2. Deodorisation and precipitation of the organic and inorganic matter.
3. Utilisation by earth closets.
4. Utilisation by irrigation.

1. *Filtration through Artificial Beds.*—The experience of the past twenty years has shown with what favour the theory of the filtration of sewage has been adopted by engineers and public boards. There is hardly a single district of any importance under the jurisdiction of the General Board of Health which has not at some time or other been more or less engaged in attempts to bring this theory into practice. Had a tithe of the energy thus bestowed upon a vain and hopeless pursuit been devoted to the solution of the question of utilization, there can be little doubt that it would have long since been settled to the permanent and solid benefit of this heavily-taxed nation. Amid all these efforts, no satisfactory case can be pointed out in which valuable results have been obtained from the adoption of artificial filter-beds; and it is now generally acknowledged that organic matter held in solution cannot be extracted by filtration. What is extracted is simply the solid matter suspended, that which is in chemical combination being practically untouched.

Sand, gravel, lime, charcoal, animal and vegetable, alum, shale, magnesia, and an indefinite number of other purifiers, have each had their turn; have undergone every variety of combination and permutation; and have invariably met with the same fate. Many of these, indeed, have given good promise when dealt with experimentally in the laboratory, or upon a very limited scale, but, from obvious reasons they have entirely failed when brought to extensive application. It may, perhaps, tend to lessen our professional pride, when we reflect that after the lapse of a generation distinguished for the spread of engineering science, we find ourselves compelled to submit to the sagacious conclusions of our eminent predecessors, after a fruitless attempt to better them.

It is but recently that at Aldershot, the eminent civil engineers who carried out the drainage of the permanent camps, erected near their outfall costly and elaborate beds of prepared lime, &c., through which it was proposed to filter the sewage on its way to the Blackwater. These works may now be seen (1867), a square, solid fabric of masonry, with all the signs of recent erection, silent, and utterly abandoned. It was found, as might have been expected, that the fluid, although by no means freed from its offensive sewage matter, became so charged with lime during its passage through the beds, that in a very short time all the fish for miles down the river were killed, and an injunction from the Court of Chancery was obtained, commanding the Government to stop the works.

At the oft-quoted Croydon, amongst the many schemes forced upon the Local Board by the proprietors of the river Wandle, filtration in every form was tried,† with such results as are recorded in the extensive works which are now rapidly falling into ruin near the site of the present irrigation tanks at the outfall. Mr. Alder-

man Mechi, in referring to these works, which consisted of vertical perforated iron plates, with layers of gravel or charcoal, said before the Select Committee on Sewage, in reply to Mr. Ferrand, that the filtered sewage "looked like dirty water, and was slightly disagreeable to the smell."²

At Wakefield, the adoption of Mr. Spencer's magnetic carhide filter for the water supply does not appear to have been devoid of success, as there is undoubtedly a material improvement in the water obtained from the river Calder after filtration; yet in the gross and polluted state of that river the removal of an immense amount of organic and inorganic matter in suspension, does not by any means destroy the dangerous condition of the liquid. Even yet, the filtered water placed in a newly-washed decanter throws down a precipitate which presently turns putrid, indicating the noxious presence of nitrogenous matter or ammonia.†

At Rugby, the failure of the filtering process was complete. Mr. G. H. Walker, the lessee of the Rugby sewage, says that the filter-bed did more harm than good, inasmuch as it was always full of putrefying matter, and the sewage flowing through it passed into the river in a fouler state than before.‡

Coventry, Leamington, Leeds, Leicester, Nottingham, Carlisle, Tottenham, Bury St. Edmund's, and other towns have witnessed the failure of artificial filtration to meet its required purpose; and it may now be considered that, with the exception of a few enthusiasts, who now and again intimate to the world that they have at last solved the problem, and discovered the true filtering medium applicable to this purpose, this means of purifying our sewage has been condemned as futile. Concerning artificial filtration, the following clause is extracted from the report of the Committee on Metropolitan Sewage 1864:—"No efficient artificial method has been discovered to purify, for drinking and culinary purposes, water which has been once infected by town sewage. By no known mechanical means can such water be more than partially cleansed; it is always liable to putrefy again. Processes of filtration and deodorisation cannot, therefore, be relied upon to do more than mitigate the evil. Water which appears perfectly pure to the eye, is sufficient, under certain conditions, to breed serious epidemics in the population which drinks it." "Soils, however, and the roots of growing plants, have a great and rapid power of abstracting impurities from sewage-water, and rendering it again innocuous and free from contamination."⁴

The Rivers Commissioners⁵ say, that "no arrangements for treating sewage are satisfactory, except its direct application to land for agricultural purposes."⁶

2. *Deodorisation and Precipitation of the Organic and Inorganic Matter.*—As the alchemist of olden time passed his life in the vain pursuit of the philosopher's stone or the elixir vitae, so in the present age the resources of chemistry have been wasted in the endeavor to extract wealth by the precipitation into a portable and concentrated manure, of the valuable parts of sewage. Enterprises conducted upon a grand scale have been projected with this object, under every eminent auspices, and have brought their promoters nothing but ruinous failure.

The history of the Patent Solid Sewage Manure Company's works, at Leicester, with such names as those of Robert Stephenson and Professors Aikin and Taylor as the chief proprietors, and that of Mr. Wicksteed as projector and engineer, forcibly illustrates the errors into which a too keen enthusiasm may lead men of acknowledged reputation. Mr. Stephenson, although, perhaps, second to none as a constructive engineer in the highest branches of the profession, could scarcely in justice be considered

* Rep. Met. Sewage, 1864: 3365-60.

† Third Report of Rivers Commission. Aire and Calder, 478 and 2301. The Calder at Wakefield is in a state of extreme pollution, draining in its course 1100 acres containing 400,000 inhabitants, the whole of whose sewage passes into the river, which, moreover, is polluted in every imaginable form by the refuse of no less than 1,200 manufactories of various kinds. To this pollution, Wakefield, a manufacturing town of 20,000 inhabitants, adds the contents of its own sewers, and the discharge from its own manufactories; and having done so, draws from the stream three-fourths of its own supply (vol. i., p. 46).

In an analysis of the water of the Calder, 1864, Mr. Fowler, surgeon, found five varieties of animalcules, decaying muscular fibre, constituents of feces, several varieties of vegetable life, and other noxious matters. This water was at that time drunk by the people of Wakefield without filtration (vol. i., p. 15).

‡ Rep. Met. Sewage, 1864: 3728-29.

§ Rep. Met. Sewage, 1864, p. vi.

|| Third Report, vol. i., p. 55.

to possess that nice and accurate knowledge of the chemical relations of sewage which unvaried study and practice can alone give; and his engineering colleague, although practised in hydraulic questions, was far too sanguine in pursuit of this theory, as will be seen on reference to his report to the Commissioners of Sewers. In 1854, after a series of satisfactory experiments, works were erected at Leicester by this company for the purpose of precipitating the solid manure in sewage, by quicklime administered in the proportion of 1 in 3,000. The capital is reported to have been 40,000*l.*, and seventeen steam-engines were required for pumping the sewage. Two reservoirs, 200 ft. by 44 ft., were constructed, and over these were erected warehouses, engine-houses, &c. Very hopeful reports were issued by Mr. Wicksteed, and the attention of very high dignitaries was directed to the enterprise, which after an enormous expenditure, collapsed into utter ruin as a commercial speculation, and now is ranked as one of the most signal failures on record.*

At Tottenham, the process of deodorisation and precipitation was tried with the same want of success, the works being now abandoned. The like result has occurred at Bury St. Edmund's, Croydon, Leamington, Coventry, and many other places.

In Paris, some years ago, gigantic reservoirs were excavated at Montfaucon, into which all the filth of that city was conveyed in covered carts, for the purpose of being converted by the action of sun and wind into a solid and useful manure or *pois-d'été*. The stench from these pools was intolerable, and bred putrid fever in the hospital in their neighbourhood. Since then the Montfaucon nuisance has yielded to a vast system of main drainage, which, as yet incomplete, promises to maintain the eminent reputation which has been gained by the internal government of Paris. The nuisance at Montfaucon, however, did not arise from what is now understood as sewage, *i.e.*, the contents of our sewers in their diluted condition, but from the night-soil, consisting chiefly of urine and excrementitious matter.

We have seen from the foregoing examples, that the verdict pronounced against the sufficiency of all known methods of dealing with the contents of our sewers by filtration or precipitation, is in every sense just and warrantable. Before we approach the discussion of the principles of sewage irrigation, there still remains another important expedient, which, although of all methods the most ancient in use, and one that has never been discontinued, has but recently received the attention it deserves, namely, deodorisation and utilisation by the use of dry earth.

The Dry Earth System of Sewage Utilisation.

The remarkable deodorant action of common black soil in a dry and pulverulent state, upon the ammoniacal steams given forth from the liquid and solid feces of animals, is a truth which, however it may be casually lost sight of, can be deemed of little less antiquity than the human race itself. Neither has this knowledge been confined to human reason, since the commonest observation tells us that it is shared by the instinct of many animals. There are few country houses of any importance where the domestics have not been instructed to carry out periodically this natural process of deodorisation by the timely aid of a shovel of ashes. When we hear, therefore, of high church dignitaries declaring the dry-earth system to be the greatest of sanitary discoveries, and of associations of learned men meeting to enlarge upon the singular revolution which is about to regenerate the mind, body, and estate of the whole human kind, we may be permitted to wonder at the want of so ordinary a kind of knowledge. Nevertheless, there can be no dispute that this useful property of earth has, to some extent, fallen into disuse, more especially amongst the humbler classes, who give themselves very little trouble on this score. That this proceeds more from indolence than from ignorance, does not detract from the merit of those who, viewing this matter with due regard to its practicality, would urge its general adoption where, from comparative isolation, or from other natural causes, the ordinary privy cannot be dispensed with.

The amount of popularity, then, which has been acquired by the earth-closet recently patented by the Rev. H. Moule, vicar of Fordington, is by

* Rep. Met. Sewage, 1864: 4732 and 4002-3. See also Mr. Wicksteed's Report to the Commissioners of Sewers, February 13, 1854.

* See p. 146, ante.

† Amongst other processes tried, were, — filtration through charcoal; Higgs's patent lime process; treatment with carbonic acid and pre-chloride of iron. Mr. Latham, Leamington Congress Papers, p. 139.

no means altogether undeserved, although far too much scope in its operation has been claimed by those inflexible enthusiasts who cannot comprehend the impossibility of arriving at a single system which shall equally serve in every case. The details of the scheme contain nothing very striking or original, and it may be better and not unjustly defined as a new and systematic rendering of a very ancient practice, rude and primitive enough. There is no need, consequently, to enlarge materially upon it. The following is a brief description of the process:—The earth, which is to be of the common black description, dried and pulverized, is thrown down into the closet after use, either by means of a self-acting mechanical contrivance, or with the hand. The receptacle, a portable vessel of commodious size, is to be removed each day or each week, as the case may be, into collecting-carts, which in towns make their rounds at certain convenient hours, whence it is returned after disposal of its contents, which in the interval are consigned to the land or to some fixed depot. The amount of earth required in each case amounts to 12 or 16 ounces, and must be perfectly dry.

From the foregoing description it will be at once seen that the whole operation and mechanism of the earth-closet are of a very simple kind; but that great care is necessary in the use, and in the preparation of the requisite material, which must be of the loosest and driest nature. Its advantages in the country and in all places where water-closets are inexpedient are very evident; for not only is its application in strict accordance with the rules of health, but there is a perfect economy or saving of the agricultural ingredients contained in human voidings. Whether these are manipulated in the most profitable manner is another matter. In all isolated dwellings, prisons, asylums, schools, barracks, in rural villages, and even in straggling and thinly-populated towns, unfitted for economical drainage from scarcity of water or other causes, the dry-earth system will be attended by good results, care in its detail management being enforced by inspection. The readiness with which an ample supply of the deodorising material can be procured is, of course, an item in the condition of success; but, in the instances mentioned, this condition may be taken for granted. It is very doubtful, however, whether, without prejudice to the agricultural neighbourhoods of large towns, a sufficient quantity of dry black earth could be made available; for although it has been so supposed, it is by no means certain that it would be consistent with sanitary rules to use it again within a reasonable period. In the use of Mr. Moule's closets, about 2 cwt. of dry earth is required per week for a family of six persons.* This, at the rate of 38 lb. per head per week, would give in the case of the metropolis, with a population of 3,000,000, a quantity of dry earth amounting to 2,600,000 tons; † or allowing, in round figures, 25 cwt. to the cube yard, a total quantity of 2,400,000 yards per annum. To put it another way, this would be equal to 100 acres of land excavated to a depth of 13 ft.; but, as it would be no easy matter to get the proper kind of soil at so great a depth, the quantity may be more fairly estimated at 1,300 acres excavated to the depth of 1 ft.

It is plain, therefore, that an attempt to carry out a complete system of dry-earth closets throughout the populous towns of this country, would be attended in the first instance by a failure of the necessary deodorising material.

Secondly, it is absolutely indispensable that material shall be perfectly dry, inasmuch as, in the words of the projectors of the Earth Closet Company, "The earth-commode will no more act properly without dry earth, than will a water-closet without water." It is equally plain, therefore, that artificial means must be employed to bring the earth to this condition of dryness as well as of pulverisation, whereby another expense is added to the cost of soil.

Thirdly, an enormous addition to street traffic would follow the introduction of this method, which would amount in the metropolis to upwards of 40,000 one-horse loads weekly, and which must not be understood to take place during the hours of sleep, but must therefore necessitate the intrusion of labourers into every dwelling.

Fourthly, the displacement of existing water-closets in order to make room for earth-closets,

would simply be doubling the expense of the internal arrangements of each household.

Fifthly, it is justly surmised by those whose experience has taught them the habits of the poor that if the material has to be bought and paid for by its weight or measure, and insists upon a certain standard of care and precaution, however slight, inevitable neglect must ensue, which no amount of costly inspection can altogether prevent. Even with water-closets, the use of which adds nothing to the immediate outlay of the householder, there is too often great difficulty in keeping the humbler classes to the simple duty of uplifting the handle.

A final, and perhaps a fatal, objection to the introduction of this system in towns of great magnitude is, that it no more affects the evils of river pollution and ill-ventilated sewers than anything most foreign to the matter. The refuse of water-closets forms but a minor portion of what we term sewage: the household refuse, the scourings of market-places, stables, slaughter-houses, knackers' yards, the refuse matter of tanneries, hospitals, and innumerable sources of pollution still remain to be dealt with. The same main sewers and house drains are required, of the same depth and of the same sectional area; the same need of sewer ventilation exists, and the same fouling of streams goes on,—in short, the whole question which it has been alleged this method has entirely solved, confronts us in all its original force.

A close and impartial examination of the objections above enumerated will hardly fail to convince the professional inquirer that something very different from what has hitherto been placed before the public in the shape of earth-closets will be needed to solve the question of sewage utilization. Dr. Hawkesley,* in a paper read at the Leamington Congress on sewage, 1866, in the course of which he stated that his acquaintance with the earth-closet contrivance extended over a period of two months, gave a series of calculations affecting the financial results of the system. In one of these he took the annual value of the liquid and solid human voidings at 10s. per head, which, perhaps, is their received value; this, in a population of 3,000,000, would give a gross value of 1,500,000l. sterling. Against this sum he places the cost of collecting and carting to the depot, namely, 793,000l., and claims, as clear profit, the balance of 707,000l. But Dr. Hawkesley's figures are based upon an unaccounted assumption. He appears to be ignorant of the vast difference between the value of the condensed constituents of manure, which may be transported to great distances at a tariff which bears but a trifling proportion to the value of the commodity, and the value of the same constituents hurried in a huge mass of comparatively valueless matter, the carriage of which fairly tends to equal its marketable value. He, therefore, falls into the error of supposing that agriculturalists would send portions of their poor lands to London. They would pay the railway charges, and the only other payment they would have to make would be for the amount of refuse organic matter put into the soil.† This supposition, which is altogether foreign to the experience of those who are especially acquainted with marketable value of night-soil, has perhaps tended to form the views of many of the exponents of the dry-earth system. But let us suppose, on the other hand, that agriculturalists will not pay the carriage of their poor land either way; but that it is paid by the seller of the manure. From London outward, the average distance to which it would be sent may be taken at fifty miles; the carriage then, of one ton, at the rate stated by Dr. Hawkesley, namely, 1d. per mile, would be 4s. 2d. either way, or altogether, 8s. 4d.; let us add this 8s. 4d. to the supposed expenses of London management, and we find the following results:—

Working expenses in London.....	2733,000
Carriage of 2,993,000 tons of manure (Dr. H.'s calculation) at 8s. 4d. per ton.....	1,247,000
.....	2,010,000
Credit by sale of manure.....	1,500,000
.....	2510,000
Balance against.....	2510,000

So that, instead of a favourable balance of 707,000l., we have an adverse balance of 540,000l. For convenience sake, no account has been made of the cost of the dry earth, but it is very evident that the cost of "scraping" so great a bulk of earth, and its subsequent preparation for proper

application, must swell the cost of this system to a far greater total. It should not be omitted that the cost of spreading so bulky an article of manure is a consideration which has its due weight with farmers generally, and is a very different thing from that of applying a similar value in guano, *poudrette*, or other consolidated manure.

It is possible, and, indeed, highly probable, that Dr. Hawkesley's calculations, above quoted, are of a very crude sort, and may not do entire justice to the merits of the system he expounds; but it is precisely our intention to show what a slight value is to be placed upon a series of calculations based entirely upon supposition, warranted by no former experience, and in many respects opposed to existing facts.

Mr. Menzies, remarking upon Dr. Hawkesley's paper before the congress at Leamington, gave a very pointed illustration of the difficulties attending the disposal of night-soil. He said that at Aldershot, surrounded by some of the poorest soils in England, the whole refuse was in the first instance received into iron troughs, and carried away every morning, or thrice a week. The disposal of this was advertised for the highest bidder; but instead of the authorities receiving anything for the concession, they were compelled to pay 500l. or 600l. per annum,* although the manure was placed upon soil within a mile of the camp.†

ON THE ARCHITECTURESQUE.‡

WHEN I speak to you of "The Architecturesque," I am perfectly well aware that I am using a term which will be entirely new to you. I have this advantage, however, that its very structure will enable you to divine the tendency of the argument with which I have to submit it for adoption. The word "picturesque" will at once occur to you as that upon which this is based; and it will no doubt occur to you also that my argument need go no further than to persuade the architect that it is necessary, or at least desirable, that he should possess some word in connexion with the fine art architecture, which will be equally useful with this word "picturesque" in connexion with the fine art painting. It is scarcely possible, I think, to say that we already possess phraseology which sufficiently conveys the idea. It would be impossible, for instance, to suppose that the word "architectural" serves the same purpose in connexion with architecture that the word "picturesque" does in connexion with painting. This word "architectural" goes little if any further than the artistic elements of architectural forms, whether as ordinarily received or otherwise. Again, the word "architectonic," which we sometimes use, goes no further, I think, than the idea that architectural forms shall be subjected to structural propriety. Neither of those words, I may safely venture to say, carries anything with it of the peculiar idea which the word "picturesque" conveys in common parlance in respect of painting.

Now, let me remind you that the adoption of the term "picturesque"—comparatively a recent act in this country,—was in reality something more than the mere adoption of a phrase. It was the foundation of an idea. The Italian word *pittoresco* had been in use for centuries, signifying "picture-like,"—"painter-like." This word had been adopted by the French in the form of *pittoresque*, signifying the same idea; but it was only, I may say, within the limits of the present century that the word "picturesque," the English form of these terms, came to be publicly used and universally accepted. Still, it is plain that the idea which the word "picturesque" conveys needed expression only, not discovery. No doubt it was well understood, both by painters and by critics, before our adoption of this term. Nevertheless, it is equally plain, I think, that our adoption of the term formulated that idea which was not capable of being expressed previously except by periphrasis, and was therefore to a considerable extent hidden or unperceived, for want of a definite phrase which would carry from one instructed mind to another the precise notion here suggested. And I may go further in saying that it was purposely to define and fix this idea, which is now so commonly known amongst us as to seem axiomatic,

* Leam. Cong. Papers, p. 70.
 † To be continued.
 ‡ Lecture to the Architectural Association, February 25th, by Professor Kerr.

* See Prospectus of the Earth Closet Company, p. 8.
 † Dr. Hawkesley estimates it at 2,930,000 tons. Leamington Congress Papers, p. 56.

* Leamington Congress Papers, p. 56.
 † Leamington Congress Papers, p. 56.

that the term *picturesque* was introduced. This is what I mean, therefore, when I say that the introduction of this word into England formulated a most valuable and essential idea; and my opinion is that the term "*architecturesque*" would be similarly useful in formulating an equally valuable idea, which, although it may be said to exist in the mind sufficiently clearly perhaps in many instances, I think I may venture to suggest does not receive that degree of public recognition which it might do if it were formulated by a definite phrase such as I have proposed.

Let me discuss for a moment the meaning of the word *picturesque*. It signifies *worthy of being painted*. It is a certain piquancy in objects capable of being painted by which they are made worthy of the application of the painter's art. Examples may be very easily offered; but indeed it is scarcely necessary, for the precise application and significance of the term *picturesque* are so thoroughly understood that examples can only serve as common-place illustrations. But take a landscape. Suppose the spectator is stationed upon a hill-top. His attention is directed to the valley beneath, parcelled out into square, trim, ploughed fields, with neat hedge-rows, and perhaps a well-kept brook. All the evidences of material prosperity are there; the farm-house, the farm-buildings, the engine-chimney, everything of the very best; and the spectator is called upon to say whether it is not a pleasing and suggestive landscape. Certainly, he says; suggestive of material wealth and comfort; hope looks forward to a long succession of abundant crops and a well-provided and happy population. But, if the painter is asked whether that landscape is picturesque, he says, "No: for my purpose it is utterly worthless. I care nothing for trim fields, for the suggestion of large crops, for the comfortable farm-house, for the substantial farm buildings. It is something altogether different that I want." And he turns about to another view, where he sees mountain scenery, barren crag, confronting barren crag, profless light and comfortless shade playing about at random amongst mere shapes and outlines, on a very desolate, dreary, barren condition of things altogether, but a condition of things which lights up the artist's eye, and makes his fingers tingle to paint it. It is what we call picturesque: inhospitable, and worthless even in the mere considerations of material benefit, but to the painter, looking upon not material good, but pictorial effect, as his peculiar province, all that can be desired. This is an illustration of course common-place enough, but still it enables us distinctly to understand what it is with which we are dealing. Take the case, again, of the features of a man. Look at the portrait of a gentleman" banging yearly on the Academy walls. A very agreeable face, no doubt; a pleasant, comfortable, smiling countenance; an eminently respectable person; an intellectual man, perhaps, or a great man, worthy of painting certainly, or it would not be where it is, but worthy only for the sake of its owner, and certainly not for the sake of its features. But take another face: it is seamed with the furrows of care and thought; perhaps the eye is lighted up with wild enthusiasm, the hair dishevelled, the whole aspect distracted. Says the painter, "This is the subject for me: an odd man, no doubt, but a picturesque countenance; a disagreeable man very likely, but that makes no difference to me; those features are the features I desire to paint." And so on. I might take any number of such illustrations; but let me take the subject of a building, because then we are all at home. What, then, is a picturesque building? It is, in its primary sense, a building which is worthy of painting. The painter looks upon the placid face of some serene classic edifice, and he says, "This is very fine, no doubt—exquisitely proportioned, gracefully beautiful in every feature, but all that I do not care to understand; show me something which is piquant, put together no matter how, in pitch-fork fashion if you like, but something which has its outline broken and its placidity disturbed, and, if you like, its mouldings worn and its face weather-stained, as the face of a man scarred and furrowed with agonies,—and its turrets cast into the clouds like wild arms tossed about: give me a building of that character, and this is what I will paint, and let the symmetries and the graces go elsewhere."

We have next to reflect upon how the painter is able to impart this picturesque principle into that which, perhaps, nature supplies to him in an

essentially non-picturesque form. The landscape, which is dull and uninteresting enough as presented by nature, he can nevertheless make picturesque at his will. He has at command certain effects of light and shade; there are certain common objects, perhaps only hrambles and stones, which he flings about the foreground; there are certain atmospheric effects in the sky, in the aerial perspective, in the accidental shades and shadows; all of which are his well known contrivances, the "tricks" if you will, of his art; and by such means he can throw any amount of the picturesque into his landscape with perfect ease. The same, of course, with the human features. If a painter has a photograph or a "portrait of a gentleman," and desires to make it a picturesque object, he has merely to study the attitude, to dispose the drapery, to throw expression into the face, and soon, according to corresponding principles, and he makes of that which is essentially unpicturesque something as essentially picturesque as need be for his purpose. This picturesque-essence, therefore, which we call the picturesque, is obviously not a name merely, but an entity independent of mere associations, and certainly independent of pre-association; and what I have to say to you to night is little more than this,—why cannot we suppose and maintain that a similar entity exists in connexion with, or in relation to, other arts; and, if this appears to be so, more particularly why should not such an entity be discerned in connexion with our own good art of architecture?

If this be so, let me next try to define what I call the *Architecturesque*. It is an essence of form and disposition, which (speaking vaguely at first) may be said to make architecture what it is. Now, what is architecture? Our old definition in this very Society twenty years ago was this—"Architecture is the art of the beautiful in building;" and I do not know that we have hit upon a better definition yet. We do not ignore building; we do not hesitate to accept it in all the fulness of the idea; but building is not architecture; architecture is not building. Architecture is the fine art of the beautiful in building; and, as all architecture must therefore be based upon building, I think it plainly follows that there is something which is to be superadded to building in order to convert building, if the expression be allowable, into architecture. This element it is that I am endeavouring to suggest to your minds; and if there be an essence, if the application of which to bricks and mortar fine art is to appear, then I go on to say that in other matters besides those which are directly architectural,—in matters which, not being themselves architectural, are still adaptable to, or commensurable with, architecture,—this same spirit or essence may be applied to produce conformity and harmony of idea; and if this principle is as I describe it, I think it may be sufficiently designated by the term I venture to propose, the *Architecturesque*.

Let me next illustrate my notion by considering what is the picturesque in architecture? We understand the idea of the picturesque in painting; and what I want to do now is to dwell for a moment upon the corresponding principle in architecture. The picturesque in painting, as I have said, is piquancy,—the picturesque in architecture is piquancy still. There are various modes of the picturesque in architecture,—various mannerisms; there have been various fashions, and there will be various others; but the same principle or idea is present in all—not in a uniform degree, or in any uniform manner of development, but still as the picturesque, and the picturesque definitely. When Classic architecture was more generally, or rather universally, in vogue, some may remember that the picturesque presumed to go no further than those villas of the rural Italian style which frequently form conspicuous objects in the works of Italian painters, and which were then considered to be all that could be wished for in respect of piquancy or architectural effect. Again, when we looked to our architectural works at home, I remember very well, for it is no longer ago than within my own remembrance, that the Elizabethan was considered to be the acme of the picturesque; indeed, when it was of more than usually ornate character, it was considered to be more than picturesque—fantastic. And it was upon this very ground, as matter of fact, that the present fashion of revived Gothic architecture arose. It was the study of the picturesque, the desire for the picturesque, which led to the study of Gothic architecture; and it has proceeded on picturesque ground step by step from

the days of Carter and Britton till now, when the desire for the picturesque in Gothic architecture has become almost unlimited. In other words, as the revival of Gothic architecture sprang out of the love of piquancy, if I say that the more piquant our designers in that style have occasionally overstepped the picturesque and passed into the fantastic, I am certainly using language which should be considered modest and moderate. So much for the forms and modes of picturesque which have successively prevailed in architecture; but observe, that the idea underlying all these developments alike has been the same idea, namely, the idea of picture-worthiness, of painter-piquancy,—of architecture, in short, worthy of painting. I need only refer you in a single word to such works as the Châteaux of the Continent, many of them so eminently picturesque as compared with our own most piquant works. The Scottish castles, again, are not, perhaps, always very convenient abodes, any more than the English castles of very early date, but they are picturesque—they are objects worthy of painting. How they came to be thus worthy of painting it is not for us at present to inquire; but still there is a rudeness, a piquancy, and ruggedness about them which render them picturesque as almost every example. Then there are the Gothic churches; and every one would say, whether adherents of Gothicism or not, that they are, beyond all others, certainly most picturesque. And all this brings me to the great fact, Medieval architecture is all picturesque. Radically and primarily, the picturesque element is that which gives spirit to Medieval architecture; and perhaps, when we trace back Medievalism to its source, the principle comes to be that it is Northern architecture which is picturesque—Northern and Western, possibly, as distinguished, however vaguely, from Oriental and more southern architecture.

It is, perhaps, by a sort of contrast with all this, that we may best endeavour to show what is the architecturesque in architecture. I should describe it to be something which is architectural, and nothing but architectural. The picturesque is picture-worthy, but the architecturesque is something not pictorial nor picture-worthy, but architectural and architecture-worthy, and nothing else. Take the Parthenon. There is a building in which there is not one gleam of picturesque design, situated upon a picturesque rock,—occupying such a position that in the hands of any Northern or Western people, it would have been made something certainly very different from what it is. The very suggestiveness of the site, we might suppose, would have induced any people but the Greeks to make a picturesque building. But to show how the Greeks were architecturesque and non-picturesque, there is that building standing upon such a site, with not one element that we can recognise for a moment as even tolerant of the picturesque. I call it purely architecturesque. Looking again at the interiors of the Egyptian temple, you find there everything excluded that architecture and other art architecturally treated. That is to say, the whole prospect is architecturesque. When I say the sculptures and paintings are treated in this manner, I refer to what is called their stiffness—their peculiar rigidity, the absence of natural development, the peculiar conventionalism which always makes Egyptian work so eminently adapted to Egyptian architecture. Then, again, we have another instance in the Pantheon at Rome. There is a building both externally and internally architectural, and nothing else. Not only is there no attempt to produce pictorial effect, but it is impossible to discover anything else but architectural sentiment. Again, take the Pompeian House: even the paintings upon the walls have a peculiarly conventional form, which I think is eminently capable of being described under the phrase I use. And all this leads us to conceive that Classic work generally is architecturesque; and not merely Classic, but Oriental work generally.

The inquiry now naturally arises in one's mind, whether the essential difference between Classic and Medieval architecture does not lie here—that the Medieval is primarily picturesque, and the Classic primarily architecturesque. I have been for years persisting in this proposition, that all Classic architecture forms one school of art, and all Medieval architecture another school of art,—the latter picturesque, and the former something not picturesque. I have called it Classical for want of a better term. But if I am now right, I should call it Architecturesque.

turesque, and say that the distinction between Medieval and Classical is thus rendered plainer than before, if the one is to be looked at as based on picturesque endeavours, the pictorial, the picture-worthy, while the other is based only on architectesque endeavours, the architectural, the architectesque-worthy, pure and simple.*

PROFESSOR G. G. SCOTT
ON EARLY ARCHITECTURE IN GREAT
BRITAIN.†

BEFORE describing any other of the remaining works of the period, I will carry you in imagination to one which has long ceased to exist. St. Paul's Cathedral in London,—founded, as we have seen, early in the seventh century, by Mellitus, the missionary bishop, and by Sebert, king of Essex,—having been destroyed by fire, its rebuilding was commenced in 1053 by Bishop Manric. The structure then commenced was of the most ample dimensions. The elementary scale was larger even than that of Winchester, for the width of the nave from centre to centre of the pillars was 46 ft. 6 in., while that of Winchester was 42 ft. 6 in. The nave was twelve bays in length, and each transept had five bays, exceeding in this respect (so far as I know) any other Norman church, excepting the Abbey at Bury St. Edmund's. The transepts were doubly aisled. The choir had, probably, four bays, but of its eastern termination I know nothing.

The central tower must have been nearly 60 ft. square, and the length of the transept 300 ft. The choir was raised high on an extensive crypt (the successor, in all probability, of that which I have conjectured that Bishop Mellitus had constructed on the model of that of St. Peter's at Rome). Whether the two western towers, placed beyond the outer walls of the aisles, like those of Abbot Paul at St. Alban's, were of the original date I am uncertain.

The architecture of the interior seems to have somewhat resembled that of Winchester, but was more lofty and more ornate. The plan of the pillars seems precisely the same; but the arches both of the main arcade and of the gallery were moulded, and circumscribed apparently by an enriched label. The triforium arches are not shown as subdivided, but I think that this was owing to an alteration of the original work. The clearstory had in each bay three openings. The aisle walls were, internally, arcaded beneath the windows. Whether the circular windows, which in Hollar's view light the triforium story, represent original ones, such as those at Waltham, we cannot judge.

Of this stupendous edifice, William of Malmesbury, who saw it in its unaltered state, remarks that "such is the magnificence of its decorations that it is reckoned worthy to be numbered among the most illustrious edifices; such the extent of the crypt, such the capacity of the temple above, that it seems capable of sufficing to hold any multitude of people."

Our old London cathedral, through the whole period of its existence, appears to have been the largest in England, and one of the largest in Europe,—its dimensions at a later date being 600 ft. east to west, 300 ft. north to south, and 520 ft. in the height of its spire.

One of the great builders of the first race of Anglo-Normans was Gundulph, a monk of the famous Abbey of Beck, and the friend of Lanfranc, who in 1077 consecrated him as Bishop of Rochester.

He rebuilt his cathedral, originally founded by the missionary Bishop Justus; but it is very doubtful whether any part of his cathedral now exists. He founded, also, the Castle at Rochester, though he did not build the magnificent keep usually attributed to him. He did, however, build the still more stupendous keep of the Tower of London, including the chapel already described, having been regularly employed by the king as the surveyor of the work. The existing remains of Norman style at Rochester differ so entirely from this in character that I am convinced that the parts of the cathedral which he built were just the eastern portion,—raised high on its crypt,—which were rebuilt again in the thirteenth century.

I shall return at another time to the existing Norman works at Rochester, of which I exhibit some beautiful illustrations.

Though not precisely in order of date, I will take next the great cathedral of East Anglia, which was erected, not on any ancient site, but wholly anew, at Norwich; and of which nearly the entire shell of the original fabric has come down to our own day.

It was commenced in 1096 by Bishop Herbert de Losinga, who (*O tempora! O mores!*) had, among other acts of simony, purchased the see of the scrologious Rufus for 1,900*l.*!—a sum equal in our money to nearly 40,000*l.* His apologist excuses this on the ground that it is lawful for the clergy to purchase the rights of the church if they cannot obtain them otherwise, adding the apostolic words, "Redeeming the time because the days are evil." The Pope, however, did not take this view, and sentenced him, for his simoniacal practices, to build a number of churches at his own cost, of which this stupendous edifice would appear to have been one, for it is distinctly stated that he built it at his own charges,—a most amazing fact, though he held the see for twenty-eight years; and our surprise is increased when we recollect that the stone of which it is constructed was transported from Northamptonshire.

The plan of the church differs from that of St. Alban's mainly in there being only one apsidal chapel to each transept, the aisle being continuous round the great apse, and in the projection therefrom of three chapels; also in the absence of western towers. Two of the chapels last named remain, and are of remarkable plan, a circle from the eastern part of which projects an apse. The nave attains the vast number of fourteen bays; each transept has four; and the eastern arm a like number to the commencement of the apse. The length is 420 ft. without the eastern chapel, now lost; that of the transept is 195 ft. Like St. Alban's, we have here the original central tower rising to its full height of 135 ft. It is richly decorated, both without and within, with ranges of arcading and other ornamental features. Within it rises a lofty lantern, round which are triforium passages on two levels. The angle buttresses without consist of a group of numerous shafts forming an octagon, and ending in turrets now terminated in another style. The upper part of the walls is curiously filled up with two ranges of large circles. The tower is a very noble work, though somewhat eccentric in its design.

We find here the aisle and its gallery, or triforium, of about equal height, and occupying about three-fourths of the height of the wall; the remainder being given to the clearstory. The triforium arches are undivided, and very much resemble those of the main arcade; differing chiefly in being generally uniform, with a slight alternate variety, while those below are subjected to frequent changes.

The usual pier on the triforium level has three shafts in a row in its reveal, carrying a wide and plain soffit, while the angles have alternately one and two recessed shafts, and the piers have alternately single and couple shafts running up their front.

The piers below are in some cases like those above, in others a portion of a vast round pillar is substituted for the row of three-shafts, the rest remaining as before described; and in one instance, on each side is a simple round column, with spiral flutings, as at Durham, Waltham, &c.

The zigzag and billet appear in the arches, and mouldings are, though sparingly, introduced. The capitals are mostly either of the cushion type, or varieties of the form I have shown you from the Tower of London, Caen, and Lincoln.

The whole internal effect is magnificent and noble in a very high degree.

The transept-fronts are divided here into three bays instead of two, as in the churches hitherto described. The arcades of the eastern arm differ considerably from those of the nave, while those of the apse unite in a very pleasing manner into a continuous range. Beneath the central arch are still remaining the shattered vestiges of the original episcopal throne.

I may mention in passing the remarkable plan of the great East Anglian abbey church at Bury St. Edmund's. I exhibit a ground-plan, from which its remarkable features and extraordinary magnitude may be judged. The length was 500 ft., and that of its western façade 250 ft. The latter is of a unique type, being flanked by two vast octagonal towers.

A very different type of the same age is found at Gloucester, the erection of which commenced in 1089. Here, as was so usual where the foundation

was of the Anglo-Saxon period, the sanctuary has a vast crypt beneath it.

The peculiarities of this church are two,—first, that the triforium or gallery of the eastern arm is vaulted with a demi-vault, and from it opened repetitions of the apsidal chapels, which are placed somewhat as at Norwich; and second, that no such gallery exists to the nave, but that the height is there thrown into the aisle; so that we have a very lofty aisle of one story to the nave, and two ranges of aisle of very low proportions to the eastern arm, the two arrangements coming face to face in the transepts. The piers throughout were vast cylindrical columns, with very plain and uncut round capitals.

This remarkable type was followed, with minor variations, in the two neighbouring monastic churches of Tewkesbury and Pershore. In all it has been greatly altered; but, by comparing one with another, the same scheme is shown to have prevailed in all three. In none were there aisles to the transepts.

The church at Tewkesbury was built just at the same time with Gloucester, and retains a feature which Gloucester has lost, a magnificent Norman central tower. It possesses also a unique feature which it is possible it may have shared with Gloucester. I refer to the enormous arch that occupies its west end, no parallel to which I know elsewhere.

This church is of peculiar value from its retaining, like those of St. Alban's and Norwich, so much of the original Norman outline, and few there are which exceed it in the solemn dignity of its external aspect.

Of the neighbouring cathedral of Worcester, as rebuilt about this time or a little earlier by St. Wolstan,—one of the few English bishops who retained their sees under the Normans,—we have only the crypt, which is wonderfully perfect in its design and preservation, and the arches which led into the eastern chapels of the transepts. We have also the unique and beautiful circular chapter-house of about the same period. Against the south transept, in an arched passage, we find either a reminiscence of the Saxon baluster or some from the old cathedral used again. St. Wolstan would, no doubt, have been glad of any such memento of good old times; remembering which, while watching the progress of his Norman church, he could not restrain his feelings, and exclaimed, "We wretched people destroy the works of the saints, that we may get praise for ourselves. That age of happy men knew not how to construct pompous edifices, but they knew well how, under such roofs as they had, to sacrifice themselves to God, and to set a good example. We, alas! strive that we may pile up stones, neglecting the while, the care of souls."

I will not detain you by describing Hereford, built by the more pious relative and namesake of Losinga, of Norwich; nor Chichester, commenced about 1089, a few years after the removal of the ancient see from Selsey, and which was a very perfect Norman cathedral on a minor scale, with its eastern end arranged much as that of Norwich, but with two western towers. Its original features are excellent specimens of the early period.

Let us now travel far northwards, and visit St. Cuthbert's glorious shrine; but, after entering upon the great Northern road, let us step aside and pay a passing tribute to the memory of England's last Saxon king, Harold Godwinson, in the church of his own founding, at Waltham.

When the nave, now standing, was erected, let us not too curiously inquire. It is a question on which some of our keenest antiquaries have differed, and let us not dispute over a site so sacred in England's history. Right goodly is the remaining fragment, by whomsoever erected. I confess to a belief that it was the work of some who still loved the memory of Harold, after living long under Norman sway; and if, in after years, the chieftains of Norman lineage delighted to trace their names in the roll of Battle Abbey, that proud memento,—

"Of Hastings' fatal field,
Where shiver'd was fair England's spear
And broken was her shield,"

he it rather for Englishmen to take a mournful pleasure in the spot whither were borne from that fatal field the mangled remains of England's native but unhappy king.

The two are alike mementos of national humiliation; but let us rejoice that, though the triumphal thank-offering of the Conqueror was a desolate ruin, the remnant of Harold's foundation, however reduced, is still a church, and has been in our day rescued from much of

* To be continued.

† Lecture III. at Royal Academy, February, concluded, See pp. 70, 90, 108, 127, and 149, ante.

its humiliation and been made the subject of thoughtful and artistic care.

In its architecture you will perceive some resemblance to the glorious work which we have next to consider; for, like Durham, its bays are arranged in complets. In one instance, on either side, the intermediate pier is a round column, pure and simple, with spiral flutings; in the others, the same form but with attached shafts towards the aisles, so that the two buildings which I have thus accidentally taken—the one on our pilgrimage to the other—are so much alike in internal design that one might fairly attribute them to the same architect. One pair of piers (which carried the western towers) are of the typical form, the others consist of two half columns flanking a shafted pilaster.

At Durham we have a glorious temple erected by Norman bishops, over the shrine of a British saint. The body of St. Cuthbert, after many journeyings and sojournings, had eventually become domiciled at Durham; for,—

"After many wanderings past,
He chose his lordly seat at last,
Where his cathedral, huge and vast,
Looks down upon the Wear;
There, deep in Durham's Gothic shade,
His reliques are in secret laid."

The existing cathedral was commenced in 1093, by the Norman Bishop de St. Carleph. Malcomb, king of Scotland, and his true-hearted English queen, Margaret, assisted in laying the first stones.

Sir Francis Palgrave tells us that Bishop de St. Carleph obtained the design abroad during three years' exile from his see. I know not of any church like it abroad, but this is no refutation of the statement, which seems by no means an unlikely one, and is, I think, founded on ancient authority. However this may be, a design more noble can scarcely be conceived, and I think it must be admitted that, among all the churches erected by the Normans in England, this is the noblest though far from being the first in size.

Its great beauty is internal, and arises from the carrying throughout the principle of alternating clustered piers and vast round columns, the latter having their shafts decorated with spiral, zigzag, intersecting, and vertical flutes.

This principle, in an isolated form, we find elsewhere: as in two bays at Norwich, and a similar number at Solby, and more perfectly at Waltham, and at Lindisfarne; but Durham seems to have taken the lead in carrying it throughout the church; but still more remarkable is the stupendous scale and noble proportions in which it is produced.

Though the church was begun by Carleph, he only survived its commencement for three years, and a like interval of vacancy followed his decease. During this time the monks, under their zealous prior, Turgot, carried on the work, which, on the succession of Ralph Flambard to the see, in 1099, is said to have been completed as the nave, which was carried on to completion by Flambard.

It is clear that the general design had been laid down under Carleph, as the choir, transepts, and nave agree in their leading idea; so that, whatever influence the previous building experience of Flambard obtained during his holding the deanery of St. Paul's or elsewhere may have had upon the details of his nave at Durham, we must award the honor of the scheme, as a whole, to Carleph's architect, who had supplied him the design during his exile in Normandy. Both bishops were as far as may be from the *beau ideal* of an unworlly ecclesiastic, but one would regret to attribute a work so noble to the unscrupulous and wicked agent of the oppressions of Rufus.

In the plan the church, being arranged in coupled bays, has two such complets to its choir and two to either transept (the latter much narrower than the former). The nave consists of three complets, after which comes a single bay, and then the bay which represents the western facade; or, in other words, it consists of four complets, the westernmost of which is disturbed by the substitution of a complex pier on either side to carry the towers, in the place of what would have been its round column. This seems an imperfection; for four complets, clear of the tower bay, would appear a more perfect arrangement.

The transept has only an eastern aisle. The eastern termination of the church is lost. It was apsidal, and probably with a circumscribing aisle. The dimensions of the entire building are not quite equal to some of those which we

have reviewed, being probably at first about 430 ft. in length by 200 ft. from north to south of the transept. The width from centre to centre of columns is 40 ft. The bays of nave and choir, similarly measured, vary from 23 ft. to 26 ft.

The piers are of prodigious size, the clusters and round pillars being respectively about 11 ft. and 7 ft. in diameter. The magnificent grandeur of the interior arises as well from the extreme nobleness of the design of these complets of bays, as from their continuous use throughout the church. Nothing can exceed the noble simplicity and grandeur with which they are treated, nor the happiness of their proportion.

The main arcade assumes a much more commanding altitude than in most of the churches already described, occupying, what became in after-times its received proportion, of one-half of the height of the wall, the other half being pretty equally divided between the triforium and clearstory.

The great columns are precisely like those at Winchester, excepting that the three-fold group of shafts, which there occupies the lateral portion, is precisely repeated on the front and back faces, making a perfectly uniform group in all directions. This arrangement produces great grandeur, owing to the noble group of shafts it carries up to the vaulting of the central space. The arches are boldly moulded, with rolls and hollows, and enriched with the chevron. The triforium, piers, and arches are of three orders; the lower one of dividing into two arches on a centre shaft. The clearstory is usually of three unequal arches.

The capitals are all of the cushion type; those to the great cylindrical columns being octagonal. The chevron is here freely used, and the doorways are magnificently rich. One most marked feature in this cathedral is, that its central space is everywhere vaulted.

It is known that this was a subsequent work; but, in the nave at least it appears equally clearly to have been contemplated from the first, a portion of the transverse ribs having been built with the walls. In the transept, however, the evidence seems to be the other way, though I think the question has been hardly sufficiently investigated. The sister church at Lindisfarne, built almost on the same design, seems from the views one sees of it to have been vaulted from the first, or, at least, to have been so designed.

Externally, a peculiarity occurs in the gabled roofing originally covering the aisles. This does not now exist, but the evidences of it are indisputable.

The awful grandeur of the interior of this cathedral, and its noble effect from without,—standing, as it does, on a rocky promontory nearly surrounded by the deep ravine of the river, and, as a quaint old writer says,—“So envyrond with hills, that he that hath seen the situation of this city hath seen the map of Zion, and may save himself a journey to the Holy Land,”—must ever cause it to rank among the grandest of our Mediaeval remains; and its influence seems to have been proportioned to its merits; for, as Sir Francis Palgrave tells us, it “became the normal model of ecclesiastical architecture throughout the ancient diocese of Aidan and Finan, far beyond the Tweed.”

I will only notice one more building in the present lecture, and that in the farthest south; and I make this long stride,—from the Wear to the New Forest,—for the sake of noticing the other great work of the notorious prime minister of Rufus. Mr. Ferrey, who has every right to judge of all that relates to Christchurch, has traced out certain resemblances between Christchurch and Durham. The difficulty in connecting such resemblances with the influence on each of Bishop Flambard, is (as I have before said) that Durham was commenced, and had made great progress before his accession to the see. I am, however, disposed to think that it was Durham that influenced Christchurch,—as it was not while dean, but subsequently when patron of Christchurch, that Flambard rebuilt that church; and this was contemporaneous with his holding the see of Durham.

Flambard's Church is extremely bold and simple in its parts, and well studied in its proportions. The clearstory and vaulting are of a later date; but Mr. Ferrey gives reasons for thinking the latter to have been from the first intended. The details are good and well considered; the capitals are of the cushioned form, and of that type noticed in the Tower of London and elsewhere. Some appear to have been subsequently carved with exquisite taste,

in a manner which reminds one of Greek foliage. The windows of the triforium gallery, with the oriel tabling over them, still remain, and are of excellent, though simple, design; while the beautifully arcaded stair-turret to the northern transept is one of the choicest relics of the Norman style.

The buildings I have thus imperfectly described I have selected as having been all commenced within the eleventh century. I trust I may be able during the next session to follow on the style through its subsequent and more ornate stages, and on again through the interesting period of its transition into the Pointed style; and, while doing this, I hope to illustrate my remarks by means of many of the smaller creations of the style, and by some which are other than ecclesiastical.

For the present,—after travelling over an eventful period of nearly seven centuries, and tracing out the rise of British architecture through many phases,—I must bring my course for this session to a close, apologising if I have, in the warmth of patriotism, been induced to lead you out of the beaten and accredited track of art; though at the same time convinced that the architecture we have been considering will be found on close examination to contain germs and principles which have been, and may again be made to germinate into styles of art of the highest and noblest character.

SCHOOLS OF ART.

THE BIRMINGHAM SCHOOL AND LOCAL SOCIETY OF ARTS.

THE annual meeting of the Birmingham Society of Arts and School of Design has been held in the Rooms of the Society of Artists, in New-street; the Right Hon. Lord Leigh in the chair.

Mr. C. R. Cope read the report of the committee, in which it was stated that the number of students receiving instruction had been 1,010, showing an increase of 3 since last year. The fees received amounted to 750l. 12s. 6d., showing a decrease of 25l. 17s. Of the 755 male students, 257 were school-boys (including 147 from the Grammar School). Recognising the fact that the present system of instruction required improvement, the committee had appointed a sub-committee to investigate the subject, to confer with manufacturers, and to obtain their views of what was required. They hoped that a scheme adequate to the requirements of the town would be the result. As the present accommodation was quite inefficient, and the Midland Institute classes were also cramped for room, it was most desirable that the whole of the rooms at the Institute should be given up to the Institute classes, and that large and commodious premises should be obtained for the School of Design.

Mr. Laundry read the statement of accounts, which showed that the income of the society for the year was 1,900l., and at the close there was a deficiency of 3l. 11s. 6d.

Mr. H. Cole, C.P., of the South Kensington Museum, who was present, addressed the meeting. He said he would venture to give them a piece of advice, and that was that the sooner they got better premises the better. But as to the Birmingham School of Design being in a bad way, it was a fact that on the whole they raised more money than any School of Design in the kingdom. They were at the top of the tree in respect to funds. Last year they took the greatest amount of public money by their results. In 1866 they had taken 148l., in 1867 that amount was increased to 297l. Having doubled their revenue was not a bad sign. And, again, he found that the students were more numerous than those of other schools. In Birmingham they had 2,537 children learning drawing; in fact, a larger number than in any of the other six great towns. And they had taken 146l. from the State, while the highest sum earned in any other town was 73l. He entirely agreed that South Kensington was for their benefit, and that they had the most perfect right to all the advantages from it that they possibly could get. They had been told that there was a horrid woman lived there, called Dalilah, and that no matter what Parliamentary Samson entered there, his locks were shaved by this Dalilah; and the mission particularly assigned to one gentleman was to get rid of this woman. He supposed the woman did exist; but he might remind them, in reference to South

Kensington, that if they did not have out of it what they wished to have, and what they desired to have, it was entirely their own affair. South Kensington had been perfectly willing—had been hawking out, indeed, all the time, and saying, "Do, in Heaven's name, come to Kensington and borrow what you want." How many things had they borrowed.

The exhibition of students' works has also taken place. The works exhibited were numerous in all the divisions and subdivisions prescribed by the Department of Practical Art. They occupied the walls of the Rotunda, and one of the small rooms was devoted to outline, mechanical, and architectural subjects. The drawings, which were very numerous, were chiefly from sculptured ornament, and executed in monochrome (sepia).

THE FOOD SUPPLY QUESTION.

An elaborate and valuable paper, "On the supply of animal food to Britain, and the means proposed for increasing it," has been read to the Society of Arts, by Mr. Wentworth Lascelles Scott, F.A.S.L., &c., whom many of our readers will remember as a correspondent of the *Builder*, chiefly on chemical subjects. The paper was illustrated by important statistical information, in a tabular form, collected, it would appear, with a view to the publication of "a somewhat ponderous volume, yet in embryo, on the 'Food Resources of the British Empire,'" and there was before the meeting a variety of samples of food prepared in different ways, according to patented and other processes, and amongst others a specimen of hainplitized beef, sent by Mr. Ede, of her Majesty's victualling yard, Deptford. The process by which this meat was preserved appears to be regarded by Mr. Scott as one of the most promising of all those various new processes of which one is every now and then hearing. On this subject, he said:—

"Of the chemical antiseptics, there is at the present time not one which appears to possess the necessary qualifications for preserving meat cheaply, easily, effectively, and without either injuring the nutritive qualities or imparting an unpleasant flavour; I allude to that great and wise process of Messrs. Medlock & Bailey (of which numerous illustrations are now before you) is founded—the bisulphite of calcium, or, as it is commonly rendered, the bisulphite of lime.

It is remarkable that sulphurous acid has frequently been employed alone for the preservation of meat, but has failed in all instances from its volatile nature, causing it to be dissipated too soon to be any real protection. The sulphites of sodium and potassium (combinations of sulphurous acid with soda and potash), in solution, have likewise been patented for the like purpose, but their unpleasant flavour, their action upon the meat itself, and the injury to the nutritive sulphates (or combinations of sulphuric acid with the bases) formed by their oxidation, have precluded their use in quantities calculated to induce the 'food of the people' in any great degree; moreover, their antiseptic action is not so certain as that of the preparation I would specially introduce to your notice.

The neutral sulphite of lime is only slightly soluble in water, and its antiseptic properties are by no means so marked as those of the bisulphite, which contains double the amount of sulphurous acid, is perfectly soluble, and, when oxidized, is merely converted into sulphate of lime—a substance perfectly harmless and inert.

In this preparation, I believe we have a means of converting to our use the enormous meat stores of Australia and South America, and I look forward with confidence to seeing beef and mutton imported for sale at 2s. to 3s. per pound, of a quality equal to any we can now procure.

I have prepared a number of specimens (now before you) which could be done in this department. Mr. Acres tells me that immense quantities of fish are frequently captured in the Bay of Youghal, but that, there being no adequate demand at the moment of the large surplus of the season—from 50 to 100 tons sometimes—has to be quickly destroyed, as is often the case elsewhere.

I sincerely hope that the bisulphite of lime may prevent some wholesale destruction of nutritive animal food, which, to my thinking, seems a reproach to our civilization, a stain upon our science, when we know that so many will spend hours in turning over dust-heaps—I have seen the poor wretches at the melting tanks for the purpose of extracting any tails or bones of fish to which some fleshy portions might adhere. These, an old woman in Whitechapel told me some years ago, "makes an old crust more filling, and her scanty meal certainly must have had a favour about it."

The obtaining of an indefinite supply of fish from the inexhaustible Irish coasts, we have often urged, and any process that would promote this immensely important object well merits the utmost attention. Even on our own coasts the waste of such food by hundreds of cart-loads used as manure while thousands and tens of thousands of the population of Britain and Ireland are either starving, or struggling on

the brink of starvation, from the dearthness of food, is truly awful. It really justifies what Continental say about the stupidity of the British islanders. On this subject Mr. Scott says,—

"I was speaking on the subject of deer food to a friend, not long ago, when he remarked, 'Why don't the people eat fish, if meat is so dear and so scarce? I have seen more fish thrown away, or allowed to decay for manure, within a few days, than would be required to keep Southampton in animal food for a month.' And this observation brings us to another subdivision of our subject,—the supply of fish. Here, again, the same melancholy story holds good,—The supply is but a fraction of the demand,—while, in addition we are forced to the humiliating confession that many thousands of tons of fish are being thrown away and absolutely wasted after they have been caught, in a country where 23,000 people die annually from insufficiency of food. Moreover, it is not only that fish, as a rule, is dear now, as compared with former times (when it was by no means uncommon for articles of industry to contain a clause stipulating that the apprentice was not to have salmon for dinner more than two or three times a week!), but we have the anomaly constantly occurring of a starving population in one part of the country, simultaneously with the absolute destruction of many tons of nutritious food in another.

Perhaps it is only some such process of preserving fish and other food as that, brought under special notice by Mr. Scott that is wanted to turn an abundant supply of capital to fishing and other food-providing purposes, and to bring about a wonderful change for the better in our food supplies.

MEMORIAL WORKMEN'S CLUB AND INSTITUTE, MADELEY, SALOP.

A MEETING of subscribers to the above memorial took place on February 3rd, in the Infants' School-room, Madeley, for the purpose of selecting from the collection of designs and plans sent in for competition the one most suitable for the purpose. It may be remembered that in the particulars issued to architects it was specified that the building should be of the red brick of the neighbourhood, with white stone dressings, and that it should contain the following accommodation, namely, workmen's common hall or club-room; youths' common hall or club-room; kitchen to supply refreshments; a smoking-room, a reading-room, committee and class rooms; a residence for hall-keeper; a large hall for concerts, lectures, &c.; retiring-rooms, lavatories, &c. These requirements appear to have been well kept in view by competitive architects, who, whilst adhering to them, have shown considerable care in the arrangement of the rooms and much artistic merit in the elevations which accompany the plans. The subscribers selected three designs from the collection of upwards of fifty sent in, which they agreed to submit to the decision of Mr. G. Maw, with a request that he would in the course of a fortnight make a selection and submit it to them at the next meeting.

The subscribers met on Wednesday, the 19th, to receive the report of Mr. Maw relative to the designs submitted to him. Mr. Maw's decision was in favour of the design bearing the motto "Well Considered," by Mr. John Johnson, architect, of Moorgate-street, London. The cost of the building will be about 1,400l.

MEDALS AND PREMIUMS OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At a special meeting of the members of this Institute held on Monday last, the recommendation of the council that the Royal Gold Medal of the current year, should, with her Majesty's gracious sanction, be awarded to Austen Henry Layard, D.C.L., M.P., was unanimously adopted.

The following medals and prizes were awarded:—

The Soane Medallion, to which, under certain conditions, the sum of 50l. is added by the Institute (subject of competition, "Design for a Town-hall"), to Mr. George Viall. A second prize of 20l. was given by Mr. W. Tite, M.P., president, to Mr. Henry L. Florence, whose drawings were considered next in order of excellence, and a Medal of Merit to Mr. Herbert M. Marshall.

The late Sir Francis E. Scott's prize of 10l. 10s. (subject of competition, "An Establishment for Baths and Wash-houses designed in accordance with modern requirements, and in the style of the thirteenth or fourteenth century") to Mr. Ernest Lee.

The Institute Silver Medal, with 5l. 5s. (subject of competition—"The restoration of the choir of Old St. Paul's Cathedral," founded on

the plates, illustrating Dugdale's work), first prize to Mr. Edmund B. Ferrey. Medal of merit to Mr. N. Renault Mangin.

In this competition Mr. E. B. Ferrey, complying with the conditions prescribed in last year's list of prizes, sent in drawings illustrating the restoration of the entire cathedral.

The Institute Silver Medal, with 5l. 5s. (subject of competition—"Measured drawings of any building erected before the year 1700," and hitherto unpublished), to Mr. William Henman. Medal of merit to Mr. Charles H. Heathcote.

In this competition the drawing of Mr. Morton M. Glover, were "honourably mentioned."

The Institute Medal for the best essay "On the origin and progress of window tracery," or other suitable subject, was awarded to Mr. W. Scott Champion.

The designs, drawings, &c., are now on view, from ten to five daily, at the Institute, where they may be inspected by any one taking a card of introduction from a member.

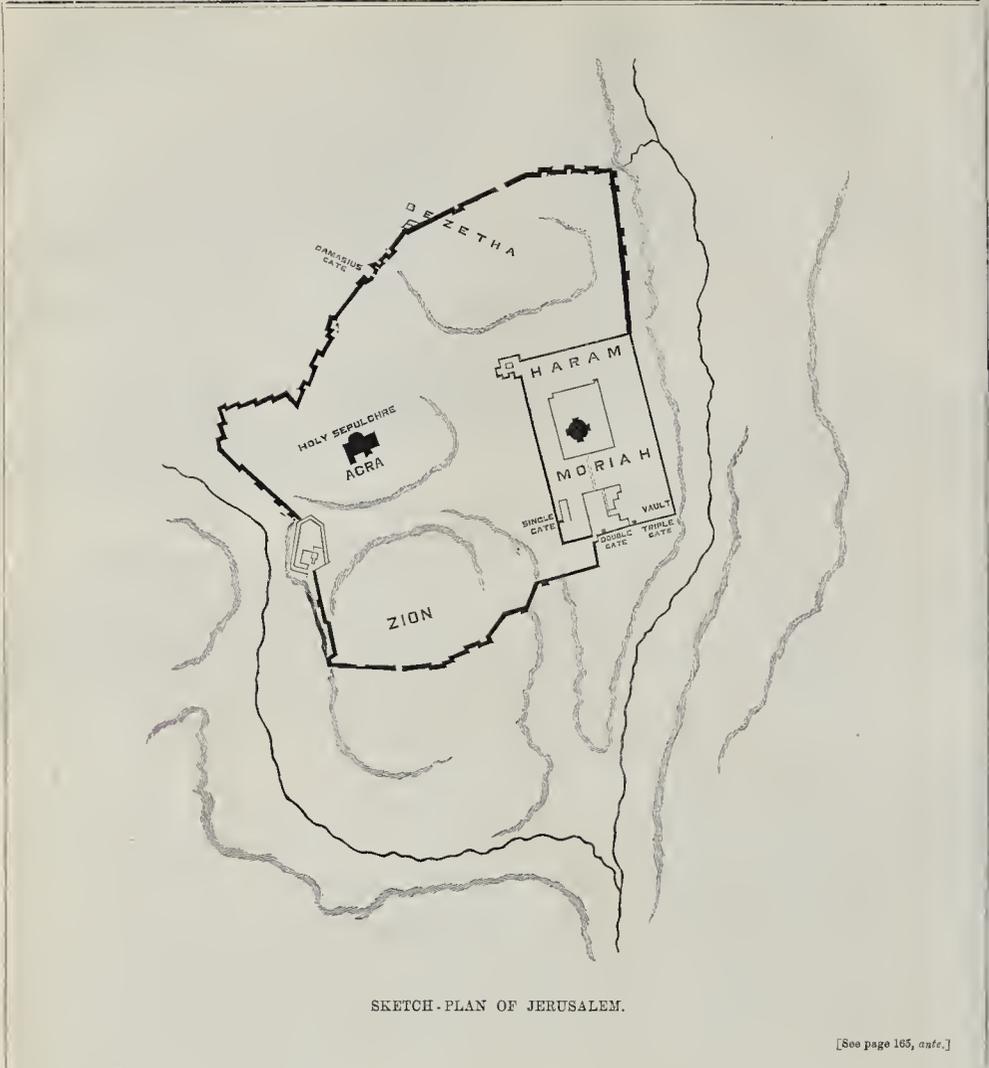
The following is a summary of the number of essays, designs, and drawings submitted in competition for the medals and prizes offered:—For the Institute medal (for essays), six essays; Soane medallion, five designs; Sir F. Scott's prize, three designs; Institute medal, with five guineas (restoration of the choir of Old St. Paul's), two sets of drawings; Institute medal, with five guineas (measured drawings), three sets of drawings; and Student's prize in books, one design.

THE LABOURERS' DWELLINGS FOR THE LIVERPOOL CORPORATION.

At the last meeting of the Health Committee, the tender of Mr. Hugh Yates, for the erection of a block of labourers' dwellings on the land purchased by the corporation, between Sylvester and Ashfield streets, at a cost of 12,321l., was accepted, being the lowest sent in. Mr. Newlands, the borough engineer, said the amount was below both his own estimate and that of the designer of the plans.

VITAL STATISTICS OF LONDON FOR 1867.

A SUMMARY of the weekly returns for the year 1867 has been issued in a printed form. Out of a population of 3,082,372 (containing 207,134 more females than males) the number of deaths was 70,588, of whom 36,276 were males, and only 34,312 females. The number of births was 112,264, of whom 57,502 were males and 54,862 females. If the rising and falling rate of mortality be taken as the criterion of health, the year 1867 was the healthiest that London has enjoyed since 1860. Through the four years that followed 1860 the annual mortality uninterruptedly rose, and reached 2,653 per cent. in 1864. It then began to decline, and probably the decrease would have continued in 1866 if cholera had not attacked London in that year. In 1867 it was 2,298 against an average of 2,436. In Birmingham the death-rate of 1867 was 2,427, in Sheffield 2,467, in Liverpool 2,957, in Newcastle-on-Tyne 3,079, in Manchester 3,140. In Dublin it was 2,706, in Edinburgh nearly the same, in Glasgow 2,854. Zymotic diseases, in which class the chief heads are typhus, small-pox, measles, scarlatina, whooping-cough, and diarrhoea, were fatal in 15,027 cases, which is more than a fifth part of the whole. This aggregate result was, however, considerably less than it had been in any previous year since 1860: and the only disease in this class which displayed increased activity was small-pox, the deaths from which were 1,332. Professor Frankland, in an appended report on Metropolitan water, says—"The New River Company stands alone in the perfection of its filtering apparatus. The seven companies who occasionally or habitually send out turbid water, subject the inhabitants of more than 300,000 houses to the unnecessary expense of private filtration. The distribution of water in the metropolis still continues, with but slight exceptions, upon the intermittent system, which has been abolished in almost every other town of importance in the United Kingdom. In addition to the well-known evils attending the storage of water in butts and cisterns under this system, there is the danger of the leakage of sewage into the pipes whilst the pressure is withdrawn. An instructive instance of this occurred in the West Middlesex Company's district in June last."



SKETCH-PLAN OF JERUSALEM.

[See page 165, ante.]

THE DUDLEY FOUNTAIN.

The people of Dudley (Worcestershire) are indebted to the Earl of Dudley for the fountain represented by our engraving. It is the work of Mr. James Forsyth, sculptor, who was selected in a limited competition, and it has cost about 3,000l. The fountain stands in the market-place, and consists of a quadrilateral, pierced by arches in one direction, and in the other supported by semicircular projections, each bearing a dolphin on the outside. Immediately above these latter are two large fronts of sea-horses, the whole surmounted by a pyramidal roof, culminating in an allegorical group, representing Industry in General and Industry in Particular. The former figure is a girl, with a spinning apparatus, and the latter is an engineer. The vaulted part is perforated by two windows, glazed with coloured glass, thus providing light to the central jet which starts from a series of three marble tazzas, one above another. In the two sides corresponding to the exterior semicircular projections are niches, occupied by figures representing an "agriculturist" and a "miner," in allusion to the characteristics of the county. The corners of the quadrilateral, forming piers, are ornamented with festoons of fruits; while the

keystones are decorated, one with the head of a river-god and the other with that of a water-nymph. The spandrels of the arches are enriched by genii, hearing scrolls, with mottoes. The legend, sub-divided into four parts, is one of the songs of the Children of Israel, under a providential supply of water as they were passing to the Promised Land. In our version (Numbers. xxi. 17) the whole song runs thus:—

"Spring up, O well;
Sing ye unto it.
The princes have digged the well,
The nobles of the people have digged it."

The words are applied in the first instance to the physical and material emblem; whilst the special historical circumstances of the living interest of the song at Beër find their correspondence in the work we are describing. The maidens of Israel, as they drew the water, claimed gratefully the bounties of God's providence, "Spring up, O well," and encouraged each other in glad recognitions of His goodness as manifested therein, "Sing ye unto it;" whilst the strongest feeling of sympathy and co-operation between the rulers and the people is conveyed by the way in which the latter made the labour of the former the burden of their song:

"The princes have digged the well: the nobles of the people have digged it." On the front of the fountain is the following inscription:—"Hunc Fontem in Usum Populi, D.D., Comes de Dudley, A.D. MDCCCLXVII." The base of the fountain is of red and gray granite, forming an agreeable contrast. There are two streams of water supplied to ladles from lions' heads; two large basins, for the use of cattle; and four smaller ones, near the ground, for the accommodation of dogs and other small animals. The cattle-troughs are supplied from the mouths of the dolphins previously mentioned. The height of the fountain is 28 ft.

A circular pavement in red and gray granite and black limestone has been recently added. This is arranged in geometrical patterns, in concentric circles. The outer circle is of gray Aberdeen granite, and the inner one red. These are connected by gray granite pitchers, which radiate in patterns like the points of a star, the ground being the black local limestones, which forms an appropriate ground-work to the whole erection.

Mr. Forsyth acknowledges his obligations to Mr. R. Monti, and to his own foreman, Mr. Dyke, for assistance in amplifying the design and carrying it into execution.



THE DUDLEY FOUNTAIN.—MR. JAMES FORSYTH, SCULPTOR.

LIGHT AND COLOUR.

The three phases of the theory of light and colour,—the physical, the physiological, and the aesthetic,—are too frequently separated as distinct specialities, and studied independently of each other. The aesthetic phase is of the three, perhaps, the most studied, cut off and isolated from its supports. This separation, either partial or complete, is, I venture to think, inimical to a comprehensive view of the entire theory of light and colour. I have therefore endeavoured to give symmetry to the materials I have gathered, in order that they may be grasped as a whole.

Though in some degree a student of science, I do not believe science has the power to be the all in all, to supplant feeling in art. The subtlety of taste, as of life, appears to elude close analysis. Its true importance to art is as the compass to the mariner when the heavens are clouded. But we might say the same of science in reference to many other professions.

A river has been accepted as an emblem of life; its continuity, smooth-flowingness, rolling roughness, and loud murmuring fall have analogues in human nature; but mention hydrodynamics, and unreasoning fancy receives a shock: still the thinker knows that there is not a ripple, eddy, nor wave, but moves in conformity with a few simple principles, and although science may be unable to follow and formulate all the complications of action and reaction, the currents and eddies of a cloud of dust, or a stream of water, it can point the way, and a correct compass is invaluable to the steadfast helmsman. This, I take it, is what true theory is to every earnest, practical man, he be artist or craftsman.

One very noticeable feature in the advance of science is, that it traces parallels and analogies between phenomena long believed to be divided and distinct, is the growing perception of their dependence on some common phenomenon of a more general and elementary nature than those which form the subject of either separately; thus the analogy subsisting between sound and light has been traced into a closeness of agreement, which can hardly leave any reasonable doubt of their ultimate coincidence in one common phenomenon, the vibratory motion of an elastic medium.

[The writer here gives a short history of the two great theories,—the Corpuscular and Undulatory,—which so long divided the scientific world and traced the growing conviction in the correspondence of the physical modes of light and sound; but this we need not print.]

More recently a very sweeping generalization has been suggested by Professor Grove, in the hypothesis known as the Correlation of the Physical Forces. It would ascribe all phenomena to a monophysical origin,—that is to say, it supposes light, heat, sound, electricity, &c., to be merely modifications of an active *substant*. That everything *objectively* varies only in configuration and in mode and degree of motion, but produces *phenomenally* or *subjectively* all that infinite variety in things which is commonly, but erroneously, believed to exist internally, and independently of sense; that we are sentient organisms amidst the great ocean of active matter, which now surging and vibrating against the optic nerve, produces light and colour; against the auditory nerve, and it breaks in sound or musical notes; against the olfactory and gustatory nerves, and its spray is scent and taste; or, heating against the broader quays of the nerves of common sensation, excites the sense of touch. That, independently of sentient beings, there is nothing but a colourless, silent, fluctuating universe. It is somewhat difficult to conceive this condition of material nature without some previous habit of abstract reasoning; nevertheless, it is one which both the Newtonian and Huyghenian theories support; for, if you recollect, Newton ascribes the production of different colours to the different velocities of the atoms emanating from the sun or other luminous source. The colours, mark, are not inherent in the atoms; for, if they were, colour would be independent of differences of velocity and refraction. In the undulatory theory, too, which makes the propagation of light analogous to that of sound, and which is the theory now generally accepted, light and colour are supposed to be produced in the eye by undulations of different velocities and magnitudes, just as sound is produced in the ear by the different velocities of the vibrations communicated by the

air. Muller says,—“That which, through the medium of our senses, is actually perceived by the sensorium, is indeed merely a property or change of condition of our nerves; but the imagination and reason are ready to interpret the modifications in the state of the nerves, produced by external influences as properties of the external bodies themselves. This mode of regarding sensations has become so habitual in the case of the senses, which are more rarely affected by internal causes, that it is only on reflection that we perceive it to be erroneous.” This is a most important consideration for all those who enter upon scientific or aesthetic studies; and no safe progress can be made in either till this position is thoroughly comprehended. But to return to what I was more immediately endeavouring to point out, viz., that in all three of the theories, recently glanced at, the supposed physical cause of light and colour is simply moving matter. This is the first great deduction we have to make from the purely physical inquiries concerning the nature of light and colour.

We now pass on to consider the facts on the physiological side of the theory of light. And if the physical hypothesis be correct, we might surmise, *à priori*, that the same simple physical cause which produces all those diverse effects on the retina from without might also cause similar effects from within; and such we find to be the case,—one of the first principles of physiology being that *external agencies can give rise to no kind of sensation which cannot also be produced by internal causes, exciting changes in the condition of our nerves*. The vibrations of a fluid existing in all space, when of a certain rapidity, produce in the retina the sensation of a certain colour; when of a different degree of rapidity, that of another colour, these colours or sensations being modes of reaction of the retina. The simultaneous impressions of undulations of different rapidity upon the same points of the retina excites the sensation of white light. These same sensations of colours and light may, however, be produced as we have just stated, without those external undulations.

One uniform internal cause acting on all the nerves of the senses in the same manner, is the accumulation of blood in the capillary vessels of the nerve, as in congestion and inflammation. This uniform cause excites in the retina, while the eyes are closed, the sensation of light and luminous flashes; in the auditory nerve humming and ringing sounds. The mechanical influence of a blow, concussion, or pressure also excites in the eye the sensation of light and colours. It is well known that by exerting pressure upon the eye when the lids are closed, we can give rise to the appearance of a luminous circle; by more gentle pressure the appearance of colours may be produced, and one colour may be made to change to another. A mechanical influence excites also peculiar sensations of the auditory nerve. It has become a common saying, “To give a person what will make his ears ring,” or “what will make his eyes flash fire,” or “what will make him feel,” so that the same cause, a blow, produces in the nerves of hearing, sight, and feeling the different sensations proper to these senses. Here, then, is another series of facts pointing to Force as the cause of light; and not only this, but to the correlation of light and sound, by it being possible to excite the senses of sight and bearing by the same means. Voltaic and frictional electricity, and chemical agents, such as narcotics, digitalis, &c., produce the different sensations proper to the two senses. From these phenomena we naturally turn to the consideration of the “ocular spectra,” consequent on impressions on the retina. The duration of the sensations of the retina is much longer than that of the impressions which produce them. According to Plateau, the sensation persists 0.32 to 0.35 of a second after the impression has ceased; and the duration of the “after sensation” or “spectrum” is greater in a direct ratio with the duration of the impression which caused it. Hence the image of a bright object, as of the panes of the window through which the light is shining, may be perceived in the retina for a considerable period, if we have previously kept our eyes fixed on the object for some time. The duration of these images in the closed eyes may also be very much prolonged by passing the hand up and down before them, so as to permit the light to fall upon them only at intervals. The after duration of sensations consequent on impressions of the retina explains the appearance of a circle of light produced by moving a luminous body in a

circle before the eyes, as well as that of the confusion of the images of the spokes of a rapidly revolving wheel, or of the prismatic colours painted upon a spinning top.

The ocular spectra may be divided into three classes. They are either colourless spectra left by colourless images, or coloured spectra after colourless images, or coloured spectra after coloured images.

Colourless Spectra left by colourless Images of real Objects.—The spectra left by the images of white or luminous objects are ordinarily white or luminous; those left by dark objects are dark. Thus, the spectrum of a luminous body rapidly moved before the eyes is also luminous. If the eye, after being subjected to a vivid impression, be closed and turned away from the light, or, what is better, quite covered, white or luminous spectra of the objects which were white or luminous are seen, and dark or black spectra of those which were dark or black. Thus, if while sitting in our room we look for some time at the light window with its dark framework, and then suddenly close the eyes, turn them from the window and cover them with the hand, so that no light, not even that which would pass through the eyelids, can reach the eye, bright spectra of the panes of the window, and a dark spectrum of the framework, are seen.

The relation of the light and dark parts in the images may, however, under certain circumstances, be reversed in the spectrum; what was bright may be dark, what was dark may appear light. This occurs whenever the eye, which is the seat of the spectrum of a luminous object is not closed, but fixed on another bright or white surface, as a white wall or a sheet of white paper. Hence the spectrum of the sun, which, while light is excluded from the eye, is luminous, appears black or grey when the eye is directed upon a white surface. In the same way the spectra of the window-panes appear dark, those of the dark framework light, if we look with closed eyes towards the light of the window, so that the light passing through the eyelids gently stimulates the retina. These phenomena are easily explained. The part of the retina which has received the luminous image remains for a certain period afterwards in an excited state, while that which has received a dark image is in an unexcited, and therefore much more excitable condition. If the eye in this condition be directed towards a white surface, the luminous rays from this surface produce upon the excited part of the retina a much more feeble impression than upon the other parts which are as yet unexcited, and therefore more susceptible of their action. Hence the parts of the retina upon which the dark portions of the previous image had fallen receive a much more intense impression from the white surface than those upon which the luminous portions of the image were directed; and hence the inversion of the light and dark parts of the image in the spectrum thus seen.

Similar phenomena are presented by the whole field of vision when a sudden change is made from light to darkness, and *vice versa*. On coming from darkness into a bright light, every object appears excessively bright, on account of the great susceptibility of the retina after its previous rest; and, on passing from light into moderate darkness, we at first see nothing, until the retina, exhausted by previous excitement, shall have recovered sufficient excitability to be acted on by the slight degree of light to which it is now submitted. A light object always appears brighter when viewed after a dark object, or even viewed side by side with it. Similar phenomena are observed with relation to the other senses. Cold is felt most intensely when it follows the impressions of heat or warmth; and, after exposure to a great heat, a slightly different temperature, which under ordinary circumstances would feel warm, will produce the sensation of cold. The distinctions between light and darkness, heat and cold, are therefore merely relative.

Ocular spectra seem to change their place with relation to our body with every movement of the eyes, and, for an evident reason, are still seen, in whatever direction we may turn the retina. If we look for a long time at a black square upon a white ground, and then divert our eyes slightly, so as not entirely to leave the square, but rather to look more directly at its border, a portion of the spectrum which it has produced, will appear free upon the white ground, as a bright margin to one part of the dark image; while, to a certain extent, the true image and the spectrum will lie upon the same part of the retina, corre-

ing each other; another portion of the true image of the object being left free. In such a case the free portion of the ocular spectrum appears very bright; the free portion of the true image very dark, while the parts of the image and the spectrum which are coincident appear of a dark grey colour, as if the two conditions of black and light were there balancing each other. The explanation of the phenomenon is this,—the sensation of white in the part of the retina which was before the seat of the image of the black object is more intense, because that part of the retina was previously unexcited; hence the bright margin. The part of the image where the true image and spectrum are coincident remains unchanged; while the portion of the true image which is left free appears blacker than before, because it now falls upon a part of the retina which had previously received rays from the white ground, and has consequently lost part of its excitability. If the impression of a luminous object on the retina be very intense, as when produced by the light of the sun's image, the spectrum consequent on it is not merely light when seen upon a dark ground, or dark when seen upon a white surface, but assumes different colours in succession, which are expressions of the states which the retina passes through in its transition from the condition of dazzling to its natural state. The dark spectrum of the sun, when the eye is fixed upon a white surface, assumes different colours, in passing from the dark to the light, in the following order:—Black, blue, green, yellow, white. The appearance of these colours commences at the borders of the spectrum. When the spectrum has become white, it is no longer distinguishable from the white surface on which it is viewed; that is, the white surface now produces the same sensation in this part of the retina as in all the other parts which had not been submitted to the dazzling action of the sun. If the eye, after viewing the sun, be exposed to perfect darkness, that is, if light be entirely excluded from it, the colours of the spectrum will succeed each other in the inverse order, namely, from white through the lightest, and then the darker colours, to black; thus white, yellow, orange, red, violet, blue, and black. When the spectrum has become black, it can no longer be distinguished from the surrounding darkness; the part of the retina which was its seat having regained the same unexcited condition as the other parts which were not acted upon by the image of the sun.

These phenomena, which cannot be explained by external conditions acting on the eye, are another proof that colours have their immediate cause in the condition of the retina itself.

The ocular spectra, which remain after the impression of coloured objects upon the retina, are always coloured; and their colour is not that of the object, or of the image produced directly by the object, but the opposite or complementary colour. The spectrum of a red object is, therefore, green; that of a green object, red, &c. If we fix our eye for any length of time upon a bright red spot upon a white ground, and then suddenly turn it from the red spot and let it rest upon the white surface, we see an ocular spectrum of the red spot of the same size and form, but of a green colour. If, on the contrary, we turn our eye only slightly to the side, so as to fix it on the border of the red spot, the spectrum is seen partly covering the object. A portion of the true image of the object appears free, and a portion also of the spectrum distinct from the true image; but this portion of the spectrum is green. At the part where the true image of the object still falls upon the same part of the retina,—that is the seat of the affection producing the phenomenon of the spectrum,—the colour of the object is seen, but it is faint and grey, whilst at that part of the true image of the object which now lies upon a part of the retina previously directed to the white surface, and which is therefore more susceptible to the normal sensation of the red. The physiological explanation of the phenomenon is the following. The perception of any one of the three simple colours consists merely in the retina being in one of those conditions to which it has a tendency when in a state of excitement. If this condition be artificially excited in an intense degree, the retina acquires a tendency to an opposite state, or that which is complementary, and which is consequently perceived as the ocular spectrum.

Physiological Colours produced by Contrast.—A very small, dull, grey strip of paper, lying upon an extensive surface of any bright colour, does not appear grey, but has a faint tint of the

colour which is the contrast of that of the surrounding surface. Thus, for example, a strip of grey upon a green field often appears to have a tint of red, and when upon a red surface a greenish tint, and so on. For the production of this phenomenon it is necessary that the colour of the extended surface should be very bright, containing abundant rays of white light. Every coloured paper is not adapted for it. It is shown most distinctly by holding a coloured glass covered with thin paper before a lamp, and covering any spot upon the glass and paper, with a strip of grey tint. The strip of grey is then readily seen to have the colour the contrast of that of the glass. The new colour is always that which, combined with the colour of the surrounding surface, would yield the sum of the three simple prismatic colours, red, yellow, and blue. The colour excited by the impression of yellow is, for example, violet, which contains blue and red. The colour excited thus, as a contrast to the exciting colour, being wholly independent of any rays of the corresponding colour acting from without upon the retina, must arise as an opposite or antagonistic condition of that membrane; and the opposite conditions of which the retina thus becomes the subject, would seem to balance each other by their reciprocal reaction. We have also in these phenomena a fresh proof that colours, physiologically considered, are merely certain states of the retina, which are capable of reciprocally exciting each other in different parts of that membrane. The coloured shadows sometimes observed are phenomena belonging to the same category. But all coloured shadows are not of this nature: some are owing solely to the shadow being illuminated by a coloured light. For if a coloured light fall upon a shadow produced by colourless light, or by light of a different colour, the shadow of course appears coloured. In the faint light of evening, the shadows of bodies appear by candle-light blue or yellow, according as the bluish light of the sky or the yellow light of the candle falls upon them. The two kinds of light may produce two shadows of different colours from one body. Of two shadows thus produced by a small rod upon a sheet of white paper, the one which cannot receive any of the bluish light of the sky, but receives light from the candle, will appear yellow; while the other shadow which receives no light from the candle, but is illuminated by the bluish light of the sky, appears blue. All other parts of the paper present no predominant colour, since they receive rays from both sources of light. The purely physical nature of these coloured shadows is obvious.

But there are coloured shadows, as we have observed, dependent on a physiological cause. If light transmitted through coloured glass, or reflected from a coloured body, fall upon a white surface, and a shadow be produced on this surface, which now appears coloured, by means of a narrow body raised upon it, this shadow, when illuminated by the white light of day, will appear of the complementary colour to the ground. The experiment succeeds also if illuminated by the light of a candle. The illumination of the shadow is a necessary condition for the production of the phenomenon. For if coloured light be thrown into a cavity otherwise perfectly dark, a shadow there produced does not appear coloured. The coloured shadows are usually ascribed to the physiological influence of contrast; the complementary colour presented by the shadows being regarded as the effect of internal causes acting upon that part of the retina, and not of the impression of coloured rays from without. A strong corroboration of this view is the fact observed by Count Rumford, that the colour of the shadow does not appear different from that of an ordinary colourless shadow, when it is viewed through a tube in such a manner that the coloured ground is not seen at the same time. Great probability is also conferred on this explanation of the phenomena by their analogy with the facts previously spoken of, viz., those in which a small grey strip upon the surface of a bright colour appears of the opposite complementary colour. In the instance of the coloured shadows, the case is complicated with many deceptive circumstances; but in that of the experiment just alluded to the phenomenon is reduced to its simplest conditions.

This brings us to the physiological basis of the harmony of colours. The phenomena we have just described clearly prove that the action of one colour upon the retina disturbs the equilibrium of its condition, exciting in it one pre-

dominant state, and that a tendency exists in it to the development of the opposite state complementary of the one thus excited: we cannot, therefore, be surprised at finding that the combinations of colours producing a pleasing and salutary impression both upon the eye and upon the mind are those which contain the colours thus opposed to, or complementary of, each other. All complementary colours have an agreeable effect, and all bright colours which are not complementary a disagreeable one, if they predominate. In this sense the complementary colours may also be styled harmonic; and those which are not complementary of each other, disharmonic. A combination of complementary colours is an harmonic combination; all other combinations of colours are disharmonic in proportion as they belong to one simple prismatic colour, and are at the same time very bright. A predominant flaming red is as unpleasant as a predominant glaring yellow, or a uniform predominant blue. Hence we are accustomed to mingle white or grey with these colours, when it is requisite to employ them alone over large surfaces, so as to soften and render them more supportable. Combinations of two of the simple colours,—the third, which would render them complementary, being deficient,—are the most offensive to the eye; for instance, combinations of yellow and red, blue and red, or yellow and blue. In these combinations there is complete disharmony; while, in the association of two colours, of which one forms the transition to the other, there is neither harmony nor disharmony. Such colours are indifferent to each other, as yellow to green, red to orange, or violet to blue. The disharmony between two colours may, however, be removed by the interposition of a third colour which is the harmonic of one of them, and is indifferent with relation to the other. We have examples of this in such combinations as red, green, and yellow; yellow, violet, and blue; blue, orange, and red; or red, green, and blue, &c.

I have only briefly adverted to the aesthetic branch of the theory, to draw your attention to the central principle of "balance" as the basis of the harmony of colour,—indeed, of all harmony; and to notice that the mode of neutralizing discord in music is another fact which links the two theories together, as it is similar to that by which two disharmonic colours are brought together by the intervention of a third, with one of which it harmonizes, while towards the other it is indifferent.

In the facts which I have collected and grouped together, it will be seen that both light and sound can be respectively produced in the eye and the ear by the same mechanical means, by a blow, by pressure, by the arterial pulse, by electricity, by narcotics; that the remarkable phenomenon of *interference*, by which two rays either of light or sound may be made to neutralise or extinguish each other, is common to both; and that the theory of light which has the widest acceptance is that which makes its propagation analogous to that of sound. The wonderful parallelism between the two phenomena "can hardly leave," as Sir John Herschel remarks, "any reasonable doubt of their ultimate coincidence in one common phenomenon, the vibratory movement of an elastic medium. Every colour, therefore, as every note, will be dependent upon the relativity of the vibrations which produce it, or of the states of the senses. This is very notably confirmed by the experiments in which the same grey spot successively assumes every hue, and by the phenomena of the complementary spectra and shadows. But the very principle of compensation which arrests our attention in studying the ocular spectra connects them with the larger physical phenomena of the solar system in which the law of compensation would appear to be eternally fixed. The law may be thus stated: every departure from a mean state on one side, must be compensated by an equal but opposite divergence on the other. And this would make good colour and good music to consist, as we feel they do, either in preserving an even temperament or in restoring a disturbed balance by means of compensation. But whether we consider colour in its physical aspect as the relativity of vibrations on or in the retina, as produced by mechanical pressure, or in the phenomena of compensation, it must be in the abstract just as music is, a science of relative proportion. And all proportional relation is comprehended in the movement of that instrument which I have called The Balance of Nature.

If the external cause of colour be merely

mechanical vibrations, how inconsistent it is with the received theory to dispute whether there be three or more primitive colours, and to talk about a substance absorbing certain colours whilst it reflects another, or of different coloured rays. For, according to the received theory, or any theory which has been entertained, there are no objective colours to absorb, but only various mechanical undulations or impulses. It is, therefore, more reasonable to suppose that substances respond the illuminating vibration with which their structure is in unison. And if an illuminating ray be constituted of mechanical undulations, it is also reasonable to suppose that it might be made to produce every colour on the retina by the raising or lowering of the velocities and magnitudes of its vibrations, and to establish the monogenesis of colour from force. I believe it will ultimately be discovered that colours are produced by modifications of the normal or mean undulation which produces the sensation of white light. That the illuminating vibrations are not conveyed by a continuous ether, but by transferred undulations, just as the pulses of a musical string are through various materials, and that transparency consists in their true and direct transference by certain substances.

There are still remaining, however, a few words to our summing up. Science very often speaks too confidently as if it had the power to penetrate causation, physical and physiological, but the truth is, in this respect, our knowledge is but inference at best. Science, all the time she fancies herself occupied with the study of the external is only contemplating the world in sensation, in its appearance to human nature, and the fundamental form of sensation is quantity. The science of proportion, therefore, is that which underlies all others; and when all our knowledge shall have assumed the form of correct quantitative statement, it will have attained its highest degree of certitude.

W. CAVE THOMAS.

PARIS.

The Palais de l'Industrie, at the Champs Elysees, has been conceded, for a term of five years, to the French Hippic Society. M. Dutron, architect of the building, is arranging the ground floor so that in one stable, or in two at most, the five hundred and odd horses can be lodged, to which the above Society purpose distributing training prizes to the value of about 2,400l. The contest is to take place from the 1st to the 15th of April.

At the New Opera-house the triangular building in which the stage will be installed has been roofed in. From the floor of the cellars to the roof of this portion of the Opera-house the height is 328 ft. Powerful machinery is to be used for working the scenery. The exterior sculptures of the ground floor are being terminated.

The immense ecclesiastical printing establishment of the Abbé Migne, at the Chaussée du Maine, Paris, has just been destroyed by fire. A portion of his library and furniture, also the paintings of the church, were preserved; but all the other valuable documents and MSS. are destroyed. The loss is irreparable. He had revived the works of the ancient churchmen in more than 500 volumes in 4to., and the fruits of his life's labour disappeared in a few hours. The establishment was the largest of its kind in the world; it was insured in thirty-five offices, but as they insured only for half the value the loss is immense. Upwards of 300 persons are thrown out of work, most of whom have families. The loss of the materials destroyed is over 120,000l. Several thousand volumes have also perished.

The mairie of the fourth arrondissement, that of the "Hôtel de Ville," is now finished, and is one of the new municipal establishments of Paris worthy of attention. It is from the designs of M. Bailly, architect of the Tribunal of Commerce, and covers an area of 24,748 square feet. Its principal entrance is on the Place Saint-Jean, and it is limited on its other façades by the Rues de Rivoli, Vieille-du-Temple, and Saint-Antoine. Access is given by three large bays; the centre one leads to a fine staircase, of triple revolution, preceded by a spacious vestibule. By the other two bays we enter into a court surrounded by closed galleries, serving as waiting-rooms, &c. On the *entresol* are placed the public library, engineers' offices, &c. Above are established the principal civil services, secretary's offices, &c., and the marriage saloon, which is well ornamented, and furnished

with a magnificent marble chimney. There is also another saloon, well decorated, for various purposes, distributions of prizes, exhibitions, concerts, charity halls, &c. It is 124 ft. 6 in. in long, by 33 ft. wide, and 24 ft. 6 in. high; it is lighted by seven large windows, with stone mullions and transoms, like those of the Middle Ages. Entrance is given to this saloon by five great doorways, the woodwork of which is of stained oak.

In the line of the Pont de Solferino, the clearance for the new street leading to the Rue de Grenelle St. Germain progresses rapidly. It will throw open the building called the Palace of the Legion of Honour.

At the ancient Louvre, under the gallery of Apollo, is the rich restoration of the ancient paintings of the apartments of Anne of Austria, which were given by the first Empire to the Museum of Antiquities. It is on the southern side of this portion of the Louvre that we see the balcony from which Charles IX., on the 24th August, 1572, fired at the unfortunate Huguenots who were swimming across the Seine, to escape the massacre of St. Bartholomew. They are occupied at present in arranging in these magnificent saloons, now restored to their primitive state, the busts and antique bas-reliefs they contained, adding to them those from the splendid collection of Compaña which the French Government purchased seven or eight years ago. When completely arranged, this museum will be unequalled in the world.

The iron framework of the roof of the new wing of the Tuileries is being put in place, and will be soon finished. Also the Emperor's entrance-gate has been finished and decorated with two life-sized lions of bronze placed upon the two pedestals which precede it. They are by the sculptor M. Barry.

We have already mentioned that the Hotel Carnavalet, in the Rue Culture-Sainte-Catherine is being restored and enlarged, so as to form a municipal museum containing an archaeological collection representing the six great eras of the town of Paris:—1. The primitive and obscure epoch of ancient Lutecia; 2. The Gallic and Gallo-Roman period; 3. Moyen Age; 4. The Renaissance; 5. The seventeenth and eighteenth centuries; 6. The present epoch. Each period will be represented by plans, instruments, tools, utensils, objects of art, design and geology, maps, human and monumental *debris*, fragments of architecture, &c., collected from excavations for foundations, past, present, and future. The present epoch will be represented also by specimens, copies, sketches, facsimiles of all that the monuments of Paris, churches, edifices, &c., contain most remarkable in artistic work, paintings, medals, decorative paintings, sculptures, statues, and curious works of all sorts.

THE PARIS EXHIBITION BUILDING.

On the 13th ult., the Exhibition Palace of the Champ de Mars was "knocked down," by adjudication, to M. Menot, since whose offer it was the highest. Viewed from the exterior, the building appears intact, but the interior has been completely cleared of its contents, and the galleries are attacked on all sides, so that they present the appearance of a scathed forest; the central garden is bare, but the central pavilion, in which the weights, measures, and coins were displayed, is still upright. The great machine gallery remains untouched, as far as its framework and roof are concerned, but the floor has been levelled, and all machinery has been removed.

Outside the building, the Champ de Mars presents a singular aspect; the red iron light-house is nearly taken down; each plate is carefully packed and placed upon a lighter, for its ultimate destination, Les Roches Douvres. Austria has removed all her own from the Park; Spain is at work dismantling the great pavilion; Switzerland, Sweden, and Russia have not as yet attacked their picturesque pavilions and chalets. Towards the north-west, or Asiatic part of the grounds, we observe many Turkish and Egyptian buildings yet standing, but the details of the latter, sphinxes, &c., are being demolished, and the pavilion of the Vicroy is attacked. The Chinese and Tunisian palaces, at this extremity of the park, seem to be the only buildings hitherto respected. The chimneys for the engine boilers are all down, and the reserved garden presents a piteous aspect.

The sale of all the materials forming the

ensemble of the Exhibition in the Palais and park was effected at the "Cercle International," on the grounds, and several days in the week were devoted by the Commission for this work. All this enormous mass of material passes away in large lots. In a very short time hence every lot will be sold, given up, and taken away, so that no trace will remain of the great Universal Exhibition of 1867, unless some spirited capitalists create a reminiscent building, like our Crystal Palace at Sydenham, of 1851, and that of Muswell-hill, of 1862.

TRADE UNION PERSECUTION.

SIR,—Can you give me the addresses of any respectable builders in or near London, who employ non-union men? I want to get work for a young man, a bricksetter, who has been positively persecuted by union men. He is remarkably steady, sober, honest, and a good workman. I had him employed on a parsonage which I am erecting, and all went on comfortably till one or two unionists, and some of them the worst hands on the work, threatened a strike, and the contractor was compelled to sacrifice the young man, whom he had from feelings of personal friendship and esteem engaged, and with whose work he expressed himself perfectly satisfied. I got him work in Lancashire, but the evil spirits followed him there also, and all because he did not begin to work until after he was fourteen years of age, while the contractor, who was employing him, had himself been a silk weaver, and did not learn his trade until after he was twenty-one.

In trade unions I see no objection so long as they are carried on with honesty and fair dealing, but I consider this an act of heartless, selfish robbery, to say to a young man, you shall not earn your bread by your trade, although you are a better hand, if may be, than many who can show their card. These brutes, for I can call them nothing else, are invariably the most ignorant, drunken muffs in the trade. By your helping me in this matter, you will do an act of charity.

A COUNTRY CLERGYMAN.

. One of our readers may, perhaps, need a bricklayer. We have the writer's address.

THE LEEDS WATERWORKS.

The first portion of the extensive corporation scheme by which the waters of the Wharfe are to be substituted by those of one of its tributaries,—the Washburn,—in the supply of Leeds, has been commenced, and there is a prospect, should the works proceed favorably, of the Wharfe being abandoned during the ensuing autumn, though several years will elapse ere the scheme in its entirety, with its extensive reservoirs in the upper reaches of the picturesque vale of the Washburn, will be completed.

The water-shed impounded by the new Waterworks Local Act it is estimated will yield about 23,000,000 gallons daily. The first part of the scheme is to pump from the Washburn at the point of its junction with the Wharfe, the 6,000,000 gallons now obtained from the larger river. This is to be accomplished by laying a 27-inch cast-iron conduit from a dam at the foot of the Washburn to the present pumping station at Arthington, a distance of about two miles. The conduit, after leaving the Arthington works, will be continued on till it meets the waters of the Washburn. For the purposes of this conduit, Mr. Filitter,—who has the exclusive supervision of the works from Arthington to the foot of the Washburn, in connexion with the pumping part of the scheme, while the reservoirs will be constructed under the joint management of Mr. Filitter & Mr. Hawksley,—has had the pipes cast specially in 12-ft. lengths, with the sockets downwards, after which they were coated, both inside and out, with a black glaze, this having the effect, to a considerable extent, of preventing corrosion, while the greater length,—pipes for similar purposes being usually 9 ft.—makes fewer joints requisite, and the leakage consequently smaller. Of the 1,000 pipes, which have been cast by Messrs. Hopkins, Gilkes, & Co. (Limited), of Middlesbrough, whose contract was for 5,630l., 900 have already been delivered. For this portion of the works, which Mr. Filitter is sanguine will be completed in about six months, the sum of 15,000l., in addition to the compensation,—

45,000l.—to be paid to Mr. F. H. Fawkes, bas already been granted by the Council.

The more important part of the scheme, however, is that comprising the reservoir works up the valley for providing the supply of the additional fourteen millions of gallons, which it is estimated will be required in Leeds for daily consumption by the end of the present century, and for sending down the compensation waters to the neighbouring landowners. The plan shows that four reservoirs are contemplated, one of these being situated at Lindley Wood, about two miles from the foot of the Washburn, two others about midway up the valley, at Fawston and Swinsty, and a fourth about three or four miles from the head of the valley. The following figures represent the approximate dimensions of the various reservoirs:—

	Lindley Reservoir. (Compensation and Supply.)	Swinsty Reservoir. (Compensation.)	Fawston Reservoir. (Supply.)	Thruscross Reservoir. (Supply and Compensation.)
Area of Watershed	21,700 acres	17,000 acres	13,000 acres	4,500 acres
Capacity of Reservoir	700,000,000 gals.	980,000,000 gals.	870,000,000 gals.	530,000,000 gals.
Area of Water Surface	117 acres	158 acres	158 acres	50 acres
Depth of Water	60 feet	65 feet	60 feet	85 feet
Height of Embankment	67 feet	67 feet	68 feet	102 feet
Height above Sea Level	300 feet	450 feet	600 feet	777 feet

SOUTH KENSINGTON PARK DRIVE.

GREAT excitement amongst the residents of this district has been caused by the temporary stoppage of the marginal Park road between the Queen's and Prince's gates. The grand quadrilateral of the Horticultural grounds being now completely surrounded by first-class mansions, has become the resort and abode of distinguished and wealthy families, who, having purchased or built their houses on account of the fine open roads, the vicinage of the Park and Gardens, and the direct access thereto by the Queen's gate, at the end of Albert-road, feel a dread lest these gates, which, by permission of the Commissioners, were erected by and at the expense of Mr. W. Jackson, should be summarily closed against carriages.

This carriage-way, in a direct line of about a mile and a half from Hyde-Park corner to Kensington, formed the most agreeable route of access to town, avoiding the not very pleasing defile opposite Knightsbridge Barracks, and offering the amenities of a seemingly rural park with wide waters and most effective floral ornamentation. The South Kensington Museum adds doubtless to the attractions of this quarter, and the new Hall of Arts and Sciences will, when completed, confer on it additional lustre; but its chief value is from proximity to the Park and the free intercourse by the marginal Park road, which will continue to be its first recommendation.

Some little deviation of the drive has become necessary at the base of the Albert Memorial, where probably another carriage-entrance may be opened, opposite to the Rotunda of Arts and Sciences; but on this side, within the distance of one mile, there are already four open carriage-gates, and one other, shut up, opposite Prince's Gardens.

For the public in general a great accommodation was conceded by the opening out of a road for cab traffic from Victoria-gate, Bayswater, to Kensington-road. This gave an improved route of communication between the important N.W. and S.W. districts; but the line which takes a southern direction to the Magazine turns off westward thence to the Albert-road, Kensington, diverging at least one-third of a mile out of the right line, which should have had issue at the gate facing the Exhibition-road. As an easy and direct intercourse between Bayswater, Brompton, and Chelsea, this line would be of general public utility; the only lines of access open to public conveyances previously having been by Park-lane,—a detour of over one mile and a half.

By adopting the suggested roadway, access to Kensington would be attained by a more level road across the plateau of the Park angle, at a distance increased by 100 yards only; whilst at all other points half a mile would be saved, and a great improvement made as regards the flower-walk of Kensington Gardens.

That an open communication should exist between the noble memorial to the regretted Prince and the Hall of Arts and Sciences suggested by him, is a proposition that meets universal concurrence; but that the beautiful drive extending from Hyde-Park corner to Queen's-gate, Kensington, should be curtailed, or that direct access from Albert-road should be

It is estimated that when the whole of the works have been carried out there will be provision made for a supply for 180 days.

As to the existing works of the corporation, the store reservoir at Ectup is about 40 acres in extent, and contains about 240,000,000 gallons, and the Woodhouse supply reservoir contains about 6,000,000 gallons, being only one-sixth more than one day's consumption. At Woodhouse are the filter-beds of sand, which cover about 2½ acres, and at Headingley the pumping-works for the high-level districts of Headingley-bill, Chapel-town, Bramley, and Wortley. Two engines send to the higher parts of the borough nearly 1,000,000 gallons per day. In addition to these works there is a small reservoir at Bramley which holds about 2,000,000 gallons, and another, very much smaller, at Beeston.

However, the works were resumed by the contractors, Messrs. Barry & Doyle, and have now been brought to completion. The building has not much pretension to architectural beauty, the intention evidently being to make it as substantial as possible, as well as comfortable for the congregation. Its length is 165 ft., and width 35 ft. The high altar has not yet been completed. It is intended to erect two side altars, to be dedicated to the Virgin Mary and St. Anthony. A sum of 4,000l. has already been subscribed towards defraying the expenses of the church, but it is believed that before it is completed an equal sum must be contributed.

BATH ABBEY RESTORATIONS.

At a vestry meeting recently held, the parishioners unanimously resolved,—

"That the churchwardens of St. Peter and St. Paul, Bath, be authorised to apply to the Consistory Court at Wells for a faculty to carry out the following alterations within the parish church, viz. to take down and remove the organ from the present gallery and re-erect the same on the north transept; to take down and remove the pulpit, reading-desk, clerk's desk, galleries, pews, and all other fittings now erected and being in the choir, and to remove the stone screen from the middle of the said church, and re-erect the same at the west end thereof, or some other convenient place, or otherwise; to take up the flooring of the nave, and re-lay the same with the stones taken up; to erect pews and sittings in the choir, nave, and transept; to use and employ any of the materials removed in the re-laying of the said choir and nave, or otherwise to sell the same, and apply the proceeds in and towards the expenses of such refittings; to remove all tombs, monuments, and tablets now erected, and being in and against the walls of the said church, and, without destroying or defacing any inscriptions thereon, to reduce to the same in size and re-erect and fix the said tombs, monuments, and tablets in some other appropriate and convenient place or places within the said church; and to remove, alter, and re-erect the rails of the chancel of the said church."

The groining of the nave is proceeding satisfactorily, but subscriptions to a considerable amount are still needed to complete this portion of the work. The roof and clearstory windows have been repaired; the transepts are nearly finished, and preparations may now be made for the removal of the organ to the north transept as suggested by Mr. Scott and approved by Mr. Hill. The stained-glass window which is intended to be placed in the south side of the nave in memory of the late Mr. J. H. Markland, D.C.L., has arrived; and the glass for another window is also in the church, leaving only one vacancy in that portion of the building.

THE PUGIN TRAVELLING STUDENTSHIP.

ELEVEN candidates sent to the Institute applications, drawings, and testimonials for the Pugin Travelling Studentship of the current year, and the studentship has been awarded by the council to Mr. C. Henman, jun., of 7, Bedford-place, Croydon.

WARMING AND VENTILATING.

DR. HAYWARD, of Liverpool, has recently made some arrangements in his own house with a view to warming and ventilating, which seem calculated to be efficacious, and recently invited several persons to examine them. The air is received in at the basement, through gratings from the street, into a chamber, where it is heated by means of hot-water pipes connected with a stove in another department. The warm air flows naturally upwards through other gratings into a lobby on the next floor, from which it is diffused into all the chambers on that floor, which are connected by gratings with the central lobby. A further draught of air is carried to a lobby on the next floor, and diffused in like manner, so on from lobbies into chambers, until we reach the top of the house, the temperature, of course, decreasing slightly as it rises. In each room, over the chandelier is another grating, into which the foul air flows, and is carried up from each room through a pipe until the entire foul air of the premises is concentrated in a small chamber at the top of the building. This chamber is connected by a shaft with the kitchen chimney, and the foul air is drawn down through this shaft, and escapes from the chimney shaft, through flues which

closed against carriages, would annoy and incommode the residents of the fine ranges of South Kensington, and damage their property.

As to the Park rides, equestrians have much to be grateful for towards the Commissioners, who, in addition to the mile-and-half course of Rotten-row, have opened out another course of equal length, completely encircling Hyde Park. Those also "who put their trust in chariots" have free circulation over well-kept drives, which command the best views of wood, water, and landscape; whilst all the borders within view are decorated with luxuriant blossom, tended with a skill and care, first introduced by official authority. With these experiences the residents of South Kensington may, we think, rest content, and feel assured that no change will be made in this angle of the Park which will not be as conducive to pictorial effect and popular enjoyment, as was the demolition of the old Cavalry Barrack and substitution of a Fairy Garden.

A COMPETITION ABROAD.

THE designs sent in for the competition opened for a public monument, commemorative of the victory obtained at Callao over the Spaniards by the republics of S. America, were examined on the 24th February last. The jury presided over by M. Gleyre, was composed of MM. Le Duc and Duhan, architects, Eng. Guillaume and Perraud, sculptors, both of the Institute. The design, selected to be classed in the first rank, emanated from M. Guillaume, architect, and M. Cugnot, sculptor. One of the designs sent by MM. Davioud, architect, and Cugnot, sculptor, obtained the place of second rank. Lastly, No. 11 of M. Simonet, architect, and Elias Robert, sculptor, held the third rank. Twenty-six designs were sent for competition.

FROM IRELAND.

Dublin.—The directors of the Industrial Tenements Company, and some personal friends (shareholders), have entertained Mr. Henry McClean, J.P., their chairman, at a banquet, in the Gresham Hotel, on the occasion of the new model dwellings, in Meat-street and Earl-street, being opened. Sir John Bagot occupied the chair, and Alderman Gregg the vice-chair. The new block of buildings contains 120 rooms, with every arrangement, it is said, for comfort, health, and decency. The Vartry water is laid on to every story up to the attics.

Killarney.—The Franciscan (R.C.) Church at Killarney has been consecrated. The church is named the Holy Trinity. On the 17th March, 1864, the foundation stone was laid. The designs for the building were furnished by Mr. J. G. McCarthy, of Dublin; and the style of architecture is as nearly similar as possible to that of Muckross Abbey, which was a monastery inhabited by the Franciscan Order in the year 1340. The new building was commenced through the exertions of the Rev. Mr. Patrick, prior of the order, and when the edifice was only seven feet above the ground that priest died. This caused a check to the progress of the building.

in parallel with the smoke flue of the kitchen. Mr. Hayward claims by his arrangement to always ensure an equable temperature either in summer or winter, and to obviate all the ordinary draughts of houses, so productive of cold and worse evils. If a heavy and cold wind blows the valves for admitting the air at the basement can be closed, and if it is warm they can be opened according to circumstances. The expenditure of fuel for heating the air, a thing accomplished by contact with hot-water pipes in its first stage of flow towards the upper chambers, is trifling, and is much more than saved by the diminution in the quantity of coal necessary for use in the grates. In summer, by the aid of iron what are in winter the heating chambers, the air can be brought to any temperature.

USE OF HOME-GROWN TIMBER.

BIRMINGHAM ARCHITECTURAL SOCIETY.

At a meeting of this Society, Mr. George B. Nichols, of West Bromwich, read a paper as an introduction to a more detailed discourse to be delivered on a future day before the same society, on "The adaptability of our own home-grown timber for internal purposes." Mr. Nichols said the subject had been forgotten by the profession for the last half century at least. The timbers of foreign countries having been brought rapidly into use on account of their adaptability and cheapness, the country had been led to depend entirely upon them, and home-grown timber had been allowed to degenerate, and become of no use except for inferior purposes. The beauty and adaptability for internal purposes of many of our home-grown timbers had been overlooked. He laid before the society samples of home-grown timber, "with a view to the introduction of a variety in order for an improvement upon the ever monotonous painting and graining." The samples he wished to bring under notice included "the vine prop alone," "the poplar never dry," "the bullock oak, solo king of forests all," "the willow, worse of foulness paramours," "the yew, obedient to the builder's will," "the birch for shafts," "the warlike beech," "the ash for nothing ill," the maple, the larch, the Scotch fir, the lime-tree, the wych elm, the sycamore, the cherry-tree, the alder, the hawthorn, the hornbeam, the apple-tree, the plumb-tree, the walnut, and the chestnut. He hoped the subject of internal decoration would be considered, with a view of bringing out in their natural state the material to be dealt with, relying on the beauty of nature for effect, wherever it could be obtained by judicious treatment of form and colour. He presented the samples to the society for the museum.

THE PROPOSED HOSPITAL FOR NEWCASTLE-UPON-TYNE.

SEVEN or eight years ago it was proposed to erect a hospital in connexion with the Union Workhouse, Newcastle-upon-Tyne; but, for wise economical reasons, that which was necessary then has not been erected yet. An opportunity, however, occurred—an opportunity in such excellent harmony with guardians' economy—that the hospital committee could not let it pass without making another effort to obtain the long-neglected requirement. According to the testimony of one gentleman, the plans had been drawn by an inmate! If this should turn out to be correct, surely the Newcastle guardians, who are about to expend from 10,000l. to 12,000l. over an erection to accommodate 250 patients, may justly be blamed for so recklessly risking the ratepayers' money, as they appear to have been accused of doing by some of their co-guardians. It is but fair, however, in explanation to say that another architect—not an inmate—has been requested, on the understanding that his commission should be reduced to 2½ per cent., in consideration of the work previously done, to revise and improve the designs of the hospital according to the matured instructions of the hospital committee. And it was on the occasion of the approving of these designs that what the local papers call a "scene" took place in the board-room of that august body. One gentleman, who advocated the pavilion plan, complained of the want of through-and-through ventilation,—of "outboots" in the shape of large day-rooms,

"which prevented the air from going all round the building,"—of the situation of the water-closets, which were "close to the wards, and under certain circumstances, which were of very frequent occurrence in all hospitals, impure air therefrom would readily get into both wards,"—and also of the position of the building upon the site, owing to which "some of the windows would face the north, and consequently be entirely deprived of sunshine." The chairman of the committee, in reply, said that "although several of them might have objections to certain portions of the plan, yet they considered it was a compromise of their various views; and that, having determined on the shape and position of the hospital, all they had to do was to give an architect instructions how to carry them out; and a better course for the interest of the ratepayers could not be pursued than the one they had adopted, either by having competition or any other mode of getting plans." After all that has been written and said upon the question of hospital construction, we fear the Newcastle guardians are behind what they ought to be as to the best mode of securing the best hospital for the least money.

THE PEABODY MEMORIAL CHURCH IN MASSACHUSETTS.

THIS church, in Georgetown, Mass., erected as a memorial of the mother of George Peabody, by her son and daughter, has been dedicated to divine service. Mr. Peabody, who was present when the corner-stone was laid, in September, 1866, was not able to attend the dedication. A letter from him was read, bearing date London, Oct. 18, 1867, and addressed to the members of the Orthodox Congregational Church in Georgetown. After stating that his sister, his "faithful coadjutor" in the enterprise, had informed him that the church had been satisfactorily completed, he adds:—

"In the building of the church we had a twofold object: first, its consecration to the memory of our beloved mother; and, second, its dedication to the worship of Almighty God, in its simple purity, according to the evangelical faith, as acknowledged and accepted by our dear mother, and as recognised by the Orthodox Congregational Churches of New England. On the completion of the building, its use will be legally conveyed to you and your successors, in trust, subject to the following conditions."

Then follow the conditions, which relate to the purposes of the edifice, its repair, and that of the memorial tablets, &c.

MR. PEABODY'S GIFT.

The following results are shown in buildings at Shadwell and Islington for the year 1867:—

	Cost.	Gross Rent.	Expenses.	Net Rent.	Interest Not Paid.	Expenses on Gross Rent.
	£	£	£	£	per cent.	per cent.
Spitalfields, for land & buildgs.	27,215	1,050	300	690	2.53	34.28
Islington	10,387	1,699	670	1,029	2.48	39.43
Totals.....	67,612	2,749	1,030	1,719	2.5	37.41

Spitalfields and Islington have been fully occupied. The annual expenses are taxes, rates, insurance, alterations, repairs, and collection. Fractions of 1l. are omitted. The net rents invested annually at 3 per cent. per annum would reproduce the whole original outlay in twenty-seven or twenty-eight years. (See *Builder* of 22nd. ult.) T. H.

A THOUGHTFUL ACT OF MASONS.

SIR,—I shall feel obliged if you will kindly insert the following lines in your valuable journal, which will set forth the manly character of the Cornish masons. When trade was prosperous, the masons of Penryn asked for an advance of wages, which they obtained. Now, when trade is dull, they have sent a memorial to the firm of Messrs. Freeman, beseeching them to deduct 6d. per day off their wages. These men appear to me to be free and use their own judgment. Such a case as the above, perhaps, was never known before. WILLIAM CROSS.

The Prince Consort Memorial, Hyde Park.

THE DESIGNER OF THE PENITENTIARY, MILLBANK.

"Dead sinners, as well as saints, should have an advocate, although not del diavolo."

SIR,—In the list of buildings designed by the late Sir Robert Smirke, R.A., published by the Institute, the fourth is the General Penitentiary, Millbank, London. This was designed, with the exception of the gateway, by a Mr. Williams, formerly teacher of military drawing in the Military College (see the style, and doubt it if you can). The writer assisted Mr. Williams in making the drawings in 1813. They were successful in the competition, and gained the first premium, and the building was carried out from them, *except the gateway*. This was designed and built by the late Mr. Thos. Hardwick; but it failed, and Mr. Smirke was called in, who put in a new foundation of concrete. The general building was not, that I am aware of, touched by him, and is not his, but Williams's design.

AVVOCATO DEL DIAVOLO.

** Making inquiries of those who know the circumstances, we are informed that when the foundation of the gateway and other parts failed, the work went into the hands of Sir E. Smirke, somewhere about 1816. The crippled pentagons were taken down, and the whole prison was rebuilt under Sir Robert's direction. Possibly the central part, round which the pentagons are arranged, may not have been rebuilt, but of this our informants are uncertain. Much constructive skill was shown, and it affords one of the earliest examples of the use of concrete in England (just fifty years ago). We have always understood that the radiating principle was devised by the late Sir S. Bentham. Lady Bentham, when alive, wrote several letters, in our pages, to assert it.

ENGRAVED LETTERS ON MARBLE.

YOUR correspondent "F. M." asks the best and most durable method of preparing engraved letters on marble or stone to receive gold-leaf.

The following will answer the purpose:—In half a pint of hot turpentine dissolve 2½ oz. of gum damar and 1½ oz. of best white wax; when cold, give the letters one or two coats of this, allowing a day between each coat to dry; then gild with double-thickness gold-leaf in the usual manner. It will not crack either indoors or exposed to the weather. TROS. KERSHAW.

HERNE BAY PIER.

ABOUT four-fifths of this pier are available as a promenade. Possibly an expenditure of 1,500l. to renew the cross planking of the platform and some longitudinal timbers would at once enable the pier to be opened.

Nothing can be more absurd than the barriers erected at the entrance to the pier, which is boarded in; and nothing would be easier than removing them at once two-thirds of the distance down the pier. Anything more creditable to the town than the closing of this pier, when a few slight repairs could at once obviate its being barred to the public, cannot readily be conceived. There may be defects in the piling, but to no considerable extent, and none which a little management could not overcome. The bays or spaces between piles are small, and might easily be trusted where defective. It may readily be imagined the money lost that has accrued to the enlightened inhabitants. PAULATIM.

ARCHITECTS' CHARGES.—RANDAL v. GRAY.

SIR,—Having seen a letter from Mr. W. Butterfield, published in the *Builder*, and on the subject of a trial concerning architects' charges between Randal and Gray, and having been present at the trial, I beg leave to state that the clerk of the works called as a witness on the trial, and who, Mr. Butterfield says, is in his employ, distinctly stated in court that he was employed by a lady, whose name he gave. What right, therefore, Mr. Butterfield has to interfere either with what he says or does after he has so openly and so publicly contradicted himself is not apparent.

If Mr. Butterfield would think for a moment, he would see that had he endeavoured to prevent the appearance of the clerk of the works on the trial a subpoena would have overcome all such "arbitrary interference." As to the clerk of the works having given "incorrect evidence" and speaking of "that of which he could have no accurate knowledge," I can only say he particularly stated himself to be only a clerk of the works. He said he never knew architects to charge more than a commission of 6 per cent., but he could not say they did not. Any one present could see that he was called for the purpose of proving neglect in the carrying out of certain works spoken of in the trial. Mr. Butterfield's name only came out by the attorney for the plaintiff asking (by the name of the plaintiff), if the church restoration, superintended by the clerk of the works, was not being carried out under Mr. Butterfield. The answer was, "I

do not wish to mention Mr. Butterfield." Plaintiff's attorney then said, "Oh, but we want to hear all about him;" but on the attorney for the defendant speaking to him, no further mention of Mr. Butterfield's name occurred.

Mr. Butterfield's giving an opinion as to the charge not being an unreasonable one, seems to me uncalled for, as he had no concern in it.

Mr. Butterfield seems very sore at the idea that a wrong impression as to his charges has been given to the public. I can only say, if the result of this trial be to induce either Mr. Butterfield, or any other architect, to state his charges before undertaking a work (which is not the universal custom), it will have done some good for the public. I enclose my card. ONE PRESENT AT THE TRIAL.

FLATS versus LODGINGS.

SIR.—Will you allow me, through your paper, to call the attention of builders and owners of house property, to what is considered by many a great want in our metropolis, and especially at the west-end? I allude to what are called flats, such as those in Victoria-street, Westminster, and of which many exist in Paris, to the great convenience of many persons who do not wish, or cannot afford, the trouble and expense of a large establishment. You are truly aware that many families have been obliged to reduce their establishments owing to the recent failures in railways and other securities. Now, people who have been long accustomed to the comforts of their own house, find lodgings a very poor substitute, whereas by taking a flat, they would have all the advantages of their own house, and would certainly not require more than two servants, thus saving very considerably in wages, &c. Victoria-street, Westminster, is not exactly the place one would choose for a dwelling in, but on the outside of the park, in Tyburnia, I believe, flats would be eagerly sought after. There are many rows of houses in that neighbourhood still unoccupied, and others in the course of erection, which might be converted into rooms such as I mention, and would thereby be conferring a great benefit upon many. I firmly believe, and amongst others yours.

PADDINGTON.

* * * A block of houses to be let in flats, and called "Belgrave Mansions," has been built on Lord Westminster's estate.

THE LOSSES OF IRONMONGERS.

SIR.—It is an every-day practice for tradesmen in the City who have what they call a country house—that is, a house situated about five miles from St. Paul's,—to give orders for a competent person to go and inspect premises, make estimates and drawings, say, for a kitchen range, a warm bath, &c. After calling several times at the City address the ironmonger finds that about half a dozen engineers and ironmongers have tendered for the job, which was not named in the first order.

I certainly think that every ironmonger should in these cases send in his account for estimates and loss of time. He should in all cases ask if it is to be a competition job? S. C.

CASES UNDER METROPOLITAN BUILDING ACT.

DISTRICT SURVEYOR'S FEES.—At the Clerkenwell Police Court, Mr. A. N. Brett, builder, St. James's-road, Holloway, was summoned, before Mr. Cooke, by Mr. John Turner, one of the district surveyors of Islington, to show cause why he refused to pay the sum of 15s. for surveying the erection of a cellar attached to a bakehouse, erected after the roof of the bakehouse had been covered in.

Mr. Cooke, the case having been heard at length on a previous occasion and adjourned, delivered a lengthened judgment, in which he pointed out that where an addition to a building was not contemplated and commenced before the main building was covered in, it could not come under the "additions" referred to in the Act, covered by the first notice and first survey; but was an addition for which an additional notice must be given, and an additional survey made, and an additional fee paid. He thought the builder had a right to say that the cellar now in dispute formed part and parcel of the bakehouse, and was intended to be included in the original notice. The wall of the cellar formed part of the bakehouse, and though there was an external and not an internal communication, he thought that that did not make it a separate building within the meaning of the Act. The cellar being, therefore, a part of the bakehouse, the surveyor was not entitled to another fee.

BUILDING WITHOUT ARCHITECTURAL SUPERVISION.

DR. LANKESBEE has had an inquest at the Torrington Arms, Finchley, on the body of George Moore, who was killed by the fall of a part of the building which he was working on. The evidence showed that the house in question was intended for a public-house, and an effort was being made to get it finished in time for the forthcoming licensing day. In order to obtain large cellars, room the stacks of chimneys were not carried down to the ground, but were built projecting from the party walls, which were 9 in. thick. As soon as the centering was removed, the wall and chimney fell, burying the deceased and suffocating him. Mr. Richard Wale, an architect, who was examined, said that no architect could have designed, and no competent builder could have carried out, a building on the plan of the one which fell. It could not possibly have stood. If it had been propped up for twelve months, and the supports then removed, it must have fallen. The dead weight upon the structure was altogether too great for its capacity. If the chimneys had been carried down to the ground the wall would have stood. He had heard of no other profession for thirty years, and had never seen a building attempted on such a plan before. The jury, after returning a verdict of accidental death, passed a resolution declaring their opinion to be that sufficient care had not been taken by the owner of the building to have it constructed properly, and that the said owner and his advisers and assistants were consequently culpable.

PARISH CHURCH BELLS.

In the *Builder* of the 13th inst., calling attention to a bell weighing fifty-five cwt., recent cast for a new church at Woburn, I said, "It is the heaviest parish church bell in Great Britain."

Your correspondent "Verus" observes, in reply, "It ventures to doubt this, by 'forgetting' that there may be several latent heavy bells of little more than local cognizance and fame. There was, forty years ago, a statement of a bell at some parish church in Gloucestershire weighing 8,000 lb."

I may remark, however, that whatever there was in Gloucestershire, or elsewhere, forty years ago, is altogether beside the point. But your correspondent goes on to say, "There is a village tenor of six in Oxfordshire, I am pretty certain, near Witney (chs Banbury), 'undoubtedly' weighing fifty-six cwt."

Now, I venture to affirm that the heaviest village bell in Oxfordshire is the tenor of a peal of five in the tower of St. Mary's Church, Bloxham, near Banbury. It is a noble bell, remarkable for dignity of tone; but its weight does not exceed 34 cwt., according to my estimate, while its reputed weight has never been above 36 cwt.

"Verus" states also that "there is a tenor at the fine church of Felverham, Beds, believed on good authority to weigh 50 cwt."

It is, therefore, evident that your respected correspondent has failed in his attempt to weaken my statement that the new bell for Woburn is the heaviest parish church bell in Great Britain.

THOMAS WALTERS.

LIGHT ON THE PREMISES.

SIR.—A lady, under the impression that gas would be laid through the pariah, has fitted up her house with stables with pipes and gas-taps, &c., throughout, at a great outlay; but now, certain difficulties have arisen, causing the entire abandonment of the introduction of gas into the pariah. Can you or any of your correspondents recommend any safe and serviceable plan of lighting her house, either with gas or anything else, and using the pipes, burners, and gasaliers already erected, without going to the expense of having the misadventure of a gasometer, &c. on the premises. Does the portable gas answer for such a purpose? I recollect, some ten or twelve years ago, receiving a prospectus of some kind of lighting company, having offices, I think, in Bishopsgate-street, recommending some new light or new mode of kind, discovered by a Frenchman, and then used at the Jockey Club, Paris, in many other public buildings. Can it be recommended? J. B.

A NEW "patent gas-generator" for private gasworks, &c., is thus described in the *American Gaslight Journal*.—In this apparatus kerosene or petroleum is distilled in combination with wood, and converted into a fixed gas of great purity, which gives a light superior in brilliancy and beauty to ordinary coal-gas. The apparatus consists of an elevated oil receptacle, communicating by a tube and syphon with a small retort in a common box-stove or furnace. Here the oil is decomposed by a temperature of 800° Fahr., in combination with wood, with which the retort is first charged, and the resultant gas is conducted into a condensing box, and thence to the gas-meter. The gas is free from the impurities and disagreeable odours of coal-gas, and is exceedingly simple to manufacture and prepare for use, because it requires no purification. For private residences, hotels, factories, and even small communities, this apparatus, it is added, is meeting with much success. Messrs. George H. Kitchen & Co. patentees, 591, Broadway, manufacture and put up the apparatus.

THE NEW CATTLE MARKET AT SOUTHAMPTON.

THIS market has been opened. It is bounded on the north side by Chantry-road, on the south by the Bridge-road, on the east by the South-Western Railway (close to the Dock Station), and on the west by Terminus-terrace. The area in use is about one acre, but there is sufficient land to extend it to four acres. About half of this space is devoted to cattle stalls, and the other half to sheep and pig pens. The main entrance is placed in the centre of the Terminus-terrace boundary fence, and the sheep and pig entrances in Bridge-road. There is also another entrance at the corner of Bridge-road, opposite Day's Hotel. The cattle stalls are estimated to accommodate 280 beasts, and the pens 1,180 sheep and 500 pigs. The pens for both these classes of stock being of the same size are available for either. The surface of the land has been raised to the level of the road of Terminus-terrace at one end, and 2 ft. above the old surface at the other end, thus securing thorough drainage into the main sewer. The cattle stalls are formed by means of two wrought-iron rails and cast-iron posts, 3 ft. 6 in. in height, bedded in concrete. The flooring is of concrete, coated with Portland cement, and drained into stone

channelling, running the whole length of the stalls, thus securing cleanliness. The sheep-pens are 6 ft. 6 in. square, and will accommodate ten sheep each. They, too, are formed of wrought iron, with concrete flooring, coated with Portland cement, and channelled with stone all round. The pig-pens are of the same size and construction as those for sheep, the bars of which are placed much closer together, so as to safely accommodate small pigs. The whole of the works have been designed by the borough surveyor, Mr. James Lemon, and executed under his superintendance. Mr. John Cox executed the drainage, and the raising and forming of the surface, and the concreting and channelling. Messrs. Hill & Smith, of Brierly-hill, Staffordshire, supplied the ironwork; and Mr. Fry, of Southampton, fixed it as a sub-contractor. The iron fencing and gates were supplied and fixed by Mr. Kent, of Southampton; and Mr. Davies and Mr. Doggrell were the contractors for the painting.

THE DRAMA.

A FEW days ago we had the satisfaction of hearing a play, "Waldeck, or the Siege of Leyden," read by the author of it, Mr. Angiolo Slons, well and widely known as the author of the first T. P. Cooke prize drama, "True to the Core," and several other successful pieces. The prize drama, by the way, added many hundreds of pounds to the funds of the Dramatic College. "Waldeck" is a very charming production, poetic and dramatic, written in a high tone that is well sustained throughout, and we cannot avoid expressing a hope that a manager may soon be found to place it properly upon the stage. It would need three actors and one actress of high class. The siege of Leyden, it will recur to our readers, which was sustained against the Spanish forces, more than 6,000 of the inhabitants dying of famine and pestilence during the investment, took place in the year 1574. The play it has given rise to is a worthy addition to the dramatic literature of the country.

STAINED GLASS.

Winslow Church.—A stained-glass memorial window has been fixed in the parish church of Winslow, Bucks, erected by Mrs. Miles, in memory of the Rev. J. Miles, B.D., late incumbent of Holy Trinity Church, Paddington. There are four lights, a subject in each, viz., The Agony in the Garden, the Crucifixion, the Resurrection, and The Ascension. The work was designed and carried out, by Mr. A. J. Mingay, of London. Lady Huntingdon's Church, *Cambridge Wells*. A memorial window, 22 ft. high by 11 ft. wide, in the Decorated style, containing five openings, with subjects in nearly life-size figures, has been put up in this church by Messrs. William Holland & Son, of Warwick, stained-glass artists. In the three centre openings the subject of "Our Saviour blessing little children," forms a picture, in nearly life-size figures. In side lights are—"Christ as the Tender Shepherd," "Our Saviour placing a Child in the midst of his Disciples," and under each of the above subjects, forming the pedestals, are the following:—"Jacob blessing Joseph's Children;" "The finding of Samuel;" "Eli brought to Samuel;" "The Israelitish Maid;" and "Timothy taught the Scriptures," under canopies. In the tracery are "Angels playing upon musical instruments," with smaller openings filled with Gothic ornament. The inscription states the window to be in memory of T. A. Gibb. A rose window has also been inserted by the same artists in this church as a memorial. The subject is,—"Eli and Samuel," surrounded by "Angels playing upon musical instruments," and ornamented with monograms. Two smaller rose windows have also been filled with Gothic floriated ornament and monograms by the same artists.

Durham Cathedral.—A stained-glass window, designed and executed by Mr. Wailles, of Newcastle-on-Tyne, has been fixed in the north aisle of this cathedral. The window has been provided at the cost of Mrs. Malby, as a memorial of her husband, the late Canon Malby. It is divided into three circular medallions, each one being filled with figures, and surrounded by conventional foliage; while round the whole runs a border composed of the Norman zigzag and leaves. The subjects in the medallions are as follows: in the upper one is represented Our

Lord in three characters,—in the centre as a Good Shepherd, bearing in his right hand a pastoral staff, and in his left a lamb; on the right he is leading a young child by the "still waters of comfort," and on the left guiding him through the "valley of the shadow of death," shown by a lion and serpent ready to devour him; in the centre circle Our Lord is represented holding a little child, "For of such is the kingdom of heaven;" the third and lowest medallion shows Our Lord giving His people into the charge of St. Peter. Across the bottom of the window is an inscription, "To the glory of God, and the memory of Henry Joseph Malthy, canon of this cathedral, and his sons, Charles Bradford and Ralph Howard. He departed Nov. 24th, 1863.

Horspath Church (Oxford).—The east window of this pretty little church has just been filled with stained glass at the cost of the Rev. H. R. Bramley, Fellow of Magdalen College. The style of the window is Perpendicular, and consists of three openings and tracery. The subject is the Crucifixion, in the centre our Lord on the Cross, with Mary Magdalen kneeling at the foot; and the side openings are filled with the Marys, St. John, and Salome. The group is surmounted by a canopy. In the tracery are depicted figures of St. Frideswide, St. Giles, St. Mary Magdalen, and St. John the Baptist. The window is the work of Mr. G. Baguley, of Newcastle-on-Tyne.

SCHOOL-BUILDING NEWS.

South Shields.—The newly-erected day-schools in connexion with St. Mary's Church, South Shields, have been opened. The building is constructed of red press bricks, with fire-brick facings. The school is situated at the head of Dock-street, Tyne Dock, and is within a few hundred yards from the church. The building is divided into three departments—girls', boys', and infant school-rooms. The entire length of the front of the school is 130 ft., by 60 ft. in depth. The height in the interior is 17 ft. from floor to ceiling. The roof is open timbered. There are three separate play-grounds, with laboratories, drinking-fountains, &c. The school-rooms are lighted with gas. The origin of the schools is due to the North-Eastern Railway Company, who contributed the sum of 1,213l. 6s. 1d. towards their erection. A large number of their workmen are located in the neighbourhood of Tyne Dock. The plot of ground on which the schools have been erected was presented by the dean and chapter of Durham and Mr. Ald. Williamson. The architect of the North-Eastern Railway, Mr. Prosser, designed the building, and gave his services gratuitously, Mr. Thomas Robson, South Shields, was the builder; Mr. J. Hall, the plumber; Mr. Edwards, the painter; and the ironwork was done by Mr. Hepple, of Gateshead. The estimated total outlay is 2,940l. 2s. 6d.

Newcastle.—The New British Schools, Tyne Dock, and also St. Mary's Church schools, have been formally opened. Both institutions are indebted to the North-Eastern Railway Company for assistance in the shape of money and of the gift of the ground. Of the 1,210l. collected, however, the workmen of the company themselves have contributed 230l. The Government have agreed to grant 588l., making a total of 1,798l. collected. The building and fittings will cost 2,250l. The schools are designed in the Medieval character, freely treated, without pretensions to ornamental details. An effect is obtained by the use of fire-bricks around the windows, doorways, and chimneys, in contrast with the red bricks of the walls. The plan of the building is nearly the form of the letter H, the boys at one end, the girls at the other, and the infants in the centre. Mr. T. Prosser, of Newcastle, was the architect; Mr. J. Scott, clerk of the works; Mr. R. Bates, the builder; Mr. J. G. Weir, the painter; Messrs. Walker & Emley, Newcastle, the plumbers; and Mr. Thomas Coulson the glazier.

Stockport.—The contract for the erection of a building in the Market-place, on the proposed site of the Bank of Stockport, has been let to Messrs. J. & J. Longson, of Stockport, from designs prepared by Mr. T. A. Allen, of Stockport, architect. It will command two fronts, one to the market and the other to the Underbank Bridge. The building, which is in what is called the Grecian-Italian style of architecture, will be four stories high, including the basement, having a stone front up to 25 ft., the remainder

being finished with stone dressings, enriched with stone pilasters and ornamental caps and moulded bases, cornice, and blocking stone, and decorated cantilevers underneath. There will be six windows looking into the Market-place, and sixteen to the bridge, the main entrance being from the bridge, each side of the door being supported by polished Aberdeen granite shafts, with carved Corinthian capitals, and a representation of the borough arms. The door opens into a vestibule, 8 ft. wide, the directors' room, 18 ft. by 16 ft., being on the left. The banking-room, which will be lofty and commodious, will measure 40 ft. by 25 ft. The ceiling will be arranged in panels.

Heckmondwike.—Alterations in the way of paving the market-place, laying new causeways, building a market-house and weigh-house, and several other conveniences in connexion with the market here, have taken place from time to time, but the new market is now complete, and a movement is on foot for the opening ceremony. Three triumphal arches are to be erected at the three entrances into the town, and the directors of the gas company have decided to supply gas gratis for the illumination of the market. Prizes are also to be given for the best show of butchers' meat, vegetables, &c.

Books Received.

Book of Designs for mural and other Monuments. JAS. FORSYTH, Sculptor. 3rd Edition.

IN this new issue of Mr. Forsyth's book the designs have been revised and drawn on stone by Mr. R. K. Thomas. In the preface to it the sculptor acknowledges the assistance of various architectural friends in the preparation of it. We should prefer to find the designer of each monument named. Mr. Norman Shaw, Mr. W. Smith, and Mr. R. H. Carpenter are amongst those, as we understand from Mr. Forsyth, who have contributed to the collection. It is the best work of the kind that we know of.

VARIORUM.

MESSRS. DEAN & SON have published "Debreit's Illustrated Peerage," and "Debrott's Illustrated Baronetage, with the Knightage," for the present year. The Peerage claims to be the oldest handbook extant relating to the upper classes. Containing, as is asserted, 200,000 facts, its general correctness must be deemed remarkable. Through these works, says the editor, with justice,—

"We learn of our public men, their seats, residences, and clubs, their marriages, their place of education (with University degrees), their children, their Church patronage, their services, their appointments in the army, navy, learned professions, and every particular of interest."

—Mr. Hardwicke sends forth his "Shilling Peerage," "Shilling Baronetage," and "Shilling Knightage," for the year, and also publishes the three together in a smart little volume, under the title of "Hardwicke's Crown Peerage for 1868." The fact that these are compiled by Mr. Edward Walford, M.A., is sufficient to assure us of their general correctness.

Miscellaneous.

LIVERPOOL WATER SUPPLY: THE BALA LAKE SCHEME.—The idea of obtaining a water supply for Liverpool from Bala Lake is still favourably entertained by many of the local council. At a recent meeting of the Water Committee of the Town Council several members expressed the opinion that instead of spending 100,000l. on additional works at Rivington and on works at Dudlow-lane, it would be much more advisable to obtain powers to spend from 2,000,000l. to 3,000,000l. upon a scheme to obtain water direct from Bala Lake, in order that the supply to Liverpool might be continuous both for present and future wants. After some bound to proceed chairman stated that they were bound to proceed with the works sanctioned by the council; and that if economy were exercised, and the present system of water-closets recommended by the council were not "pushed too far," there might be a sufficient supply from existing sources for the next twenty years. During the last two or three years the rain-fall at Rivington had been very slight in comparison with that in the districts of the Ribble and the Lane.

THE DISCOVERIES IN PALESTINE.—In a lecture on this subject at the Crystal Palace last week by the Rev. Chas. Boutell, the lecturer said a letter had just been received from Lieutenant Warren, in which he announces that he has discovered two new arches of 23 ft. span west of the west of the two arches of 14 ft. span to the west of Wilson's arch, and also a long vaulted passage leading towards the Yaffa gate. He has traced this for 120 ft., the masonry being carefully hewn. A flight of steps has been discovered at the Bir Eyhub, and a new tank north of Robinson's Arch.

THE IMPROVEMENTS AT LUDGATE-HILL.—On Tuesday the Commissioners of Sewers held a meeting at Guildhall. The clerk read a letter from the Metropolitan Board of Works, stating that they had voted in aid of the Mansion House improvement the sum of 7,354l., and in aid of widening the west end of Ludgate-hill the sum of 11,756l. A long discussion ensued as to the propriety of setting back several houses on the south side of Ludgate-hill, and it was eventually resolved that, having regard to the importance of the improvement contemplated, notice be immediately given, under the powers of the Act of Parliament, to take the whole of the premises and property connected therewith at such a sum as a jury may award, for the purpose of continuing the improvement on Ludgate-hill.

THE UNWHOLESOME STATE OF COURTS OF JUSTICE.—It is strange that the frequent complaints of Judges as to the state of the Courts in which they are called upon to sit are so little heeded. Mr. Justice Mellor, who presided over the civil side of the Northumberland assizes, has been complaining sorely of the state of the Court-room in the Moor-hall, Newcastle. About an hour after the opening of the assize, his Lordship said he should be obliged to adjourn the Court. He was nearly suffocated, and was badly seated. His desk was so far from his chair that he had to lean forward to take his notes, and the Court was overpoweringly hot from the steam, which rose directly under his feet! It was perplexing to have to attend to a case while suffering the abominable inconvenience of being half-baked. He had before made the same complaint, and unless the county magistrates made the place suitable for holding the business, he should have either to stop the business or to adjourn to another place. He should fine both the under-sheriff and the county surveyor if something were not done.

SALE OF THE BRIGHTON WORKHOUSE ESTATE.—The most valuable portion of the old workhouse site has been sold by auction. The ground being restricted to the erection of villas, the sale-rooms were well attended by both private and speculating purchasers, the latter predominating; and, with the exception of three lots out of twenty submitted, comprising thirty-eight plots, the whole was knocked down to the "trade." This was the only opportunity of obtaining land for villas in the centre of the town and away from the bustle of Brighton, commanding a view of the sea, the Downs, and the town; it is in close proximity to the railway and parish church; and abuts on to one of the principal pleasure-rides and drives in the borough, namely, the Dyke-road. The sales were all *bona fide*, the reserved price being exceeded in each case, and the aggregate amount realized was 1,000l. above the estimated value. The principal lot in the sale is situated at the corner of the Dyke-road, where the latter is intersected by Buckingham-road and Powis-grove. It has a frontage in the Dyke-road of 67 ft., and in Buckingham-road of 92 ft., being 79 ft. 3 in. in width at the east end, with an average depth of about 95 ft. The first offer was 650l., and, after some lively bidding in 10l. advances, Mr. George Attree, auctioneer, North-street, became the purchaser at 800l. With the exception of two single plots, two houses may be built on the several lots, of the value of 600l. each, but not more than two; but it is at the option of the purchaser to build one only, provided that it be of the value of 1,000l. The total amount realized was 12,125l., being nearly 3,000l. over the sum obtained in either of two previous sales. By the first sale, 8,755l. were obtained, and 9,465l. by the second; making an aggregate, with 1,179l. for the old buildings, of 31,524l., already realised for this land, verifying the calculations made by the guardians, that the parish would get its new workhouse for nothing: and the land is not yet all disposed of.

ARCHITECTS' BENEVOLENT SOCIETY.—We would direct attention to the circumstance that the annual meeting of this useful society will be held in the Rooms of the Institute, 9, Conduit-street, on Wednesday, the 11th instant, when it is hoped members and friends will attend numerously. The society is scarcely supported to the extent desirable.

THE HAMMER OF HAMMERS.—M. Krupp is about to construct at his works at Essen (Prussia) a single-acting steam hammer, far exceeding in size any now in existence. The design for this hammer—which will have a head weighing 129 tons—has already been prepared, and the patterns are now in hand. At present, the largest steam-hammer at M. Krupp's establishment is one with a 50-ton head, falling 9 ft. 6 in.

FATAL ACCIDENT AT A MANCHESTER BRICK-KILN.—The Manchester city coroner has held an inquest on the body of a young man who was engaged in getting bricks from a kiln, at the brickyard of Messrs. Johnson & Livesey, at Gorton, when a number of bricks fell upon him, and he sustained such severe injuries that a verdict of "Accidental death" was returned.

MORE FEVER AT THE MAURITIUS.—A regiment has just been thrown into a terrible fever at the Mauritius, because, as is asserted, the colonel was disinclined to undergo the inconvenience and discomfort of a return voyage to the Cape. The general and medical officers at the station remonstrated against the landing; but the colonel's convenience and comfort gained the day. The men were landed, and fever soon crept amongst them. The number of cases was increasing when the last mail left. The case has been mentioned in Parliament, and Sir J. Pakington, Secretary of War, held that the landing was reprehensible.

GAS.—The Belper Gas Company have declared their usual dividend at the rate of 10 per cent. per annum.—There is a strike at Malmesbury against the price of gas. The price charged is 6s. 6d. per 1,000 cubic feet: the consumers say it ought not to be more than 6s., and to bring the Company to terms they have reverted to the use of lamps and candles.—The Sudbury Paving and Lighting Commissioners have agreed to reduce the price of gas 3d. per 1,000 (from 6s. 3d. to 5s. 6d.), and make a further reduction of 6d. per 1,000, as soon as the consumption is increased from 6,000,000 to 7,500,000, without the public lamps. The great majority of the gas consumers have engaged, it seems, to take gas for five years of a new company at 4s. per 1,000 ft., and it is believed the reduction to 5s. 6d. will not satisfy them. A practical engineer had offered to produce gas at 4s. 6d. per 1,000 ft., and give the shareholders of either the old or new company six per cent. Mr. Burke, of the Anberley, who is chairman of the Imperial Gas Company, is about to erect new works for his house, and says the gas, after allowing interest of outlay and all other charges, will only cost him 4s. per 1,000 ft.

RESTORATION OF CHESTER CATHEDRAL.—Estimates have been obtained from Mr. Christian and Mr. Scott, of the cost of repairing and restoring this edifice, as follows:—Necessary repairs, 22,531l.; desirable repairs, 7,000l.; improvements, 20,000l.; total, 49,531l.; add architect's commission, 5l. per cent. (2,500l.), 52,031l. The "desirable repairs" include flying buttresses, restoration of cloisters, King's school, and bottom stage of west Norman tower, with lead instead of slate on the roof. The "improvements" include stone groining of the nave and aisles, restoration of the tower and spire, internal cleansing and repair, and complete restoration of the choir. No special fund is provided by the foundation or the Ecclesiastical Commissioners, for repairs or other contingencies. The Dean and Chapter have usually set apart from 300l. to 500l. annually for this object. By this means a sum of nearly 1,500l. had been accumulated in the course of ten years, which it had been intended to apply to the restoration of the fabric. It has, however, been applied to the purchase of the new bells, 500l.; to the warming of the cathedral, 500l.; to the fittings of the nave and other expenses connected with the special evening services. The entire cost of these has been 2,100l., so that there is a deficit on this head of 600l., to the met out of the annual revenue of the chapter. There is now no fund for the restoration or repair of the cathedral building.

NUISANCES.—A nuisance against which the Court of Chancery will grant an injunction must be a material injury to property, or to the comfort of the existence of those who dwell in the neighbourhood. This was the holding of the Court of Appeal (reversing a decision of Vice-Chancellor Stuary) in the case of Lucombe v. Stier, where it was remarked by one of the Lords Justices, that in such cases as these, the recovery of a verdict at law does not necessarily entitle the plaintiff to an injunction; but the fact that there is legally and technically a nuisance must be considered, together with the amount of damage, and the duration of the nuisance complained of.

LONDON LABOURERS' DWELLINGS SOCIETY.—At the thirteenth half-yearly meeting of this society, held last week, the directors presented their report for the six months ending December 31st, and the usual dividend at the rate of 5 per cent. per annum, free of income-tax, was declared. The capital of the society now amounts to 31,900l., the sinking fund (for the redemption of the leasehold property of the society) to 927l., and the reserve fund (for the equalization of dividends, or extraordinary expenses) to 9,887l., of which sum 1,500l. are deposited at interest in order to provide the means of purchasing temporarily at par any shares that a member may from unforeseen circumstances wish to realize.

THE AMALGAMATED SOCIETY OF CARPENTERS AND JOINERS.—Mr. Hughes, M.P., presided on Wednesday evening at a meeting held in the Arundel Hall, Arundel-street, convened by the Amalgamated Society of Carpenters and Joiners, "for the purpose of presenting the accident benefit of 100l. to each of two members of the society who, through affliction, have been rendered incapable of following their employment for life." The Chairman said, they were aware in the principles of trade societies were being inquired into by a royal commission, and if they had been called together to consider the question of trade unions, it would not have been proper for him to preside that evening. The questions involved in trade unions they would not go into that evening. They were present for the purpose of presenting 100l. to two of their members, that sum being the reward of George Burford was a resident in the hospital he had the honour to represent. Whatever the action of trade unions had been, societies like the Amalgamated Society of Carpenters and Joiners had done a great deal of good for the working classes in the hour of need.

TENDERS.

For villa residence to be erected upon the Albert Park, Abingdon, for Mr. E. Harries, Mr. Edwin Dobby, architect. Quantities not supplied.—

Table with 2 columns: Name and Amount. Includes Dover (21,300 0 0), Thomas (1,068 0 0), Selby (1,620 0 0).

For two villa residences, Wilmshor, Cheshire, for Mr. John Beaumont, Messrs. Eiston, Chambers, & Bradley, architects. Quantities supplied.—

Table with 2 columns: Name and Amount. Includes Bowden & Edwards (23,245 0 0), Neil & Sons (3,220 0 0), Gotthard (5,300 0 0), Thompson (3,275 0 0), Hughes (5,160 0 0), Royle & Mallor (2,950 0 0).

For erecting a dwelling-house and shop in Old-street, St. Luke's, for Mrs. Brain. Mr. Thomas J. Hill, architect.—

Table with 2 columns: Name and Amount. Includes Chessum (21,167 0 0), Rivet (1,023 0 0), Moreland & Burton (1,085 0 0), Perry (1,063 0 0), Henshaw (1,620 0 0), Ennor (871 0 0), Saley (931 0 0).

For alterations to White Horse Tavern, Fann-street, City. Mr. Thomas J. Hill, architect.—

Table with 2 columns: Name and Amount. Includes Fosse (4,340 0 0), Perry (335 0 0), Corbeldick (301 0 0), Tegg (237 0 0).

For new warehouses and offices, No. 61, Coleman-street, for Mr. Charles Tinserton, Mr. G. J. Lee, architect. Quantities supplied by Mr. T. R. Nixon.—

Table with 2 columns: Name and Amount. Includes Colls & Co. (22,180 0 0), Adamson & Son (2,137 0 0), Axford & Co. (2,100 0 0), Hart (2,060 0 0), Rider & Son (2,877 0 0), Winder (2,071 0 0), Gammon & Son (2,600 0 0), King & Son (2,471 0 0), Wells (2,460 0 0), Hill & Keddell (2,425 0 0), Conder (2,222 0 0), Wills (1,875 0 0), Crabb & Vaughan (accepted) (1,848 0 0).

For new 'stabling, Avenue, City-hill, Lower Newmarket, for Mr. J. W. Stelfox, Mr. G. J. Lee, architects.—

For alterations and additions to Fower Cottage, Kenton Town, to adapt the same as a Work Office for District No. 1, and a Labour-yard for the Parish of St. Pancras, Mr. E. C. Robins, architect.—

Table with 2 columns: Name and Amount. Includes Waters (22,400 0 0), Keeble (2,160 0 0), Palmer (2,167 0 0), Brass (2,419 0 0), Abbott (2,654 0 0), Till (2,026 0 0), Heming (2,000 0 0), Crockett (1,806 0 0), Newman & Mann (1,980 0 0), Crabb & Vaughan (1,888 0 0), Nightingale (1,873 0 0), Layley, Bros. (1,870 0 0), Kelly, Bros. (1,853 0 0), Mann (1,840 0 0), Nutt & Co. (1,790 0 0), Sorvener & White (1,789 0 0), Manley & Rogers (1,782 0 0), Sharpington & Coles (1,777 0 0), Thomas & Son (1,735 0 0).

For erecting a pair of semi-detached villas, at Hitchin, for Miss Hall. Mr. J. Chalcock, architect.—

Table with 2 columns: Name and Amount. Includes Butterfield (2,740 0 0), Jeeves (735 0 0), Stapleton (731 0 0), Ansell (719 0 0), Allen (accepted) (672 0 0), Allen (accepted) (670 0 0).

For alterations to 55, Old Broad-street, City, for Messrs. Somes, Bullock, & Co. Mr. Woodcock, architect.—

Table with 2 columns: Name and Amount. Includes Quantities supplied by Mr. G. Evans (1,935 10 8), Johnstone & Jeane (1,897 0 0), Gammon & Son (1,870 0 0), Carter & Sons (1,870 0 0), Piper & Wheeler (accepted) (1,824 0 0).

TO CORRESPONDENTS.

Agricultural Hall, Walsley.—The architect is Mr. O. B. Nichols. W. F. J. H. H. R. R. P. & Co.—I. O. R. J. W. P. & K.—L. M. H. C. P. J. P. P. H. W.—W. H. S. J. B. T. K. T. H.—Nestman M. G. B. A. M. R. E. O. H. A. F. J. S. R. W. E.—F. R. W. J. H. O. H. H. O. W. F. J. S. H. I. O. D. H. A. N.—B. K. L. K. R. E. Land-Agents.—F. K. H. W. R. A. T.—Messrs. D. T. J. H. G. J. L. H. H. (consult a proper person on the spot)—J. B. (next week).

NOTE.—Architects who are unwilling (as we are) that their names should not accompany lists of tenders with which they are concerned, may prevent the omission by sending a late themselves. We cannot repeat lists on the ground of such omission. We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not to be casually for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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[ADVERTISEMENTS.]

CHURCH, TURRET, and STABLE CLOCKS. J. W. BENSON, having erected steam-power and improved machinery for clock-making, at the Manufactory, Ludgate-hill, will be glad to furnish to clergymen, architects, and committees, Estimates and Specifications of every description of Horological Machines, especially cathedral and public clocks, chiming tapes on any number of bells. A descriptive pamphlet on Church Clocks post free for one stamp. Watch and Clock Maker by Warrant of Appointment to H.R.H. the Prince of Wales, and maker of the great clock for the Exhibition, 1862. 25, Old Bond-street, and 33 & 34, Ludgate-hill, E.C. Established 1749.

The Builder.

VOL. XXVI.—No. 1310.

Waste, Want, and Work.



ERTAINLY that intelligent foreigner who is always telling us that we are a difficult nation to understand, would be more puzzled than ever should he happen to be amongst us at this moment. London at this time offers a most singular philosophical study in what we will call the anomalies of civilization. Fourteen thousand people are living on the bread of charity at the East, whilst wealth and gaiety revel at the West. The "distress at the East-end" has become an annual crop, and, if some course "short, sharp, and decisive" be not taken, the state of affairs at that part of town will become one of the institutions of the country. Its influence is spreading and acting in an attractive manner; the tramping vagrancy of England is rolling towards the east, attracted by the very largeness of the charity that is hating with the native distress. Guardians are becoming helpless and paralysed, whilst the crew of *The Poor-law Board* are clearing the decks for action as against a second Lancashire famine. With respect to the staff that guardians are made of in general, and East-end guardians in particular, we must not be over-nice, nor expect too much. We dare say that Shadwell, Stepney, Poplar, and Bethnal-green acted as was their nature, and according to the light that was in them. Still, the wall of misery rose high, and the waves of destitution spread until a province in miniature was threatened to be engulfed. The question now is, what can be done for the permanent relief of the East-end? Let us look around us and see;—face the danger firmly.

A large army of the Will-nots, with a sprinkling of the Can-nots, is broken up into small detachments of fours and sixes, who parade the streets of the metropolis every day. We can hear them at this moment shouting their war-cry—"We've got no work to do!" From recently instituted inquiries, the proper rendering of the text in most instances should be—"We want no work to do." They generally disappear early in the afternoon, when, it is presumed, they have managed to scrape up enough to keep body and soul together until next day; and so they go on. This is a solution of the labour question that was never expected either by statesmen or philanthropists; a gradual gathering of all the able-bodied vagrancy of England into London every winter, to locate at the East-end, and extract a livelihood by the "got no work to do" plan, should everything else fail. Here we have the Lancashire abuses over again, and we must safely affirm that were work suddenly to become plentiful there would be an enormous percentage of this class of men who would not go near it as long as they could obtain a hand-to-mouth kind of existence by howling about the streets.

"How would you remedy it?" we fancy we should hear some one ask. Nothing could be easier if the public wished to be relieved from the double nuisance of the annoyance and scandal; and now is the time. If we are to have a "rate in aid"

for the special purpose of stemming East-end starvation, let us also have a "law in aid" for the purpose of stemming general able-bodied vagabondage.

London wants a new water supply that must come some time, either during the present generation or the next. London, too, is in process of rebuilding, and its highways and byways want increasing and widening and straightening. The water supply has been estimated at about seven millions, and the lines of communication for the metropolis would, for the next few years, absorb three millions more. Well, now, as posterity, which is on the road of the future, will find upon its arrival all these works for its benefit and enjoyment, minus the trouble and annoyance of making them, would there be any unfairness or unsound statesmanship in banding over to the said posterity a part of the cost along with the work? We think not. We have started this question as an argument amongst those whom the world recognises as "competent men," and have heard it warmly debated. We have heard Mr. Gladstone's widely-spread axiom quoted and—perverted. Reasoning by analogy is very pleasant cantering when you have a good level road, and the analogies run with their heads well together. It reminds one of the donkey-horsed, bare-back rider of the sawdust ring. As long as the wild steeds continue doing the stride nose to nose, so long will the rider perform you any number of amazing tricks; but let one steed only give a snort, shake his head, and throw back his ears, and you will soon see that the "hare-hacked phenomenon" has something more serious to attend to than dancing "Rob Roy" or "Tam O'Shanter" on the unsaddled one. So it is with people who take up the occasional Sibylline verses of ministers and ex-ministers, and imagine that such verses can be made by "analogy" to dovetail into anything that may be handy.

The story goes that Mr. Gladstone has laid it down as a State-finance axiom that every generation ought to pay its own expenses, and leave a clear ledger for the new-comers. No doubt but that, in the way which the ex-Chancellor of the Exchequer meant, the axiom is true enough; but to distort it and twist it into every possible shape and for every possible purpose, is both mischievous and absurd. As a great principle is involved in the proposition here laid down in reference to this very East-end labour question, it will be as well to be clear upon the point. The expenses of a nation, as of an individual, may be of many kinds, and may resolve themselves into the ephemeral and the permanent in the results obtained. For instance, the man who expends 500*l.* in a grand entertainment, is not in the same position as the man who buys a house with the money. When the money is expended and the feast eaten, the results are ephemeral; but with the man who has built the house the results are permanent, for the house has become property, and, when tenanted, will immediately begin the repayment of its cost. We are here assuming all other things to be equal; that is, that the first man could have done without the feast, and that the second man might have spent his money on some passing pleasure with a similar conclusion, and have been "no worse off."

Now, we will suppose that both these imaginary gentlemen have "posterity," and that they borrow 200*l.* each, shortly after spending which they die. But, the owner of the house has laid out his money in the enlargement and improvement of that "homestead," whilst he of the grand feast has merely supplied an unforeseen want, which some of the feast money would have provided had it not been all disposed of. Well, the "posterity" of each comes in for what is left. Surely the heir of the 700*l.* house can well afford, and would have no room to grumble to take up the 200*l.* mortgage to clear that

which he would not only enjoy himself, but would even pass on to his "posterity." The other party would not be in so good a position, because he would have to contribute towards the expenses of the spread of which he knew nothing, and could not possibly enjoy anything. It was ephemeral; it had passed away, and its pleasure with it; whilst the house on the opposite side of the question was in existence, paying rent, and would be permanent. And this brings us to the question of a rate in aid and public works in connexion with East-end, or any other chronic distress. There is no new political truth stated here; it is "as old as the hills," has often been used for other purposes, and elucidates the well-known principle of improving an hereditary estate, as the Marquis of Westminster is now doing in Pimlico, and many others are doing elsewhere. But there are many persons whose opinions on general subjects are entitled to much respect, who get on the back of some public man's dictum; they want every saying of their own to fit into the same harness, no matter what the difference may be, round or square, and, as they drive along at an immense rate, amid a perfect shower of flying sawdust, they exclaim,— "This is what we call 'reasoning by analogy!'"

We have at this moment a vast amount both of real and simulated destitution eastwards; an amount that has evoked a corresponding quantity of the charitable honny of the west. Such money is bringing no useful return; it simply feeds a large number of persons who are, perforce, idle; it is like that of the grand feast, will leave no permanent value behind it, beyond that of stemming starvation, which, we will admit, is something when taken by itself, but only then. Well, but employment for the same money would also stem starvation, and, like the outlay on the house already mentioned, would leave something permanently profitable behind it.

London wants re-arranging and re-whetting. Is it too much to ask that a rate-in-aid be established for the work,—to make a beginning,—and that it be so apportioned as to make "posterity" in due time pay a fair share of the cost of the regenerated and improved metropolis, which will be theirs as soon as they are ready for it? Why should we labour and smile not, nor rejoice, for the exclusive benefit of the ladies and gentlemen of the posterity train, and they to have nothing to pay? The principle is unsound and one-sided. We are aware of the argument on the other hand, that if ancestry had paid for all it had as it went along, we should not now be harassed in scraping up twenty-six millions a year as interest for the national debt. Our answer is, that ancestry should have attended to its own affairs, especially during the political dramatic era that was closed by the falling of the curtain of 1815. Ancestry sent its sons and its money to be wasted in war for people who despised it, who have long since repudiated being under any obligation whatever for such friendship, who have borrowed our gold and laughed in our face when payment was mentioned, and who have treated us very much like "the commonest dirt," whilst the posterity of the very people we tried to blow off the face of the earth are our fastest friends.

In 1826 we had to deal with a large area of distress, especially in the north-west, and public road-making was resorted to. The population of England and Wales at that time was about 13,000,000, more or less, whilst the total of the metropolis, suburbs included, was a little over 1,225,000. Profitable work had to be found then, and profitable work must be found now; the country is wealthy enough, and with some extra safeguards, the plan here sketched would be the most economical. A discussion has recently been going on about the income of the nation, and it has turned out that we have, as disposable money, every year, the enormous sum of 825,000,000*l.* Now it must

seem plain that if the nations of Europe would only agree to furl the flag of glory, and let the banner of peace permanently wave in the former's place, we could, all of us, do a great deal more in the way of preventing our several east-end distresses than we can now.

The first thing to be done is to ascertain from competent persons the more pressing improvements that are required in the metropolis, and obtain plans and estimates. Running on all fours with this, let a list of all the able-bodied men and boys applying for relief be made out; their age, where from, trade, how long in the present abode, when last at work, &c. In the meantime, Parliament must pass a *thorough, uncompromising Vagrancy Suppression Act*; one that can be unparaphrasedly applied to man, woman, and child, the hale, the lame, and the blind; one that could neither be evaded by the "We've got no work to do"ers, nor the "Fusses, a half-penny a-box" ontastors. All flimsy and colourable pretences for cadging, whether with a child in each arm, or three at the heels, should be relentlessly put down—down. The administration of our vagrancy law is not creditable to us. It is absolutely scandalous that the philanthropy of a private nobleman has to do the duty of the police in the conviction of barefaced street imposture. In no capital in Europe, and in no large towns, either in England or the Continent, does vagabondage and street ruffianism run the course of unchecked riot that they do in London. But, as the further consideration of this part of the subject at present would lead us out of our way, we will proceed in our proper direction.

Having got our organization of relief and repression complete, we might then begin to cope with the evil of distress and mendicancy, and to reduce it within reasonable limits. The infantile and the infirm aged should be cared for; but, with respect to the rest, work, unflinching work, or cruel, confinement, and hunger. When the "do-no-workers" begin to bawl their rounds, let them be immediately taken before the magistrate, and compelled to render an account of themselves. If they really had no work to do, send them where some could be had, if they were able to do it, and let very moderate wages be paid to them. With respect to the rising generation, who, half-naked and ignorant, infest our footways at every step, let them be all taken charge of, their parents, if any, "hunted up," and made answerable for their future good conduct, and those who have no friends put in the way of being trained. Can anything be more disgraceful than the fact of a whole army of vagabonds of all ages, amounting to many thousands, being permitted to render dangerous and almost impassable the principal thoroughfares of the metropolis of the world, and steadily recruit the ranks of the dangerous classes? It seems most belief; but it is so, and that, too, in the face of several Acts of Parliament, specially directed against such lawlessness.

When we have set up such an organization as this in motion, we shall have made a beginning towards the subversion of chronic East-end distress, and London vagabondage and street-rascality generally. Every able-bodied person, on applying for relief, whether to the parish or to private charity, should be able to read over the portals, "Work or Starve." But the work should be of a kind that would not uneducate the skilled, delicate hand, as it were, when the day of employment arrived. For instance, stone-breaking and oakum-picking would be almost permanent destruction to the highly-trained fingers of the scientific instrument maker, or in the more nicely-fitting parts of mechanical engineering. If a man has a wife and family, the public work wages resulting from a fair amount of industry should be sufficient to enable them to keep the Englishman's much-cherished home together until better work could be had. Another thing,—strict classification should be carried out, and decency enforced: the rough to the rough. The common language of a certain portion of the labouring classes, when they are conversing by themselves, is shocking in the extreme; oaths and abominable expressions nickerate every sentence. They are not entirely to blame for this. The want of an established system of national education for the children of the poor, the absence of a sound moral tone in the shop or the yard when the age of labour begins, the apparently utter indifference often shown towards them by those in whose interest they labour, and the wretched dens wherein they live, must be taken into account.

In consequence of the abundance of money that is finding its way from voluntary benevolent pockets to the scenes of suffering, the East-end is being literally flooded with the life-trained vagrancy of all England,—nay, to such an extent has this unexpected tide of cadgerly set in that single rooms in small tenements have risen in the market! Surely this ought to be put a stop to. Those who belong to the regular tramp-locust tribe may be refused relief of any kind beyond what will carry them out of the district. But then, in the absence of a common-sense vagrant law, see what a legion of rascaldom and imposture you turn loose all over the town! The seventy odd square miles of which London proper is composed would have gangs of "got no work to do" in every decent thoroughfare, whilst the "starving mother," with the twin babies that never grow bigger nor older, would bristle at every street corner. On the other hand, if the professional tramp and impostors knew that work of some kind must be done, that the streets were closed to their imposture, they would soon take some other course.

Whatever aspect this periodical East-end distress may ultimately assume, it will never do to feed twelve or fourteen thousand people every "now and then" winter without any productive result. If it be done, and some system of public labour be not organised with the heavy-handed repression of pure vagrancy, the East-end of London will be turned into the regular winter quarters of unmitigated imposture. The time to begin is now; sketch out the works that will be most useful, and have a commencement made as soon as practicable; let every able-bodied "distressed" know that—
"HE THAT WILL NOT WORK NEITHER SHALL HE EAT."

RAILWAY BOARDS, CONTRACTORS, AND SHAREHOLDERS.

It is a happy peculiarity of the English character that enables us to turn to good account a force which, in other countries, is for the most part merely disturbing or morious. We mean the force of public dismay. We have acquired the habit, first fully established during the Crimean war, of turning on any questionable points the full light of complete investigation. This method may be branded as commercial; it may be decried as forming no part either of the admitted government of the country, or of the organisation of the people in relation to their government. Still it exists, and not only so, but it answers its end. No doubt it was for the commercial purpose of increasing the sale, and augmenting the advertising power of the daily journals, that their proprietors went to the cost of sending educated men to procure reliable information wherever subjects of public interest were to be described. But the result has been far more than private utility. Exposures have become a terror to evil-doers in all directions. Very much, indeed, has yet to be done in the way of systematic searching for abuses; but let the abuse be of a certain magnitude, unconnected with political party or with great interests, and once brought to light, the investigation is likely to be probing and final.

For more than twelve months past the full force of public dismay has been brought to bear upon our English railway system. Not the full force of investigation, for as we write evidence is slowly collecting by Mr. Commissioner Winslow of a more reckless and unsparing mode of dealing with the property of deluded shareholders than has yet entered into the imagination of the most active Bear. A contractor quietly states that in September, 1866, he took certain works at the high prices which are likely to be imposed on those lines which pay for their construction not in cash, but in stock. In October of the same year these prices seem to have been augmented by some 20 per cent. Then he was allowed a commission of 25 per cent. for "placing" these shares. "He knew that in August, 1862, the A and B shares were treated as paid. That was subject to the deduction of 25 per cent. commission. In July, 1862, he proposed that he should receive a rebate of 50 per cent. upon the A shares in consequence of an agreement to postpone them. The directors replied stating that, however much they might regret the loss, they had no other course than to recommend the board to accept the offer. The rebate of 50 per cent. was in addition to the commission of 25 per cent., but under

existing circumstances the witness considered the arrangements fair and equitable."

The fairness and equity to the unfortunate purchaser of the A share would probably be to this effect. He paid 100l. in cash; of this 10l. went to the brokers and "rebates," amount to Balance of commission and "rebates," amount to 65l. This leaves 25l. for works; but, as it was "having regard to the fact that the firm was to receive payment in shares, which were to be taken at par," that Sir M. Peto "considered that the prices stipulated for were fair prices," we can hardly estimate the contractor's risk and profit at having been put at less than 40 per cent. on the schedule, especially after its increase in October 1860. Most likely 50 per cent. would be nearer the mark. The actual value, then, in land and works, which the unfortunate A shareholder has received for his 100l., will be from 15l. to 12l. 10s., a very satisfactory "b'porth of bread for the intolerable amount of "sack," properly so called, secured by the enterprising and adroit contractor,—from 697,000l. to 717,500l. out of the 825,000l. of the A capital. Shareholder and broker divide one-fourth of the United States' railroads, executing the work and making the market, and three-fourths go somewhere else. In this case it certainly would appear to an honest man not behind the scenes, that the gentlemen called directors are as much more blameable than the persons called contractors, as is the governor who betrays a fortress entrusted to his care more inexcusable than the captain of brigands or of free lancers who seizes the neglected stronghold. That, however, is not our present concern.

The attention of our readers will, no doubt, be curiously directed towards the further proceedings "in re Peto, Betts, & Crampton." We have referred to the case, not so much for its own importance, great as that is, as for the sake of giving some explanation of one or two round facts which are worthy of attentive study.

At the close of the year 1867, according to the report of the United States' Statistical Bureau, there were in those states 54,325 miles of railway, of which 38,605 miles were completed. The aggregate cost of the roads and their equipments was 1,654,050 dollars. Omitting the consideration of the unfinished lines, the average cost per mile of the United States' railways may be taken at about 42,000 dollars. In Pennsylvania, the leading railway state, the cost of 4,192 miles is given as about 222 millions of dollars, or 53,000 dollars per mile. The railways of the United States are, no doubt, of a rough and ready description; but when we come to remark on the sums expended on renewals and reconstructions in our own country, we shall find that we have not outstripped by any means built for eternity.

In Ireland, to June 30th, 1867, 39 railway companies have expended 26,652,433l., on 1,693 miles of line. The gross receipts for the year on this expenditure were 1,552,417l. The cost per mile was thus, in round numbers, 14,000l., each mile earning a gross amount, however, of a little under 1,000l. (975l.).

In Scotland, to June 30th, 1867 forty-nine railway companies have expended 55,921,649l. on 2,466 miles of line. The gross receipts for the year on this expenditure were 4,081,904l. The approximate cost per mile was 22,700l., each mile earning a gross annual revenue of 1,650l.

Up to the date of the last returns before us from France, the whole expended capital represented by shares and debentures was 233,000,000l., and the length of the lines of railway constructed was 8,134. The cost of these lines is thus about 28,500l. per mile. The net income is stated at 12,500,000l., or about 1,536l. per mile.

In England, to June 30th, 1867, 170 companies have expended 405,331,055l. on 9,634 miles of railway. The gross receipts on these lines for the year ending at the same date were 33,954,793l. The cost per mile was 42,000l., the gross earning per mile was 3,551l.

We thus find that the difference of cost between a railway in England and one in America is no less than the difference of value between a pound and a dollar. English railways have cost as many pounds per mile as American railways have cost dollars. The natural features of the countries are by no means such as to account for this enormous disproportion; in fact, the rule would appear rather to have been to ascertain how much the proprietary would in each case bear, and to spend accordingly. Thus, while English railways have cost almost exactly three times

the price per mile of Irish railways, and not far from twice as much as Scotch railways, their expenditure has been hitherto so far controlled as to allow (on the supposition that working expenses equal half the gross revenue) nearly one-half per cent. more return to the shareholders on the gross capital than that of the poorer sister countries. But in France the expenditure has been kept down so as to allow a return of one per cent. above that earned in England. It is clear to those who have practical knowledge of the railways under comparison that it is rather to investigations such as those which are now being conducted by Mr. Winslow, than to such as are carried on by Parliamentary Committees, that we must look for the explanation of the enormous additional cost of our English lines. Had they been kept down to the French cost they would now have paid all round 6½ per cent. Of course the consideration of the additional locomotive and carrying stock required for a larger traffic must not be lost sight of. But the revenue of the English lines, that is to say the measure of their need for working plant, only exceeds the revenue of the French lines in the proportion of 1767 to 1536, and this excess only regards the portion of the capital invested in working stock. The proportion of cost between the two systems is as 42 to 28½.

Now, it is on such a state of things as this that of late,—criminally late, but we trust not too late,—the force of public dismay has been brought to bear with a vengeance. The first result has been disastrous to an educated profession, to a great number of men who had risen to a mushroom wealth which has disappeared like those fungi themselves, and to a large and important body of English workmen; but it has been necessary, nevertheless. The railway system of this country is very far from having attained a development equal to the requirements of the day. It leaves room for a large and remunerative development of the requirements of the future. But it had been developed in the wrong direction,—for private, not for public ends,—for the benefit of lawyers and contractors, not for that of railway proprietors. Until this iniquitous development was checked, the constant swell in the tide of revenue was only made use of for encouraging expenditure and for facilitating the borrowing of capital. The better the return the wilder the extension. For this system to be put a stop to, for the capital accounts to be closed, for the actual state of things to be looked honestly in the face, and for the incessant pilferage of the railway proprietors to be stopped by the process of making them aware of what was going on, has been the function of the panic of 1867.

Already we are seeing results. The Great Eastern, with a diminished outlay, has earned some 30,000*l.* more for the second half-year of 1867 than for that of 1866. The Great Western, also, with a diminished outlay, 50,000*l.* more. With the steady increase of net revenue these companies are learning to struggle with that floating debt, in the permission or encouragement of the growth of which they were learning, at their proportionate distance, to emulate the borrowing states of Europe and of America.

It has been by the facility of borrowing money that the great vice of our own system has chiefly found opportunity to run riot. So long as the shareholder had to be asked for calls, so long was a certain check put upon expenditure. Most men have an instinctive dislike to be asked for money. Even those who part with it for the purpose of investment, are apt to ask for particulars in a manner that would be disagreeable to directors who had felt compelled to allow a rebate of 50 per cent. on A shares. Thus, in the early days of most lines, the constitutional forms of representative assemblies were kept up. The engineer of the line was invariably present at the half-yearly meetings, to throw the agency of his responsibility over the Board, and to take his proper share of badgering as to the progress of the works. But with the completion of the original lines, and with the expenditure of the original capital, crept in another mode of doing business. Men who were not asked at the moment to put their hands into their own pockets gladly compounded for immunity at the price of giving a tacit sanction to the borrowing, on the part of the executors who administered their joint property, of sums that were to be expended for the general welfare and prosperity. Few asked themselves the question of how far the half-year's dividend might have come out of the exercise of the half-year's borrowing powers. The dividend was a pleasant, tangible fact. The

increase of the capital was a matter of account. All men are not clever at accounts. Most men dislike them. So it came to pass that, without speaking of the floating debt, which, after all, is the main cause of the present cessation of dividends, the acknowledged debt which, under the forms of temporary loans, debenture loans, debenture stock, and preference capital, presses upon the original shareholders, is appreciably larger than their whole original venture. Of the total capital which, up to June, 1867, had been raised by 389 railway companies, amounting to 489,060,699*l.*, only the sum of 229,197,867*l.* was ordinary capital. The remainder was money borrowed or raised under one or another of the four above-named heads. On a property costing nearly five-eighths of the National Debt, more than half the value had been borrowed. This is the most favourable way of putting the facts. The proportion is that of 260,000,000*l.* of borrowed or preference capital to 230,000,000*l.* of original paid-up capital. Can we wonder that railway making became so lucrative a trade while the capital was so readily forthcoming from a confiding public? Can we wonder that, between landowners, lawyers, contractors, brokers, and others, the existing network of English railways has cost the respectable sum of 42,000*l.* per mile?

It is fair to mention that some, though not all, of our figures are taken from an analysis of the capital and revenue of the railways of the United Kingdom, drawn up by Mr. H. E. Bird, of Basinghall-street. Mr. Bird has continued the Parliamentary return of 1865 down to the close of 1867. The figures, so far as they go, appear to be reliable, and would have been a still more valuable contribution to our knowledge, if they had contained some information as to the distribution of capital, the cost of land, of works, of stock, and of legal and Parliamentary expenses. The natural result of Mr. Bird's figures (we will not say their object, but it looks like it), is to increase the feeling of dismay with which railway property is regarded. With an unsparring, but probably not with an unjust hand, the expenditure charged to capital is compared with the amount of ordinary dividend. "If the outlay commences at the same rate as heretofore, a great reduction, and in some cases an entire cessation of dividends on ordinary stock must be the result." In one sense this is a favourable mode of putting the case. The outlay has to be stopped, or has been stopped, and the dividends too. We have gone too far to be set right by a mere halt. We have, if it be impossible to retrace our steps, to wait till our friends come to our relief. Those friends are the travelling and freight-paying public. They are rapidly rolling up to the rescue.

The difficulties which oppose any attempt to speak with tolerable certitude as to the future of the railways of Great Britain arise chiefly from our ignorance of their exact condition at present. The floating debt is large, estimated at 20,000,000*l.*, although the cash in hand, outstanding accounts, and stores may go far to balance such a debit. Then, the question of the actual cost of working is one on which no definite judgment can be formed until the capital accounts are actually closed. Still, there is little reason to doubt the possibility of keeping the expenditure, exclusive of interest, beneath 50 per cent. of the gross intake. That income amounted, in 1866, to 38,164,354*l.*, being an increase of 2,274,241*l.* on the income of 1865. The net receipts are stated in the Board of Trade returns to be 4.04 per cent. on the paid-up capital. But notwithstanding the fact that the working expenses are only averaged at 49 per cent., the large increase in the traffic of 1866 is only allowed to have augmented the net revenue by the sum of 750,099*l.*, or from 15,602,582*l.* to 19,352,681*l.* As the latter sum gives a dividend only at the average rate of 4.04 per cent., it would seem, on the most unfavourable view, that an increased gross income of 10,000,000*l.* per annum would be requisite before railway capital, on the mean average, would pay 5 per cent., a state of things which, at the rate of the last year's increase, would not be attained before 1881. On the other hand, the several series, if acting in harmony may be expected largely to increase their receipts without any corresponding increase of expenditure; and if this expectation be fulfilled, the addition of four millions and a half to the nineteen millions of the present net revenue, which would be necessary to allow of the addition of one per cent., may be attained in the year 1870. With proper management, we hold that this date should be nearer the period of the resto-

ration of railway capital, taken in the gross, to the par value, than the more deferred period; but we place the limits and the dates before our readers, to enable them to form their own conclusions. In any event it can only go by a return to the former state of easy-going public indifference that the great railway revenue of Great Britain can be for the future diverted from the pocket of the shareholder to the hands of the schemer. In the check of profligate expenditure, in the exposure of the mode of "placing" and "rehabing" A shares, in the cessation of hostilities, and in the general attempt to look facts in the face, instead of striving to make them pleasant, we recognise the probability that a restoration of railway prosperity may yet be the result of the function of public dismay.*

ON THE ARCHITECTURESQUE.†

PART II.

If I have succeeded in conveying to you the precise meaning which I attach to the term *architecturesque*, it becomes my further task to pursue this idea from its direct application to architecture into its bearing upon other matters,—that is, upon certain other arts and kindred subjects which are more or less connected with architecture.

First, I will direct your attention to painting; and the question, of course, will be, What is the architecturesque in painting? My answer is this: The idea implies subordination to architectural forms and purposes in respect of painting applied to architecture. An architectural decoration produced by the painter may be, speaking in general terms, either suitable or unsuitable to the architecture; and, therefore, it will be so far either successful or unsuccessful in respect of the character of being architecturesque. A good illustration happens to offer itself at once. Two or three months ago an interesting communication was presented to the Royal Institute of Architects, by a painter, Mr. Scott,—of Edinburgh, I think. He had executed certain very noticeable decorative works on a considerable scale, in two mansion-houses in the northern part of the country, consisting of figure subjects, which were in themselves exceedingly well devised, well drawn, and well painted. He was able to show us in one case the actual pictures (they being on canvas, for being affixed to the walls), and in the other case he produced the full-size coloured cartoons; so that we were able to understand thoroughly what he professed to do.† One of these works was designed for the adornment of a central hall in a Classic or Italian mansion, the four walls being occupied by arched galleries, and the pictures being made to fill in the space between the arches and the entablature above, including the sprandrels formed by the meeting of the arches. The subject was found in the incidents of a Border ballad—one of the Percy ballads, I think; the series of paintings assuming a sort of panoramic form; and a very charming composition, as a whole, was the result of Mr. Scott's labour and skill. But some of us objected that, owing to the lower limit of the canvas being formed by a series of arches, the picture now and then appeared to be passing behind the arcade, the arches, in fact, constituting a succession of semi-circular gaps, cut out of the panorama. Others of us maintained that this was quite right, on the precedents of Giotto and other great masters. At all events, this was obviously a question of the very principle of which I am speaking; the real point was simply this,—whether the picture was treated architecturesquely or not; whether the figures were adapted to the forms of the architecture, so as to be in harmony with the architectural purpose. Although everybody was satisfied with the pictures as pictures, this was not all. We thought they had not been treated in an architectural spirit,—that is, in the manner which I venture to call the architecturesque manner. The same gentleman further exhibited, as I have said, another work. This consisted of figure subjects ascending an interior circular stair. The paintings were here in panels; the mode of designs was more or less Medieval; and they were, as in the former case,

* A slight modification was made by Sir M. Peto in his second examination. The first statement was that above cited; but on consultation with his painter, Mr. Betts, the hon. baronet corrected it to the effect that his firm ultimately took the A shares, not at 25*l.*, but at 37*l.* 10*s.* for the 1*st* share.

† See p. 169, ante. ‡ See pp. 31 and 73, ante.

exceedingly well done. But here another very curious principle came into view, quite as embarrassing as the line of arches.

Seeing that the subject was, so to speak, going up-stairs, and that the absolute horizontality and perpendicularity of nature are conditions that will not go up-stairs except by some artificial contrivance, the question was how should the designer treat his subject so as to make natural landscape accord with a circular stair. In a word, we occasionally found that he was treating his subject very satisfactorily, and occasionally it was not so: when it was architecturally treated it pleased; when not so, it did not please.

The landscape, for example, sometimes seemed to slope, in spite of itself, unnaturally, in accordance with the form of the panels. In other cases, it seemed to maintain its level and perpendicular in a sort of discord with the situation; and so there was a deficiency in respect of artificial adaptation to the forms and conditions of the architecture by which the composition, however admirable as works of painting, was placed at disadvantage,—picturesque work, but not architecturally.

Passing next from painting to sculpture, the idea in question is to a certain extent precisely similar. That is to say, when sculptural decorations are in panels, for instance, or spandrels, probably as *relievi*, we may say that, as in the case of paintings—indeed, even more decidedly so than in any case of paintings—it is necessary that the figures should be adapted conventionally, if you please to call it so, but beyond doubt artificially, to the forms of the architecture. Again, and this is the case of statuary used in what may be called a structural capacity; as, for instance, when a statue occupies one of a series of pedestals surmounting a colonnade or arcade, it is obviously essential that it should be posed in a particular way; for it takes the place of what, in another school of architecture, would be a pinnacle; and it is necessary that it should be treated architecturally,—or, I would rather say, architecturally. If designed with a great display of motion, or with fluttering drapery like the figures on Temple Bar, it is not suitably treated. It is, no doubt, treated sculpturally; but, as a portion of an architectural composition, not architecturally. As another example, it is even still more plain that when figures are used as brackets (as in the French roof-windows, &c.), it is absolutely necessary that they should be subordinated strictly and scrupulously to architectural forms and purposes; and this, once more, is the question of the architecturally in sculpture. Again, it sometimes happens that independent statues should be treated in the same spirit when placed in connexion with architectural work. To mention a second time the statues on Temple Bar, they are, as objects of art of the period, perhaps fine works; but, as statues encaased in architecture, they are wanting in architecturally repose. To turn to a modern example, you have perhaps seen the statue of Sir Robert Peel in Parliament-square, not yet unveiled, and you may have observed that it occupies a somewhat peculiar position. It is set down in front of a piece of railing. Seen from behind it will look—forgive me if I appear to fall into the diphany of British criticism,—but it will look very much like something in a cage, or perhaps in a pound; whereas, looked at from the front, the architectural critic, and even the sculptural critic, may be excused if he wonders how it is that a mere railing should be carried past the back of the figure without the slightest attempt to do what would be so easy, namely, to divert the pattern into some form calculated to harmonize with and enhance the sculptural effect. The railing in itself may be architectural enough; but why should it not serve to afford also to the statue the legitimate architecturally support due to the site?

Now, let us pass to a subject peculiarly well calculated to give us a clear idea of what I am aiming at,—namely, the architectural carving of natural objects, such as foliage. A more charming description of art, whether viewed by itself, for its own purpose, or for its architectural purpose, it is impossible to conceive; and I think we shall all agree that whatever may be sometimes said of the inferiority of various kinds of English art-workmanship, the high character of English foliage carving is unquestioned. Now, we all know that before natural foliage can be well or pleasingly adapted to architectural work it has to be in some degree conventionalized, in order to satisfy the critical

mind that it is not a mere portrait of a vegetable product, but a product of stone-working, hased only upon the nature-work which is copied. This, then, is architecturally conventionalized; and we are naturally led to remember how elaborately foliage was thus conventionalized by the ancient Greeks and Romans. With them, indeed, such foliage ceased altogether to be natural, and became architectural alone; and I think nothing can be a stronger illustration of the persevering resolution with which the Greeks, and, following them, the Romans, developed the architecturally principle. Here again, also, we have suggested to our minds the essential difference between the Classic and the Medieval schools of design; the Classic carving is more architecturally, Medieval more picturesquely.

Coming, in the next place, to decorative art, I need scarcely say that if the decorator, as a separate artist, is admitted into a building, to supplement the architect's work, he ought not to confine himself strictly within the limits of architectural motive. Observe in passing that the decorator's work is not architectural—it is not even architecturally, or even architectonic. But I certainly think that the term *architecturally* expresses with perfect fitness the adaptation of the decorator's work to the architectural and architectonic features. The other day, I stepped into the studio of my friend Mr. Owen Jones, whose felicity of design in decorative art has a world-wide reputation and I had a great treat, for he showed me a series of marvellous drawings whereby a whole house was to be decorated in his most elaborate manner—ceilings, walls, carpets, hangings, all harmonising in colour and form, and constituting one of the most exquisite sets of designs I ever had the good fortune to inspect. Now, what was the spirit which was actuating the artist in his design of all this? It was evidently this very principle of which I have been so long speaking,—the adaptation of all those various decorative efforts to one vital architectural purpose.

When we go again a little further, and look at the question of Furniture, we perceive the point quite as forcibly as ever. All the world knows that the cabinet-maker systematically objects to the architect's designs for furniture; and younger men may perhaps be persuaded by me when I tell them that whenever it is found that an objection of this kind is systematically and universally made by any class of tradespeople or others against the incidental demands of the architect in respect of what is their subject and not his own, it is a sure sign that the architect is going too far. Now, when cabinet-makers object to the architect's design for furniture the reason is this,—the architect in designing furniture is attending, no doubt loyally enough, to the architect's principles; but he fails to recognise the demands of the structural and other elements, and he treats his work *architecturally* when he ought to treat it only *architecturally*. Now, it certainly may be admitted that if furniture is to be adapted artistically to the features of the house it ought to be best done by the architect. In the abstract, the cabinet-maker himself will be ready to agree to that; but the architect must never attempt to treat the furniture as if it were architecture, for it is not architecture in any degree, but furniture altogether, and to adapt it to the architecture,—that is to say, to throw over it a mantle of what I call the architecturally,—is a more artistic task than any imitation of architectural forms can ever be.

The question of interior plan is one in which, the principle of which I am speaking comes very frequently into view. When one is designing interior effect,—an effective interior, as we are accustomed to say,—he is apt to think that it is a question of architecture and architecture only; but I think that, as a matter of experience, I have generally found that it was a matter of architecture directly to the features of the domestic arrangements to architectural purposes. Speaking not of great public buildings, nor of churches, where the interior is treated in a grand manner for its own sake, but rather of domestic and other more modest works, I think the first consideration in plan is obviously convenience; and therefore I say the motive is not architectural so much as architecturally which seeks to adapt this convenience to the purposes of architectural effect.

Let me allude for a moment to landscape gardening. This is acknowledged to be of two styles. One is called the Italian, the other the English. Italian landscape gardening is that which sprang up in the fifteenth and sixteenth centuries, the art having had no existence before

that time artistically; and the English that which has in this country and partly on the Continent supplemented and very much supplanted the Italian style within a comparatively recent period. In the English style, which is otherwise called the natural style, and which is in reality the picturesque style, formality is avoided, and little else than graceful irregularity is attempted to be produced, the ordinary effects of natural landscape being refined upon as the sole elements of effect. On the other hand, in the Italian style the principles are based upon regularity, symmetry, and system, in every form, of severe and often purely architectural strictness. The effect produced in either case may be very fine, but the two systems are essentially and entirely different; and, indeed, in connexion with the large mansions of wealthy owners, it is the rule for both styles to be introduced in separate portions of the grounds, for the express sake of their equal value,—the garden attached to one of the drawing-room façades of the house being perhaps laid out with perfect regularity in what is called an "architectural garden"; whereas, the land on the other side of the house,—that is, the park, shrubbery, and other ornamental grounds generally,—are treated in the English style, with everything irregular and picturesque natural. Here, then, we see contrasted the architecturally of the Italian garden and the picturesque of the English garden.

The Houses of Parliament, in respect of site, afford us, I think, a very fair instance of the application of the principle in hand. That building is one about which there will be probably much controversy in the future—more than there has yet been—not in respect of its authorship (which is comparatively immaterial), but in respect of its artistic value; but I think there is one thing we may all agree to declare,—that it is a building of exquisitely graceful design, and, if not academically sound as Gothic work (a proposition which, I think, may generally be accepted now),—a composition, nevertheless, in which the artistic sentiment of Sir Charles Barry took that particular course which was always characteristic of his genius—the architecturally rather than the picturesque. The great grievance of Gothicists in this case is, that the Gothic work does not follow properly picturesque models; hence the symmetry which severe Gothicism objects to; hence the uniformity which many others not Gothicists complain of. However, as regards its site, opposing the river shore from the building to the water had been irregular,—a mere sand-beach or something of the kind, or a bank tufted with shrubs, the effect of the building would have been very much inferior to what it is. But when the site is treated, as it is, architecturally by the formation of the long and unbroken terrace wall, with the unbroken line of lamps which in the evening forms so pleasing a feature with Westminster Bridge, also designed in adaptation to the building (not so much in respect of style, for that we need not look at, but in its treatment as an approach), you have only to turn to the picturesque sites of squalid buildings which extend westwards beyond the building, and there you see the effect of what is decidedly at the least a non-architecturally treatment of site. Again, the Thames Embankment in itself is interesting to us as architects in this precise way. As far as regards the formation of a new road along the river, that is only a matter of convenience; as far as regards the sanitary question of the contraction of the river current, that also is of course not a question in which we as artists take any special interest; but, looking upon the Thames Embankment in connexion with the buildings which will be erected along the line, then we perceive an instance of architecturally design, contrasting the new artificial elegance with the very natural and perhaps picturesque, but inelegant and unpleasing aspect of the former shore. We have another and a most admirable class of illustrations of architecturally sites throughout the Parisian streets. Whatever may be said on the monotony and sometimes feebleness displayed in the design of the Boulevards, there can be no doubt that, for classical artistic treatment of thoroughfares, Paris is perfection. Compare this with that academical system of Medievalism of which some of our friends appear at times to advocate a revival, saying, "Let us give up straight lines and squares; let us have piquant winding thoroughfares where we shall be constantly turning corners and coming upon fine things unexpectedly." That is no doubt good Medieval doctrine, sound picturesque; and I do not deny

that a town treated on that principle might be made extremely charming in its way; but all I have to do with it here is to offer it as a contrast to the Parisian system, which is the architectesque. Lastly, I may remark, that if the principle of the architectesque be what I have described it, how is it neglected in London? There is scarcely a public building which is even creditably disposed as regards the arrangement of site. As for the picturesque in site there is, of course, no attempt at such a thing—and even nature does not give us the picturesque by accident, except it be in Whitechapel. Compared with Paris everything in the London streets is almost sordid, certainly most remarkably devoid of the charm which attaches to liberal artistic effort. There is no attempt to support architectesquely even our most costly buildings. The Palace of Parliament itself, as regards the outlook upon the west, is in no less deplorable circumstances than if it were a gin palace: indeed, the magnificent Victoria Tower, the portal of sovereign majesty, actually looks down upon a petty tavern and a coal wharf! Surely, to surround such a building with some of those simple contrivances of site which I identify with the term architectesque would not be money wasted. On the contrary, a very slight homage to this principle would, in the case of most of our costly buildings, simply double their value. Therefore, if I am right in what I have been endeavouring to develop, it is, I think, extremely important that this principle of the architectesque should be thoughtfully studied by English architects. Pray consider that I have not myself been able to devote any very considerable study to the subject. I may be more or less wrong in much that I have proposed; I have had no authorities to consult upon the matter; moreover, I am speaking extemporaneously: what I have said is meant to be suggestive only, certainly not dogmatic. I am not in a position to offer instruction on such a subject, but only to submit reflections of my own upon a new theme, which I am sure will well reward careful study, and prove in every way worthy of intelligent development. ROBERT KERR.

LIFE AND DEATH IN OUR LARGE TOWNS IN 1867.

So great is becoming the aggregation of human life in our large towns that the death-rate of the nation may now be said to be governed by the mortality, and consequently by the sanitary condition, of our urban population. The Registrar-General's detailed Annual Report of Births and Deaths for 1866 has not yet appeared; a considerable time must, therefore, elapse ere we may expect that for 1867. However, the quarterly return for the last quarter of 1867, and the annual summary of the weekly returns for London and twelve other large towns of the United Kingdom, furnish facts sufficient for a general view of the vital and sanitary statistics for last year. The satisfactory conclusions to be derived from such a retrospect cannot but be gratifying to the inhabitants of those towns where recent sanitary activity has in a measure already reaped its reward, while it should stimulate the dawning energy in others whose past apathy is still reflected in excessive death-rates.

During the three years 1860-2, the annual death-rate per 1,000 in the population of England and Wales ranged so low as 21.2, 21.6, and 21.5; in each of the four following years it exceeded 23 per 1,000, in 1864, and, influenced by the cholera epidemic, 29.6, in 1865. Last year it fell again to 22.0,—a lower rate than in any year since 1862. The meteorological conditions of the year presented no unusual features, but were, on the whole, favourable to public health, more especially in large towns where the density of population and the combined effects of indifferent water-supply and imperfect sewerage render the inhabitants more susceptible of such influences. The mean temperature of the year at the Royal Observatory, Greenwich, was 48°6', which, although considerably lower than that of the two previous years, differed but slightly from the average of ninety-six years. In each of the first three quarters of the year there was a slight excess of temperature; while the last quarter of the year, although unusually cold, was not unfavourable to the public health, as there were no continued frosts. Rain was abundant, measuring 28.4 in. for the year, and nearly 4½ in. above the average of the twenty-

eight years 1840-67. There was during the year an unusual amount of wind, the average daily amount of horizontal movement of the air being 283 miles, against 248, the average in the twenty years 1848-67, and higher than in any year since 1848, when it was 318 miles per day. The year 1867 had a winter without continued, although severe, frosts; a summer unmarked by excessive heat; a fully abundant fall of rain; and a more than average amount of movement in the air. These conditions in great measure account for the low death-rate of the year, which cannot be entirely attributed to the recent rapid increase of sanitary knowledge and activity.

The Registrar-General's annual summary for 1867, just published, gives instructive details of the births and deaths in London and twelve other large towns of the United Kingdom, estimated to contain in the middle of that year the large population of over six millions of persons. Of these, half inhabit the metropolis, a million are shared between Dublin, Edinburgh, and Glasgow, and the remaining two millions are divided among nine large cities and boroughs of England. The total urban population of England and Wales, including all the large town districts, must last year have numbered at least twelve millions, even at the same rate of increase that prevailed between 1851-61, whereas there is every reason to believe that the aggregation to purely rural districts, has proceeded still more rapidly since 1861 than in the previous decennial period. For the purposes of comparison, however, the figures published concerning the six million persons inhabiting these thirteen large towns, including London, are fraught with considerable interest.

These thirteen large cities and boroughs were estimated to contain 6,187,764 persons at the middle of the year 1867. During that year 230,199 births and 155,943 deaths were registered, giving an annual birth-rate of 37.3 per 1,000. In the whole of England and Wales for that year, including alike the town and country districts, the birth-rate for the year was 35.8. Setting aside Dublin, where registration, more particularly of births, is yet in a most defective condition (showing as it does, a birth-rate for the year of only 25.9 per thousand, and an excess of deaths over births), the death-rate for the year in the other large towns varied from 36.4 and 36.6 in Bristol and London, to 41.3, and 44.3 in Sheffield and Leeds. These excessive rates in Leeds and Sheffield suggest the probability, strengthened by local evidence that the estimated population of these two towns is below the actual population; the effect of this would be to exaggerate both the birth and death rates, calculated by means of the estimate. These estimates are framed upon the assumption that the rate of increase in the population of each of the towns since 1861 has been the same as prevailed between the census of 1851 and that of 1861. Many of these towns are the centres of some one or other of the manufacturing districts, and their populations are subject to excessive fluctuations dependent upon the flourishing or depressed condition of their particular manufactures. The American war, for instance, producing the cotton famine, at the same time infused most unusual activity and prosperity into our woollen districts. Thus a considerable portion of the unemployed population of the Lancashire cotton towns were attracted by the increased demand for labour in the Yorkshire woollen towns. Thus are the estimates for particular towns and another rendered inaccurate, and the accuracy of calculated birth and death rates disturbed. Nothing short of a quinquennial census for, at least, all the large towns will give a sufficiently trustworthy basis for sanitary statistics, which are now studied so carefully throughout the country. France, with a population comparatively stationary, has long had a quinquennial census. Why should England, where the increase is so much more rapid and variable, only have its people numbered once in ten years?

In the thirteen towns above mentioned the 155,943 deaths registered during last year showed an annual death-rate among these six millions of inhabitants equal to 25.3 per 1,000. This was 1.4 per 1,000 above the rate in the twelve millions inhabiting all the town districts, and 3.3 above that for the whole of England and Wales for the same period. The following table showing the death-rates in each of the thirteen towns for the three past years, considered with reference to the known amount of sanitary work done in recent years in the different towns, is highly

instructive. The towns are arranged in the order of their death-rates for 1867, from the lowest.

Annual Death-rate to 1,000 Persons living in the Years 1865, 1866, and 1867.

	1865.	1866.	1867.
London	24.4	28.5	23.0
Bristol	29.5	24.9	23.1
Birmingham	24.6	24.0	24.3
Sheffield	27.0	29.1	24.7
Hull	27.3	24.6	25.0
Leeds	31.0	32.5	27.0
Dublin	25.8	28.5	27.1
Edinburgh	28.1	27.4	27.1
Salford	29.3	29.0	25.6
Glasgow	32.9	29.6	28.5
Liverpool	36.4	41.9	29.8
Newcastle-on-Tyne	29.2	32.1	30.8
Manchester	33.0	32.0	31.4

Before proceeding to consider some of the details of the summary bearing especially upon London, let us glance at a few conclusions to be derived from the foregoing table. Setting aside the mortality from cholera in 1866, which was purely exceptional, and made an addition of 1.8 per 1,000 to the mortality for that year, the death-rates from ordinary causes will remain for that year but little in excess of that for 1865, and still shows an important reduction in the rate for 1867. The rates in Bristol for the three years were almost stationary, and place that city very nearly at the top of the list for each year: summer diarrhoea and a few cholera cases somewhat raised the mortality in 1866. In Birmingham the rate scarcely varied at all in the three years: the low death-rate enjoyed by this town, notwithstanding a considerable mortality each summer from infantile diarrhoea, and a recently increasing fatality from scarlatina, whooping cough, and other infantile zymotics, is strong evidence of the natural sanitary advantages possessed by this town. Sheffield, during 1867, showed a marked improvement upon the two previous years, while in Hull the decrease of the death-rate commenced with 1866. It is to Leeds, however, that the advocates of sanitary reform can most confidently point, in proof of what may be done by well-directed and continued efforts in that cause. The death-rate in Leeds in 1865 was 31.0 per 1,000; in 1866, through a somewhat more severe epidemic of summer diarrhoea, although there was no cholera, the rate increased to 32.5, but fell to 27.0 under the régime of a new medical officer in 1867. Since the beginning of this year the continued decline in the death-rate of Leeds is still more remarkable. Edinburgh, Glasgow, and Salford each show a small but continuous decline in the death-rate in each of the three years. The success of recent earnest co-operation on the part of the municipal authorities in Liverpool with their zealous health officer appears to have borne fruit. The death-rate in that town, which in 1865 was 36.4, and influenced by the cholera epidemic, rose to 41.9 in 1866, fell last year to 29.6. The continuous decline of the proportion of deaths from zymotic diseases, and especially of still more considerable reductions in the present and succeeding years. Of the last two towns on the list, with their steadily maintained excessive death-rates throughout the three years, what can be said? Their example is perhaps useful, but at too terrible a cost of human life, to show the result of apathy in dealing with these important sanitary problems. The cases of these two towns are very similar. In Newcastle, a continued mortality from typhus and typhoid fevers, with a more than usually severe epidemic of scarlatina, helped to make up the high rate for the three years: it was not till nearly the end of 1866 that the town appeared to awake from its lethargy, and if the death returns for the past ten weeks of this year may be taken as evidence of its improved health, we may hope for a more favourable return for 1868: no officer of health has, however, yet been appointed. In Manchester the same class of diseases has produced the same results as in Newcastle. We are glad to hear that an Officer of Health has been appointed, and we shall hope to see the sanitary horizon clearer before long. Since the beginning of this year the mortality in Manchester has continually exceeded that in any of the other large towns furnishing weekly returns, and fever in various forms, besides scarlatina and whooping-cough, have been continuously and fatally prevalent.

London was healthier in 1867 than in any year since 1860, which was exceptional, inasmuch as the summer of that year was remarkably cold and wet, and there was in consequence an almost entire immunity from the usual mor-

tally from summer diarrhoea. The death-rate in London in 1867 was 23.0 per 1,000. Notwithstanding the great excess in the female population of London over the males, the male deaths exceeded those of females by nearly 2,000; the death-rate for the year among males being 25.3 per 1,000, and of females only 20.9. To the dwellers in this metropolis, who have been somewhat groaning in recent years under the weight of the extra millions that have been added to the local taxation for the payment of the Main Drainage Works, it should at least be some satisfaction to be able fairly to assign some portion of the improved health of London to the operation of this vast system of sewerage. The worst part of London, by which we mean those parts most densely crowded with the poorest classes, such as St. Giles's, St. Luke's, Whitechapel, &c., enjoyed death-rates in 1867 which bore favourable comparison with some of our provincial towns. This is also in a great measure due to the effective working of the system of health officers, who, although in many cases overburdened by far too large districts, are surely effecting a radical improvement in the condition of some of the worst localities which formerly contributed so largely to swell the death-rate for London. We gave details, with reference to London in our last, and need not repeat them.

Of the total 70,538 deaths registered in London in 1867, the causes were recorded of 69,757. More than a fifth of the whole, 15,027, were referred to zymotic diseases, principally to one or other of the following diseases:—Typhus, small-pox, measles, scarlatina, whooping-cough, and diarrhoea. This class of diseases is almost entirely within human control. In 1865, the deaths referred to these causes were 18,058; and in 1866 (including 5,577 from cholera), 23,680. Not since 1860 have the deaths in London from zymotic diseases been so low as in 1867. The only disease of this class which showed an increase in 1867 was small-pox, which was fatal in 1,332 cases; this number although slightly below that in 1866, was far above the average of recent years. The mortality from typhus has shown an almost continuous decline since 1862.

On the whole, as far as London is concerned, the return for 1867 is certainly satisfactory, and seems to indicate a still greater prospective improvement in the health of its residents. The great sanitary problem remaining to be solved for the metropolis is, doubtless, the water supply. That Londoners will long be contented with the present systems is scarcely creditable, after the light which has recently been thrown upon the indubitable influence of the quality of water upon public health. There is little doubt but that with an adequate supply of pure water, London would be one of the healthiest cities in the world.

MANCHESTER TOWN-HALL COMPETITION.

THE following is a list of the designs sent in by the architects selected by the corporation with the assistance of Mr. Godwin, in the first competition, pointed to by mottoes or symbols only in the report of the referees in the second competition, which we append:—

1. "Arnolfo di Lapo," Mr. Cuthbert Brodrick (architect of the Leeds Town-hall).
2. "Faire sans dire," Mr. T. H. Wyatt (architect of the Liverpool Exchange).
3. "Fides," Mr. Lee (London).
4. "Sperandium," Mr. J. Scott (London).
5. "St. Valentine," Mr. Waterhouse.
6. The Masons' symbol of crossed triangles, Messrs. Speakman & Charlesworth (Manchester).
7. "True to the line," Mr. Thomas Worthington (Manchester).
8. "Valentine," Mr. Salomons, (Manchester).

Dear Sir,—We have been honoured by the instructions of the Town-hall Sub-committee for the erection of a new Town-hall in the city of Manchester, dated the 20th February last, and conveyed through you, requesting us to furnish our opinion generally on the plans sent in by the eight competing architects, and especially with reference to the matters therein specified. (Mottoes of designs)—1. "Arnolfo di Lapo," 2. "Faire sans dire," 3. "Fides," 4. "Sperandium," 5. "St. Valentine," 6. "Masons' symbol of crossed triangles," 7. "True to the line," 8. "Valentine." We have accordingly examined with very great care, the several drawings, and read the explanations of the designs drawn up by the architects, and we beg to report as follows:—

1. As to the comparative merits of the designs in an architectural point of view, having regard to the form of the sites, the lines of the adjacent streets, the climate of the district, and the purposes for which the building is

required, we are of opinion that the designs No. 6, No. 4, No. 7, and No. 8 are, as works of art, the finest designs of the whole series; and, with regard to relative merit, may be considered to stand in the order in which we have here placed them.

2. As to general arrangements and convenience, having regard (amongst other matters) to the simplicity of plan, the facilities of access to the different parts of the building, the entrances for the different streams of visitors, the position and conveniences of staircases with a view to the avoiding of unnecessary walking inside the building, the provision made for getting down and taking up visitors arriving or departing in carriages, and also for the entrance of carts, and for the loading and unloading thereof; also, the convenience and character of the Mayor's reception-rooms, and the arrangements made for keeping the same distinct from the business portion of the building; and also whether the whole of the accommodation asked for in the Corporation was being provided, and the extent of unappropriated space: we are of opinion that the first place ought decidedly to be given to No. 5; the two next best designs being those of No. 6 and No. 8.

3. As to the expediency of window light supplied throughout the building, we consider the design of No. 5 best.

4. As to the provision made for ventilation and warming, we consider that all the designs would admit of the adoption of proper artificial systems of warming and ventilation; and that, owing to the open arrangements of the interior courtyards in this plan, the design of No. 6 would be best as regards natural ventilation.

5. As to the acoustic properties of the large hall or room and the council chamber, we are not prepared to give any decided opinion on this head.

6. As to the cost of the design, and the probability of the same being carried out for the amount stated by the architect, we are of opinion No. 5, No. 8, and No. 7 are the least costly of the designs submitted; and that the expense of carrying either of them into execution would probably not exceed the sum named in the instructions to the competing architects.

The conclusion at which we have arrived, after a careful adjustment and comparison of the various designs, on the plan and arrangement, light, construction, excellence of the interior courtyards, and the position of the spare room, is, that the four best designs in order of merit are 1st, No. 5; 2nd, No. 8; 3rd, No. 4; 4th, No. 7. And we both concur in recommending that the design marked "St. Valentine" (No. 5) should be recommended by the sub-committee to the mayor and corporation for adoption. The architectural character of this design is, as we have said, not quite so good as that of the others; but the plan has such great merits, it is so admirably and simply disposed, and so well lighted, that we cannot but feel that it is thoroughly suited to the first place. The general disposition of the masses of the building is simple, compact, and there is much dignity about the treatment of the principal story towards Albert-square. We are bound to say that in some respects the design appears to us to require additional study and modification, of which it admits without difficulty. The great entrance requires better proportions, more light, and greater dignity, and the designs for the clock tower and the angles between them towards Albert-square will, doubtless, be modified and improved by the architect, before they are carried into execution. We regret very much that the interior courts of this building (as indeed those of almost all the designs) have not been more carefully designed in regard to their appearance. They will be seen by most visitors to the building, as the whole of the corridors open into them; and as they are all as spacious and open as could be carried on the site, it seems a fatal mistake to leave them entirely unadorned. Mr. Waterhouse's design, in this respect, character is what they require, and there is no reason why they should not have it. The character of the building as a work of art depends very much upon its being uniformly good throughout.

We cannot conclude without saying that all the competitors appear to have bestowed immense pains on their designs for this very important work, and that the requirements contained in the instructions have been generally very carefully attended to.—We remain, dear sir, your very faithful servants,

THOS. L. DONALDSON,
GEORGE EDWARD STREET.

To the Town Clerk,

SIR,—The subject of the new town-hall is exciting considerable interest down here; but the public in general seem to know very little as to the real state of the case, therefore rumour is busy in a thousand forms. The report of the appointed judges has appeared in the papers, and the name of Mr. Waterhouse has been given as the one recommended to the council for the carrying out of the work. It is to be hoped that (previously to the decision being come to by the council) as to whether they follow the recommendation of Messrs. Street and Donaldson or not) the designs of the architects will be thrown open to the public, so as to elicit the opinion of the community. A MANCHESTER CITIZEN.

SIR,—I am not an architect, have not seen any of the designs, nor do I know who are the competitors, with the exception of Mr. Waterhouse, whose name has been made public. My objections to the report, which seems very inconsistent, are, therefore, entirely resting upon the report itself. In No. 1 of my report, Messrs. Donaldson and Street place Mr. Waterhouse's design, No. 5, as the fourth best according to the merits of the designs in an architectural point of view, having regard to various important points named in the purpose for which the building is required. Now, I think that this admission ought to exclude Mr. Waterhouse altogether from the competition, as there are three other designs, according to the report, which have higher merit in an architectural point of view, and are better adapted for the purpose for which the building is required, these being, in my opinion, the two most points we have to look to. As to the greater merit of the design of Mr. Waterhouse, No. 5, as it is said in the report that all the designs would admit of the adoption of proper artificial warming and ventilation; and, in my opinion, it matters very little whether the ventilation is natural or artificial, as long as the artificial venti-

lation is as good as the natural. In No. 6 of the report, Messrs. Donaldson & Street express their opinion that the least costly of the designs submitted, and that the expense of carrying either of them into execution would probably not exceed the sum named in the instructions to the competing architects. May I ask Messrs. Donaldson and Street whether the architects of the other designs have exceeded the sum named in the instructions, and if not, why they are considered less honest or less competent to make correct calculations than the above-named three? We know from experience, of at least one of these, that he is not infallible in making estimates, and the new Assize Courts. At the conclusion of their report, Messrs. Donaldson and Street say, that Mr. Waterhouse's design, which they recommended for adoption, requires additional study and modifications (i. e., alterations and improvements)—1st in the great entrance; 2nd, in the great clock-tower; and, 3rd, in the angles of the principal front. Therefore the three most conspicuous points in the whole building, as far as the exterior is concerned, are considered bad. If the other architects would be allowed to make alterations of equal importance to their plans and designs, after the various defects had been pointed out to them, I think that the few advantages in Mr. Waterhouse's design, which are mentioned in Nos. 2 and 3 of the report, would very soon disappear.

COMPETITIONS.

Proposed Infirmary at Highgate, for the Parish of St. Pancras.—The designs by a selected number of architects, referred to in our pages recently, were sent in on Monday, the 2nd. The guardians have awarded the first premium (150*l.*) to Messrs. John Giles & Co. The building is to accommodate 500 patients, and the estimated cost is about 53,000*l.*, exclusive of external drainage, boundary-walls, and fittings. The second premium (100*l.*) is given to Mr. Burden; and the third (50*l.*) to Mr. E. C. Robins. A correspondent complains that "the designs were sent in on Monday; were opened on Tuesday; and the report of the committee was printed and confirmed by the Board by Thursday Board meeting." Certainly very quick work.

Asylum for Imbecile Poor, Levensden-Woodside.—The designs for this building (ten, we believe) were sent in to the officers of the Metropolitan Asylum District Board on the 2nd inst.

Designs for a similar building, for a similar purpose, to be erected at Catterham, were sent in on the 9th inst.

Darlington Workhouse.—Eighteen sets of designs, in all 116 drawings, were sent in for this workhouse, and the guardians, after consulting with an independent architect from London, awarded, as we have already mentioned, the 1st premium, 40*l.*, to Mr. Adams, Stockton. The 2nd premium, 30*l.*, has been awarded to Mr. Stanger, of York; and the 3rd, 20*l.*, to Mr. R. B. Dixon, of Darlington. A correspondent asserts that "to carry out the selected plan will entail a cost of about 14,000*l.*, instead of the 10,000*l.* proposed."

Worcester Orphan Asylum.—The competition for this building, the advertisement of which appeared in the *Builder* of August 17, 1867, has resulted in the selection of a design, the joint production of Mr. William Watkins, of Lincoln, and Mr. S. Dutton Walker, of Nottingham. There were twenty-three competitors. As regards external treatment, economy being a great consideration, the little stone-work has been introduced, but the effect had been sought by means of a broken "skyline," and by the introduction of Staffordshire blue brick bands or strings of character being given to the building by the adoption of the Early Gothic style. The building is designed to accommodate twenty-five girls and twenty-five boys, with arrangements for extension, so as to receive conveniently double that number when required. The material chosen is red brick and Bath stone. The estimated cost is 4,000*l.*

St. Andrew's, Hertford.—Fourteen designs have been submitted, and are now in the Shire Hall. A meeting will be held on the 20th to make the selection.

New Cemetery, Diss.—The amount already expended in purchase of land, drainage, and other matters connected with the new cemetery is 850*l.* The design of Mr. J. T. Musket has been accepted, and the premium of 10*l.* awarded to him, and he has received instructions to prepare specifications for the chapels in accordance with his design: the cost not to exceed 850*l.* A premium of 5*l.* has been awarded to Mr. H. G.

* *St. Pancras Infirmary.*—Mr. Knightley writes,—"Will you kindly say that I was one of those chosen to compete, and that my design was selected for the first premium and for adoption; but, it being found that my estimate and description were not sent in till Tuesday morning, instead of Monday evening, the chairman ruled that I had put myself on foot, and so it was decided. It seems hard to be turned out for so small a matter." † See p. 167, ante.

Bishop, for the pains he has taken in preparing plans.

Slough New Parish Church.—According to the *Parish Magazine*, the following architects have been selected to compete for the design of the proposed new church.—Mr. Alfred Bedborough, Southampton; Mr. R. Brandon, London; Mr. Biggill, London; Mr. Conybeare, Westminster; Mr. Edgington, Windsor; Mr. Francis, London; Mr. Fowler, Louth; Mr. James, London; and Mr. Seddon, Westminster. It has been resolved by the committee to have the designs sent in under mottoes, and to offer 50*l.* premium for the best design, and 25*l.* for the second.

Kensal New Town.—An anonymous gift of 4,000*l.* was recently made to the Bishop of London's Fund for the purpose of erecting a church in Kensal New Town. The carrying out of the donor's intention was undertaken at the request of the Bishop's Fund Committee, by the London Diocesan Church Building Society, who invited a few architects to submit designs. Out of four sets of drawings sent in, the committee have selected the design submitted by Mr. Basset Keeling, under whose superintendence it will be at once carried out. The church will seat 800 adults, and the inclusive cost (site only excepted) will be covered by the amount above stated.

WAKEFIELD FINE-ART AND INDUSTRIAL INSTITUTION.

THIS Institution is to be opened in April. It is the outcome of the Exhibition of 1865. There were, as our readers will remember, many suggestions as to the application of the 3,000*l.* surplus which the Exhibition left in the hands of the committee of management, and for a full year they were all carefully considered, and the result was a determination to found a Fine-Art and Industrial Institution. The purchase of the old national school and the adjacent land, in Bell-street, followed; and the assistance of Mr. Watson, architect, was obtained to adapt the building to its new purposes; and contracts were entered into for the alterations. The building has good street frontages. The old national school had not much architectural beauty to recommend it. Notwithstanding its massive portico, ugly woodwork had been too barge-board to apply to it; but the alterations that have been made, and are making, promise to render its aspect, externally, not wanting in congruity with its uses. The portico is retained; and round-arched windows are opened, one on each side; and the roof is finished off with light ironwork. Opening out from the hall, one on each side, are rooms—the one to be appropriated to the library, and the other as the council-room. Passing forwards through the entrance-hall we enter a spacious hall, which is to be the museum; and beyond that again is another hall, to be used as the School of Art. These rooms have no side windows, but are lighted from the roof. The contractors for making the alterations are, Mr. George Fawcett, mason's work; Messrs. Heaps & Robinson, Leeds, ironwork; Mr. Speight, joiner's work; Mr. T. C. Tattersall, the plaster work; and Mr. Craven, the plumbing. The committee have obtained a master who will give the Wakefield School of Art a position.—Mr. Walter Smith, the head master of the Leeds School of Art, who is well known as a successful teacher, and who is an earnest student, of his art.

THE CASTLE OF COUCY.

COUCY-LE-CHATEAU, LOWE BIRD CASTLE, are built upon and completely occupy the somewhat irregularly-shaped but level summit of a promontory of chalk, the eastern part or root of which is connected with the high land of the upper forest of Coucy, while towards the north and west the termination of the platform stands out boldly and abruptly, from 150 ft. to 200 ft. above the fertile valleys on either hand, whence spring the tributary waters of the Lette, a stream which flows down from the ancient city of Laon to reach the Oise at Manicamp.

The valleys immediately below and commanded by the castle bear marks of high and early cultivation, and no doubt contributed largely to its support. More distant, chiefly on the eastern and northern sides, are the immense woodland tracts of the high and low forests of Coucy, St. Gobain, and Monceau, while to the

south are those of Pinon and Mostier. Occupying fertile spots amidst these forests were the abbies of Nogent, St. Nicolas, Barizy, and Prémontre, where was the burial-place of the de Coucys, and the remains of which religious houses are interspersed with those of the castles of St. Gobain, Folembray, Anizy, La Fère, Pinon, and many others, showing the value attached to this tract of country by the jealousy displayed in its defence.

The etymology of Coucy has not been explained. The district in which it stands was known as Le Meze in the sixth century, and Coucy was probably included in that part of it granted by Clovis to St. Remi for the archiepiscopal see of Reims A.D. 500. In 909 it was piscopal see of Archbishop Hervé, who, moved in the hands of the Norman, here first built the castle known henceforward as Coucy.

Whatever may have been the particulars of this fortress, its area must have been identical with that of the later work, governed by the configuration of the ground; and, whatever may be its construction, its position could not but endow it with strength and importance. It became at once a place of note, and was so coveted by Herbert Count of Vermandois, that he caused his son of five years old to be elected archbishop, and administered the temporalities of Reims in his name. Here he imprisoned Charles the Simple, whom he sold to his rival king for the county of Laon. Nevertheless, in 930 Hervé was forced to give up Coucy to Boson, brother to Raoul, king of France. Boson was slain before St. Quentin in 931, and, after a century of vicissitudes, the domain, held by a more quiet-temper of the church, was in 1037 the signory of Alberic, the founder of the heronial name of Coucy. It is uncertain whether Alberic was of the family of Eudo de Chartres or that of the Counts of Vermandois. By marriage he added Amiens and its grand adjacent castle of Boves to Coucy, and is thought to have founded the abbey of Nogent-sons-Coucy.

Alberic was succeeded by his son Enguerrand, Sieur de Coucy, Count of Amiens, and Lord of Boves. He married Ada, heiress of Letard de Roucy, Lord of Marle, second son of Gilbert, Count of Reims, with whom he acquired Marle and La Fère. He is thought to have first assumed the well-known armorial bearings "Barry of 6, vairé and gules." He died 1116, leaving Thomas.

Thomas de Marle, de Coucy, his son and successor, long in rebellion against his father, bore a bad name for violence. He lost Amiens; but, again by marriage, acquired Crécy-en-Serre and Nogent. He died 1130.

Enguerrand II., known as Le Sire de Coucy—this title, it is said, denoting the lord of an allodial fief,—beld also Marle, Crécy, Verme, Pinon, and La Fère, in which latter castle he defended himself with success against Louis le Gros and Raoul, Count of Vermandois, in 1132. His reign was one of peace and justice.

This Enguerrand is said to have slain in personal combat a ferocious beast, called a lion, that infested the neighbourhood; and this tale is no doubt the origin of the lions which were used by the family as crest and supporters. Such tales were common in the twelfth century, only the scene of the exploit was usually more safely laid in Palestine. This combat was commemorated in a bas-relief over the door of the keep at Coucy, and was probably the foundation of a singular ceremony which only ceased at the revolution. "Thrice annually, at Easter, Pentecost, and Christmas, the Abbot of Nogent, or his attorney, entered Coucy by the lower gate, a whip in his hand and mounted upon a croppered and doctailed bay. On his pommel was suspended a seed-bag of white linen filled with wheat, and in a basket certain crescent-shaped cakes stuffed with minced veal, cooked in oil, and called rissoles, probably the earliest mention of a dish which has descended to our own times.

Behind the abbot came a red dog, also with cropped ears and tail, and having a rissole suspended from his neck. This singular procession then entered the castle, and at the base of the keep the abbot made the circuit of a central and three lesser couchant lions there carved in stone, and afterwards embraced the larger beast. This done he offered the cakes in homage to the lord, who distributed them to the people, and then witnessed the record of the homage by affixing to it a special seal, representing a mitred and crosiered abbot, having for feet the hoofs of a huck. A representation of this ceremony in tapestry long adorned the walls of the

castle, and is thought to have been taken into Lorraine after the marriage of a later Coucy with a daughter of that house.

Enguerrand II. died while on a crusade in Palestine about 1145; but his body was laid in his abbey of Prémontre, near the castle, where his effigy remained in 1632.

Raoul de Coucy, son and successor, was under age at his father's death. He married, about 1169, Agnes of Hainaut; and secondly, Alix, niece of Louis-le-Jenne, and sister of Robert de Dreux. By this match he connected himself with the blood royal. He accompanied Philip Augustus to Palestine in 1188, and fell before the walls of Acre in 1191. He was buried at Foigny, and his son by Alix was his successor.

Enguerrand III., called the Great, Lord of Montmirail, Oisy, Crèvecœur, la Ferté-Ancueil, la Ferté-Gaucher, Vicomte de Meaux, and Châtelain of Cambray. He was the founder of the present castle, and at the same time walled in the considerable town that had risen under the protection of his ancestors. As he was a child at his accession, his mother administered the signory, and conceded a charter of liberties to the town in 1197; which he confirmed upon age. In 1200, *more majorum*, he attacked the property of the Church of Reims. In 1210, he joined the Count of Vermandois in the first crusade against the Albigenses, which he repeated in 1219 and 1226; then assisting at the siege of Toulouse and the taking of Avignon. He distinguished himself also at the battle of Bovines.

Enguerrand, though not wanting in territorial power, exercised an influence far beyond that due to wealth or breadth of possessions, and which was in great measure personal. He appears to have submitted with an ill grace to the government of Queen Blanche during the minority of St. Louis, and is said to have even contemplated regal power. However this may be, the consciousness of his influence no doubt led him to erect the Castle of Coucy, it is thought, between 1225-1230; and it may be that in so doing he proposed to himself to cast into the shade the grand tower of the Louvre, the work, a few years before, of Philip Augustus. He is also said to have rebuilt his other castles of St. Gobain, Assis, Marle, Folembray, and St. Aubin, and the Hôtel Coucy at Paris.

In 1244, he was in the confidence of St. Louis, and attended a conference of nobles at Chinon, where he supported the plan of a descent upon England; but while assembling his vassals for this purpose he was stung from his horse and killed by his own sword. Of his children by Marie de Montmirail, Raoul II., who fell in the crusade of 1250, and Enguerrand IV., became successively Sieurs de Coucy; but both died childless; and with the last closed the male line of these great barons. Alix, half-sister to the last lords, married Arnoul, Count de Cuiues. Enguerrand the Great had also a daughter, Mary, who was the second wife of Alexander II. of Scotland, and the mother of Alexander III. Mary was a very remarkable person, and exercised the duties of guardian to her son in difficult times in a very efficient manner, devising and executing a vigorous policy of her own.

Arnold Comte de Cuiues sold Cuiues to Philip le Hardi in 1282. Alix de Coucy, his wife, was daughter of Enguerrand III. by Marie Dame d'Oisy, his third wife. They had Enguerrand V. de Cuiues, Sire de Coucy, &c., who lived at the court of his cousin-german, Alexander III., in Scotland, where he married, before 1235, Christine de Baliol. He died 1321.

William, his son and heir, married Isabel, daughter of Guy de Châtillon, Comte de St. Pol. He died 1345, and was succeeded by Enguerrand VI., who married Catherine daughter of Leopold, Duke of Austria. This baron took part in the defence of his province against Edward III., and fell at the battle of Crécy, in 1346, leaving his son an infant.

Enguerrand VII., better known in England as Ingelram de Coucy, was one of the greatest and most powerful barons of his race and age, and, in a warlike age, celebrated as a military leader. He commenced his public life by a war of extermination against the insurgent Jacquerie. He was then one of the hostages in England for King John, and there married Isabel, daughter of Edward III., became a Knight of the Garter (30th on the list), and in 1366 was created Earl of Bedford. The effect, perhaps the price, of these honours was his neutrality in the war between France and England. He claimed the duchy of Austria, and raised 60,000

condottieri to support his rights, but in this he was unsuccessful.

After the death of Edward III. he returned the insignia of the Garter to his successor, and took part with France. Upon Du Guesclin's death, he was offered, and declined, the sword of Constable of France, but became governor of Picardy. His advice to the king was to anticipate the English attacks.

His second wife was a daughter of the Duke of Lorraine. In 1382, he composed, by fair words, the insurrection of the Maillotins, at Paris. In Picardy he was scarcely less lenient. Doutard, one of their leaders, he sentenced to death, but at the gallows foot he was pardoned, by the custom of Picardy, because a woman from the crowd consented to marry him,—a singular legal juxtaposition of hanging and matrimony. Enguerrand took part in the campaign of Charles VI. against Ghent, in which Van Artevelde was killed; and in the following year, after putting down an insurrection at Paris, he joined the war in Flanders, where he won the high approbation of Froissart.

He then went to Italy, and fought at the battle of Arezzo, for which he received the charge of Grand Butler of France. Shortly afterwards, he was prominent in the military and naval preparations for a descent upon England, and seems to have commanded a division of the fleet, and to have been driven upon the coast of Scotland.

In 1390 he took part in the African expedition, landing at Carthage. The closing act of his life was the unsuccessful crusade against Sultan Bajazet, upon his invasion of Hungary, where Enguerrand was defeated and made prisoner, and so died in 1397, aged 57, the last male of the second line of the Sires of Concy.

Upon his death, Louis Duke of Orleans, by a mixture of force and fraud, obtained possession of the Concy estates, to the exclusion of the heir female. Upon the death of Louis, in 1465, Duke Charles succeeded, and upon his accession to the throne of France as Louis XII., in 1498, Concy became Crown property, and ceased to retain any individuality, or to be the seat of an independent family. As an appanage of the Crown it was granted to the successive families of Orleans, and was thence held by *égalité* at the revolution. It is at present vested in the Crown, and has in consequence received a share of the consideration with which the Emperor regards all public monuments, and has been most judiciously preserved from further decay by M. Viollet-le-Duc, from whose survey the annexed engraving has been made.

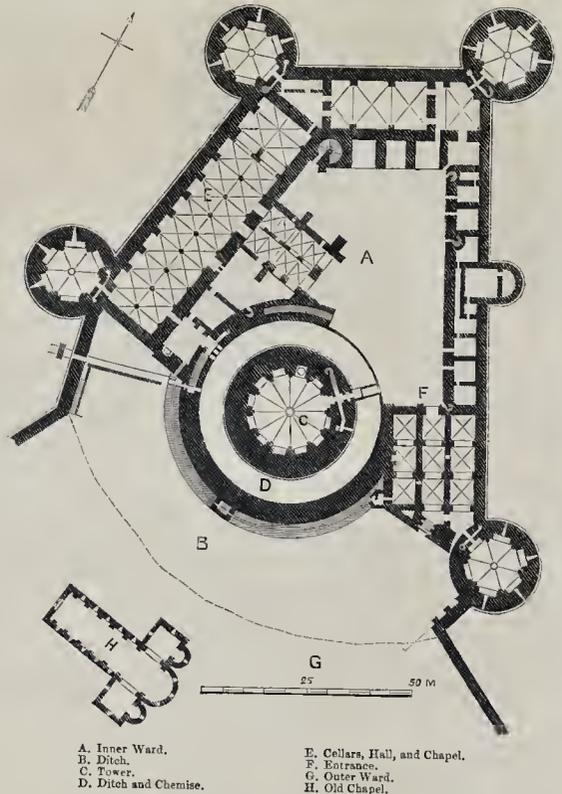
The Castle occupies the north-western extremity of the platform, of which the remainder is occupied by the town. Upon three sides the natural defence is the steep hill-side, the upper 30 ft. or 40 ft. of which are rendered vertical by art, and faced with masonry. (The wholly artificial) defences of the town on the south front are a deep ditch, extending from cliff to cliff, and dividing the town from the castle, within which is a curtain wall, flanked at its ends by two round towers, containing vaulted chambers, and with a central gate-house, also so flanked*.

THE NEW CHURCH OF ST. JUDE, EAST BRITXON.

On the 8th of December, 1866, a few gentlemen met at the Parsonage of the parish of St. Matthew, Brixton, when the Incumbent drew attention to the rapid increase of the population of the parish, which now exceeds what it was before the portions of it now belonging to St. John's, Angel Town, Holy Trinity, Tulse Hill, and All Saints', Clapham Park, were separated from it. The subject was maturely considered, and it was resolved to erect a new church. A plot of ground in Dalwich-lane was purchased at a cost of 736*l.*, and designs were received in competition from twelve invited architects for a church to accommodate 1,000 adults and 100 children. From these the design sent by Mr. E. C. Robins was adopted, and we publish a view of the interior in our present number.

The foundation stone was laid in August last, and the building has rapidly progressed since. The whole of the exterior is now complete, with the exception of the upper stages of the spire; and great efforts are being made to raise the remaining 2,000*l.* required to complete the interior.

* To be continued.



COUCY CASTLE, FRANCE.—Plan.

The church is designed in the Early Decorated style, and consists of a nave 96 ft. long by 24 ft. wide, and 48 ft. high to the internal apex of the open-timber roof, and north and south aisles, each 96 ft. long by 17 ft. wide, 36 ft. high, with shallow transepts at the chancel end. The total internal width of the church is 62 ft., and across the transepts 78 ft.

The chancel is 27 ft. deep by 20 ft. wide, and 30 ft. high from the raised pavement to the highest part of polygonal boarded roof. There are nave and north aisle porches. The tower is situated in the north side of the chancel, at the end of the north aisle. It is divided into four stages, the lowest story forming a third porch, and is surmounted by a Bath-stone spire, 105 ft. from the ground to the top of the vane. The vestry, with hot-water apparatus chamber beneath, is situated in a corresponding position on the south side of the chancel.

The church is faced externally with Kentish rag and Bath stone dressings. The windows generally are divided by mullions, with three lights, and the heads filled with geometrical tracery. The transept and nave end windows are in four lights, and the chancel window is in five lights. The roofs are of steep pitch, set to an angle of 60 degrees with the horizon. They are covered with purple and blue Welsh slates in bands, with serrated edges to the lowest course of each band. There are ornamental iron ridges to all the roofs, with crosses of iron or stone to all the gable ends, the large wrought-iron vane and lightning conductor being supplied by Messrs. Richardson, Slade, & Ellison.

There is a good deal of carving included in the contract, both externally and internally—externally, chiefly in label end bosses, and ball flowers to the corbel tables and angles, cornice to parapet of tower, and gargoyles for each angle of the tower. Internally the circular

columns of the nave arcades are surmounted with square abaci with carved capitals.

The chancel arch is double, the lower, receding 6 in., and supported on red Mansfield stone shafts, with foliated capitals on carved corbels. The nave arcade and the chancel arches are of stones, alternately with red and white bricks. The rest of the interior walls are plastered with rough stucco face. The aisle roofs are of trussed rafters, circular-saw cut, and stained. The nave roof is in addition provided with mot trusses, with curved braces, and pierced cusping resting on moulded corbels. The space between the nave and aisle roofs is plastered for ceiling. Between the nave and aisle roofs are sixteen dormer windows provided for light and ventilation, chiefly the latter. The pewing is of stained deal varnished. The pulpit and reading-desk are intended to be of stone. The pavement of the chancel and the recesses will be of ornamental tiles. The chancel will be heated with warm water.

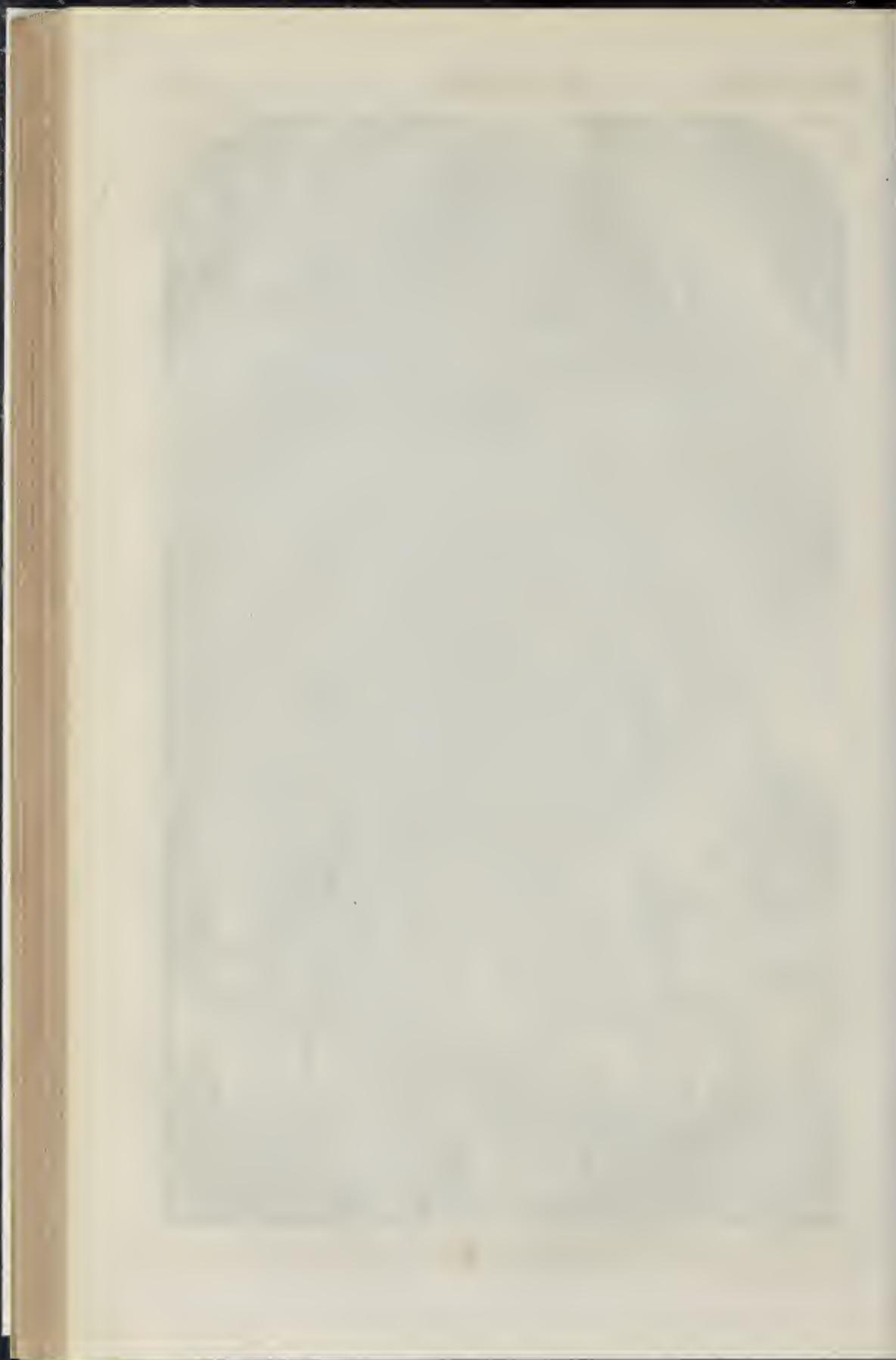
The amount of the contract for the whole is 6,000*l.* The contractor is Mr. John Kirk; the clerk of works, Mr. Leach.

THE ARCHITECTURAL MUSEUM.

We understand that a contract for the new building, Westminster, has been signed, and that the works are in progress. A considerable sum of money is still needed to insure completion of the undertaking. Would-be students should remember that there are large architectural collections in the South Kensington Museum, and that they need not wait until the new building is up. The fact is, it is much easier to talk about studying, and to find reasons for not doing it, than to go to work in earnest.



THE CHURCH OF ST. JUDE, EAST BRIXTON.—MR. E. C. ROBINS, ARCHITECT.



THE TECHNICAL INSTRUCTION MOVEMENT.

At the Society of Arts last week a paper on Technical Education was read by Mr. John Randall, F.G.S., one of the artizan reporters on the Paris Exhibition. In referring to French progress in art, as evidenced at last year's Exhibition, he said:—

This progress was witnessed by a large number of our countrymen, including a goodly sprinkling of artisans, who expressed their surprise,—a surprise, however, which subsided on looking into the facilities foreign workmen enjoy for obtaining a knowledge of the principles of their art, and of the theory of their several crafts. Many of those who have written on the subject tell us that they found light and easy styles of ornamentation, founded upon a close observance of nature, and adapted to various materials in almost endless devices; and this not altogether as applied to rich and costly articles coming within reach of the luxurious classes, but in connexion with multifarious objects of elegance, produced at little cost, and intended for common consumption and general use.

They saw French workmen working less hard than ourselves, but producing higher effects with greater ease,—working with less energy, but with a greater familiarity with the science and tendencies of their art; they found these workmen acting out their part under the direction of intelligent foremen and chiefs—themselves the higher creations of the same excellent system of technical training; and they found these results the matured fruitage of indigenous institutions which had taken firm root on French soil. They found, on instituting a comparison, in very many instances, British workmen imperfectly taught, and to a great extent ignorant of the economy of human effort,—often working under foremen chosen more for ability to keep accounts than from any superior knowledge or power to direct. In either case, they found few reaching above the level of mediocrity, or receiving any stimulus beyond mere wages to develop the facilities with which God has enriched them, and which, if fully cultivated, would increase the means of individual happiness, and add to the prosperity of the country.

I heard an English workman observe in Paris that there is much more credit due to an English workman if he is clever; for a Frenchman has so many advantages that, if he only have moderate talents, he can scarcely help but be a good workman. He has excellent schools to give him a technical education, and, go where he will, there is something to educate his eye, and elevate his taste.

It is my decided opinion that, whatever the means suggested for supplying the deficiencies of technical instruction, they should be in the hands and under the control of Government. The voluntary system with regard to education, notwithstanding the sectarian stimulants applied, has signally failed; and the part-voluntary scheme of art-education has proved inefficient. In few places, if any, are art-schools supported as they ought to be, whilst in some they have been closed altogether, or those still open are chiefly attended by amateur ladies and others above the class of artisans. Government has hitherto been in advance of the people to a certain extent on these points; and it really is to the governing power that we must look, rather than to local effort, for the means of placing the art-workmen of this country on an equal footing with their rivals on the Continent. Give to the Englishman the same opportunities of enlightenment and instruction as to the foreigner, and there is no branch of art and science, no human industry requiring taste and skill, in which he will not shine pre-eminent.

The conclusion seems natural that the seed of a scientific and art-education, such as the country requires, must be sown in the national or primary school, either by the schoolmaster or by supplementary teachers. What we complain of, and what the country, raising the taxes to support the present system, complains of most, is that it is too much in the hands of the clergy, and under inspection by men drafted from them,—men who are neither qualified by their education, their callings, nor their sympathies, for appreciating the importance of that secular knowledge which is so essential to the social well-being of the children committed to their care, and who are under a temptation to use it as a proselyting scheme, rather than an engine for fitting children for their duties. What we

want is for the State to carry out its own admitted principles; to furnish that education which it professes to give, which it admits is essential to the commonwealth, instead of going a round-about way and giving something else. Government in effect now says: Education is all-important; it is essential to your welfare, and to that of the public; you want it, and we undertake to give it upon condition that you take something else along with it. It is the old plan of cheating the law by selling the straw and giving the hook.

The new minute of the committee of council for the advancement of technical education in connexion with art and night schools, by payments and scholarships, is a step in the right direction, and will give a stimulus to the good work of technical training; but it will even require something more than this to overcome the inertia of existing indifference and general apathy.

In the discussion which followed the reading of the paper, several workmen, chiefly artizan-reporters on last year's Paris Exhibition, took part. One of these, Mr. Connolly, mason, whilst assenting generally to Mr. Randall's view as to French progress, said that in his own trade—that of a stonemason—he had often seen a shop-foreman spend hours over a stone, showing the man who was to work it what was required, and drawing lines upon it for that purpose; and it was often quite a puzzle between the man and the foreman what direction these lines should take. There was not more than one foreman in twenty that could take a pencil and make a plan and section of what was required to be done; and if there were more, not one man in a hundred would know what was meant. If the foreman had sufficient education to be able to communicate his ideas to the workman by drawing, and if the workman were able to understand the drawings, an immense deal of time would be saved, and work would be better done; but at present they both had, to a great extent, to grope their way in the dark. He contended that the nation ought to supply this education, and that it would be economy on its part to do so. He must differ in one respect from the reader of the paper, and that was as to the religious element in teaching. He could not ignore the benefits which art had received from religion. Everything grand and noble in it had been the result of the action of religion upon the human mind. The noble buildings which studded the face of the country like gems in a diadem, arose out of the religious enthusiasm of the Middle Ages; and were they to believe that that same spirit was dead in the people of England? No, it only slept; it only required to be once more aroused to zeal and enthusiasm.

Mr. Jacob (cabinet-maker, one of the artizan-reporters) remarked, that one great advantage which it had struck him during his visit to Paris, the French workman had over the English, was the opportunity of visiting museums and galleries of art at times convenient to himself. They could only visit the British Museum on certain days in the daytime, which was practically impossible to excluding working men. The influence of the clergy would probably be exerted to prevent the opening of such institutions on a Sunday. If they were even open of an evening, he would ask any one who worked for eight or ten hours a day as he ought to work, if he then felt fit to go to a museum and study. He had tried it, and found great difficulty in deriving much benefit from his visit. The museum of South Kensington had certainly done more than anything else to improve the artistic taste of the working classes; but much more might be done, and, as one means, he would suggest the supplying copies of plaster casts at cost price. Again, the knowledge of geometry and orthographic projection was difficult of attainment, and the hooks from which it might be learned were costly; yet, without some acquaintance with these subjects, it was difficult to make a workman understand a working drawing. He suggested that sheets of such projections should be issued at a low price, so that they might be introduced into workshops, and that men might become familiarised with them.

Mr. Randall, at the close of the discussion, said he wished to correct a wrong impression which seemed to have been produced—that he was not a friend to religion. It would be sufficient to show that this was not the case, if he mentioned that he and his wife were members of the Church of England, that he had three daughters school mistresses in national schools, and one son a pupil teacher. He, therefore

knew something of the system of which he had spoken, and he knew that religious prejudices did interfere with the proper education of the country. It was quite usual, especially in country parishes, for a clergyman to speak of "my school," and "my schoolmaster," just as if the whole establishment were under his sole control. He quite agreed with the idea that district museums and colleges should be established. He thought it would be well if these district colleges had the power of conferring honorary distinctions. He had been made a fellow of the Geological Society, in consequence of his studies in that science, which he looked upon merely as a recreation; and if some similar distinction were awarded to men who devoted their energies to the attainment of excellence in their own particular business, it would be likely to have a very beneficial effect, especially on the rising generation of artisans.

EXHIBITION OF THE ROYAL SCOTTISH ACADEMY.

THE forty-second exhibition of the Royal Scottish Academy was opened to the public on the 15th ult., the number of works displayed being 1,086. Amongst this number there are a few excellent productions, a larger number of secondary merit, and a still larger residuum of inferior quality.

Of well-known works there is, as usual, a small admixture. These include Debufo's portrait of Rosa Bonheur, Philipp's "Letter-writer of Seville," "Marriage of the Princess Royal," and several of the sketches for his larger works; "The Finishing Touch," by Erskine Nicoll; "A Winter Night's Tale," by MacIver, and others.

The figure subjects are more numerous than has been the case for the last few years, the number of large obtrusive portraits fewer, and landscapes still continue to receive more favour than in the Royal Academy. The president has only one picture, No. 495, a "View of Glenfalloch, looking towards Loch Lomond." It is possessed of the qualities of health, air, and repose which more or less characterise his former landscapes, with less of the peiny glitter which so greatly detracted from their value.

The agony of the "Man of Sorrows," in Gethsemane (No. 622, Sir Noel Paton), is one of those subjects upon which modern painters should hardly venture. It jars against our ideas to criticise such. In this work we can trace nothing superhuman in the agony depicted. The picture is pretty rather than affecting. There is the calm moonlit sky, with the single star, which the artist delights in reproducing, and the carefully-painted grass and flowers, which could hardly be so distinctly seen under such a light. The drapery is gracefully disposed, and possesses considerable depth of colour.

More to our taste is the small picture (No. 454) of the ancient mariner obtaining relief by sleep from the strange grief that oppressed him. The aerial figure floating overhead is treated with the grace and elegance pervading the fairy subjects which are the artist's strong point.

No. 515, "Among the Cliffs," by Peter Graham, is not a very good subject; as a study from nature it is excellent; but we miss in it the poetical suggestiveness displayed in some of the former works of the artist. There is more in No. 497, "Billowness," by W. F. Vallance, where the peculiar swing of a ground-swell breaking against a sharp ledge of rock is happily rendered, as well as the gradual recession of the sea towards the horizon.

No. 542, "Tomb of the Bruce," W. H. Paton, is a view of Dunfermline Abbey, under the soft and mellowing influence of moonlight,—the salient points of the building being well brought out. We, however, prefer this artist's water colours: that medium seems better adapted for his style of work, which is pretty rather than forcible. No. 86, "Loch-in-Daal, Skye," is a good example.

No. 537, "Loch Torridon," A. Perigal. Mr. Perigal has the merit of choosing fine subjects from a good point of view, and these he delineates in a hard and formal manner: the same sky with billows of heavy clouds overhangs the metallic mountains which appear in all his views of Highland scenery.

No. 550, "A Rainy Day in the Country," Charles Lees, shows us a room in a country-house where the inmates are engaged playing chess, bagatelle, &c. Mr. Lees does not inform us whether this country-house is one of those esta-

blishments for the care and safe custody of the insane, yet certainly the inmates seem beside themselves: the half-emptied decanters on the side-table may account for this.

No. 651, "Borrowdale, Cumberland," Sam. Bough. The view is fine and excellently treated; nothing is shirked, all the details being carefully elaborated, yet in such a manner that they blend into a harmonious unity. The gradation of light and shade from the strongly-pronounced foreground onward till the distance vanishes in pearly gray behind the closing vista of hills, shows the work, if not of a master-mind, certainly of a very clever artist.

In a different style, and yet fine in their way, are the works of Mr. E. T. Crawford. No. 623, "A Lowland Strath," is one of those placid, sunny bits of nature where one lingers to linger, and the artist has succeeded in imparting that character to it. He is equally successful in his sea-piece, and has produced a warm and hazy atmosphere and sparkling translucent water in No. 679, "Hay-boats off Doedrecht."

Mr. W. Douglas used to produce works of some importance which told a particular tale of their own. The accessories of these works were always carefully studied, and displayed antiquarian research. Now, however, he allows his love of nick-nacks to carry him away, and the human element introduced is a mere excuse for their display. This is obvious in No. 668, "The Antiquary's Daughter," and appears more or less obtrusively in his other exhibits.

No. 520, "Portrait of Mrs. Shand," by R. Herdman, is the portrait of a lovely woman, painted with delicacy and grace.

There is always something in the works of Mr. W. B. Scott to arrest attention; this may arise in some degree from the peculiarity of the subjects he chooses, but also from the manner in which they are presented. No. 300, "A Messenger of the New Faith," represents a scene in Roman life in the middle of the second century; a Christian maiden with the "Book of Life" in her hand is entering a temple of Venus intent upon rescuing from the wiles of the priestess a simple-looking girl, whom she is initiating into the mysteries of the worship of Aphrodite. In the courtyard of the temple (a good example of Roman coloured decoration) are two girls prattling with a chubby little fellow equipped as a Cupid. Beside the priestess a woman reclines on a couch in a state of semi-nudity, who seems scared at the entrance of the visitor, but the aged priestess is in a state of vehement wrath at the intrusion. The most unsatisfactory thing in this picture is the chief figure. In his desire to impart to the messenger an air of purity, he has run into the extreme of making her appearance.

310, "An Eastern Lady," M. J. Portales, is one of those specimens of soft mezzo colouring which find many admirers. The lady has the large liquid eyes, rich brown skin, and full ripe lips which characterize the beauties of the harem.

340, "The Alarm," J. B. Macdonald, represents one of the followers of the Pretender, after Culloden, alarmed by the approach of an enemy. He is accompanied by his wife or sweetheart, who urges him to seek safety in flight, but he appears more inclined to face the danger. This is, in our opinion, the finest piece of work the artist has produced. The figures are boldly and vigorously drawn, and the texture and colour far surpass his former efforts.

Mr. Macgarrath's "Dora in the Wheat-field" (No. 404) is in many respects a fine picture; the figure of Dora is simple and graceful, and that of the boy childlike and natural, and the reapers in the distances are skillfully introduced. We are not quite sure of the colour of the ripe wheat, but we feel convinced that "the mould that was unsown, where many poppies grew," requires much more work upon it than has been bestowed upon it by the artist: the poppies and other wild flowers are carefully enough wrought out, but they grow individually, each by itself, without the accompaniments which are found in nature. Detail of this sort should either be distinctly wrought out or suggested: in this instance neither course has been adopted. The sky in this picture seems rather tame, but this may arise from its proximity to the glowing sunshine of Bough's "Thames from Greenwich" (No. 410). 448, "A Pine Forest," by J. McWhirter, is solemn and grand in conception, and vigorous in execution.

488, "The Ballad Singer," Geo. Hay, has a thoroughly Medieval look about it: the characters do not seem like moderns dressed up to play

a part, as they do in No. 793, "The Captured Banner," by J. A. Houston.

684, "Waiting for a Reader," J. Drummond, represents a scene common after the Reformation. A number of the early Protestants are waiting for some one to read to them from a large Bible chained to a desk in a church porch; it is one of the best pictures Mr. Drummond has produced for many years.

694, "Checkmate," R. P. Bell, introduces us to two cavaliers engaged at chess. The crest-fallen puzzled look of the one and the self-satisfied triumph of the other are given without exaggeration.

Mr. J. Farquharson is a young landscape-painter whose works are full of promise. No. 708, "Pass of Aberglassly," is sunny and bright; and 947, "Llyn Idval, North Wales," sombre and appropriate.

There are other two young aspirants to fame, whose works are deserving of special notice.—Mr. W. E. Lockhart and Mr. E. J. Douglas. The former is of the school of Philip, and the latter is a follower of Landseer.

Mr. Archer exhibits two pictures, both displaying good drawing, texture, and colour.

Want of space prevents us from noticing in detail the figure subjects of Messrs. Chalmers, Halswell, T. Graham, and others, and the landscapes of Messrs. Cassie, Beattie Brown, Burton, &c., which are all deserving of notice; but at the same time it saves us the pain of writing in terms of censure of the productions of others of whom better things might have been expected.

In our next we shall take up the architectural drawings, as in duty bound.

MEMORIAL OF STOTHARD.

The memorial bust of Stothard, recently executed by Mr. Weekes, R.A. (for presentation to the National Collection as a *pendant* to that of Mulready by the same sculptor), will be included in the ensuing exhibition of the Royal Academy. The promoters of this memorial to the gentle, gifted artist it so happily represents, have well earned the grateful thanks of all classes of our art-loving public; for, previously to its execution, no such tribute had been awarded to his name and memory.

LOCAL BOARDS AND TOWN SURVEYORS. CREWE.

WHERE all local boards to follow the example of Crewe, the office of town surveyor would not be an enviable one. Crewe is what may be called a working men's town, of about 16,000 inhabitants, the majority of the adult male population being employed at the locomotive works of the London and North-Western Railway Company. The local board is composed of fifteen members, whose views appear to be not very liberal. From the accounts in a local paper, it seems there are extensive sewerage works in operation in the town under the superintendence of the surveyor, who had, until recently, the assistance of a foreman, whose duties were to keep the time of the workmen employed in the streets, and generally to assist the surveyor in his outdoor duties, also to act as turncock and water-inspector.

The Board have recently deemed it necessary to take away this man, in order that he may devote the whole of his time as inspector at the outfall sewerage works, thus depriving the surveyor of his services, who has now not only to perform his own professional duties (the construction of the main outfall sewers entailing a great amount of additional work), but the duties of the water inspector and ganger. He asked to be allowed to appoint one of the other men to keep the time and to have charge of the remainder of the workmen during his (the surveyor's) absence, and he paid 2s. per week extra for such work; this was passed in the general purposes committee, but over-ruled at the last general meeting of the Board. It is amusing to read the arguments against such an arrangement. The chairman, who is described by one of the members as "a close and cheese-paring man," thought that the surveyor ought to pay it out of his own pocket. The following resolution was passed:—"That the surveyor be informed that it is his duty to look after the men in the streets, even if it necessitates his attendance at six o'clock in the morning."

Now, had the surveyor been "informed" of such being his duties when he was appointed, he probably would never have engaged to perform such work, as he states that he was never called upon in his previous engagements to be in attendance before nine o'clock except on particular occasions. It was admitted that he is frequently required to attend committee meetings up to ten o'clock at night, and now he is required to be out at six o'clock in the morning.

A few months ago the surveyor was "informed" by a resolution of the Board that it was his duty to make a survey and plan of the whole town and district. What will be the next duty of this unfortunate town surveyor?

APPOINTMENT OF AN OFFICER OF HEALTH FOR MANCHESTER.

At a meeting of the Manchester City Council, on the 4th inst., a resolution was passed appointing Mr. John Leigh, M.R.C.S., Officer of Health for that city, at a salary of 500l. per annum.

The importance of this appointment to the cause of sanitary progress can scarcely be over-rated. Not only may the close upon half a million of inhabitants living in Manchester reasonably expect to derive advantage in the shape of reduced death-rates, and the enjoyment of a higher standard of health, but this appointment, in the third city of England, will strengthen the hands of the sanitary party in those of our large towns which have not yet acknowledged the necessity for the services of such an officer. Birmingham is now by far the largest town in England unprovided with an officer of health; and although, from natural advantages of situation, this town has enjoyed a comparative immunity from epidemics, and a generally low death-rate (for a large town), evidence is not wanting in recent returns to show that Birmingham is being left behind by the greater sanitary activity of other towns. Since the beginning of the year Birmingham has not stood so well in the list of towns, arranged in the order of the weekly rates of mortality, as formerly. This is not so much because Birmingham is less healthy, but that it is standing still, while other towns are rapidly reducing their excessive death-rates.

The appointment of an officer of health for Manchester has been the result of a long-continued struggle between two almost equally balanced parties in that city and its council; and long since such an appointment had been decided upon, the selection of the officer has been keenly contested. Mr. Leigh, from the first, had been mentioned as the most eligible candidate, from having long been known to possess many of the most necessary requirements for an efficient officer of health. He had devoted much time to sanitary research; he was well-versed in the subject; was a chemist of undoubted ability; and had for years held appointments under the council, entailing duties of an analogous character to those which should be performed by an officer of health. Early in September last, at a meeting of the Council, when the appointment was brought forward, its opponents succeeded in referring it to a committee, which was empowered to advertise publicly for candidates for the proposed appointment. Six months were apparently consumed in the labours of this committee. The advertisements setting forth that the Corporation of Manchester were prepared to receive applications from gentlemen, medical or otherwise, willing to undertake the duties of officer of health for that city, the salary being 500l. per annum, as might be supposed, resulted in numerous applications.

In addition to Mr. John Leigh, and Dr. Reed, of the Royal Infirmary, Manchester, between whom the choice of the council eventually rested, ten other medical gentlemen, three officers of the army, one clergyman and schoolmaster, an Inspector-General of Army Hospitals, the Officer of Health of Southampton, two sanitary inspectors, and three other gentlemen, whose qualifications are not stated, were among the applicants. As before stated, these candidates were finally reduced to two, Mr. Leigh and Dr. Reed; and when the selection was finally put to the vote, thirty-three of the council were found to be in favour of Mr. Leigh, and twenty-six for Dr. Reed, the former being thus elected by a majority of seven. The recent unsatisfactory sanitary condition of Manchester, as shown in the published re-

turns of births and deaths, has probably influenced in some measure the council to the appointment just made. The following few figures will show that it has been made none too soon. In the city of Manchester the death-rate in 1867 was 31.4 per 1,000 persons living, and higher than in any one of the twelve other large towns of the United Kingdom, furnishing weekly returns. The average rate in the thirteen towns for the year, was 25.3 per 1,000. In the past ten weeks of this year (ending 7th inst.), the death-rate in the city of Manchester and the borough of Salford, has averaged 31.5 per 1,000, whereas in eleven large towns of England, including London, the rate has not exceeded 25.3 per 1,000.

ARCHITECTS' BENEVOLENT SOCIETY.

The annual general meeting of the subscribers to this Society was held on Wednesday, at the House, in Conduit-street, at which were present Mr. Sydney Smirke, R.A. (president), in the chair, and Messrs. B. Ferrey, F.S.A., George J. J. Mair, F.S.A., C. C. Nelson, F.S.A., E. Roberts, F.S.A., E. Nash, F. Good, S. Wood, James Lockyer, and others.

The balance-sheet and general report, which was read by Mr. J. Turner (hon. sec.), and unanimously adopted, showed that, including the previous balance of 104l. 13s. 6d., together with subscriptions, donations, dividends, &c., the total amounted to 366l. 7s. 2d., of which, after paying in gifts to applicants 192l., and defraying the other expenses, a balance remained of 41l. 11s. 8d., in addition to 1,367l. 15s. 8d. invested in the New Three per Cents. The council had to deplore the insufficiency of their means, especially as during the past year the demands had been more numerous than in any preceding year. The general financial depression had been severely felt by the profession, many great works having been postponed or abandoned, and a great number of private undertakings checked. The applicants relieved had been 14, of whom 3 had been particularly distressing cases; but, in consequence of the exhaustion of the funds, several most deserving claims had been of necessity rejected. Since the last report, 18 new members had joined. The council had most specially to regret the decease of Sir Robert Smirke, their first patron. The Report proceeded to urge upon the members to use their utmost exertions to augment the number of subscribers, and generally to promote the efficiency of the Society. During the year there had been a great accession of members in Manchester; and it was heartily hoped that this noble example would encourage and promote the extension of their brotherhood in other districts.

The list of subscriptions was read, and donations of 5l. 5s. each, handed in from Messrs. Ashton and Mair.

After the appointment of council and other officers for the year ensuing, thanks were accorded to those of the past year, as also to the Chairman of the day and the Hon. Secretary, and the proceedings concluded.

THE SOIRÉE AT THE ROYAL SOCIETY.

The *soirée* at Burlington House on Saturday last was largely attended. The Prince of Wales was present, and the Master of the Mint (Professor Graham), the Chemist, and Professor Tyndall exhibited some exceedingly curious experiments—the former the dialytic separation, by a septum of palladium, of pure hydrogen from coal gas, and the extraction of occluded hydrogen from palladium; and the latter Faraday's famous magnetization of light. There were many other objects of interest, among which were two simple means of increasing the luminosity of ordinary gas-lights. In one case increased amount of light was obtained by placing a simple self-regulating valve over the top of a glass chimney, the increased pressure and heating of the air within the chimney causing perfect combustion in the flame, with increased steadiness and softness as well as volume of light. In the other case the increase of light was obtained by an equally simple expedient, not new but important, namely, by placing over and across the two holes of an ordinary burner a small thin plate of platinum. In this case the size as well as the illuminating power of the light was greatly increased. It is stated that there is less consumption of gas

effected by this simple means, in the proportion of 2.92 with platinum perfecter, as against 3.02 cubic feet per hour without it, the illuminating power in standard sperm candles being as 6.41 to 4.06, or an increase of light, per foot of gas, of 63 per cent. The platinum disc used was the invention, it is said, of Mr. Scholl, and it was placed by a little cup over the burner. The self-regulating valve was exhibited by the Gas Economising Company.

To the art collections the Queen contributed original drawings by Fra Bartolomeo and the scholars of Raffaello. Photographs of Palestine, by the exploration party; photographs of the scenery, people, and animals of India, by Mr. W. Douglas; drawings made in the regions beyond Behring Straits, by Mr. Frederick Whymper; and the rotary induction machine for statical electricity, by Sir William Thomson, were also exhibited.

INSTITUTION OF ENGINEERS IN SCOTLAND.

At the fifth general meeting of this Institution, held on Wednesday, the 12th of February, Mr. James M. Gale, C.E., president, in the chair, the report of the Committee on Institution Buildings was read by the secretary. After discussion, it was agreed that the report be printed and distributed among the members, and a special general meeting called further to consider it and decide, on Tuesday, the 18th of February, at two o'clock, p.m.

The discussion on Mr. Duncan's paper, "Remarks on the Proposed Amendments of the Merchant Shipping Act," was resumed and terminated.

A paper "On an Improved Bar-testing Machine, and Callipers for Testing the Thickness of Pipes" (designed by Mr. H. J. King), communicated by Mr. John Page, C.E., was read. A discussion followed and was terminated.

At the adjourned meeting, on the 18th February, it was unanimously carried that the recommendations in the report be adopted, and the matter remitted back to the committee to take the necessary steps to carry out the proposed arrangement with the City authorities, and secure accommodation in the Corporation-buildings, South-shall-street.

Mr. Peter Denny intimated that he was willing to give 250l. (being one-half of what he had subscribed towards the scheme for obtaining a suitable building for the institution), on the understanding that the recommendations in the report be carried out, and the sum of 2,000l. obtained.

THE INSTITUTION OF CIVIL ENGINEERS.

On March 3rd, the paper read was "On the Manufacture and Wear of Rails," by Mr. C. P. Sandberg. It was divided into three parts. First, as to the best method of manufacturing rails out of common iron, and as to the time they would last. Secondly, as to the disposal of the iron rails when they were worn out. And thirdly, as to whether iron or steel, or a combination of the two materials, was the most economical to use for rails.

Assuming that, under a very heavy traffic, common iron rails would last five years, steel-top rails fifteen years, and solid steel rails thirty years, and that iron rails would cost 7l. per ton, steel-top rails 10l. per ton, and solid steel rails 15l. per ton, and that the old steel-top and iron rails were valued at 4l. per ton, and the old solid steel rails at 8l. per ton, then, with a rail section of 84 lb. per yard, 250 tons of rails would be required for one English mile of double line, and the cost of laying the rails might be estimated at 1l. per ton. On these assumptions the author gave various tables, the result of which was to show that the amount of traffic must decide which material it was the most economical to use for the maintenance of the permanent way. For all railways where ordinary iron rails were worn out in five years, or in a shorter time, solid steel rails were the most economical, at the prices quoted. Where ordinary iron rails lasted over five and up to ten years, steel-top rails would be the cheapest; iron rails in these cases being proved to be the most expensive, although the cheapest where they lasted from fifteen to twenty years.

One table indicated that the iron rails were in no instance the cheapest; but, on the contrary, that when iron rails lasted only five years, solid steel rails had the advantage, and where iron rails had a longer duration, than that steel-headed rails were the most economical.

HOGARTH'S MONUMENT.

HAVING passed many hours of instruction and admiration over the engravings of Hogarth, I wish to draw your attention to the state of his monument in Chiswick Churchyard. Every person who has gazed on his picture, and that are handed down as heirlooms from generation to generation in the mansions of the rich and noble, and our public galleries, cannot but admit that his grave, if he visit it, is treated with great neglect. It was restored by William Hogarth, of Aberdeen, in 1856. After eleven years' service, at the present time the black in the letters on the stony panels is completely gone, and the face of the marble itself is perished. But no notice is taken of the spot where lies the man whose pictured morals charm the mind. At the present time, when the name of Garrick is posted on placards over London, and with your aid, could not something be done so as to render the epitaph that Garrick wrote legible on the spot where his friend lies buried. The myrtle by the side is green and fresh, and to the reflecting mind the thought must come that Nature is more kind than his countrymen. I was a witness in the picture-gallery of the Exhibition of 1862 of the pride with which men pointed out "Marriage à la Mode" for the painting of an Englishman, and yet few seem to know or care about where the artist lies buried. Artists, actors, literary men, if only aware of it, I am certain would all willingly contribute to have the words placed on that monument in Chiswick churchyard. P. P.

THE SCIENCE AND ART DEPARTMENT EXAMINATIONS.

Sir,—While the important subject of education is occupying so large a portion of the public attention, permit me to direct the attention of your readers to a great defect in the examinations of the Government Department of Science and Art. A large amount of the public money is annually expended on these examinations, and it may, therefore, be well to consider for a moment the trial to which candidates are therein subjected, and the success attending these examinations. As one who has been awarded first-class certificates of competency and Queen's prizes under the Department, I speak from my own experience.

Considering the importance attached to these competitions, it might reasonably be expected that in such a subject as "Building Construction and Naval Architecture," candidates would be subjected to an examination as to the orders and principles of architecture, the construction of buildings, and naval construction; but, instead of this, the entire examination consists in copying, in a certain time, a few lithographs of building elevations, sections, &c., of the construction and technical terms of which the candidate is totally ignorant. This is all! There are no questions whatever asked relative to the subjects which head the examination papers, and no attempt is made to ascertain whether the candidate understands anything about the constructions in which he is supposed to be examined.

These remarks apply also to the examinations in "Mechanical and Machine Construction," &c. Should the candidate successfully pass this "terrible ordeal," he is invested with a Government certificate of competency, and rewarded with a "Queen's Prize," or even a Gold or Silver Medal at the public expense! Now, I consider this kind of education (?) not only a mere sham, but also a double deception. Firstly, the Government is persuaded into voting a large sum of money annually to support an educational movement, which, as it is now conducted, can be productive of no lasting good; and secondly, the successful candidate is led to consider himself competent in subjects of which he has no real knowledge.

It may be said that were a more searching mode of examination adopted, the remuneration of science and art teachers under the Department would be seriously affected; but it is only reasonable to expect that were the standard of excellence raised (which would necessarily result in a great decrease in the number of successful candidates) teachers' premiums, as well as the value of prizes, would be proportionally increased.

I am persuaded that had a form of examination such as I have hinted at, comprising questions in construction, technical terms, &c., with illustrative diagrams, been adopted in the May

examinations of last year, instead of between 400 and 500 students passing, not a fifth of that number would have been successful. In my opinion this is a subject which those who are now taking such an active part in the question of educational reform would do well to take into their serious consideration. Such an apparent defect in our Government educational department ought not to be passed over in silence.

I hope that the want of a reform in these examinations may soon be considered by those at head-quarters too apparent to be any longer disregarded.

A. E. P.

“USE OF HOME-GROWN TIMBER.”

UNDER the above heading, in last week's Builder, was given notice of a paper referring to several British timber-trees. In the list appeared “the howler,” “the vine-prop alone,” and the “plum-tree.” These three additions to our Flora were evidently discovered by the non-botanical contributor. It is not easy to say what “the howler” is meant for, but it should probably read “osier,” or “holm;” “vine-prop alone,” should be “vine-prop elm;” and “plum-tree” should give place to “plum-tree” (plums, intimately allied as they are to the building trades, do not yet grow upon trees). As the other quotations in the article are morsels of the following exquisite lines from Spenser's “Faery Queen,” perhaps you will allow me to quote them out:-

“Much can they praise the trees so straight and high,
The sailing pine, the cedar proud and tall,
The vine-prop elm, the poplar never dry,
The bulder oak, sole king of forests all;
The sprin good for staves, the cypress inneral;
The laurel, need of mighty conquerors;
And pines sage; the fir that weepeth still;
The willow, worn of forlorn parsons;
The yew obedient to the hand that wills;
The birch for shafts, the saw for the mill;
The myrtle sweet bleeding in the bitter wound,
The fruitful beech, the ash for nothing ill,
The fruitful olive, and the plantain round,
The carver holme, the maple seldom inward sound.”

W. G. S.

THE DRAWING OF THE THRONE, HOUSE OF LORDS.

ERRA.—Having seen some strange assertions of Mr. Herbert, R.A., in the Standard, I wrote to that paper, but was refused the insertion of my letter; I therefore hope you will allow me to state in the Builder that I have thought it my duty to ask to see the drawing from which the photograph in Dr. Barry's pamphlet was taken.

Having seen it, and from my long connexion and friendship with Mr. Pugin, being necessarily very familiar with his touch, possessing, as I do, many drawings of his, I am certain that the drawing in question is not Mr. Pugin's. The touch is different, the style is different, and it has nothing in common with his handwork. The photograph from its small size gives an idea of fineness of line, which the original does not possess, and it is different in every respect from Mr. Pugin's drawing. Having examined it very carefully, and compared it with other drawings of Mr. Pugin's and Sir C. Barry's, I am confident that it is wholly the work of the latter.

I may remark, that though I have seen Mr. Pugin make hundreds of drawings, I never saw him put his initials upon them as separate letters. He used a well-known cypher, combining his three initials, with letters of a totally different form from the marks on the photograph. He used to put this cypher in one corner, and not in the body of a drawing, and certainly not in drawings made for other people.

TALBOT BURY.

ST. JOHN'S CHURCH, WEYMOUTH.

LOCAL SUPERINTENDENTS.

ERR.—I should not have troubled myself to take any notice of Mr. Bennett's letter (published February 28th) if my veracity had not been impugned, and a flat contradiction given to a statement I was obliged to make, in consequence of misapprehensions published respecting the alterations to St. John's Church.

Mr. Bennett states that I am “not correct” in my statements, and that “I am labouring under a mistake,” yet he does not name the nature of my incorrectness, or where I am “under a mistake,” and refers me to the Rev. J. Stephenson. This I will do, as he desires it, and give extracts from several of his letters from the beginning, which will fully explain my position as “architect to the church,” both originally and now, and how this Mr. Bennett was mixed up with it.

In my letter to you of February 15th, I stated that I am architect to the church, which was erected fourteen years since, from my designs, and under my inspection; that I have made all the designs, elevations, plans, details, working drawings, and specifications for the alterations of the church, at present in progress; and that I have been in constant communication with the Rev. J. Stephenson, the incumbent, as the architect. Now, as regards these matters, I cannot be “under any mistake.” I think having made these drawings, &c., must make me the architect. To save travelling expenses and look after the construction, a local man was to be employed, “to superintend the execution of the work;” and Mr. Bennett has thus been brought into connexion with the church. I do not question what he may be, or if he is or is not an architect, as I never heard of him before this; but his claims in this case are not justifiable, and, on principle and honesty alone, I am bound to defend myself, or else there

is no architect who has a clerk of works employed under him but may be subject to the same injustice. If Mr. Bennett had built churches, or was capable of doing so, why was he not engaged? Even the working drawings and specification seem to have been beyond his capacity, and Mr. Stephenson's letters of the following dates confirm my assertions. January 24, 1867, I was applied to as architect to prepare all the necessary working drawings, specification, and an entire set of plans needful for carrying out the work, leaving the supervision of the actual building to a person to be appointed for the purpose, reference, of course, to be made to you should any difficulties arise during the progress of the works in carrying out your plans.”

I presume that “person” was to see my designs carried out in their “integrity.” Again (July 10, 1867), “What we want is this, that the plans, drawings, &c., mentioned in my last letter be prepared by you in such a way, that the work of engagement can be carried out according to them by a person we appoint to superintend the building; and that you shall be responsible for accuracy, practicability, and completeness of the plans and drawings.”

Again (July 15, 1867), “We shall not require you to superintend the work or make up accounts. We want the specification, designs, drawings, &c., &c.; in fact, we want the work placed entirely in your hands.”

October 7, 1867.—“We shall be obliged if you will send us, as soon as you can the drawings and drawings of the pier as it will enable us to get tenders for the new work at St. John's.”

October 9, 1867.—“Pray let us have the plans and specification that we may get tenders.”

November 20, 1867.—“Will you send the working drawings as speedily as possible? They are much wanted.”

I could give extracts of other letters to the same effect; but I think there is quite enough to prove my assertions and nullify the pretensions of Mr. Bennett; besides, as it is not a matter of general interest, I wish to make this explanation as short as possible.

TALBOT BURY.

HERNE BAY PIER.

SIR,—Your correspondents on this subject will, I dare say, be glad to know that something is likely to be done towards restoring and opening the pier.

It has been a disgraceful situation long time, and now it only remains for the proprietor and the public to come forward with a good heart: then, no doubt, a contractor can be found who will be disposed to meet them on fair terms. I think anything short of restoring the pier as it exists, so that it may be made a stopping-place for steamers as well as a promenade, as it used to be, will be most absurd. It is high time the Herne Bay people were roused. Why should the place not be one of the favourite resorts instead of being neglected and almost despised because of its forlorn condition? I hope that the parties who have the matter in hand will light through successfully the difficulties which seem placed in their way, and so redeem the lost prestige of Herne Bay.

ONE OF THE PIERS.

COMPARATIVE ALTITUDES.

SIR,—Comparative altitudes are very useful and interesting, but only when they are clearly defined as to position and exact spot; to say many drawings of his, I am certain that the drawing in question is not Mr. Pugin's. The touch is different, the style is different, and it has nothing in common with his handwork. The photograph from its small size gives an idea of fineness of line, which the original does not possess, and it is different in every respect from Mr. Pugin's drawing. Having examined it very carefully, and compared it with other drawings of Mr. Pugin's and Sir C. Barry's, I am confident that it is wholly the work of the latter.

It may save the time of some who are struck at the altitudes if I remind them of Sir Henry James's abstract of the principal lines of spirit levelling in England and Wales taken during the Ordnance Survey. It is a hook containing 624 pages, and gives the levels and bench marks all over England and Wales up to 1861.

F. E. H.

A SOCIETY FOR DECORATORS.

SIR,—It has often occurred to me, and more especially at the present time, when so much is being said about art education, to ask whether or not there is in existence a society of which a country decorator may be a member, and through the publication of its essays and lectures, a report of the more important works executed in England, and an occasional visit to some of the meetings, may derive some advantage from association with more favoured brethren living in the very centre of industry and wealth, and the public thus be benefited by an interchange of ideas. Most of the higher professions have their associations, and none but those who are qualified are admitted as members, or considered by the public to be up in their respective occupations. If there is not a society, then why so important a profession as that of the decorators should be so far behind I cannot conceive.

In your impression of November 30th I sent a lecture by Mr. J. G. Crane, before the “House-painters' Association.” I know not if the society is such as I describe; if so, I should like to know more of it, through your publication or personal correspondence with any interested in the matter.

G. H.

GIVE VICTORIA STREET A MOVE.

In the commissioners of the Westminster Improvement and Encumbered Estate Acts of 1861 and 1865, would spend about £200, which by the 15th section of the Act of 1865, they are empowered to do, they might get Victoria Street, Westminster, finished off in a “jiffy.”

The plan is this: give an air of freshness to the whole street, follow:—

- 1. Employ about a dozen men for a month or so in clearing, and digging to a level, the surface of all the unoccupied ground, and in clearing away the rubbish from the roads, &c.
- 2. Put up several great fresh notices-board, with large black letters, on white grounds,—not many words,—and announce where particulars of the building plots can be obtained (see No. 4), and take all the old notices-board away.

3. Remove all posting-hills from every part of the street, and allow no more.

4. Erect in a conspicuous position, say about opposite the distillery, in the vacant ground, and close to the street, a one-story, fresh looking, cheap, temporary building, a corrugated iron building; painted some clean colour might be best; and in it have a large, fresh-looking plan of the street, and the plots to be let, and some person in attendance to explain. There should be a second room for private conference. It is almost certain that this plan room should be quite on a level with the street pavement, so as to be very easily entered.

5. Office of Victoria-street lands, should be conspicuous on the two sides.

6. Have the plan and particulars printed, so that any applicant could take one with him, or send for one.

7. Advertise the street a little.

AN XX-LAND AGENT.

UTILIZATION OF SEWAGE.

SIR.—The writer of the article in last week's Builder on the utilization of sewage has included Carlisle in the list of towns where sewage filtration through artificial beds has been tried and failed. Allow me to state that neither the Local Board nor the lessee has ever tried any method other than irrigation for the disposal of the sewage.

EDWARD T. MORLEY, City Surveyor, Carlisle.

THOUGHTFUL MANSIONS.

SIR,—We fully concur in the character our friend Mr. Cross has given the Cornish mansions, but at the same time he is hardly correct in stating that they have memorialised us for a reduction in their rate of wages.

Changes consequent upon the altered condition of the labour market have been made, but were anticipated by the men, who have recognised their propriety and necessity.

JOHN FREEMAN & SONS.

THE ALLEGED INSTABILITY OF THE NEW FORTIFICATIONS.

In reply to questions put by Colonel Sykes in the Commons, Sir J. Pakington said that two of the forts near Chatham, having been built on marshy ground, had in some degree subsided, but nothing would prevent the forts from being satisfactorily completed. At a fort at Warrington, in consequence of a changing in the soil, part of the retaining wall had shown some signs of weakness, but nothing would prevent that also from being repaired satisfactorily. He could not consent to accept Mr. Hawksley's authority as conclusive, compared with that of naval and military men of the highest standing, upon whose advice the Government of Lord Palmerston determined to carry on the fortifications. We are sorry to be forced to say that our own experience fully bears out the opinion expressed by Colonel Sykes. Some further supervision is absolutely necessary.

FROM MELBOURNE.

PRINCE ALFRED has had a splendid reception here. The town was decorated in every possible way for the occasion, with triumphal arches, flags, illuminations, fireworks, and torch-light processions. His Royal Highness also visited Ballarat and Geelong, and was received with similar manifestations of loyalty and rejoicing. Some of the triumphal arches were very tasteful. The Chinese displayed their loyalty by means of illuminated arches, Chinese lanterns, flags, and Chinese inscriptions. The Geelong Fire Brigade erected a triumphal arch of their own for the occasion of his Geelong visit. Advantage was taken of the Prince's visit to Melbourne to get him to lay the foundation-stone of the new Town-hall, which was done with great ceremonial. The trowel was of gold, and so splendid an article that his Royal Highness smilingly said it was almost a pity to use it. The design was by Mr. Ralph Wilson, of the firm of Cronch & Wilson, architects. Messrs. Reed & Barnes were the architects of the selected design for the Town-hall, which will be a really handsome Italian edifice. The design was obtained by competition, and was chosen from about thirty sets of drawings, more than a twelve-month since. The erection has been undertaken by Messrs. Lawrence & Cain, builders, for 65,000.

Ballarat.—Prince Alfred also laid the chief stones of the Victoria Temperance Hall, Ballarat, of which Mr. Poeppel is the architect. The general style of this building is Norman. The front elevation will consist of three stories, and the hall will be a spacious one. The trowel, here, too, was a handsome one, of gold gathered on the spot, and was designed by Mr. Poeppel.

An untoward episode of the Prince's visit to Melbourne was a robbery of some jewelry belonging to him, the thief being a person appointed by the Governor to attend His Royal Highness temporarily as his valet. The name of this scamp, who ought to be whipped for so disgraceful an act upon such an occasion, was Osbaldeston. He had been keeper of a Turkish bath, and promoted to the office of shampooer to his Excellency the Governor; hence his further promotion to be valet, *pro tempore*, to the Duke of Edinburgh.

ACCIDENTS.

ONE of the houses which still remained to be pulled down on the Law Courts site, near Temple Bar, has fallen of its own accord. It was the well-known shop occupied by the Holloway's ointment people, of advertising notoriety. The primary cause of the fall is said to have been the burning some time since of a beam in the basement, which was not replaced, and when the upper floors were being removed the want of its support led to the fall of the whole building.

A dilapidated building of four stories at Osburn, Newcastle, has partly fallen while under repair, killing one of the workmen and severely wounding another. One of the beams supporting a floor, on which was a quantity of cement, had snapped, causing the flooring to give way.

Another cement warehouse has fallen. It was situated in Hope-street, Glasgow, and was a one-story brick building.

Books Received.

Half-hours with the Telescope. By RICHARD A. PROCTOR, B.A., F.R.A.S. London: Hardwicke.

THE author and publisher of this little work had in view, in its preparation, the production, at a moderate price, of a useful and reliable guide to the amateur telescopicist; and the result is an excellent little treatise, which was much wanted by amateurs, who will here find just the sort of practical instruction which they specially require. The volume is illustrated by diagrams on stone and wood.

Papers on Subjects connected with the Duties of the Corps of Royal Engineers, contributed by Officers of the Royal Engineers. New series. Vol. XVII. Printed by Jackson & Son, Woolwich, 1868.

THIS volume of transactions of the Royal Engineers contains some interesting papers, and especially one titled "A Comparison between Free and Convict Labour," by Captain Harvey, Deputy-Governor of Portsmouth Prison. This is a subject we have for years occasionally treated of, and we are glad to notice how favourably it is considered by the Deputy-Governor of Portsmouth Prison. The waste of manual power in the general treatment of convicts is enormous, and the expense to the country is very great. A subject akin to this, as regards waste of power, is also treated of in this volume—namely, military labour, on which, as well as on convict labour also, there is a paper by Captain Percy Smith.

VARIORUM.

"The Reliquary: Quarterly Archeological Journal and Review." No. 31, Vol. VIII., January, 1868. Edited by Llewellyn Jewitt, F.S.A. London: Bemrose, Paternoster-row.—The two first papers in this very interesting quarterly are on the tile-kiln discovered at Repton, in Derbyshire; one by the Rev. Stuart Adolphus Pears, D.D.; and the other by the Editor. A version of the amusing ballad of the Derby Ram is given, regarding which the writer of this notice would suggest that the nonsense of the chorus might be avoided, as it was in a version which he was taught fifty years ago in Scotland, and wherein the last verse given in the Archeological Quarterly forms the chorus between the verses.—"Report to the Hon. the Commissioners of Sewers of the City of London on the Projects of Companies, Session 1867-8, affecting the City." By William Haywood, Engineer and Surveyor to the Commission.—From this report it appears that

the railway projects affecting the City are very much fewer this year than the alarming lists which threatened to swallow up the City altogether of late years. The only new ones now are the Eastern Metropolitan (Underground); the Islington; and the Metropolitan (Smithfield Junction). Two or three others want extension of time. The Tower Subway and the London Corporation Gas Bill are the only others; in all there are seven Bills. Mr. Haywood recommends a cautionary dissent from the whole of these projects, so as to enable the Commissioners to retain a *locus standi* before the Parliamentary Committees.

Miscellanea.

ARTISANS' AND LABOURERS' DWELLINGS BILL.—Mr. Mac Cullagh Torrens's Bill has been read a second time in the House of Commons.

EXPLOSION AND BURNING THROUGH NAPHTHA.—The English schooner, *Mary Ann*, Captain Marshall, laden with naphtha and petroleum, caught fire at Antwerp, in consequence of an explosion on board. The ship was entirely destroyed, and the captain and crew perished.

DESTRUCTION OF A CHURCH BY FIRE.—The parish church of St. George, Wemdon, near Bridgewater, has been destroyed by fire. During divine service, and just after the vicar had given out his text, a loud knocking was heard at one of the doors, and on its being opened, a man alarmed the congregation by exclaiming, "Make haste out, the church is on fire." Great consternation prevailed, although no fire or smoke was then observed inside the building. Outside, however, it was seen that one portion of the roof was in a blaze. It was evident that the flue belonging to the stove had either become overheated, or that there was some defect in it, which had caused ignition of the rafters between the ceiling and the roof. Except the tower, which was saved, together with a peal of five bells, and the chancel, the whole of the building was entirely destroyed, together with an organ, almost new, and the carved oak pulpit. Until a few years past the church was insured in the sum of 500*l.*, but was now uninsured.

THE NEW TOWN HALL FOR GATESHEAD.—At a recent meeting of the town council, according to the local paper, the committee reported that Sir W. James had signified his approval of the Gateshead Town-hall and Corporate Buildings; that the draft contract with Mr. Thomas Bulman and his security had been prepared; and that the matter only wanted the completion, by Mr. J. Johnstone, of the specifications and details. Messrs. W. & R. Reed were the contractors selected for the erection of the buildings proposed to face the High-street. When it was arranged that they should be erected in West-street, it was suggested that the Messrs. Reed should be employed to do the work, at the schedule of prices attached to their original tender. It was not now intended to employ Messrs. Reed in any part of the work, and the committee recommend that 200*l.* be paid to them in full of all compensation. Messrs. Reed have signified their willingness to accept the sum named in full of all claims. The report was adopted and confirmed.

DRAINAGE.—We understand that Mr. Codrington, Associate of the Institution of Civil Engineers, has addressed a letter to the Mayor of Reading, proposing to submit a plan to the local Drainage Committee for the disposal of the sewage of the town. Irrigation of a sufficient area of land at Lower Caversham, above flood level, and an outfall from the irrigated land, aided by pumping, are prominent points in the plan. A saving of 7,000*l.* in cost of works, and a large sum in annual working expenses, is anticipated.—The tenders for executing the necessary works for extending the sewerage and water supply to the White Cross district, Hereford, have been opened by the District Drainage Committee of the Town Council. There were seven competitors, who tendered as follows:—Messrs. Jones & Jepson, 2,649*l.*; Mr. Charles Sterry, 2,860*l.*; Mr. Richard Pritchard, 2,280*l.*; Messrs. R. Welsh & Son, 2,137*l.*; Mr. William Bowers, 2,135*l.*; Mr. Edward Bigglestone, 2,075*l.*; and Mr. James Bowers, 1,937*l.* 10*s.* The tender of Mr. James Bowers, being the lowest, was accepted, and the work will be immediately commenced, and is to be completed within six months.

TURRET CLOCKS.—Mr. Benson sends us a long list of turret clocks erected by him during the year 1867, as well in India as in the United Kingdom. It serves to show the esteem in which the maker's works are held, but would scarcely interest our readers.

SALE OF CARVINGS AND CASTS.—Mr. W. G. Rogers, the carver, unable, as he says, to fight against the weight of seventy-six years, is about to sell by auction the whole of his collection, consisting of several hundred specimens of old Italian, Flemish, Venetian, and French works; works by Gibbon and Chippendale; and many of his own works of original designs and working drawings. Some of our readers will doubtless take advantage of the opportunity.

TUNBRIDGE WELLS INFIRMARY.—A movement is in progress for the erection of a new infirmary for Tunbridge Wells, at a cost of somewhere about 10,000*l.* This is thought by some to be preferable to any enlargement or improvement of the present infirmary, which only contains accommodation for twenty-four beds. It is suggested that the new infirmary should be called the Victoria Hospital, and that perhaps her Majesty, who spent much of her childhood in the neighbourhood, might be induced to lay the foundation-stone.

BURIED COVENTRY.—At a recent meeting of the Warwickshire Naturalists' and Archeologists' Field Club, held at the Museum, Warwick, Mr. P. Wykeham Martin, M.P., in the chair, an interesting paper was read by Mr. W. G. Fretton, on "Buried Coventry," descriptive of the various indications of edifices, &c., which have passed away, and especially noticing the crypts. Old Coventry, as known to the earliest inhabitants of the district, said the lecturer, is, in fact, buried; and, with its assemblage of wattle huts, timber houses, and stone hindings of greater note, all has disappeared; a new and fashionable resort of the wealthier citizens has usurped its place, and if we were to seek for indications of the former town we should find them round and about the vicarage of Holy Trinity, where, beneath the surface, old foundations of the church of St. Nicholas are still to be met with, and human bones have been found. Closely adjacent is a portion of the old pack-horse road to Leicester. The traces of the monastery founded by Lady Godiva in 1043, on the ruins of the Saxon nunnery of St. Osburg, that had been destroyed by Edric the Traitor nearly thirty years before, formed a special subject of notice in the lecture.

NEWCASTLE ANTIQUARIAN SOCIETY.—The monthly meeting of this society has been held in the Old Castle, Newcastle-upon-Tyne, the Right Hon. Lord Ravensworth in the chair. His lordship, on taking the chair, said that some two or three years ago he promised to write a memoir, on the suggestion of his friend Dr. Charlton, on an enigmatic tablet called the Corbridge Lanx. There was one point which he then stated, namely, that the female figure, which had been represented by different commentators in different guises, was Latona, the mother of Apollo and Diana, the two prominent figures in that Lanx. And he also mentioned that the worship of Latona was practically conjoined with the worship of Apollo and Diana; also that one of the symbols in the borders of the Lanx was a palm-tree dedicated to Latona, on account of (according to the ancient mythology) her clasping, at the time of the birth of Apollo, a palm-tree and an olive-tree. A report had just been handed to him by a gentleman who had been sent out by the Dilettanti Society of London (of which he was a member) to take measurements and make a report of the remains of a temple of Apollo Sminthena in Asia Minor. An altar had been discovered by the gentleman (Mr. Pullen), of which rubbings had been taken. The temple was dedicated to Apollo, Artemis, and Latona—Artemis being the Greek Diana, and Latona being the mother of the god and goddess. He mentioned these circumstances as it was in some degree corroborative of the opinion which he then ventured to state. Dr. Bruce said that he had been informed by Sir E. Blackett of the finding of a Roman altar at Hulton Castle, near Matten. On the top of it was discovered the word "NVMINIUS," but what followed he could not tell; they expected it would be the word AUGUSTORUM. He would take care to make a journey out, and endeavour to see it before the next meeting. Lord Ravensworth read an interesting paper on "The Roman Wall."

LEAD-WORK.—It is fair to mention that the lead-work of the new spire, St. Nicholas's Chapel, Lynn, as also that for the new lantern, Ely Cathedral, was executed by Mr. Matthew Hall, of London.

CHEMICAL SOCIETY'S SOIREE.—A very charming entertainment was given on Wednesday evening by the President and Mrs. Warren De La Rue to a large company, at Willis's Rooms. The reception-halls were crowded with new and important philosophical and other apparatus, and a host of other objects of interest, many of them chemical and metallic, and the walls were hung with pictures, photographs, &c.

DESTRUCTIVE FIRE.—The extensive premises of Messrs. Farmico & Sons, window-glass and lead merchants, St. John-street, Smithfield, have been destroyed by fire, which also seized on adjoining buildings, eight of which, besides Messrs. Farmico's, but including Messrs. Brownings, oil merchants, have been destroyed. Messrs. Farmico announce that their business will continue to be conducted as before at the same place.

CAITHNESS INDUSTRIAL EXHIBITION.—The Caithness Industrial Exhibition has been formally opened at Wick. It has proved a great success. The hall, on the day of opening, was well filled by a numerous and highly respectable gathering from all parts of the county. The exhibition is held in the Temperance Hall, which is completely filled with a varied assortment of objects of industry and art. Her Majesty conferred a hush of the Prince Consort, escorted by the Crown Princess of Prussia. The ceremonial of opening the exhibition included the unveiling of this hush, which has been the principal attraction in the exhibition.

RESTORATION OF DECAY.—A new form of falsification in the restoration of an old building is reported from Italy. The Archive Office at Pisa is being restored, and the finished portions are said to display considerable archaeological study. It was decided, however, that the work was not to look like a restoration, but should wear the appearance of a genuine relic of antiquity; and so the workmen and artists employed were directed to anticipate the injuries of time by smudging their work here and there, by chipping pieces now and then out of the new walls, by toning down their tints, and by introducing artificial discolourations, importing to be the result of age and damp.

THE GLASGOW SEWAGE ASSOCIATION.—At the last ordinary meeting of this association Mr. Smith briefly sketched the leading features of the paper which he read at the previous meeting, and the discussion thereon was resumed, after which Mr. Sim read a paper, in which he proposed a plan to prevent the sedimentary matter which issues from the sewers of the city from passing into the river. This was simply by intercepting it at the outlets in sediment receptacles and barging it regularly away. Mr. Sim said that on reading his paper to Mr. Roy, the Glasgow representative of Messrs. Brassey & Co., he suggested an intercepting sewer on each side of the river, to lead down past the city to some convenient place for settling ground where the sediment could be deposited and carried away in barges as proposed. No one seemed much to appreciate Mr. Sim's scheme.

THE GREAT TRIENNIAL HANDEL FESTIVAL, CRYSTAL PALACE, 1868.—Extensive preparations are being made to render this celebration, in June, the most complete illustration of English musical progress that has yet been witnessed. An able programme has been published. The London division of the chorus will be more numerous even than on previous occasions; application for admission thereto having proportionately increased. An interesting feature in connexion with this festival is the publication of a photo-lithographic fac simile of Handel's own manuscript score of the Messiah, which has been lent for the purpose by her majesty the Queen from the royal library. Handel's scores were bequeathed by him to John Christopher Smith, his amanuensis, who in his turn presented them to George III., after the death of the Dowager Princess of Wales, the mother of the king, upon the latter continuing the pension which Smith had received during the lifetime of the princess. The date of the commencement of the work is August 22nd, and at the end, September 12th, thus proving that this immortal production was penned by Handel in the short space of twenty-one days.

PERSECUTION OF A NON-UNION MAN.—We have forwarded to the "Country Clergyman" three offers of an engagement for the young brick-layer.

METROPOLIS SUBWAYS BILL.—This bill, which is a reprint of that of last session, as amended in committee, has passed the second reading in the Commons.

RAILWAYS IN MEXICO.—We hear of various great projects being now before Congress, which will place the city of Mexico in direct communication with the United States, and with all the salient points of its own territory. One company, the Mexico and United States, proposes a line which shall place this city within ninety hours of New York.

IMPORTANT PUBLIC QUESTIONS IN BRIGHTON.—A committee of influential residents in Brighton, including Mr. White, M.P., and Professor Fawcett, M.P., has been formed with the view of bringing before the inhabitants opinions on some of the more important questions of the day. The inaugural lecture was given by Mr. W. Hepworth Dixon, on "The True Theory of Representation," and was regarded by the committee as a complete success. Mr. Dixon's address has been printed and circulated. Mr. Godwin Smith has since lectured; and on Friday, the 20th instant, Mr. Godwin is to deliver an address in the Town-Hall, on "The Health and Happiness Question." Mr. Henry Willett and Mr. J. E. Mayall act as honorary secretaries.

TENDERS.

Table with columns for work descriptions and amounts. Includes entries for Lake, Henshaw, King & Sons, Wills, Dubbin, and various construction projects.

For the erection of a warehouse and offices at 41, Coleman-street. Mr. G. Loe, architect:—

Table listing tenders for Coleman-street warehouse project, including Adamson & Son, Axford & Whillier, Hart, Hyder & Son, Winder, Gammon & Son, King & Sons, Wills, Hill & Keddell, Conder, Wells, and Crab & Vaughan.

For workshops, Marlboro'-place, Brighton. Mr. J. Berney, architect:—

Table listing tenders for Marlboro'-place workshops, including Oliver, Loader, Dobson, Dalhimore, George, Sawyer, Farr, Hall, Jackson, and Lockyer.

For the erection of four houses at Barking, Essex. Mr. J. W. Dennison, architect:—

Table listing tenders for Barking houses, including Stokes, Brett, and Withers.

For detached villa, on the Stonebridge Park Estate, Willesden. Five to be erected. Mr. Bassett Keeling, architect. No quantities supplied:—

Table listing tenders for Stonebridge Park Estate villa, including Woodbridge, Linn, and Suowden.

For new infirmary and dispensary, Barton-on-Trent. Mr. Edward Hulme, architect. Quantities supplied:—

Table listing tenders for Barton-on-Trent infirmary, including Jeffrey & Fritchard, Webb (too late), Hewley, Brothers, Lovatt, Matthews, Gregory, Maddocks, Trow & Sons, Wileman & Wigley, Hadfield, Smith & Chamberlain, Bowler & Beck, Clarke, Mason, Lilley & Son, Nelson, Neale & Son, Hardrick & Son, Lowe & Son, Lilly & Son, and Hunter & Bennett.

For new schools and parochial meeting-room, Newhaven, Sussex, for the Rev. E. P. Southwood, Messrs. Halsey, Brock, & Wicks, architects:—

Table listing tenders for Newhaven schools, including Parks, Simpson, Card & Son, Lee, Kirk, Holloway & Son, and Moring.

For new market, for Clevedon Local Board of Health. Mr. Hans F. Price, architect:—

Table listing tenders for Clevedon market, including Bennett and Newman.

For weigh-bridge house, for Clevedon Local Board of Health. Mr. Hans F. Price, architect:—

Table listing tenders for Clevedon weigh-bridge house, including Bennett and Newman.

For new house at Bathford, for Mr. Bath. Mr. Hans F. Price, architect:—

Table listing tenders for Bathford house, including Newman.

For the erection of a Roman Catholic church and presbytery, London, Staffordshire, for the Rev. J. Massey. Mr. E. W. Fugin, architect:—

Table listing tenders for Staffordshire church, including Collis & Hodgson, Eaton, Barlow, Hughes, Hall & Son, Hodgson, Heveningham, Trow & Son, Richardson, and Crutchley.

For erecting four houses at Crown-hill, Lower Norwood, for Messrs J. & J. Allen. Mr. Albert Bridgman, architect:—

Table listing tenders for Crown-hill houses, including Gunning.

For the Holyhead drainage:—

Table listing tenders for Holyhead drainage, including Hardacre, Jeffrey, Messrs. Hughes, Chester, Owen & Williams, Owens & Evans, Messrs. Fogg, Bugbird (accepted), and Thomas & Sons.

For carcasses of house and stable offices, at Castle Hill, Blechingley, Surrey, for Mr. James Norris, exclusive of bricks, rubble stone, and sand. Mr. James Wylson, architect. Quantities furnished by Mr. Dan Cubitt Nichols:—

Table listing tenders for Castle Hill offices, including Little, Bowman, Rentmore, Patman & Fotheringham, Barnes, Macey, Carruthers, M. Regis, sen., J. & W. Sanders, Myers & Sons, Hill & Keddell, Conder, Jackson, Shaw, Piper & Wheeler.

For alterations and additions to residence, Brigadier Hill, Epsfeld, for Mr. F. G. Carling. Mr. Thomas J. Hill, architect:—

Table listing tenders for Brigadier Hill residence, including Saunders, Salford, Patman, Brox, Field & Sons, and Bayes.

For St. Augustine's Church, Wisbech. Mr. William Smith, architect:—

Table listing tenders for St. Augustine's Church, including Cave & Halliday, Bell & Sons, Cooke, Bennett, Brown, Rust, and Law.

For addition of new aisle and entire reseating of St. Mary's Church, East Barrow, for Mr. Rowland Barker, architect. Quantities supplied by Mr. F. W. Hunt:—

Table listing tenders for St. Mary's Church, including Rhodes & Roberts, Carter & Son, Dove, Brothers, and Brass.

St. Peter's Schools, Hammersmith.—Mr. Stimpson's tender was 4,063l., not 4,863l.

TO CORRESPONDENTS.

H. T. (to give plaster casts "the appearance of ivory," they are intended, we believe, in bolting stearine).—T. F. C. (Mr. Rothchild Cooke's rights have been often admitted and argued in the Builder).—J. D. P. (unnecessary).—J. R. (forwarded).—B. B. (ditto).—H. F. (not worth while).—E. V. (next week). O. V. (ditto).—M. Brothers (shall be forwarded).—T. B.—O. J. H.—J. H.—R.—T.—R.—J. M.—W.—O. & Co.—H. F. A.—B.—A.—H.—D.—H.—A.—D.—P. S.—W.—L.—B.—H.—M.—J.—W.—R.—H.—G.—Rev. I. B.—A.—F.—F.—L. J. (forwarded).—T. B.—W. O. R.—J.—G.—K.—B.—W.—R.—E. T.—E. W. P.—H.—H.—B.—Radcliffe.—J. L.—N.—P. G. S.—E. T.—R.—R.—J.—B.—J.—W. C.—B.—Messrs. F.—Fairplay.—W.—B.—G.—I.—J. H.—Z.

Note.—Architects who are unwilling (as we are) that their names should not accompany lists of tenders with which they are concerned, may prevent the omission by sending lists themselves. We cannot repeat lists in the ground of such omission.

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

TO SUBSCRIBERS.

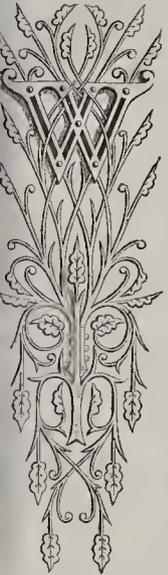
NOW READY, THE TWENTY-FIFTH VOLUME OF "THE BUILDER" (bound), for the year 1867, price One Guinea.

CLOTH CASES for binding the Numbers, price Two Shillings and Ninpence. COLOURED TITLE-PAGE, Gratis.

The Builder.

VOL. XXVI.—No. 1311.

Machinery for Joiners' Work.—The Redcliffe Estate, Brompton.



I propose to devote this page to a little bit of advertising, but it is advertising with a view to what seems to us public advantage. We want to make better known what can really be done in one branch of building by means of machinery than it is at present. It would seem curious, if we did not know how often a new thing must be said before it is heard and acted on, to find that even at the present time some of our leading builders, each paying hundreds of pounds weekly for joiners' wages, shut their eyes to the enormous economy that can be effected in this class of work by the employment

of some of the machines which have been perfected within the last few years. It seems a general idea among builders, even among those who admit the saving effected by machinery for joiners' work, that machinery can pay only in very large establishments, and that unless a builder can afford to expend a great sum of money upon an extensive plant, and have separate machines for each operation, he had better be without machinery altogether. Our inquiries, however, had us to the belief that by a moderate outlay on machinery, which would be within the means of any man employing a dozen men, a great saving may be effected. Desiring by all means to lessen the cost of houses, and knowing very well that machinery benefits in the long run even those who may seem for a time to be injuriously affected by it, we have looked more carefully into the subject, and will give some of the results. These are taken from the accounts kept of the work actually turned out by a small plant of machinery erected by Samuel Worsam & Co., of Chelsea, for Messrs. Corbett & McClymont, who are building largely upon the Redcliffe Estate, West Brompton. And first let us say a few words about the rather remarkable building operations that are being carried on here. The Redcliffe Estate, which is something less than two miles from Hyde Park-corner, consists of about seventy acres. The Fulham-road bounds it on the south side; the Old Richmond-road, leading from South Kensington to Hammer-smith, on the north side; Honey-lane, leading from the Fulham-road to the Richmond-road, forms its western termination; and The Grove, Boltons, and Redcliffe-road, are its bounds on the east side. Not five years ago the whole of this estate was used as market garden-ground, a considerable portion of it belongs to Capt. Hunter and Capt. James Gunter, Messrs. G. &

H. Godwin acting as their architects. For the freeholder of another part of the estate Messrs. C. Lee & Son are the architects.

When Messrs. Corbett & McClymont first went on to the land there was no carriage-road from Fulham-road to Richmond-road, but they have now made a handsome road, called Redcliffe-gardens, upwards of 60 ft. in width, and about half a mile in length (on the site of Walnut-tree-walk), on either side of which very capital semi-detached villas are being erected. Near the north end of Redcliffe-gardens a square has been formed, through which Redcliffe-gardens pass, and in the western half of the square a site has been set aside for a church. The builders have carried out their operations with great spirit and activity; they have constructed the whole of the roads and sewers, and there are now erected on the estate, standing upon a bed of gravel and sand for upwards of 20 ft. in depth, about 550 houses, shops, and stables. The houses have been built with a view apparently to suit a variety of tenants, as the rents commence at 50*l.*, and range from that amount up to 160*l.* per annum. About 400 more houses, we learn, are yet to be erected, many of them of large size. With a good service of omnibuses, and two railway-stations, viz., the Chelsea Station, at the south end of the estate, and the West Brompton Station, at the north end of the estate, which afford ready communication with the City, this district can scarcely fail to come into good use, and give a good reward to the builders for their enterprise and skill.

To return, however, to our subject. The whole of the joiners' work for the houses on this estate is prepared from deals and battens, which are purchased at the docks, and stacked in the yard adjoining the mill until seasoned.

The machinery is fixed in a temporary building on a convenient part of the land, and comprises:—

1. A Worsam's portable deal frame, capable of sawing at one time two deals or planks, up to 14 in. wide by 4 in. thick, into hoards of any required thickness. This machine is so constructed as to require no excavations below the floor, often inconvenient. It is entirely self-contained, being all fitted to a strong cast-iron foundation plate. The swing frame being made of steel, it combines great strength with lightness, and can be driven at the rate of 250 strokes per minute with twelve saws working at once without perceptible vibration. The saws used in this frame are very thin, so as to reduce the waste of wood to the minimum.

2. A self-acting saw-bench with a feed motion by means of a rope for bringing forward the timber to the saw. The rate of feed, it seems, can be varied from 12 ft. to 60 ft. a minute, according to the nature of the work. This bench is used chiefly for sawing single cuts in deals, planks, or battens; for cutting feather-edged hoards or ripping out scantlings of various sizes; and it is provided with a pair of timber-carriages or "hogies" running on rails for carrying the ends of a long piece of timber.

3. There is a planing and "trueing up" machine for planing and "trueing up" the stuff after it leaves the sawing-machines. This, they say, is the only machine which has ever been brought out which will set a piece of twisted timber true, and at the same time give it a planed face fit for gluing up without requiring to be touched by a hand-plane. The stuff to be planed is laid upon a planed travelling-table of cast-iron, and is held by a series of screw cramps, which retain it in one position when under the action of the cutters. It is worked by a labourer at 2*s.* a week, and some notion may be formed of the economy effected by the use of this machine when it is mentioned that it will plane up the whole of the stuff for fifty 2-in. doors in ten hours. The work performed by it in our presence seemed very good.

4. The "General Joiner" is a singularly useful machine, which appears to do almost all the different kinds of work usually executed by hand in a joiner's shop, amongst which may be reckoned sawing, planing and thicknessing, mortising, tenoning (single or double), cross-cutting and squaring up, grooving, tonguing, rebating, moulding and heading, chamfering, wedge-cutting, boring, and a great variety of other operations. With a little practice any joiner can work it. The mortising apparatus is fitted with a self-acting feed motion, by means of which the piece being mortised is moved forward at each stroke of the hand lever. The table is fitted with stops which regulate the depth and length of the mortises, and the bed has an independent rising and falling motion, so that a lad can be mortising or boring while a man is at work at the other table. The mortising apparatus is usually worked by a young lad, who will make from sixty to eighty ordinary mortises in an hour.

After the stuff has been planed at the trying-up machine, it is taken to the "general joiner," at which it is mortised, tenoned, grooved, moulded, and otherwise prepared for putting together and cleaning off in the joiners' shop.

All these machines, in full work, are driven by a Ransome's 12-horse power portable steam-engine. The fire-place is of extra size, to enable it to use up the sawdust and waste wood from the different machines, which, mixed with a little small coal, is found sufficient to generate an ample supply of steam. The road-wheels and axles of the engine are removed, and the boiler is set upon two cast-iron saddles: by this arrangement all oscillation is avoided, and it becomes as it were a stationary engine, with a quick draught, occupying a very small space. The smoke from this engine is not much more than that from an ordinary house chimney, and it works almost noiselessly.

Of course there is a grinding apparatus for grinding and setting the plane-irons, and a moulding-iron grinder, with small Bilston stones of various forms for sharpening moulding-irons; and in order to keep the grit and sludge from the grinding machines from spoiling the other machinery, the former are fixed in a small "lean-to," built out from the main building.

The whole of the machinery is driven from a single line of main shafting which runs across the mill. This shafting, we observe, is fixed below the floor in a tunnel, and thus all the driving-hands are kept out of the way, which is a great advantage where long pieces of timber are being constantly carried about, and where, consequently, overhead driving gear would be dangerous. All the machines are placed on stones, set on a few courses of brickwork: being thus solidly fixed, they can be driven at a very high speed without vibration; and being entirely independent of the building, a light cheap erection to keep out the weather is all that is required.

The entire cost of the plant in the shop we are describing, including steam-engine, shafting, hands, and a complete set of saws and cutters for each machine, was 1,000*l.*, including fixing and starting it to work. Of this sum one-half may fairly be taken as chargeable to the sawing department, leaving the cost of the joiner's machinery with its proportionate share of the engine and shafting at 500*l.*

And now comes the question of saving. The net earnings of the deal-frame and self-acting saw-bench, estimated from the prices charged for cutting at the mills, have averaged, we are assured, 72*l.* per month, after deducting all working expenses. This result has been obtained from the books of the mill, dating back from the time when the machinery was first started, about six months since.

The following facts will illustrate the saving

of labour effected by the Trying-up Machine and the "General Joiner"—

Cost of Labour upon Thirty 2-in. Four-panel Doors, 6 ft. 10 in. by 2 ft. 10 in.

Planing and truing up the whole of the stuff, and planing and thickening the panels. Man's time at trying-up machine, 7 hours	£ s. d.
Mortising, tenoning, grooving, and otherwise preparing the work ready for putting together at the "General Joiner," two lads ten hours each	0 3 2
Half the time of the foreman of the mill setting out the work and adjusting the cutters, &c., five hours	0 3 6
Total cost of labour at the machines ...	0 10 10
Putting together, wedging, and gluing up and cleaning off by hand, but not including mending, 7½ hours at 6d. per hour	1 18 3

Total cost for labour on thirty 2-in. doors

Total cost for labour on one 2-in. door, equal to 1s. 7d.

Cost of Labour upon 36 Pairs of Sashes, 7 ft. by 4 ft., with four Panes.

Planing and truing up the whole of the stuff. Man's time at the trying-up machine, five hours	0 2 2½
Mortising, tenoning, mending, and rebating, scribbing, sticking the sash-bars, &c., at the "General Joiner," two lads ten hours each	0 4 2
Half the foreman's time setting out the work, and adjusting the cutters for the lads at the "General Joiner," five hours	0 3 6
Total cost of labour at machines	0 9 10½
Putting together, wedging, and gluing up and cleaning off after leaving the machines, sixty hours at 6d. per hour	1 10 6

Total cost for labour on thirty-six pairs of sashes

The total cost for labour on one pair of sashes, equal to 1s. 8d.

Cost of Labour upon 28 Sash Frames for 7 ft. by 4 ft. Sashes, including the Sills.

Planing up the whole of the stuff for twenty-eight sash frames. Man's time at trying-up machine, five hours	0 2 2½
Sticking parting beads, grooving the pulley stiles for putting bead, cross-tonguing and sinking heads of pulley stiles, bevelling, grooving, and sinking sills, and tenoning to receive pulley stiles, at the "General Joiner," two lads ten hours each	0 4 2
Half the foreman's time setting out the work, and adjusting the cutters for the lads at the "General Joiner," five hours	0 3 6
Total cost of labour at the machines ...	0 9 10¼
Putting together and cleaning off by hand after leaving the machines, fifty-six hours at 6d. ...	1 8 0

Total cost for labour on twenty-eight frames

The total cost for labour on one frame, equal to 1s. 4d.

In all the above instances the stuff was snwn to the right thickness at the deal frame and saw-hench, and cross cut to lengths; but the ripping out was done at the "General Joiner," the cost being included in the above figures. Interest on the cost of the machinery would have to be added, together with a proportion of the engine-man's wages; but this would give but a very small increase to the cost of the items in question. We believe that a section of our readers will find it worth while to inquire for themselves into the correctness of these details.

We saw at the manufacturers' some specimens of the higher kinds of joiners' work, such as circular panels and embossed and snnk ornamental panels, such as, it has hitherto been considered, could not be done by machinery, but which, in reality, are produced by a newly-invented machine at less than one-fortieth part of the cost of hand labour; and into this part of the subject we will not now enter, confining ourselves to the results of the plant set up for one particular firm of builders.

TECHNICAL INSTRUCTION FOR ARTISANS.—At a conference on this subject at the Society of Arts, arranged by the Working Men's Club and Institute Union, a committee was appointed to ascertain how far existing institutions may be rendered available as industrial museums and trade colleges in London, to be set on foot on the principle of combining voluntary effort with aid from the State; to ascertain in what district of London such colleges and museums may best be established; to communicate with employers and manufacturers on the subject of providing technical instruction in the workshops; and to take such further steps as the committee may think desirable with reference to the object in view.

ON THE UTILIZATION OF SEWAGE BY IRRIGATION.*

It has already been demonstrated that in pouring the impure contents of our sewers into the nearest water-courses, we are not only imperilling the health of the community in more ways than one, but we are wasting, to produce this baneful effect, a commodity of inestimable value to our fields. That such is the case is due partly to the looseness of the laws referring to the pollution of rivers; partly to the narrow policy of private manufacturers, who in many cases, from ignorance or want of energy, will take no means to rescue ingredients of considerable worth, such as are now aiding in the discoloration of our streams; and partly—perhaps chiefly—to the apathy of the great body of the public, which, ever slow to the appreciation of a nuisance which has been of a gradual and insidious growth, has at the same time no just idea of the benefit which would accrue from the application of sewage to the land. That this benefit would be solid and permanent, is a truth which cannot fail to be extracted from the great mass of evidence which has from time to time been placed before the nation, and it is now our duty to give a sort of digest of this evidence, which, however crude and incomplete, at any rate may claim to possess the merit of being faithful. In this statement it is proposed to include an analysis of the principles of sewage irrigation; its estimated benefits to the country; a careful examination into its different methods of application; its comparative merits under the combined and separate systems of drainage; the nature of the land and the crops concerned in its application; the sanitary effects; and its practical results as recorded in the most eminent examples.

Comparative Novelty of Sewage Irrigation in this Country.

When the word novelty is used in reference to the cultivation of land by sewage, it is to be understood that, although in one or two isolated cases—such as Edinburgh, where we are credibly informed† that even from so far back as two centuries ago, sewage has been applied to the soil—it is only within recent times that it has been reduced to an organised system.

On the other hand, in the southern parts of Europe, the principles and practice of this important branch of agricultural science have long since attained considerable perfection, evidence of which may be derived from the numerous and costly works which have been profitably constructed in the vicinity of large towns. And, as has already been said, in all hot and dry countries in every part of the globe, water irrigation has from the remotest ages supplemented the forces of nature. For this purpose, we are told that systems of reservoirs, similar to those of our modern waterworks, were constructed by the engineers of ancient India, Assyria, and Egypt, on a scale of magnitude corresponding with the powerful grandeur of those nations. The *norias* of the Moors, the bucket-wheel of the Persian, and the *fadoud* or rudo water-lever of the Egyptians, were appliances used in irrigation for raising the water to the desired height, and are still to be seen in those countries.

In Spain, where this art was carried to perfection under the enlightened dominion of the Moors, schemes of irrigation at the present day form a most important branch of public and private enterprise, some of which are in the hands of English engineers. These works do not resemble the river-warpings which have from a very ancient date been practised in this country, more particularly upon the banks of the Ouse, in Yorkshire, but rather those river-meadows such as in Devonshire illustrate the value of a large and regular supply of water on a free and well-drained soil.

To the humidity of our climate, and consequent abundance of water, is due the rarity of irrigation works in this country; and to this it may be added, that until very recently, the defective drainage of cultivated lands prohibited anything like irrigation on a large scale, where such works were feasible and most to be desired. Now, however, that good drainage has become general, and the soil rendered dry and porous, and capable of absorbing additional moisture, the latter drawback no longer exists, and it is generally admitted that light and well-worked soils are adapted for irrigation under ordinary circumstances. Experience also has demon-

strated that the moisture of our climate is so far from marring the effect of irrigation, that enormous quantities of water or sewage may be applied with the happiest results.

It has been computed that the annual depth of sewage applied to the Craigentinny meadow, Edinburgh, which bring a rental of from 15*l.* to 20*l.* per acre, is not less than 64 in., and that under a climate far more humid than that of England generally.*

Analysis of the Principles of Sewage Irrigation.

In treating of this section of our subject, we must consider, firstly, the elements of vegetable growth; secondly, the form in which such elements are best applied to the plant; and thirdly, whether, in matter and in form, the sewage of towns comprehends those qualities essential to application and increase. Although the diversity of the combination of the elementary constituents of plants is almost infinite, yet these constituents are actually reducible to four, namely, oxygen, hydrogen, carbon, and azote or nitrogen. From these elements are derived, through the medium of chemical combination, certain compound constituents, some of which are combustible, and some of which are incombustible. The latter, which are simply the ash which all vegetable substances leave on combustion, are chiefly phosphoric, sulphuric, silicic acid, potash, soda, lime, iron, magnesia, and chloride of sodium. The former are derived from carbonic acid, ammonia, sulphuric acid, and water. These, whence we have the ammonia, starch, sugar, gum, and other substances composing the fabric of a plant, are in point of fact the food which is supplied to it by the decomposition of the atoms of manure in which its roots are embedded, so that to a certain extent, the medium which is calculated to effect most speedily and completely such decomposition must be productive of most benefit. Now it is a well-known fact that no manure, be it what it may, is freed from the enriching elements it may contain without the intervention of moisture. For the roots of plants to absorb their food in a dry state is an impossibility; therefore, until a shower of rain or some other watery agent has decomposed the sources of fertility, an application of manure is of no benefit. Cowley has said—

"The plants suck in the earth, and are
By constant drinking fresh and fair;"

and it would be difficult to find a more fitting expression in which to convey a definition of the process of their growth. Liebig says: "The presence of moisture, a certain degree of heat, and free access of air are the proximate conditions of those changes by which the nutritive substances in chemical combination are made available for the roots. A certain quantity of water is indispensable to transpire the soil constituents when rendered soluble; water, with the co-operation of carbonic acid, decomposes the silicates, and makes the undissolved phosphates soluble and diffusible through the soil."‡ Again—

"Dung and other manuring agents act only through the medium of the earthy particles that have become saturated with the nutritive substances contained in the manure."‡

If, therefore, we can discover a manure which, while it contains the elements of fertility, contains them in that form which most readily assimilates them to the structure of the plant,—the form of solution,—it will be admitted that, provided the application of such a manure be commercially practicable, it must be productive of immense benefit to the country. From the analyses and opinions of our most enlightened chemists and practical agriculturists, we have shown that the sewage of cities is rich in manurial properties, the greater part of which are held in solution, and are thereby most available for vegetable increase. And we shall hereafter place before the reader proof that its application in such form is consistent with the most satisfactory pecuniary results.

The chairman of the Metropolitan Board of Works is of opinion that the application of sewage in a liquid form is the best. §

Sir Charles Fox says that sewage can be remuneratively applied in a liquid form only. ||

The Rivers Pollution Commissioners, speaking with reference to the application of town sewage to land, say in their third report (Aire and

* Rep. Met. Sewage, 4673.

† Natural Laws of Husbandry, p. 75.

‡ Natural Laws of Husbandry, p. 115.

§ Rep. Met. Sewage, 1854: 222.

|| Rep. Met. Sewage, 1854: 1228.

* See, pp. 149 and 168, ante.

† Rep. Met. Sewage, 1864: 4103.

valder rivers), that "the produce of properly irrigated land will be from five to ten-fold that of the same land under ordinary cultivation." The Commissioners also state that, in the course of their inspection of the Aire and Calder district, they had no experience of any town or locality where the application of sewage irrigation would be impracticable.*

† Professor Wey considers that the liquid form is the only proper form of dealing with sewage. † Mr. R. Rawlinson thinks the best mode of dealing with sewage in all cases is to carry it rapidly on to the land. ‡

§ The Report of the Commissioners on Metropolitan Sewage, 1864, states,—"Your committee have come to the conclusion that it is not only possible to utilize the sewage of towns, by conveying it in a liquid state through mains and pipes into the country, but that such an undertaking may be made to result in pecuniary benefit to the ratepayers of the town whose sewage is thus utilized." "That soils and the roots of growing plants have a great and rapid power of abstracting impurities from sewage-water, and rendering it again innocuous and free from contamination." And, "That if it is no longer to flow into rivers, the only alternative which remains is to dispose of it on the land." §

1. The Different Methods of Sewage Irrigation.

¶ Having described the principles of the action of sewage upon the soil, we will now proceed to give a brief account of the various modes of its application. These are as follow:—

1. By bed and catch-work from open conduits.
2. By hose and jet distribution from iron pipes.
3. By flat-flooding or submersion.
4. By sub-irrigation.

1. Bed and Catch-work.

¶ So far as our present experience extends, there is no little doubt that this method of applying diluted liquid manure is by far the most successful, and its extreme simplicity as compared with other modes would appear to mark this as a natural result. Bed-work is adopted generally in preference to catch-work, but this arises chiefly from the fact that where irrigation is being carried on the configuration of the ground is more generally adapted to the former method. In the selection of a site for an irrigation farm, a level or gently rising meadows on the banks of a stream below the outfall are considered as the most favourable to the principle of gravitation; preference being always given to ground with a double inclination,—that is, with a slope perpendicular to, as well as parallel with, the stream. When these slopes are sufficiently moderate, or when the ground is level, the following is the system of preparing it by bed and catch-work. The sewage, after being strained, by means of a very simple and effective grating, from those grosser impurities which would impede the easy flow of the liquid over the soil, is brought to the highest point in the field, in a subterranean open conduit; thence it is conveyed through the head of the enclosure, maintaining a superior elevation. The surface of the field is divided into parallel beds of the width of from 16 ft. to 40 ft., running perpendicularly to the conduit. These beds are carefully arranged on a ridge and hollow plan, so that they present a series of gentle declivities, falling away on both sides from the centre of each ridge, which longitudinally intersected by a narrow gutter a few inches deep. Communication is effected between these gutters or feeding canals and the main conduit by means of little stop-gates, which, being removed, allow the feeders to be filled, and to shed their overflowing contents in a gentle, constant stratum, in and about the roots of the plants, which absorb the properties in solution through the digestive medium of the soil. The action of the latter, thus quickened by the transmuting process of vegetable growth, tends directly to clarify the liquid, which drains off in a comparatively pure state.

¶ In the centre of each hollow, between the beds, is laid a shallow drain of just sufficient depth to receive and carry off without reference to subsoil drainage, the clarified water after irrigation. In some cases it is deemed necessary to pass this water more over the soil. By these minor drains the liquid is carried into a large intercepting drain at the bottom of the field, which, taking a general inclination of the valley, may be

¶ Third Rep. (Aire and Calder, 1867), vol. 1, pp. 15, 64.
 † Rep. Met. Sewage, 1864: 4710.
 ‡ Rep. Met. Sewage, 1864: 4100.
 § Rep. Met. Sewage, 1864: pp. 5, 6, Preliminary Report.

brought to the surface at a lower level, and its contents once more utilized. The completeness with which this plan is carried out is a striking feature in the irrigation works at South Norwood.

¶ In water irrigation, open receiving-canals are often substituted for shallow drains, into which the liquid is drained off, percolating to the root-fibres; but this method cannot be considered as adapted for the treatment of sewage. When, as often happens, the inclination of the ground in the direction of the feeding-canals is too great to admit of their being filled to one level throughout, it becomes necessary to ensure a uniform distribution of the sewage by dividing them into level reaches with sudden drops, as in ordinary canals. This is effected by the simple expedient of wooden slopes or sods of turf, which may be put down or taken up at will, and between which the sewage overflows equally on both sides. In order to receive the highest benefit from the utilisation of sewage in this mode, it is requisite that the land selected should be naturally free and porous, well drained and pulverized, so as to render it thoroughly absorbent and to avoid stagnation, the bane of irrigation. Beneath the surface-drains specially laid to collect the purified sewage-water, a perfect system of irrigation demands efficient deep drainage of the nasal kind; otherwise, unless the soil happens to be unusually dry, it will tend to become water-logged and soddened: this, of course, should be the first operation. The quickest method of making the small feeding-canals is to run the plough along the ridge of each bed, taking a tolerably deep furrow; after which, a labourer with his spade can finish them off with great facility.

¶ Messrs. Napier & Hope, in their scheme for the utilization of the northern sewage of London on the Maplin Sands, have proposed to line their feeding-canals with clay tiles having a double lip; this lip extending 2 in. or 3 in. over the ridge on either side.* This is with a design to prevent the supposed nuisance arising from the accumulation of decomposing solid matter upon the "ragged edges" of ordinary feeders,—a supposition wholly inconsistent with the fact. In Messrs. Napier & Hope's scheme, as laid before the Metropolitan Board of Works, no provision appears to have been made for straining or settling the solid portions of sewage prior to conducting it upon the land. In this case it would be doubtless necessary to adopt tiles of the kind mentioned; and, as stated by the projectors, to have them swept out daily. But those conversant with the practical application of sewage to agricultural purposes would hardly think of allowing such solid refuse to enter and choke up the feeders. By the simple and inexpensive grating before mentioned, which retains all the papers and heavy matters, the sewage is rendered so easy of flow that all fear of such nuisance is entirely avoided. The plan, therefore, of tiled gutters would add considerably to the prime cost of irrigation works without presenting any corresponding advantages. Bed-work is alike adapted for level meadows, and for gently-inclined ground with a tolerably uniform surface.

¶ The method of catch-work is usually adopted when bed-work is rendered impossible by the steep inclination of the land, under which circumstances no equal distribution of the liquid could be effected by feeders running with the slope. Land, therefore, possessing this abrupt inclination, should be intersected transversely with the slope, and parallel with the main conduit, by level lines contoured one above another along its surface, which lines mark the position of the feeders. These may be of more or less distance apart, and should have direct communication with the main conduit by means of side-channels, and when filled, their contents flow evenly over the lower side, down the intervening slope, fertilising the soil in its progress. What is not absorbed by the ground is caught by the next feeder, whence it is again discharged, and this process is repeated until, having reached the bottom of the declivity in a state of comparative purity, the water falls into a catch-drain. It must be observed that as the lower parts of the ground are reached, the direct supply of sewage to the feeders should be materially diminished, so that no portion should receive more than its requisite share, and that none of the sewage should escape without traversing a sufficient purifying area. A very slight fall should also be given to the contour canals to

* Report Met. Sewage, 1864: 556.

admit of their cleansing or emptying themselves, when the process of active irrigation is discontinued. As to whether it may be deemed sufficient not to effect communication in every case between the main supply and the feeders, this point may be ruled by circumstances.

¶ If irrigation by catch-work is not so thoroughly perfect in the purification of sewage as bed-work, inasmuch as a certain proportion must pass over the surface of the ground without percolation to the roots of the plant, yet there can be no doubt that it is very effective, and may be accomplished at a far less cost. By these methods of irrigation, sewage may be applied to grass crops once in ten or fourteen days, almost up to the moment of cutting the crop.

¶ At Croydon, 3l. to 4l. per acre were allowed by the local Board to its tenant, Mr. Marriage, for the preparation of the ground into bed-work, in the execution of which many woods and shaws were grubbed up.*

¶ Edinburgh, Aldershot, Norwood, Croydon, Rugby, Bury St. Edmund's, Barking, and almost all those irrigation works which are prominently associated with the progress of the utilisation of sewage, have adopted the open conduit system. Mr. Baldwin Latham, the well-known engineer to the Croydon Board, whose connexion with the Croydon and Norwood works entitles his opinion to very considerable weight in this important question, considers this the simplest and most effectual mode of application, and this opinion is borne out by the Rivers' Pollution Commissioners, Mr. Bateman, Mr. Rawlinson, Mr. Walker, of Rugby, Messrs. Napier & Hope, Mr. Lawos, and others. †

2. Hose and Jet Distribution from Iron Pipes.

¶ The power requisite for forcing sewage on to the land, by means of leathern hose affixed to hydrants, is obtained either by pumping or by constructing certain summit reservoirs or tanks, which shall have the necessary head of pressure.

¶ Pipes of cast iron convey the sewage to the land, and are provided with hydrants at proper intervals, to which may be attached the distributing-hose. Glazed pipes of stoneware have been tried at Worthing in lieu of cast iron, but without success. ‡ The ground requires no special preparation, but is irrigated through the medium of the hose, which is directed over the area within its compass by a labourer, who carries it to and fro until the operation is complete. Care must be exercised lest any hollow part of the ground should become swamped. About five acres daily may be covered by one jet.

¶ It will be seen that by this method sewage, instead of being applied in a smooth and uniform current to the roots of the crop, is propelled forward with considerable force, and drops in a heavy vertical shower upon the stem or blade,—a process which, in the case of long thick grass, tends to beat down and injure the plant. Whilst the crop is still young, little harm results on this score; but after arriving at a certain stage and growth, the sewage must be applied with great caution, if not altogether discontinued. The strongest recommendation which is urged by the advocates of the jet and hose principle, is its low cost as compared with the expense of throwing the soil into elaborate artificial beds. From 3l. to 4l. per acre is the estimated cost for submains, hydrants, hose, &c., given by Mr. Ellis, who, quoting the Report of the Board of Health, states, "that whereas the average cost of the distribution of bed-work has been 31l. 14s. 7d. per acre, with annual working expenses amounting to 3l. 7s. 1d., the average cost of distribution by underground pipes and hose has been 3l. 5s. 1d. per acre, with annual working expenses of 5s. 11d." § But, as we have already seen, that in the case of Croydon, where the ground was not unusually favourable, 3l. or 4l. sufficed the tenant for laying out the land, we may not unfairly conclude that the statement of the Board of Health is not founded upon a careful examination of facts, and may be suspected of some degree of partiality. Mr. Pusey has stated that catch-work water irrigation has been adopted with great success in Devonshire, at a

* Rep. Met. Sewage, 1864: 2245.
 † The Rivers' Commissioners (Aire and Calder Report) state that the cost of preparing the ground on the open carrier system may be 6l. per acre.—Third Report, vol. 1, p. 14. "Where main open carriers may be considered a nuisance, as near houses, roads, or foot-walks, they may have covered conduits having cheap outlet-valves at a chain apart."—*Ibid.*
 ‡ Rep. Met. Sewage: 4105.
 § Report Met. Sewage, 1864: 2450-1-2.

cost of from 2l. to 5l. per acre.* The very elaborate works at Mansfield, on the Duke of Portland's estate, which are usually cited by the opponents of the open conduit system as illustrative of its great cost, form a wholly exceptional case, having been executed without regard to expenses. These included the reclamation of waste land, drains, bridges, carriers paved with brick, and items of the like unnecessary nature.

It must also be recollected that in many cases sewage, which may be easily gravitated to its destination by means of open carriers, would, under the hose-and-jet system, require pumping up to an artificial head before the pressure could be obtained sufficient to overcome the friction of several hundred feet of earthen piping, so as to admit of its free and efficient discharge. Such additional expense has evidently not been included in the statement of the Board.

It is, however, in the principle of the application of the sewage to the plant that the special defect of this system is held to consist. The vertical discharge from a hose may be likened by its admirers to that of a natural shower of rain; but the comparison hardly holds good by reason of the different degrees of density. It is far likelier one of those heavy flood rains, which do so much damage in advanced seasons, such damage being increased by the deposition of a gritty substance upon the stem or blade of vegetation, very injurious to the value of the crops. But, it may be argued, it is not intended to apply sewage to grass of long growth. The result of this would be an enormous increase in the quantity of land required to utilise the sewage, thus enhancing what is under any circumstances felt to be the great difficulty attending this question. By open carriers active irrigation may be carried on in the hours of night without the supervision of attendants; but with the hose and jet this would be impossible. One of three contingencies would be inevitable,—firstly, hand-distribution by night; secondly, the construction of a costly reservoir; or, thirdly, the nightly use of an overflow with its attendant waste.

Amongst those who have declared in favour of the hose-and-jet principle of distribution are Sir Charles Fox, Alderman Mechi, Mr. Ellis, &c. It is used at Aldershot by Mr. Blackburn, but to a very limited extent, the irrigation there being for the most part carried on by open conduits; by Alderman Mechi, on his own land at Tipney Hall; by the Earl of Essex, at Cassiobury Park, near Watford; and on Mr. Harvey's Farm, at Portobello, near Glasgow.

On the other hand, Mr. Walker, of Rugby, first tried the hose-and-jet principle, but found open gutters more satisfactory.† Mr. Latham, in his interesting paper, read before the Society of Engineers in 1866, says, in reference to this system, that it may be viewed as a scientific toy, which is outwardly more attractive than useful.‡

M. P.

NON-EDUCATING ENGLAND.

REPORT OF THE EDUCATION COMMISSIONERS.

THE edifices of any period of history afford the most distinct, as well as the most permanent, indication of the character of the age. In the ever-changing eddies of that vast secular transformation of the human race which we know as history, we are apt to lose sight of the movement of the day, from the fact that we ourselves are included in it. But if we can divide our own memory into intervals,—if we recall the phases of life presented, for instance, decade after decade,—the rapidity of change forces itself on the contemplation. Dress, manner, phraseology, tone of conventional intercourse, method of regarding the great problems of life,—what changes have been witnessed in each since, for example, the flight of the Orleans family from France. But the records of these changes are only to be found either by the student, in the form of literature, or by the observer in the form of architecture.

In structural embodiment, the genius of the day is ever reproducing its own image. It may be an age of great power, represented by great structures, which preserve the impress of their character through more changeable times; it may be an age of servility or of degradation, witnessed by the feeble reproduction of the past.

But in any case the handwriting of the genius of the time is plain to those who know how to read it.

Our own contemporary time is one of unprecedented structural activity. All over the civilized world the cities of the past are being transformed into those of the present. Paris is being rebuilt; Marseilles is a new creation; the old Italian cities are instinct with a new life; London itself is rebuilding. With all this activity there is a want of guiding architectural genius. Reproduction or adaptation of the past meets us all around. Architects are discussing questions as to the authorship and the origin of style. It is rather the social and the political movement of the day that is forcing the hand of the builder, than the builder who is anticipating and guiding the wants of the public. We have more street building than architecture.

But in one respect the period which has elapsed since 1830 has left records of its fight, such as no preceding age of history has witnessed. If the architect has not been showing original genius, the same blame will not attach to the engineer. First the country, and now the cities, are covered with great works,—unornamental, no doubt; at times even devoid of the truest style of ornament, structural adaptation to their object, but still great works. It is in such structures as the Menai Bridge, the new viaducts that span the Thames, the mighty wagon roofs of our terminal metropolitan stations, that we see the true signs of the times. The immense revolution inaugurated by the steam-engine, has already become commemorated by structures, before which the mouldering relics of the feudal ages are being swept from the face of the country.

We have thus written with a pen of iron and of stone upon the face of England the great characteristics of the times. So far as we hold to the past, there are signs of incertitude and of confusion; so far as we have been compelled to provide for a new future—a future so new that it hardly seems to be the product of the past,—we have evidence of vigor, of originality, of skill; and we have just been called on, in a tone as loud as thunder, to detect the same difference in that which underlies all external structures, the very framework of society itself.

Our attention has long been directed to the subject of education. Three commissioners have been appointed within the last ten years to attest facts, as to the state both of our own schools and of those of Europe and the United States. The commissioners have had a patience worthy of their task. Reports of the utmost value have been in print since 1856; but it is only during the past month that the first of the twenty volumes which the commissioners are preparing for publication is presented to the public.

It is not using exaggerated language to say that the aspect of the facts, collected under the direction of the several commissioners, is such as to take away the breath of any one to whom they are presented in thrilling novelty. Uneasy feelings have been present in the minds of most thoughtful men; but when a careful study of the information now in course of issue to the public shall have made them masters of the salient outlines of the case, these feelings will be replaced by mingled wonder, alarm, and humiliation. Not that these feelings will be unquenched by a solid ground of hope. There are bright, very bright, points, amid our insular darkness.

An abstract of the reports now in course of publication would in itself exceed any reasonable limits that our pages could afford, and an abstract could have but little value were it not of considerable length. The study of a single detailed report would do more to bring home to the mind the impression under which we write, and which we would gladly communicate to our readers, than a far wider range of information thus acquired at second-hand. Those who believe that in the education of the young lies the key to the future of the country, will not fail to consult the reports for themselves. If they cannot see with their own eyes, they will at least desire to look through the glasses of the assistant commissioners.

The grand outlines of the case are these. Europe and America, in all parts that can be spoken of as progressive, almost in all that can be called civilized, are educating the youth of the respective States on some definitely organised, provident system. To this general rule there are certain exceptions,—chiefly Spain, Austria, Rome, and the United Kingdom. Spain we may for the moment disregard, as a country which, since 1830, has been continually on the verge of

a volcano. Austria is undergoing transformation, and since Mr. Arnold compared the institutions of that great geographical agglomeration with those of this country, the Legislature of Hungary have determined that the school shall no longer be left beneath the blighting shadow of the priesthood. In Rome, so long as the tripod crown is propped up by the Chassepot rifle education of course means excommunication, exile, imprisonment. Priestly government and popular education are irreconcilable even for a week.

Amongst those countries, then, which may with more or less justice suppose themselves entitled to compete for the leadership of Europe or at least for one of the highest seats in its council, England stands alone as a non-educating country; and it is tolerably clear that unless she entirely frees herself from this inconvertible reproach, that her claim to a position in the world will soon become a mere empty boast.

It is impossible to investigate the state of things now laid bare by a patient and searching inquiry, without admitting the conclusion that we have neither high nor secondary education organised in this country. We have some few admirable schools, in which secondary education of a high order may be obtained. But such schools are rare and brilliant exceptions. On universities, it is hard to deny, are unfitted the state of knowledge of the day, although fitted to that of our usual style of education. High instruction is only to be attained in the some branches of study, at the personal expense of the under-graduate, by paying spectators, and in other branches not at all. It is not that we have no learned men,—no able men,—but the system is such as to render these men as inefficient as possible.

The secondary education which is now offered to the choice of parents is provided by private schools, proprietary schools, and public schools. Of the latter, all that can by any stretch of courtesy be spoken of as deserving the name, contain 15,000 scholars. The French public secondary schools, with a population exceeding our own by 45 per cent., contain 66,000. The public secondary schools of Prussia, with a population of a million and a half less than our own (in round figures) the same number contain 66,000. The universities of England contain 3,500 students. The universities of Prussia contain 6,362. But all the Prussian students are admitted by a real examination, not a test of power of retaining cram for a few days or weeks, but a serial set of tests of having passed through a serious education. For many of our students Oxford and Cambridge are mere agreeable clubs; for all Prussian students the gymnasiums and universities are admirable preparatory schools for the real business of the life of highly-educated men. "An admirable English mathematician," writes Mr. Arnold, "told me that he should never recover the loss of the two years he wasted under schoolboy-instruction at an English university, when he ought to have been under superior instruction, for which the present university course in England makes no provision." "Who can estimate the loss to the country from an absence,—so complete that it needs genius to be sensible of it, and cost genius an effort to repair it,—of all regular provision for the scientific study and teaching of any branch of knowledge."

No country in the world has organised a scheme of universal education, that is to say universal in the sense that different boys at girls should only differ from one another, in the course through which they pass, in the number of years which they spend at school. We are not arguing that this is desirable, or even affirming it to be possible. But if not, it is clear that a first requisite in drawing up any plan of systematic education, must be the classification of the subjects of that education according to the number of years which they may be able spent under schooling. Hence the first important division of education into primary, secondary or middle-class, and high. The line in this country appears to be drawn at the twelfth or thirteenth year as the upper limit of the first, and at the eighteenth or nineteenth as that of the second.

Now, if we regard the sixth or highest standard of the Revised Code, as stated in the Report of the Committee of Council on Education for 1865, as defining the natural limit of primary education, we shall come to the conclusion that we are thankful for small mercies. The child educated up to that sixth standard must be ab-

* Royal Agricultural Journal, vol. 1, p. 367. It is but fair to state, however, that Mr. Pusey places the cost of his works at from 20l. to 30l. per acre.

† Rep. Met. Sewage, 1864, 4697-5.

‡ To be continued.

read correctly "a short ordinary paragraph in newspaper or other modern narrative." He must be able to write correctly from dictation another short paragraph in a newspaper or other modern narrative slowly dictated once by few words at a time." And he must be able to work "a sum in practice or bills of parcels." In the City of London School, which justly claims to be regarded as one of the best organized and most successful of our educational establishments, the second division of the junior department contains boys of the average age of 11 years. This class may, therefore, be taken to represent the highest phase of primary education in England. The subjects taught are,—Bible, Testament, History, Geography, Grammar, Arithmetic, Writing, Dictation, and Chemistry. A mere enumeration of the studies does not, of course, give much information as to the proficiency of the students; but it must be observed that this division consists of boys who are in their third year of instruction on the same subjects, and that those who pass to the first division of the junior department containing boys of seven years' average age, only add lessons in French to the above list. There is also a separate grammar class, containing boys of 12½ years in which Latin is commenced.

In the French public schools, the children are admitted to the eighth or lowest class as young as seven years of age, if they can read and write. There is a lower and unnumbered class, in which children are admitted as early as five years of age. Latin is commenced in the first year after two years' schooling. The education of the French boy is thus from two to three years in advance of that of the English boy. We do not consider this an advantage. A general adoption of a system resembling that of the City of London School would, in our opinion, other things being alike, turn out a far more vigorous, healthy, and helpful race of English citizens than the severer course adopted in France. But it is not with us yet come to the choice of the best system. We have first to determine the necessity of the adoption of any system at all.

In Prussia, a nine years' course of education is required to be regularly gone through before obtaining admission to the university at eighteen or nineteen. In the *Realschulen*, or schools which aim at preparation for business life, there is a course of nine years, in which Latin is compulsory, or one of seven years, in which it is optional. Drawing is obligatory throughout all the Prussian secondary schools. In Switzerland, the school child between six and sixteen—one-fifth of the population—is under school discipline to a certain extent.

The question recently so much debated among ourselves as to the proper place and position of classical teaching in an education course, receives much light from the experience of the continent. It is important to distinguish between the two separate claims of the dead languages upon the attention of the organizers of education. Latin and Greek, by the general opinion of highly educated men, form an essential and even a dominant portion of the highest part of intellectual culture, such, for instance, as is the object of the Prussian universities to impart. Even in this highest form of classic education, however, there are two distinct views as to the object chiefly to be followed, some teachers giving chief attention to the mastery of the language, and others more especially regarding the literature of the classic times, and seeking to train the mind by intimate converse with the great writers of the past. Neither the one nor the other of these objects can be set before any youth whose school education is to terminate at the seventh or fourteenth year, and it is therefore not surprising that many, and even by some uneducated persons, why teach Latin at all to boys who are not destined, at all events, to pass through a full course of secondary education? Attempts have been made to meet the demand of the modern utilitarian spirit, and it is a curious fact that in Prussia, in France, and in Italy the proportion of non-classical to classical students is almost identical, the former constituting rather less than the latter part of the total number. But the reply to the question, the truth of which seems to be borne out by the balance of the evidence, is this. Latin is not taught to the primary or elementary student for its own sake, neither the philosophy nor the literature of the language is regarded by his education as a means of mental discipline,—a means

of opening the mind and of communicating to it,—not knowledge, but the power of acquiring knowledge,—the rudimentary study of Latin is the best method known to experience. As a rule, this would seem to be the case. Something must depend on the pupils, more on the masters. Some children may aptly learn, and some masters may aptly teach, whatever be the selected study intended to act as a sort of skeleton key to the mind. Arithmetic, as taught in the City of London School, seems to have been successfully used for this purpose. As yet, however, it would seem that the balance of opinion is in favour of the retention of Latin as a basis of general education, abandoning Greek, when a technical training is rather the object of the scholar's parents than a more liberal and complete culture.

It deserves careful reflection that a study which might well be made use of as an advantageous substitute for rudimentary Latin, a study which, more than any other, would tend freely and spontaneously to open the mind, a study, the importance of which was dimly indicated by Bacon himself, is to be found only among the higher forms of the secondary schools. If natural history were taught with the scrupulous exactitude that seems to be the first requisite for primary education, and with the life and fire that is the glory of the best American teachers, it would soon become apparent that no equally advantageous branch of study could be selected for the commencement of tuition. The interest would be aroused, the habit of attention formed, exactitude of observation would be enforced, the memory strengthened, the idea of a foreign language would be produced in the mind, and explained as far as least as the nouns; the idea of number would be illustrated by the happy labours of the genius of Linnaeus; and the child, while his unflagging attention was fixed on the contemplation of a series of natural objects, would be receiving a real training, of a nature to call out all the slumbering faculties without strain or distress. Were this basis of education introduced into the primary school, we might well afford to defer the rudiments of Latin until after the twelfth year, or to omit them altogether from technical or purely commercial schools.

As we turn from the subject the warning voice of Mr. Matthew Arnold lingers in our ears:—"France, Germany, Italy, Switzerland, Holland, have a civil organization which has been framed with forethought and design to meet the wants of modern society, while our civil organization in England still remains what time and chance have made it. The states which we really resemble, in this respect, are Austria and Rome." "Organize your secondary and your superior instruction."

THE CATHEDRAL OF BAMBERG.

In a paper on "The Medieval Architecture of Central and Southern Germany," read at the Institute of Architects on the 16th instant, Mr. H. W. Brewer gave particulars of Bamberg Cathedral, which we quote:—

The ancient ecclesiastical "Free City" of Bamberg is about 50 miles from Würzburg. Bamberg from a distance presents a grand appearance, though less striking than Würzburg. The city is built upon seven hills, each of which is crowned by a large church, the most remarkable of which is the cathedral. This noble church consists of a nave and aisles, with a choir and polygonal apse flanked by tall square towers, surmounted by octagon lanterns and spires at the east end, and transepts, apsidal choir, and two lofty spires at the west end. Each choir has a large crypt under it, and is raised 10 ft. or 12 ft. above the level of the nave. They are approached from the nave by double flights of steps, between each of which is an altar on a level with the nave floor. These altars are isolated from the wall in such a way as to leave a space at the back, from which there is a large opening looking down into the crypts. A large chapel with aisles forms a kind of continuation to the south transept. The church was originally founded by St. Henry in the year 1004, and was consecrated in 1012. This building was entirely destroyed by fire in the twelfth century. Of the present church the earliest portions are the eastern choir, lower portions of the two eastern towers, and the three first bays of the nave: these were not completed until 1237. The great eastern apse, the earliest portion of the existing church, is a remarkably fine

Romanesque work. It is covered with zig-zags and all kinds of ornament. The nave of the cathedral originally had a flat timber roof, and the present quadripartite vaulting has caused the blocking up of the alternate clerestory windows. This portion of the church is Transitional in character, but the pointed arch is only very sparingly used, showing how very far Germany was behind France and England in adopting Pointed architecture. Nor is this a solitary example; for the church of Kloster-Ebrach, near Bamberg, which is quite Romanesque in character, and exhibits scarcely any use of the Pointed arch, was completed as late as the year 1285. It is a singular fact that the further east one goes in Germany the longer the Romanesque style seems to have been retained. In the south-east of Austria and Hungary there are several Romanesque churches built after the year 1300; for instance, that of Seebisler Reen, on the borders of Hungary, on the doorway of which is an inscription recording its foundation in the year 1330. In the east of Hungary and parts of Servia the Romanesque style existed even to a later date; and the churches of Manassis and Ipek were both erected after the year 1400, and neither of them possess any Pointed arches. This would seem to argue strongly against Gothic architecture having been introduced from the East.

The next portions of Bamberg Cathedral in point of date are the transepts and western choir, which were completed in 1274; they are very fine Early First Pointed, but with the round arch still used, though sparingly. The two western towers, which are the most beautiful portions of the church, were erected after 1274. These exquisite towers bear such a resemblance to those of Laon, in France, that one is almost led to believe they were copied from the French church. Here we have another proof that the Germans were far behind the French, for the towers of Laon were built between the years 1225 and 1235; whereas those of Bamberg, which appear even earlier in character, were not commenced until after 1274. These towers are square to the level of the choir-walls, and are then carried up octagonally, with octagonal buttresses, consisting of beautiful open arcades, supported upon slender columns. The towers themselves are pierced in all their stories. These stories are marked by bold projecting cornices. The pinnacles and spires which crown and disfigure these noble towers are either modern or have been altered during the seventeenth century. The interior of this cathedral is very striking and solemn, though plain and severe. The beautiful warm colour of the stone adds greatly to the effect, and the grand quadripartite vaulting of the nave and the eastern choir directly attract admiration. The eastern apse is vaulted with a semi-dome, and the arcade running round the lowest portion is very singular. The arches are supported upon intertwined columns, some of which are tied together with great knots in the centre. In front of this apse stands a modern high altar of very objectionable design, surmounted by a large bronze crucifix, by Thorvaldsen; the stalls are fourteenth-century work. Against the south wall is a bronze effigy to Bishop Ebeuett, by Peter Vischer. In the centre of the choir are two other monuments, both thirteenth-century work. As before mentioned, this choir is raised about 12 ft. above the level of the nave, and at the back of the stalls are solid stone walls, separating it from the aisles. Towards the aisles these walls are divided into two stories by beautifully-carved cornices. The lower story is occupied by an arcade of pointed arches, supported upon detached shafts, with richly-carved capitals, quite French in character. The upper story consists of an arcade of trefoil-headed arches, filled with remarkably fine statues, representing the Twelve Apostles and the Twelve Prophets, the Annunciation, and St. Michael and the Devil. The heads are most noble, and the whole sculpture reminds one of the western doorway of Amiens. The spandrels are filled with most charming conventional foliage. These screens are probably of the same date as the western towers.

The two doorways in the eastern towers have very fine statues inserted, of a later date than the doorways themselves; the canopies over them are good specimens of the conventional representations of the Heavenly Jerusalem so common in France and Italy during the twelfth and thirteenth centuries. The great north doorway contains figures of the Prophets supporting the Evangelists upon their shoulders. Under the eastern choir is a large crypt, the vaulting

of which is supported upon two rows of cylindrical columns; it contains a holy well. The nave is very simple internally, and possesses no triforium; the western choir is more rich, and the vaulting ribs are ornamented with small "sigææ." The western apse is singularly beautiful; it is pierced by two tiers of lancet windows, with groups of shafts in the jambs and rich moldings. The western choir crosses the transepts, and is separated from them by solid stone screens similar to those of the eastern choir, except that they are decorated with thirteenth-century frescoes instead of statues: these frescoes are very much faded, but still are very interesting. The western choir contains a modern high altar, and a fine set of fourteenth-century stalls with canopies over them. In the centre of this choir is a most singular monument, consisting of a classical sarcophagus of white marble, standing upon a thirteenth-century base, and with a twelfth or early thirteenth century effigy lying upon it. This remarkable monument covers the remains of Pope Clement II. who died in the year 1047. He was formerly Archbishop of Bamberg, and is one of the very few popes who lie buried on this side of the Alps. Nothing whatever is known about the history of this most singular monument; the sarcophagus, which is ornamented with centaurs and other mythological figures, cannot well be later than the third or fourth century, and may be very much earlier.

In the western choir are two other remarkable monuments; they are large bronze effigies placed in an upright position against the walls; they are in very low relief, but perfect marvels of workmanship; they are works of Peter Vischer, and represent Archbishops Gross von Trochan and Truchses von Pommerfelden. The transepts are similar in architecture to the western choir. The north transept has a fine rose-window of plate tracery; the walls are arcaded within. In the south transept over an altar is an ivory crucifix, given to the church by the Emperor St. Henry II., and consequently dates as far back as the eleventh century. Attached to the piers of the nave are several remarkable bas-relief monuments of archbishops, two of them are as early as the twelfth century; there are also several frescoes in similar positions, which probably served as monuments. In the centre of the nave stands the magnificent altar-tomb of St. Henry II. and St. Cunigunda: it is entirely of white marble; the sides are ornamented with panels containing representations of various events in the lives of the two saints, and their effigies lie upon the slab of the monument: the workmanship of the whole is very delicate and refined. It is in a most wonderful state of preservation; was executed between the years 1499 and 1505, and is the masterpiece of Tilman Riemenschneider.

As this is the last time I shall have to mention the name of this great master, I cannot help expressing a regret that we know so little of his works in this country. To my mind he was one of the greatest sculptors Germany ever produced; his works are far more severe and simple in spirit than those of Adam Kraft or Peter Vischer, and indicate a great deal of that quiet religious feeling which is so noticeable in works of the thirteenth century.

Attached to one of the great piers of the chancel arch of the eastern choir is a most remarkable work of the thirteenth century. It is simply a life-sized equestrian statue of St. Stephen, King of Hungary. The horse has a wonderfully classical look about it, and might almost have walked out of the "Elgin marbles." The rider is very inferior as a work of art to the horse; he is represented as clothed in chain mail, and is rather stiff and cramped.

In a very small chapel leading out of the south aisle of the nave is an altar with a carved wooden reredos of the fifteenth century; it is the work of Michael Wolgemuth, and represents the separation of the Apostles: it is richly decorated with gilding and colour. Leading out of the south transept is a large chapel, dedicated to St. Andrew. This chapel is divided into a nave and aisles of equal width and height by two rows of columns. The northern portion is superb First Pointed work, thoroughly French in character, and the southern Late Second Pointed, rather plain. There are three altars, two of which are ancient; the reredos of one of them is a large triptych inclosing a picture by Lucas Cranach, containing more than 300 heads. The walls of this chapel are entirely covered with bronze monuments, representing archbishops, bishops, and priests; they are in low

relief, and consist of life-sized effigies standing under canopies. The earlier ones date from the end of the fifteenth century, and the latest the commencement of the sixteenth. The earlier ones are very spirited and fine, the later ones are poor and flat. In this chapel and other parts of the cathedral there are more than 130 of these monuments. The sacristy, which is very interesting, is entered from the chapel; it contains a superb pascal candlestick of silver, about 5 ft. high, bearing the date of 1216; it is covered with foliage, birds, beasts, and all kinds of ornament, and bears a strong resemblance to the "Glocestor candlestick," exhibited at the Loan Collection, except that in the Bamberg candlestick the work is more delicate and refined. There is a large reliquary of silver and crystal, about 8 ft. high, enclosing a smaller one presented to the church by St. Henry in the year 1004; this contains a third reliquary, of probably a still earlier date, entirely of cut crystal, within which is one of the largest relics of the true cross known to exist; the relic itself is in the shape of a cross, about 9 in. long and 4 in. across the arms. Whatever opinions may be entertained respecting relics, whether we believe that this piece of wood is a portion of the true cross or not, few can look without interest upon an object which caused the foundation of one of the grandest churches of Germany, of a city belonging to the most powerful and most ancient prince archbishops in Southern Germany, and second in historical interest to none in Central Europe. It was to enshrine this relic that St. Henry erected the first cathedral on this spot. Subsequently he gave the town to the archbishop and his successors, and the town of Bamberg owed its importance to the pilgrims of all nations, many of them kings and princes, who came to visit this relic. In so great reverence was it held that the town, although at one time containing nearly 40,000 inhabitants, was never fortified, and it is probably the largest ancient town in Europe which has never had any means of defence. The sacristy also contains a remarkably fine remonstrance of the fifteenth century, two reliquaries of the same date, and a vestment of the fourteenth or fifteenth century.

Bamberg Cathedral, as before stated, stands upon the top of a hill, and round the church is a terrace with a curious fifteenth-century work parapet, and a kind of stone reading-desk at the east end.

THE CASTLE OF COUCY.*

The castle is composed of a keep, an inner and an outer ward. The outer, about thrice the area of the inner ward, intervenes between the inner ward and the town. Its narrow south front has been described. Towards the north-east the hill is very steep, and the revetment wall on this face is not reinforced by buttresses or flanking towers. On the opposite face the ground is far less steep, and the platform projects in a bold salient towards the south-west, the revetment of which is strengthened by eight mural towers or bastions, some half-round and the others rectangular. The south wall is lofty, the others were probably mere parapets. The great gate-house, or "Porte de Maître Odon," is now much broken down. The portal arch was pointed, as are two lateral arches for the guard. The square grooms of one porticulis remains. The gate-house seems to have been of the usual rectangular plan, having a central portal arch and passage, and two exterior half-round flanking towers. In this outer ward are to be traced very considerable foundations, and here are found fragments of piers and arch stones, and carved blocks, showing that the buildings erected as stables and barracks for the castellan, and probably, in times of peace, for the lord, were very considerable, and of a handsome character. Here also are the foundations of a church, recently cleared out. They show a single nave, with a semicircular apse, and a transept, the two arms of which have, on their eastern sides, two smaller apses, the three ranging nearly in a line. The building is about 100 ft. long by 30 ft. broad; has a double west door, and five windows of a side, besides three in the apse and three in each limb of the transept. From its plan and proportions this church has been regarded as part of the original castle, and the only part now remaining. Its actual date is, however, probably of the eleventh century.

The inner or north end of this ward abuts

upon the inner ward. This front is occupied by a broad and deep dry ditch, concave towards the outer ward, having a walled concave and counter-scarp, and crossed at each end by the exterior encainte wall of the place.

The inner ward, or castle proper, is four-sided. The east face, of 130 yards, and north face, 60 yards, are both straight, and set at right angles. The east front, of 70 yards, is set at an obtuse angle to the north, but is also straight. Thus breadth is given to the south front, which is 130 yards. This front is also straight, but about five-sevenths of its central part is occupied by the convexity of the great tower and a chemise, which are placed upon the line of the curtain.

The east, west, and north fronts are towards the field, and are formed by facing the scarp rock with masonry, so that they stand 30 ft. 40 ft. high to the level of the *terre-plein*, above which rises the curtain-wall. The south front is covered by the ditch already described, and which is segmental in plan, with vertical sides. Near its east end this ditch is expanded from 60 ft. to 90 ft., and was there traversed by long drawbridge, which rested upon three detached rectangular piers, of which the inner one was the largest, and contained two lateral places of arms, and no doubt carried a tower. The bridge led up to the main gate. It is now replaced by a causeway.

At the four angles of the ward are four equidistant towers, 60 ft. in diameter, and 105 ft. high for the exterior base. They are remarkable for their size and boldness, being engaged on by one-fifth of their circumference. The towers rise from the rock, and contain two domes stages below the terre-plein level. These are entered by a circular hole or eye in the centre of each vault. The terre-plein level of each is hexagonal chamber, vaulted, having five recesses, of which four are pierced as loops. The entrance is in the gorge, with two lateral passages, one leading to a garderobe and one to a well-stair, ascending to the summit.

The chamber above is similar, but the loops are placed between instead of over those below, and thus the towers have been preserved from these vertical fissures so common when a series of loops or windows occur, as they usually do, on one vertical line. By this arrangement, although the archers defending the tower much increased, every point within arrow range was exposed to fire. There are three floors above the ground-level, or five in all. All are vaulted. A line of corbels at the present summit shows that they were originally defended by bretasche.

Nearly in the centre of the east face was a small half-round bastion with flat sides, 30 ft. diameter, and about 20 ft. projection.

Standing in the court, no part of the curtain is visible. Along the central 180 ft. of the eastern face is a range of buildings, called offices, about 30 ft. deep, and having three well-staircases serving the first and second floor, now destroyed. At the south end the space between the curtain and the tower chemise, about 60 ft. by 80 ft., occupied by three aisles of vaulting, each three bays. The centre of these is the main entrance, or continued portal arch. The lateral bays are for warders and soldiery in charge of the gate. There were two stories above the now destroyed.

Along the north front was originally a vaulted arcade, 45 ft. broad, composed of four bays. This has been added, in front, an arcade of three arches, open towards the court, and upon a platform thus gained have been constructed terraces and a range of state rooms, of which the principal is the ladies' hall, or *salle des princesses*, so named from the medallions of nine celebrated women which adorned the great chimney-piece. In the exterior was a sort of oriel bodice, or large windows towards the field. Above this was another story, to construct which the curtain was raised. These buildings were the addition of the Duke of Orleans. A large well-stair, also addition, led from the court to these apartments.

The west side also has a high curtain, again which is constructed a magnificent chamber 45 ft. broad by 470 ft. long, down the centre of which stands a line of ten columns, dividing the space into eleven vaulted and groined bays, which the northern pair are cut off as a privy cellar. On the east side of this chamber are four doors, two near the centre opening into the crypt of the chapel, one south of this, probably the main entrance, and one near the south end opening into what appear to have been kitchen, and which lie between this splendid

* See p. 191, ante. Also for Plan.

range of magazines and the great tower. Connected with the kitchens are three courts, and a staircase descending to the cellars.

Below the chamber is another of equal size, excavated in the chalk, as a cellar, probably about the finest and most spacious ever constructed.

Above, on the first-floor, or third stage, was the great hall of the castle, called from its nine effigies of heroes, *La Salle des Preux*. It had a wooden roof, two large fireplaces, and a large window at the south end, below which a small door opened upon a light wooden bridge, which dropped upon the curtain of the outer ward, just above the postern.

The chapel was a rectangular building, 60 ft. east and west, by 36 ft. north and south. It projected from the hall into the court. It was composed of two parallel aisles, vaulted, each in four bays. Its south-east angle was engaged with the chemise of the great tower. Its south-west angle was free, and had two buttresses set on at right angles. This chapel is now destroyed to its foundations. It opened from the great hall.

The keep, or great tower, is the boast of Coucy, and deservedly so, being one of the finest towers in the world, and no doubt the largest and most complete single military building.

It is a plain tower, perfectly cylindrical, of excellent ashlar workmanship, 100 ft. diameter at base and summit, and 200 ft. high. It rises out of a paved moat, the base being about 12 ft. below the level of the terre-plain, and is entered by a drawbridge from the level, all below being solid.

Including the hasement, the tower contains three stories. The ground floor, on the level of the terre-plain, is entered by a drawbridge laid across the ditch, and which, when raised, covered a small square-headed portal, under a pointed arch, the entrance to a passage directly piercing the wall. The passage has an interior machicolation and a portcullis, both worked from a small chamber in the wall above, which also received the chains of the bridge. Within the portcullis was a stout door barred within, and, on the left and right, passages, one to a mural garderobe with an exterior loop, the other leading to a well-stair which served the upper rooms and led to the ramparts.

The entrance-passage leads direct into a dodocagonal chamber of about 60 ft. diameter, having a recess in each floor for stores, one occupied by the entrance, one by a large well, now about 90 ft. deep and formerly 200 ft., and one by a chimney.

Each pier is faced by a column, from which springs a rib, the twelve meeting in the centre at an eye, and supporting the vault. Each vaulting cell has a pointed gable, of which two are pierced for light.

The first-floor is of the same figure and diameter, and vaulted in a similar manner. One of its recesses is closed by a fireplace with an oven behind it; one gives passage to a very narrow postern, the plank bridge from which drops upon the rampart of the chemise wall, and three are pierced by small windows. One of these window recesses is entered laterally by a small passage from the adjacent recess. This is of fifteenth-century work, made when the recess was walled up to serve as a separate chamber. Another recess has also a lateral passage, entering a small mural garderobe, looped from the outside. In one recess are two windows, one above the other.

The second-floor, resembling the other in plan and diameter at its floor level, has a different arrangement at a height of 12 ft. Here the piers cease, and behind, between them and the outer shell of wall, is a gallery, entered by the regular well-stair, but each of the eleven other compartments of which forms a box like that of a theatre, looking down upon the central pit or floor. Two of these boxes are occupied by the detached flues of the two chimneys from below, and two are lighted by windows, which, with the central eye, form the whole and very insufficient light. In this chamber, the next below the battlements, the commander could collect and address a very numerous garrison.

The third-floor, that of the ramparts, and open above, is contained within a thick and lofty parapet wall about 10 ft. high, and pierced by twenty-four lancet arches, and as many intermediate loops. Above these the wall is surmounted by a grand coping, which overhangs both ways about three times the thickness of the wall, and then slopes upwards into a ridge. It was upon this ridge that were laid the roofing rafters

of the *brétasche* gallery, which enclosed the wall inside and outside. The former was merely as a counterpoise. The latter was of two stories, and rested its main struts upon a line of forty-eight grand corbels, which remain on the exterior face of the wall at the rampart level. The flues appeared above the roof, and three large and highly crocketed pinnacles were placed astride on the crest of the wall. The stone vault of the upper chamber was covered with lead, with occasional gutter openings outwards.

Nothing can be grander than the conception of this tower, nothing more complete than the execution of its details. All is gigantesque, as though for a race above the ordinary stature of man, and the walls within were overlaid with a fine cement, and painted with care. The design of the sculpture is bold and masculine, as becomes a military building; but all is in excellent taste, and admirably executed.

The walls of the keep are tied with chain-courses of timber, laid in mortar, in the centre of the work, as was the custom in France in the twelfth and thirteenth centuries. The timber is exposed below some of the loops. In the upper floors were imbedded radiating ties, also of wood.

Two lines of square putlog-holes are seen on the exterior of the keep. They ascend in a spiral, or a right-handed screw, and indicate the manner in which the building was constructed. Horizontal beams, projecting from the upper row, carried the inclined plane or roadway up which the materials were dragged, and these were supported by struts, the feet of which rested in the lower row.

There remains to be described only the *chemise*, or work designed to cover the base of the keep from the operations of the miner. It has been seen that the base of the keep was solid, and that it stood in a paved fosse, about 20 ft. broad, with vertical sides. The exterior side, or counter-scarp, of this fosse was a wall, about 8 ft. thick, which divided it from the main exterior ditch of the ward, and rose to the level of the first floor of the keep, say 30 ft. The ordinary ascent to its rampart walk was by a stair within the wall, commencing on the right near the keep entrance. It was also reached from the first-floor of the keep by a slight bridge, such as was employed at Rochester, and probably in one or two places in the Tower of London. There was also an access from the other end of the wall, from the rooms over the great gateway.

Outside of and at the base of the salient half of this wall was built against it, at the level of the bottom of the exterior ditch, a covered way or gallery, intended to act as a countermine, and still more completely to frustrate attempts against the keep. The gallery is entered from either end, and in its centre rises a sort of buttress against the wall in which was contained a wooden stair, by which the people on the rampart could communicate with those in the gallery. In the gallery also was a well, for the use of the kitchens, and in the substance of the wall a garderobe.

From the bottom of the keep ditch issued a postern, defended by gate, portcullis, and machicolation, the two latter worked from a small chamber in the wall; from this a wooden bridge led, in the ditch, to a postern in the west and outer wall of the outer ward.

The castle and town being of one date, and from one design, may be regarded as representing a thirteenth-century fortress of the first class, and of the strongest character, in which the internal arrangements, though palatial, were made completely subordinate to the military character and security of the place. The great feature of the castle is the keep, which commands the whole, in every part, and from its size and strength could be held with confidence after all the other defences had been taken.

The additions of the fifteenth century, consisting of state-rooms, a hall, and various upper stories, intended for the state and attendants of a court, though not extending to the keep, in some degree injured the military character of the place, and took off from the predominating grandeur of that great central feature. These, however, have for the most part fallen away, and what remains is chiefly original work, so that the appearance of the keep and inner ward is in many respects as they were designed by the great haron, who contemned the titles of king and prince, and was content with the severe simplicity of that of "Sire de Coucy."

The castle in 1652 fell into the hands of Mazarin, who employed Metzcan, son of him who threw up the famous dyke at Rochelle, to render it indefensible. The engineer blew the

chemise wall outwards into the ditch, and exploded a heavy charge of powder in each of the towers. The effect of this upon the keep was to clear out the vaulted stages, and to leave the cylinder like the tube of a vast cannon. Thus, with one or two vertical figures, it stood till our day; but now these have been closed with great care and judgment, and the cylinder has been hooped with iron, in a manner that is scarcely to be observed, and will preserve it indefinitely.

Those who wish to understand the details of this most curious place, and to acquire a complete and comprehensive view of it as a military work, would do well to read the masterly exposition of M. Le Duc, sold upon the spot, and given also in this Dictionary, under the articles of "Château" and "Donjon."

The town is also worth a visit. It contains a good church, and its southern gate-house is a very massive structure. The portal is very narrow, about 9 ft., acutely pointed, and it opens between two drum towers of one-third projection, and of about 100 ft. diameter and 60 ft. high. The short curtain between them, occupied below by the gateway, above is convex in plan, and supports two hold brackets, upon which lies a stout beam, a part of the original *brétasche*, and a rare, if not a solitary, instance of a part of such a structure remaining in place.

The drawbridge is replaced by a causeway, but at the base of the gateway are two large square holes, nearly where the axle of the bridge would rest, but which closely resemble drains, which they can scarcely be. There are no marks of external defences, save the *brétasche*. Probably the bridge, when up, acted as a gate. Within the passage, on each side, is a large lateral loop, then two portcullises, and between them a large machicolation. Within the second grate is a gate, and within this the passage is vaulted for about 16 ft. Then follows an open space, of which the roof was of timber, and then a vault. The inner end of the passage is injured, and repaired. Above, over the portal, is a fireplace of enormous size.

This gatehouse is placed in the middle of the curtain which covers the very narrow south-east front of the town. On each side of the gate-towers is a curtain of about 100 ft. long, and beyond this a pair of drum mural towers, of half projection. The loops of these towers, like every detail in Coucy, are on a grand scale. Though mere slots, they are 10 ft. high, and in three tiers. In front of the wall is a fosse of unusual breadth, wholly artificial, and which, like that of the castle, is dug across the peninsula, from one lateral valley to the other. C.

PARIS.

THERE is some talk here of demolishing the Pont Royal, and reconstructing it in the axis of the Emperor's grand entrance to the Tuilleries, and in a line, almost, with the Rue de Banne. Up to 1632 the sole means of communication between the Faubourg Saint-Germain and the Louvre and Tuilleries was by a *bac* (hence the name Rue du Bac close by), or sort of large boats ferried across the river by means of a rope stretched from one bank to the other. At this period the bridge was a wooden one, but in 1664 it was carried away by an inundation, and the present one built of stone. It was here, also, that the first dredging-boat was used to prepare the bed for the principal pier, under which the coins, &c., of Louis XIV. were deposited, and it will be curious to see those authentic relics laid bare.

We gave some account at p. 659—1867, of the works undertaken to restore the ironwork of the central doorway of Notre Dame de Paris. It was opened anciently only on very rare religious occasions, and we find that it was opened for ceremonies foreign to the general church-service at the following epochs:—Philip IV., called the Bel, on his return from the war against Flanders, entered on horseback into the church to give thanks for his victory. In remembrance of this occurrence, an equestrian statue, as large as life, of Philip the Bel, was erected at the end of the nave. Louis XII., Louis XIII., and Louis XIV., also entered Notre Dame by this door. This last monarch paid a first visit to the church, with the Queen Marie-Thérèse, for the ceremony of the baptism of the celebrated bell, called the Bourdon (in the south tower), in 1655. This bell bears the names of Emmanuel-Louise-Thérèse. The second visit of Louis XIV. was in 1699, when he laid the first stone of the

altar. Behind the altar, under the centre arcade, there was at that period a marble group by Conston, and called *Le Vœu de Louis XIII.* This splendid work of art partly figures at the Versailles Museum since 1830. The Emperor Napoleon I., on the day of the *sacre*, and Pope Pius VII., passed likewise into the church by this door. Napoleon III. also entered by it on the occasion of his marriage.

The reconstruction of the Halles Centrales, and the disengagement of their neighborhood, have, for some years, been carried on at the west, the north, and the south sides; the underground stories of the two last pavilions of the second group were finished in the second half-year of 1867. The columns and framework of the roof are erected and the metallic carcass is being put together; so that in a short time these pavilions will be ready to be opened. Of the different thoroughfares projected for this great central market, those of the south (Rues du Pont Neuf and des Halles Centrales), are completely finished; that of the north-east (the Rue Turbigo) continues its diagonal line as far as the Place du Château d'Eau, and the Rue Berger, which is to form on the south a line symmetrical with that of the Rue Rambuteau, will be shortly opened throughout.

The second group of the Halles once terminated the houses surrounding the Halle au Blé are to be raised, and four pavilions erected in their place to serve as annexes to this vast rotunda. To the west of this group will pass the Rue du Louvre, prolonged upon which will debouch the Rues Berger and Rambuteau.

In place of the old fountain of the Château d'Eau, now removed to the new abattoirs of La Villette, the foundations are being laid for that to be erected in its place. It will consist of eight lions, from the mouths of which cascades will fall into an enormous basin, after having passed through two circles bordered with verdure and flowers; at night a brilliant candelabrum of vast proportions will light it up.

At the sale by auction of the collection of M. Roux (of Tours) at the hôtel Drouot, including a variety of artistic curiosities, the "bonnet" of the sale was a small mirror, of the hilt of a female, the size of a child's hand, of boxwood, profusely decorated with interlacings; groups of fruit arabesques; figures of geni, &c.; and a woman representing Justice;—on the reverse, Daniel in the lion's den; a little girl sounding the trumpet; a figure of a man playing the violin, &c.;—a true little *chef d'œuvre*, immitable, of composition and execution of the Flemish art of the sixteenth century. Its dimensions are 133 millimètres high by 108 millim. wide. The sum at which it was valued by the appraiser was 400l., and it was sold for 1,000l., plus the usual 5 per cent. auction dues. M. Roux had bought it for 3l. 4s. (1) fifteen years ago. The purchaser is said to be the Duc d'Angoulême, who deputed some one to buy it for him.

One of the best sales of pictures of this year took place at the same hotel, viz., the collection of the Count d'Aquila. The sale of forty-six modern paintings produced more than 8,000l.

ABRIDGED SPECIFICATIONS OF PATENTS.*

THESE portly volumes, of 1,400 pages each or so, four of which in number have been forwarded to us by Mr. Woodcroft from the Patent Office, contain each abridgments of a single order of patents, one, for example, relating to Hydraulics, from A. D. 1617 to 1865; another on the Preparation and Combustion of Fuel, dating from A. D. 1620 to 1865; and so on. The selection and issue in a printed form of these volumes cannot but be of immense service to all interested in the taking out or the resisting of patent rights, as they obviate the necessity for an endless search at the Patent Office amongst the heterogeneous mass of extended and often wordy patents of all sorts for some one special order of patents. The abridgments or abstracts are short and as explicit as possible too, thus saving additional time in search even through the volumes themselves, which afford still further facilities by the addition of a full index of names, and a still more valuable index of subject matter. In the volume relating to Hydraulics, for

* Patents for Inventions: Abridgments of Specifications. Printed by order of the Commissioners of Patents, London: Office of Commissioners, 25, Southampton-buildings, Chancery-lane, Holborn, 1868.

example, in the index of subject matter, everything is separated into distinct heads, such as Aëriated Waters, Baths, Beer-engines, Boring, Canals, Cocks and Taps, Culverts, Docks, Drains, Drinking-fountains, Filters, Fire-engines, and so on in a multitude of headings all through the alphabet. This volume, by the way, is all the more especially useful in our province that it includes a great many patents for sanitary purposes, as the following summary of its contents will show:—

"This series relates to raising, forcing, storing, filtering, applying, measuring, and regulating the flow of water; it also relates to irrigation and drainage, to apparatus for the employment of hydraulic motive power, and to the appliances for its domestic and sanitary use, such as joints for pipes, taps and cocks, fountains, baths, and water-closets; moreover, it includes improvements in the form or arrangement of sewers and drains, designed to facilitate the flow of water; in flushing or otherwise removing obstructions; in trapping; in excavating or cutting trenches, ditches, and drains. But it is not intended to include materials for or methods of manufacturing or constructing sewers or drains; these will be found in the series of abridgments entitled, 'Tunnels, Subways, and Sewers,' and 'Drain Tiles and Pipes.' Nor is it intended to include improvements in the collection and treatment of sewage; these will be found in the series of abridgments entitled, 'Manure.'"

The number of specifications printed and published at the time of the issue of this volume amounted to nearly 61,000; and the number included in the other volume on Combustion of Fuel was 59,000.

Each volume contains an Introduction, giving a rapid and brief *resumé* of the history of the subjects patented in each. There is thus a short historical treatise or essay on Hydraulics in the volume relating to Hydraulics; and one on Fuel and Combustion in the correlative volume.

So early as 1630, we see, from the volume on Hydraulics, a patent was got by one David Ramseye, "to make boats, shippers, and barges to go against wynde and tyde." The draining of water out of mines and marshes by hydraulic engines appears as the subject of various patents of about as early a date; and canals and water-works are also amongst them. The eighth patent on the list was granted to Hugh Middleton "for the wyning and draying of many grounds," granted "for the good opinion we have conceived of the said Hugh Middleton, or that worthy works of his in bringing the New River to our Citty of London, and his care and industry in busines of like nature tending to the publicke good." The second patent on the list, of date 1618, was granted to David Ramsay and Thomas Wildgosse "to ploughe ground without horse or oxen." John Gilbert, in 1618, got a patent for a "new engine or instrument called or termed a water-plough, for the taking upp of sand, gravell, shelles or hanches of the river of Thames," &c. In 1638 a patent was granted to Sir George Horsey, Dudd Dudley, and others, for "the making of iron with sea or pitt coale, peate, or turfe, and with the same to rost, melt, or refine all metalls of what nature soever." All these and the other patents in these volumes can be had separately, and not as mere abridgments, in a printed form, from prices varying from 4d. and 6d. to 2s. or 3s.

The volume on "Fuel and Combustion" shows that smoke consumption was a very early subject of consideration and experiment. In the Introduction to this volume a curious fact is brought forward from "Pennant's Tour in Wales," p. 17, that a "flint axe was found in an out-crop of coal in Monmouthshire, and similar discoveries have been made near Ashby. Of course it is not to be inferred, all at once, from this that it will form evidence of the existence of man in the carboniferous era, although even that would not be so startling an inference in these days; but that coal was probably used as fuel in exceedingly ancient times.

It is mentioned, in this Introduction, that of date 1686, a plan for making the fire gasses and smoke of a wood fire descend downwards through the fuel, was invented by Mr. Dalesme, and is alluded to by M. De la Hire, in his "*Reflexions sur la Machine qui consume la Poudre*," at p. 406, of vol. x. of the (1686) *Mémoires de l'Académie Royale des Sciences* (Paris, 1730); and that Dr. Franklin invented in 1785 a revolving grate, with a circular fire cage, and so made as to be capable of being turned round, after being lighted, in order to bring the fresh coal under the burning coals, and thereby prevent the development of smoke. (From "The Transactions of the American Philosophical Society," January 28, 1786, into "The Complete Works," &c., of Dr. Franklin, London, 1806, vol. ii., p. 314.) A down-draught stove, the construction of which is based upon that of Dalesme,

from which it was avowedly taken, is also described.

Altogether these volumes must not only be exceedingly useful, but they are of great interest historically and archæologically as well as scientifically speaking; and the work of compilation and condensation, which must have been a most formidable one, appears to be excellently well done. The other two volumes before us relate to Railways, and to Raising, Lowering, and Weighing.

THE ARCHITECTURAL EXHIBITION SOCIETY.

WE would remind our readers that the annual Exhibition in the galleries of the Houses in Conduit-street, will be opened on Monday, May 4th next, and that all drawings must be sent to the galleries on Wednesday or Thursday, the 8th and 9th days of April. The committee desire to give to the architectural profession, and the public at large, a convenient opportunity of exhibiting and inspecting well-executed representations of the works now being executed by individual architects and others interested in art. In furtherance of these objects, and in addition to the usual attractions of the Exhibition, they are desirous of receiving perspective and geometrical drawings of all new buildings, with such particulars as to plan, construction, cost, draughtsman, or artist, as may be desirable; and, in addition, photographs of buildings already executed, original sketches, working drawings, sketches of old works, and competition or other designs, which may recently have been prepared. The Committee have also decided upon accepting a limited number of purely artistic drawings of architectural subjects. They have published a list of towns in which honorary secretaries are desired. Some of our readers may be disposed to act in that capacity.

ARCHITECTURE IN THE ROYAL SCOTTISH ACADEMY.

THE architectural drawings exhibited this year are remarkable neither as to quantity nor quality. A few of the designs show some amount of thought on the part of the authors; but others not only exhibit an utter want of it, but a disregard of, or incapacity to appreciate, the laws of harmony and proportion. Notwithstanding all that has been written against the use of "constructed ornamentation," and the debased forms of the later renaissance, broken pediments, gables without roofs behind them, and detached columns supporting nothing, continue to appear. No. 192, "Langton House, Berwickshire," is the work of Mr. David Bryce, the leading architect in Scotland, and he has designed many mansions, and added to or reconstructed more; but we do not recollect of any instance save this where he has reproduced so much meretricious detail. The mansion is certainly a large and stately one, but it is ostentatious; and the portal is flanked by three tiers of detached pillars, which do no other duty than thrust themselves forward to be looked at, and the carving is mostly made up of large scrolls, which sprawl out wherever an opportunity presents itself. No. 118, "Free St. George's Church," as designed for the site ultimately chosen, is Palladian in style, and without the tower would be a poor production. The tower is, however, a striking feature, made up of a series of arched unglazed openings, and adorned with statuary. The style adopted is undoubtedly more in keeping with the surroundings than would have been the Gothic church (No. 162), designed for the site first fixed upon.

No. 57, "Free High Church, Partick," by J. Honeyman, is a gracefully proportioned edifice of fourteenth-century Gothic, and it has been skilfully adapted to the slope of the ground, the result being quietly picturesque, without the architect having gone out of the way to produce that result.

Mr. Pilkington's "Dundee Church," No. 270, is an effort at producing picturesque by the addition of many little adjuncts to the main building; these adjuncts detract from the dignity of the building, which would be better without them. The spire is a fine piece of composition, bold and gracefully proportioned.

No. 194, "Church of St. Michael and All Angels, Helensburgh," Robert Anderson, architect, is neither picturesque nor graceful, the

general effect being heavy and uninteresting; the detail appears to be faultlessly correct, but the little sills of windows, both in the aisles and clerestory, are rather primitive. Mr. Anderson seems to be more successful with his interiors than with his elevations. No. 210, "Interior of Church of St. John the Evangelist," at Alloa, is broad, simple, and well proportioned.

Nos. 211 and 231 are the first efforts at church-building of Mr. J. W. Smith. We prefer the former to the latter, the main gable of which is weakly treated. Mr. Smith will pardon us for advising him not to aim at giving too much for the money; his churches would be much better if more simply treated.

No. 120, "U. P. Church, Newtown, St. Howell's" by Mr. John Paterson, is liney and characterless, notwithstanding an effort at novelty in the arrangement.

No. 103, "Design for a Church in Glasgow in the Mixed Moorish and Lombardic Styles," by Mr. J. T. Roched, is quite out of the ordinary run, and is more peculiar than beautiful: the slender campanile is not a feature that would appear to advantage amongst the high chimney-stalks of Glasgow.

No. 160, "Perspective View of the Choir of St. Giles's Cathedral, showing the Improvements proposed by the Lord Provost;" B. Matheon. This does not pretend to be a restoration, the requirements of the Presbyterian form of worship being incompatible with the arrangements usual in a cathedral choir, and the only course left to the architect was to give the interior the semblance of such. This he has done by arranging the stalls against the walls of the aisles and across the east end, substituting open benches for the present heavy pews, and leaving an open railed-in space in which the pulpit and font are placed. The stalls are copied from those in King's College Chapel, Aberdeen, the best remaining example of ecclesiastical wood carving in Scotland. They are in perfect keeping with the style of the cathedral. The pulpit has a rather tab-like appearance; something of the nature of a platform would be more appropriate. The mutilated tracery is left as it was: as we stated in a former notice, all character has been knocked out of it by paring down; to place stained glass in it would be worse than setting a fine picture in a shabby martinet frame.

No. 42, "United Presbyterian New Church, North Berwick, in the Early English or Pointed Style of Architecture; the small Island of Craigleith and Firth of Forth in the distance," Robert R. Raehurn, architect. The intelligent reader may form a guess of what kind of church this is from the entry in the catalogue which we have quoted: *in form it is hideous, and in style execrable; the pinnacles which surmount the buttresses are certainly not Early English, and if of any style at all are of that which was in vogue a century ago.* We advance these remarks solely in the interest of art. It is sometimes necessary to speak strongly, and no one who knows nought of the art of building will, we venture to say, attempt to defend such a design as the one in question.

No. 61, "House at Weston, near North Shields, Durham," by Douglas & Stevenson, is Italian Gothic in style; the arrangement of the parts is pleasing and natural, and the detail good. There is a homely unostentatious look about this house, which suggests the idea that internal elegance and comfort have not been sacrificed to external effect.

No. 16, "Tenements at Heriot Mount," R. Thornton Shiells.—This is a bold and effective group of Scottish tenanted dwellings,—rather severe, perhaps, but well suited for the locality which they occupy on a height overlooking the Queen's Park and in the proximity of Salisbury Craigs. Had the other dwellings in this neighborhood been well designed, the views of the city from the craigs would have been greatly enhanced; as it is, they are "stale, flat, and unprofitable"—a rare opportunity of producing a fine effect, at small cost, has been missed.

No. 249, "Kingsknows House," Wm. Hay.—In the Scottish Baronial style. Stone was the invariable material used, and the detail was vigorous rather than refined. We have here, however, a building which has more the character of a brick than a stone structure.

Mr. Pilkington's "Dundee Club," No. 273, is unlike any other building of this class that we know of; it is marked by an individuality which characterises the designs of this architect. The style may be termed Byzantine; the openings consist of wide round-headed arches, and the

windows of the first-floor have an open-framed margin in stone. There is a certain vigour about this design, as well as in the mansion No. 228, similar to it, which would be highly commendable were it combined with elegance and gracefulness of proportion.

Mr. James Gowans exhibits a large view of part of Castle-terrace (No. 153), which is in course of erection. This terrace will form a marked feature in the architecture of Edinburgh; the broken and varied skyline is very different from the invariable straight-line of cornice in all the other terraces of the new town. If Mr. Gowans would only forego his peculiar notions of detail, and substitute a little carving for the profusion of notches and splay he delights in, his buildings would be less peculiar, but certainly more beautiful.

BUILDING MATERIALS AND THE PROPOSED PAUPER ASYLUMS.

THE question of building upon an extensive scale for the accommodation of pauper lunatics and pauper patients, afflicted with small-pox or fever, is assuming a very prominent and important feature in the social arrangements of the metropolis, under the provisions of the Poor-law Act of 1837. Measures are in progress for the erection of such buildings in various parts of the suburbs of London, the funds being provided by contributions from the several metropolitan parishes and unions, the whole being under the supervision of representatives elected by the several parochial districts, and constituting what is termed the Board of Management of the Metropolitan Asylum District. Sites for the proposed buildings have been already purchased at Leewesden and Caterham, and others are now under consideration for hospital purposes. The Board have already obtained power to borrow 200,000*l.* for the purposes of the two asylums sanctioned, and a much larger sum will no doubt be required before the system which has been thus commenced can be brought into practical operation. In the construction of these extensive buildings, if bricks be used, some 20,000,000 or 30,000,000 will be required for each, in bricks and mortar, consequently the third of the whole expenditure will be incurred. It may not, therefore, be unimportant to review some of the matters which bear a close relation to the subject, and especially those affecting the quality of the materials employed, it being highly necessary that such materials should be of the soundest quality possible, free from any admixture of ingredients which produce deterioration and generate disease.

The Legislature, it may be observed, has already assumed the responsibility of regulating the construction of buildings, by the Act of 18 & 19 Vict., c. 122, well known as the Metropolitan Building Act, 1855; and two amendment Acts, modifying and extending the provisions of the original statute, have since received the sanction of Parliament. These Acts contain provisions relating to the lines of walls, recesses and openings, parapets and bressummers, chimneys and flues, fireplaces and conveyance-pipes for heated air, steam and other products of production; but they make no reference whatever to the character and quality of the materials commonly used in the erection of such buildings. There are no regulations enforceable to insure the structure being perfectly dry in all seasons of the year, which is a very important consideration in this variable climate, and never attained when sand or any material impregnated with saline matter is used in the construction of the building. Many of our public structures give ocular demonstration of inherent defects which due precaution might have prevented. We need only instance the Hanwell viaduct of the Great Western Railway, in elucidation of the point to which we direct attention. This with its mil-dewy walls indicates a process of absorption and emission going on continually, rendering every part thereof damp. If saline particles be in either bricks or mortar they act like a sponge in absorbing moisture from the atmosphere, and giving it out again under the influence of heat. The new boundary-walls of Coldbath-fields' prison, near to Mount Pleasant, is another instance; and we should not be surprised if the costly erection of St. Thomas's Hospital, now in progress, should in after years awaken posterity to the fact that materials containing saline matter were used in the building. It is now upwards of twenty-five years since the Great Western Railway Viaduct was built, and there it

stands, a monument of indiscretion on the part of those by whom it was constructed.

The committee of the Board of Management of the Asylum District, who are entrusted with the selection of sites, the preparing of plans, and the drawing of specifications, very laudably direct their attention to facilities for drainage, salubrity of atmosphere, accessibility by road or railway, and other requisites of an obvious character, which ordinary business men could not overlook without displaying great want of attention; but there are many other considerations well entitled to notice in the formation of such buildings as are contemplated by the Asylum Board. While the Building Acts, as before stated, abound in rules applying to form of construction, they absolutely ignore the quality of building materials; and hence we have private dwellings, public schools, infirmaries and hospitals, workhouses and prisons, built of brick containing saline matter, kept together by means of mortar which has been mixed up with sea-sand or sand taken from the river Thames below Blackwall, where it is generally brackish, and becomes more and more so as we approach Gravesend, where the river flows into the sea. Buildings made in the way we have described never fail to exhibit the ordinary tests of dampness, which, if not recognized by the sensibility of the organs of smell, seldom remain undetected by those of vision. The walls of such buildings generally become flakey white outside, and frequently present a similar appearance inside through three or four coats of paint. The observant eye may have noticed blisters of paint upon a "flatted wall," which, if probed with a knife, will let moisture exude and trickle down, showing that it must have come from the material of which the walls are built. The Board-room of the mansion in Spring-gardens, where the Metropolitan Board of Works holds its weekly sittings, and which is at present temporarily occupied by the Asylum District Board, affords a striking proof of the correctness of these remarks.

Our object in directing attention to these matters is to obviate, as far as possible, in the construction of buildings projected by the Metropolitan Asylum Board, similar mistake to those already committed in other large building operations. We believe that, in many cases, builders err through sheer ignorance, and that architects—highly educated professional men—from want of practical attention, have failed to detect the hidden causes which are silently operating in producing the most disastrous results.

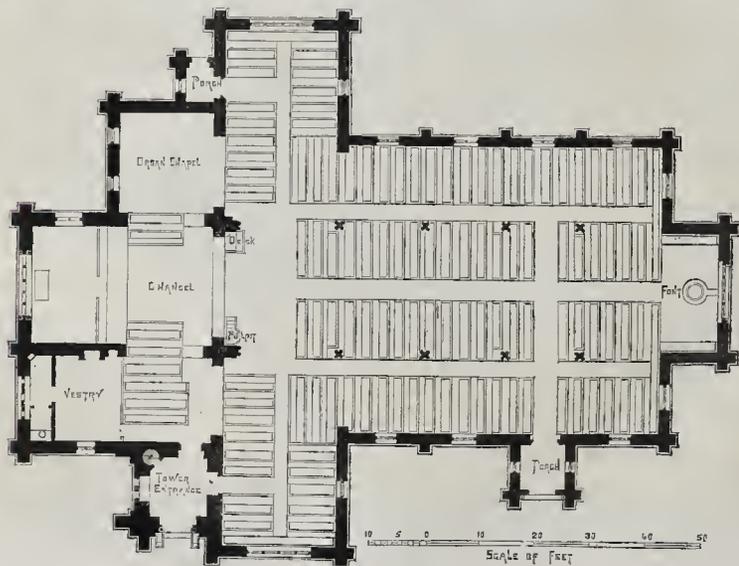
The infirmaries of our workhouses, and many of our large hospitals, contain very many patients, labouring under chronic diseases of a painful character, which there is every reason to believe originated from damp pervading the structures, and by consequence the atmosphere of the houses in which they resided. Chronic rheumatism, ague, intermittent fever, and many other affinitive forms of disease, which generally prevail in large establishments, especially when situated in close neighborhoods, or where the inmates are crowded together as in the dwellings of the poor and working-classes, owe their existence, in a great measure, to the faulty nature of the materials of which the dwellings are constructed; nor do these observations apply only to the houses of the poor; for the rich, whose residences wear a degree of splendour on their exterior, have the same canker-worm of saline damp, eating its way through every part of the structure, and seizing with irresistible force, albeit unobservedly, the physical frames of all who come within the sphere of its pervading influence. A METROPOLITAN RATEPAYER.

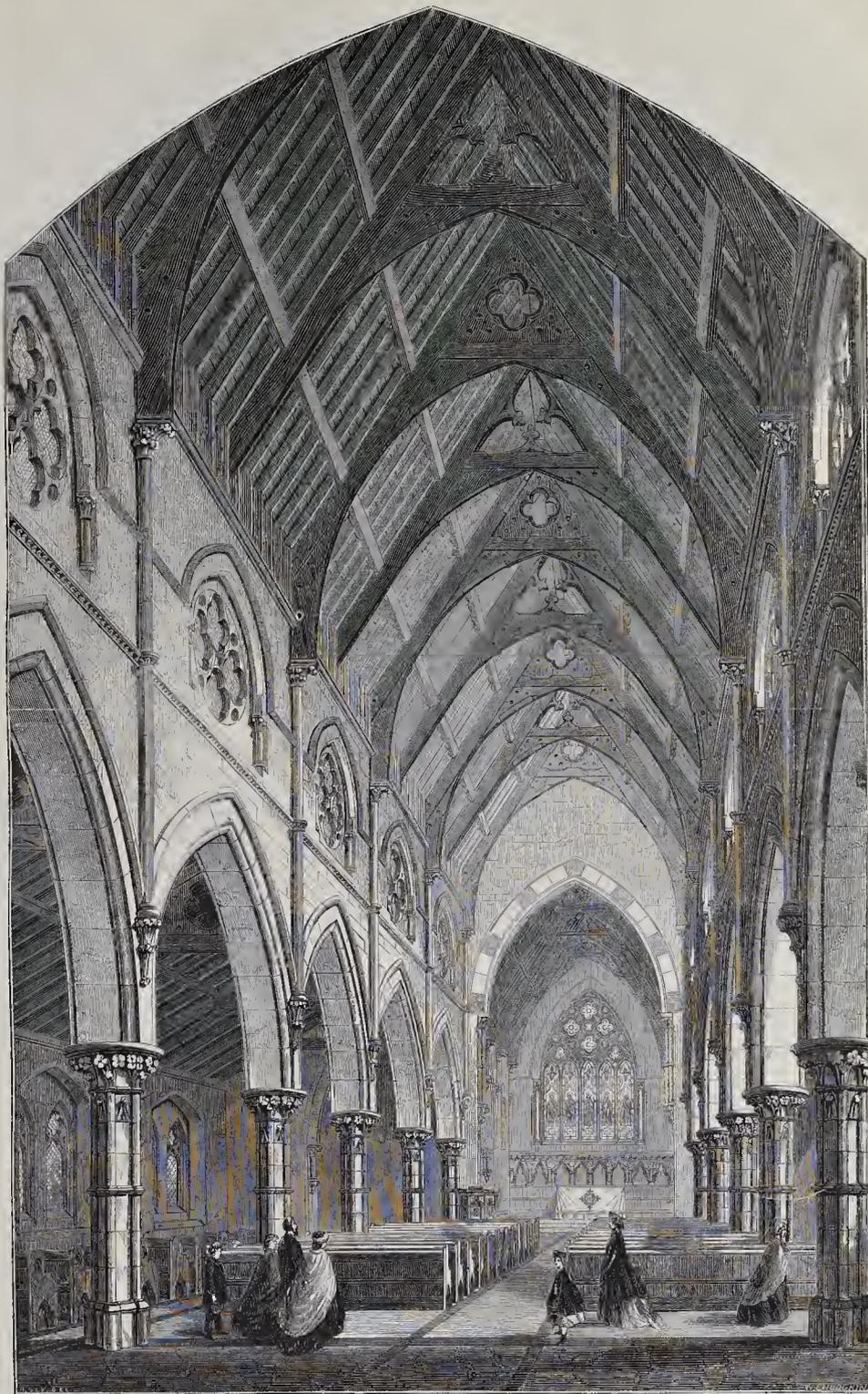
BISHOP'S CAMDEN SANITARY VALVE.

In thousands of cisterns the "waste pipe" leads direct into the house-drain; and, being untrapped, or so trapped as to be inefficient, permits the contamination of the water by foul and dangerous gases. Who can estimate the number of illnesses to which this has led? The best thing to do is to arrange the waste-pipe so that it may discharge itself without actual connexion with the drain; but, when this cannot be done, the Camden Sanitary Valve, patented by Mr. Bishop, of Pratt-street, Camden Town, may be very usefully employed. It consists of an air-ball, that opens a carefully arranged valve, when the cistern is too full, and it may be applied at small cost.

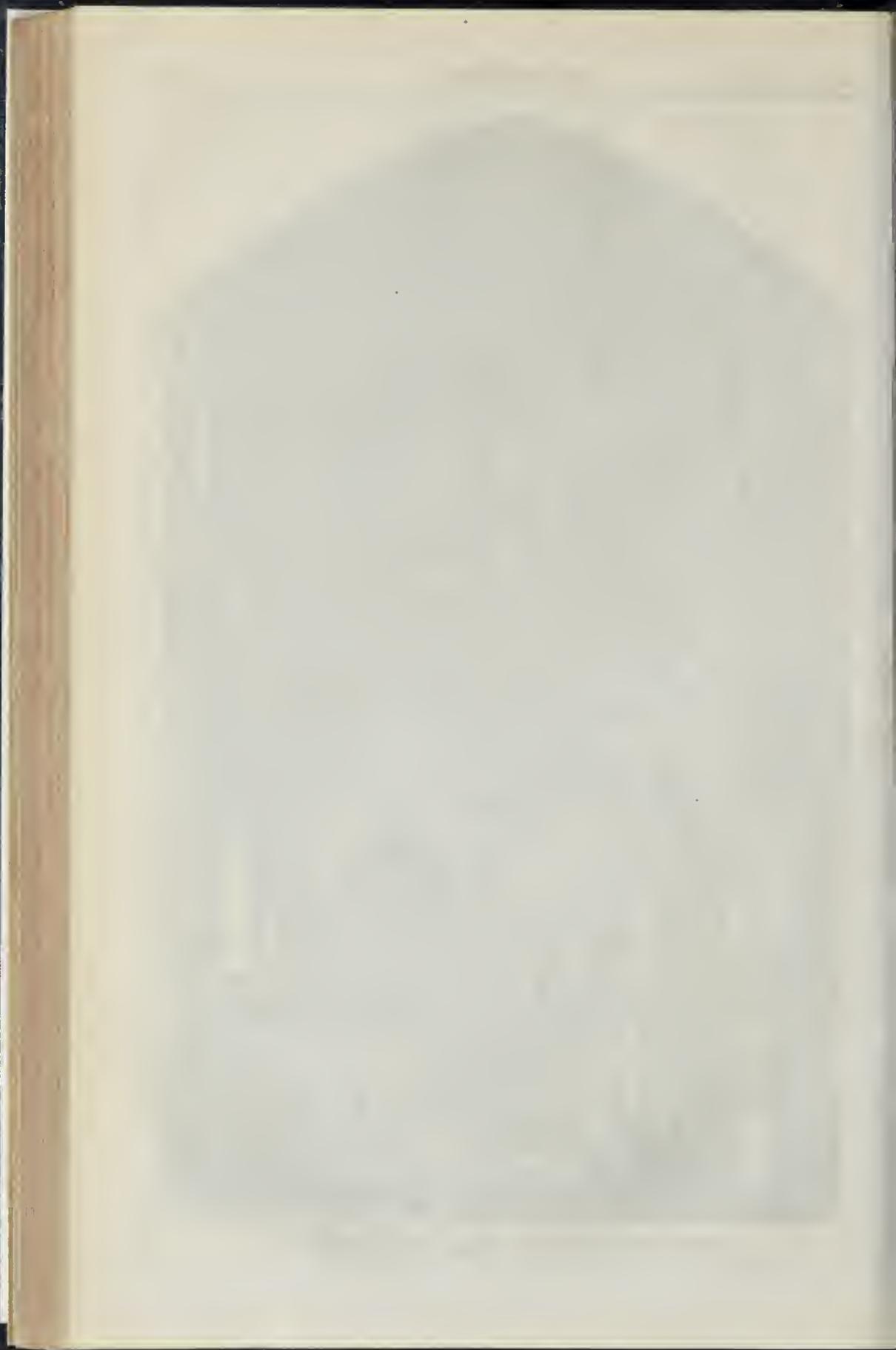


SHARROW CHURCH, SHEFFIELD.





SHARROW CHURCH, SHEFFIELD.—MR. J. B. MITCHELL-WITHERS, ARCHITECT.



SHARROW CHURCH, SHEFFIELD.

This church is being erected by the Sheffield Church Extension Society. The design was selected in open competition from those of about thirty competitors. The corner-stone was laid in June last by the Archbishop of York, the president of the society.

The building is erected with Whitlow well-stones and Eyan ashlar. The roofs and internal fittings are of stained deal. The contracts, exclusive of warming, lighting, boundary walls, architect's commission, and clerk of works, amount to about 4,200*l*. Accommodation is provided for 750 adults. The site was presented by Sir John Brown.

The east window will be filled with stained glass by Messrs. Clayton & Bell, the gift of Mr. Chas. Gould, and the west will be filled with glass, the gift of another friend.

The church will be ready for consecration in the autumn of the present year.

The architect is Mr. J. B. Mitchell-Withers, of Sheffield.

SONS OF THEIR WORKS.

UNDER this title, "*Les Fils de leurs Œuvres*," Mr. George d'Heilly publishes, this week, at Ronquette's, Paris, a curious little book, in which the origin of a few well-known persons of the present epoch is indicated. We learn from it that About is a grocer's son; Amber, son of a picture-dealer; Belmont, of a joiner; Coquelin, of a haker; Crozier, of a porter; Duprez, of a performer; Garnier, architect of the new Opera House, Paris (of which an illustration was lately given in the pages of the *Builder*), of a smith; Govaert, of a labourer; Gvoynard, of a farmer; Halevy, of a grocer; Houssaye, of a miller; Levasour, of a labourer; Victor Massé, of a dealer in nails; Monselet, of a bookseller. Mademoiselle Rachel is the daughter of a hawker; Rossini, the son of itinerant singers; Sorhe, of a silk dealer; and Verdi, of an inn-keeper. All honour to them for their self-creation!

TUBE WELLS.

A NUMBER of gentlemen met on Saturday last in a field near Thames Ditton station, for the purpose of witnessing the sinking of wells upon the tube system, which was used to good purpose in the American war, and is now being used in Abyssinia with success. The utility of this invention, of which Mr. Norton, of Ludgate-hill, is the sole patentee in this country, is not, however, confined to campaigning.

The simple contrivance by which it would appear, a well may be extemporised in some twenty minutes, is a few pipes about 3 ft. long—like gas pipes—two clamps, and a monkey. The first pipe, which makes the well, is perforated for about 16 in., and is shod with a steel peg top, which swells out beyond the pipe, and which fulfils the double purpose of providing a sharp point and easing from friction whatever lengths of tubing may have to follow it. A clamp is placed about the centre of this tube, and another clamp at the top, to which two pulleys are attached, and over these pulleys a cylindrical "monkey" is suspended, which, falling on the clamp below, drives the pipe into the ground. Then another pipe is screwed on, and the clamps being lifted higher, the same process is continued, and so pipe is added to pipe until the water stratum has been reached, which is ascertained by dropping a plummet into the tubing. Then a small ordinary sucking-pump is screwed on to the last pipe, which is allowed to protrude about a foot above the ground, and water thick with sand immediately comes up at the rate of about ten gallons a minute. After some time all the sand smaller than the perforations below to which the draw of the pump extends is eliminated, and the perforated portion of the pipe rests in a bed of shingle, the pebbles being necessarily small near the pipe, and growing larger in proportion to the distance at which they are removed. Thus a natural filter is formed.

The tube-well which attracted most attention was that which is in use in Abyssinia, the pipes of which are only 1½ in. in diameter. This well was sunk 15 ft. in 17½ minutes, and water was pumped in 19 minutes. Two men can carry this well, and everything connected with fixing it, and one is quite equal to anything the fixing requires. It was taken up by means of the

"monkey" worked upwards, in 7½ minutes, and in the apparently astonishing time of 1½ minute by means of a lever, which a mule easily carries in addition to half a dozen wells. These pumps can be made useful on farms, and in factories, as well as in the premises of private houses. When water does not come it is coaxed, as it were, by driving water down the tubing at a pressure of two or three hundred pounds to the inch, which searches the strata, and makes a water-way. Where the water stratum is sandy a filter of horse-hair is inserted in the tube. The water never freezes.

EARTHQUAKE-PROOF BUILDINGS.

At a recent meeting of the Scottish Society of Arts, in Edinburgh, Mr. David Stevenson read a paper on certain arrangements, designed for the preservation of structures in countries subject to earthquakes. Mr. Stevenson stated that his attention had been directed to the matter, not as a speculative question, but by the Government, as a problem of practical engineering. The Japanese had applied to the Government of this country to advise them as to what was necessary to light the coast, according to treaty, the difficulty consequent on frequent earthquakes being pointed out. The Board of Trade, in remitting the whole subject to Messrs. Stevenson, specially directed attention to this new feature in lighthouse engineering. Mr. Stevenson explained the device he had proposed for rendering buildings aseismatic, and illustrated it by diagrams and models. The new construction, as described in the *Scottsman*, is based on the principle of breaking the continuity between the earth, which is effected by the shock, and the superstructure which rests on its surface; and the break is effected by the aseismatic joint, which, in the case of lighthouse apparatus, consists in placing the iron table on which the apparatus rests on halls of metal, working in cups [of somewhat larger diameter, we presume, than the halls], formed in the underside of the table. These halls rest in similar cups formed on the upper side of a lower table. When the lower table is affected by a shock, it is at liberty to move freely, without affecting the apparatus above, which, by reason of its inertia, remains unaffected. The motion being *quas quæ versus*, also renders its action the same from whatever direction the shock may come. Mr. Stevenson stated that the aseismatic action had been successfully tested by experiments made at Messrs. Milne's works on tables of the full size for a first-order lighthouse. The Government have ordered the whole of the lights about to be constructed here for the Japanese Government to be made on this principle; and it may ultimately be adopted for architectural or domestic arrangements generally in countries subject to earthquakes of destructive character. The Japanese, who are an ingenious, mechanical people, will probably adopt it wherever it is applicable.

PROVINCIAL NEWS.

Brighton.—The foundation stone of a Turkish bath has been laid in West-street. Messrs. Cheesman & Co. are the contractors, and the architect is Mr. Gouley.

Hull.—The west dock, an important addition to the works of the Hull Dock Company, will be opened before the close of the present year. It is expected that the Prince of Wales will attend the opening ceremonial.

Bradford.—The new buildings at the corner of Bate-street, for the Commercial Joint Stock Banking Company, lately carrying on business in Market-street, have been opened. The style is French Gothic. The principal front looks towards the Exchange. It consists of two stories and an attic. A tower rises to a height of about 90 ft. from the corner adjoining the intended new street. The entrance door at the foot is deeply sunk, with polished granite shafts and moulded hands. The windows in the first story of this tower are sunk to a depth of 4 or 5 ft. Each of these windows has a projecting balcony, with balusters, and is surmounted by gables having carved crockets and finials. The double windows here are also pointed and deeply recessed. A carved cornice and pierced parapet, with angle pinnacles, surmount this story, above which rises a steep slate roof, with dormer windows, terminating in wrought-iron cresting and finials. In this frontage, there are on the

ground-floor four windows, with pierced panels underneath, and a door corresponding to that in the tower. These have shafts of polished granite. On the second floor are five double windows, with tracery heads. Throughout the carving has been executed by Messrs. Maw & Ingie, of Leeds. A cornice, supported on carved brackets in couples, runs along the front, and above it is a pierced parapet. A row of single-light stone dormer windows, with gables, is placed in the roof. The frontage to Piece Hall-yard corresponds in detail with that just described. The third side, commencing from the lower previously described, is, with the exception of a large central gable, treated in a similar manner, but is at present almost hidden by the adjacent houses. Mr. A. Mallinson has been clerk of the works, and under his superintendence the designs of the architects, Messrs. Andrews, Son, & Pepper, of this town, have been executed. The masonry was done by J. Burnley & Son; the joiners' work by J. Wilson & Sons; the furniture of the bank by Mills & Backhouse; the plumbing by J. Keighley; the slating by T. Nelson; the plastering by E. Dixon; the painting and decorating by H. Briggs; the cast-iron work by J. Cliff & E. Halevy; the ornamental wrought-iron work by W. Slater; and the gasfittings by Skidmore, of Coventry.

Shepton Mallet.—The almshouses have been recently built, and are designed to accommodate four persons. Each comprises a living-room, pantry, and bed-room with a bay-window and porch. There is a separate yard at the back of each house enclosed by a wall, with the necessary outbuildings. The walls are built of the local stone, hammer-dressed on the external face, with doubling quoins and dressings. The roofs are covered with Bridgwater tiles. The contractor for the masons' work was Mr. Fudge, and for the carpenters' and joiners' work Mr. Stock, both of Shepton Mallet. Mr. Ferrey, of London, was the architect employed.

SANITARY MATTERS.

Liverpool.—At a special meeting of the Health Committee of the Liverpool corporation, it has been decided to recommend the council to apply to Parliament for powers to enforce the conversion of all privies within the borough into water-closets, the cost to be defrayed by the corporation and the respective owners, in proportions afterwards to be decided. It has been satisfactorily shown that the conversion, so far as it has proceeded, has materially reduced the local rate of mortality.

Farnham Sewerage Competition.—A correspondent of the *Surrey Standard* says,—"It is now twelve months since plans were deposited with the local authorities for improving the sanitary state of the town, and, as yet, nothing is known, either by the competitors or the public, respecting the adoption of any of the numerous schemes submitted, agreeably with the advertised desire of the local Board. It appears very desirable that some immediate decision of the Board should be made known, especially so, considering the dangerous sanitary state of the town. An unsewered town, containing nearly 6,000 inhabitants, is certainly a place most likely to be visited by fevers, cholera, and other epidemics: should these fearful visitants arrive during the approaching summer, death must necessarily ensue, and then the authorities will feel they have been guilty of gross neglect and abuse of powers vested in them by Government. It is to be hoped that the local Board will set resolutely to work in improving the present defective sanitary condition of the town. Will you kindly inform us whether the Board is defunct, and what has been done with the various sets of plans?"

Seaford Drainage.—The plan of Messrs. Gotto & Beesley (estimated cost 2,400*l*.), which has been finally adopted, will consist of a main out-fall sewer along the front of the town, so as to convey the sewage to the Cliffe and about half a mile to the eastward, and discharge it, after being deodorised, into the sea at low-water mark. At and after low water, the current sets in to the eastward, towards Beachy Head: so that there will be no nuisance to bathers and others in front of the town, the whole being about a mile in extent. At the western extremity a large flushing reservoir will be formed. This will be filled by means of a self-acting iron pipe through the beach, at high water, and as soon as the sewage is emptied at low tide, the con-

tents of this reservoir, about 15,000 gallons, will be flushed through from end to end of the main drain, to keep it clear and free from deposit. Pipe sewers, communicating with the main outfall sewer, are to be laid in all the streets, with special provisions for inspection, cleansing, and ventilating the same, the latter object being attained by charcoal ventilators. There is also to be attached to the main sewer a tank and apparatus for deodorising its contents before its discharge into the sea. Provision will also be made at the outfall for, at a future time, as the town increases, pumping the sewage on the land at a distance from the town for agricultural purposes. The tender of Mr. W. Williams, of Swansea, to do the work for 2,283l. was accepted. The plan has been approved of by the Home Secretary, and arrangements made for repayment by rate in thirty years.

Fever at Higham-on-the-Hill.—A correspondent of the *Covestry Herald* states that the fever which prevails at Higham, where there have been sixty cases and six deaths in a population of 500, arises from nuisances on private property in that part of Higham where the fever broke out, and also from overcrowding. A medical report also speaks of bad drainage as one cause; this, however, the writer says, relates chiefly to the private property referred to. Private or not private, the nuisances will surely be abated. Of the cases of fever, it is said, thirty-five occurred within fifty yards of the nuisances.

ASYLUMS FOR THE INSANE POOR, LONDON.

On the 14th, the Metropolitan Asylum District Board, a body formed by the Poor Law Act of last Session, held a meeting at the Westminster Palace Hotel, for the purpose of considering the designs sent in, as we mentioned last week, by various architects for building an asylum for the insane poor, at Leavesden, Woodside, Herts. The designs were from,—

Messrs. Tolley & Dale (estimated cost), 65,000l.; Mr. Wm. Lee, 82,000l.; Mr. F. H. Pownall, 108,800l.; Mr. A. Wilson, 91,000l.; Mr. P. Gordon Smith, 78,800l.; Mr. F. Chambers, 96,350l.; Mr. John Giles (Giles & Biven), 66,700l.; Mr. Thomas Worthington, 94,300l.; Mr. Henry Jarvis, 78,000l.; Mr. M. P. Manning, 92,000l.; and Mr. J. E. Knightley, 125,000l.

The first premium of 250l. was awarded to Mr. Giles, whose design was estimated at 66,700l.; the second premium of 150l. to Mr. A. Wilson; and the third (100l.) to Mr. F. H. Pownall.

The designs for an asylum at Caterham were referred to the same committee, who have sent in their report. The competitors in this case are Messrs. Giles & Biven, Mr. Knightley, Mr. Andrew Wilson, Messrs. Tolley & Dale, Mr. F. H. Pownall, Mr. Thos. Worthington, Mr. Jarvis, Mr. F. Chambers, and Mr. M. P. Manning.

The committee have recommended to the Board the design submitted by Messrs. Giles & Biven, as in the first case, and it will probably be selected. We have no hesitation in saying, after examination, that the design selected is far superior in several important points to any of the others.

HASLINGDON WORKHOUSE TENDERS.

From the report to the local Guardians, of the Building Committee, it appears that there was but one tender for the whole work—that of Mr. J. Barry, of Scarborough; the others, which were very numerous, being from smaller contractors for portions of the work only. The tender of Mr. J. Barry, at the sum of 20,865l., was accepted by the guardians. Several of the guardians expressed surprise at the necessity for the original grant of 33,500l. being so largely exceeded; but the architects, Messrs. Lockwood & Mawson, who were both present, explained that all this was mainly due to the increased requirements of the Poor-law Board since the plans were originally decided upon, alterations and additions thereby being rendered compulsory which greatly enhanced the cost. Not long ago, 17l. a head on the number of inmates would have been ample to have paid for a well-built workhouse, but now, so stringent had the requirements of the Poor-law Board become, nearly double that amount was necessary if good material and satisfactory workmanship were to be used. A few years back 500 cubic

feet of space were allowed for each pauper, but now the Poor-law Board were satisfied with nothing less than 1,500 ft. per head. A large increase in the cost of internal arrangements was entailed by reason of extra staircases, passages, bath-rooms, &c. They also stated that before the plans were drawn they had not been shown the site, and had, therefore, not taken into consideration the cost of taking material thither. However, they were content to accept the 5 per cent. on the original estimate as their remuneration; although, in consequence of the alterations taking, it would be far from a profitable undertaking. It was decided that application be made to the Poor-law Board for permission to borrow 15,000l. additional. As to payment of the architects, it was resolved that these gentlemen be paid 300l. down, on account of expenses already incurred; 150l. more when the main building was ready for the roof; and the balance (200l.) on the completion of the work—making in all 650l., or 5 per cent. on the amount originally estimated.

COMPETITIONS.

Hereford Lunatic Asylum.—A meeting was held last week of the committee appointed at the last Quarter Sessions to select the plans for the new lunatic asylum for the county and city of Hereford, which it has been determined to erect on the Barton estate, near the city, consequent on the decision which has been arrived at to dissolve the present union between the counties of Hereford, Monmouth, Brecon, and Radnor, and the city of Hereford. Three architects had been invited to send in designs, viz., Mr. Kempson and Mr. Chick, of Hereford, and Mr. Griffiths, of Stafford. After investigation of the respective plans, and interviews with the architects, the committee selected those of Mr. Griffiths, and they have been forwarded to London for examination by the Commissioners in Lunacy. It is stated that there was not more than 1,000l. difference in the estimates of the architects, the highest being 39,000l.

Darlington Workhouse.—The second premium was awarded to Mr. G. Styan, not Stanger.

THE "EGYPTIAN HALL" IN THE CITY.

Your "Old Correspondent," who sent the interesting "Notes from York," in the number for Feb. 1st, writes in evident ignorance of the meaning of the expression "Egyptian Hall" as an architectural term. He is, however, by no means singular in this: indeed, I have scarcely ever met with any one, however familiar with the science of architecture generally, who could tell me why the "Egyptian Hall" at the "Mansion House" of the City of London has that designation. When the subject is referred to, either in printed descriptions of the building or in conversation, surprise is usually expressed that a building should be so called which is so entirely devoid of the characteristic features of the architecture of Egypt; and various wild suggestions are made to account for the name, which affords no difficulty whatever to a student who has read his Vitruvius,—evidently few enough at the present day.

Any one who will take the trouble to consult Vitruvius, "*De Architectura*," lib. vi., c. 5, § 31, will find two kinds of hall described, the *Corinthian* and the *Egyptian*. The former is stated to have a single row of columns, supporting an architrave and cornice, with a vaulted roof of elliptical form springing from them. The latter, or Egyptian hall, has a second row of columns, one-fourth part less, placed vertically above the lower row, with a decorated flat ceiling supported on the entablature of the upper order. I have never seen the Assembly Rooms at York, and it is at least thirty years since I looked at the engravings in the "*Vitruvius Britannicus*," so that I cannot say how far the room, in its present condition, corresponds to Vitruvius's description; but my impression is that, as there depicted, it possessed the double tier of columns which is the chief characteristic of an Egyptian hall. Your "Old Correspondent" will doubtless be able to tell us whether the design is still unaltered, or whether, like the Egyptian Hall at the Mansion House, it has lost its upper story, and with it all right to the designation it still bears. As everybody knows, the Mansion

House room corresponds exactly to the Corinthian Hall as described by Vitruvius, and few are aware that when originally built it was half as high again as it is now, and had a second tier of three-quarter Composite columns, with ohlong windows between, and a flat ceiling. The design, as erected by Dance, may be seen in Campbell's "*Vitruvius Britannicus*," 1767 (I must apologise for my inability to give a more exact reference, writing from old notes), and was evidently drawn in exact accordance with the description given by Vitruvius. I cannot say when this upper story was taken down (it appears in the external view given in Strype's "Stow," 1754), but when I first knew the hall in 1825, the alteration was not very recent. Probably some correspondent connected with the corporation may be able to supply the exact date.

The corresponding upper story which surmounted the Ball-room is fresh in the recollection of many of us. It was demolished somewhere about twenty years ago.

It may not be generally known that the architect of the Mansion House, forgetting the difference between an Italian and an English climate, constructed it originally with an open court in the centre, with colonnades, which had to be traversed by the guests when passing from the long parlour, or dining-room, to the drawing-room. I well remember a lady saying that on one occasion she was powdered with snow in going from one room to the other, on the occasion of a grand civic party.

EDMUND VENABLES.

FIRE-PROOF CONSTRUCTION OF DWELLING-HOUSES.

I was attracted by Mr. George Burchett's title to his letter on the fire-proof construction of dwelling-houses to read it reflectively. There is no doubt about it: fire-proof construction is of the greatest importance, not only for dwelling-houses, but for factories and agricultural buildings; nor would the expense in many cases be so much as the ordinary mode of building, and I think in none so high as Mr. Burchett puts it, 25 per cent.

Why do not the class of architects employed on ordinary dwelling-houses give attention to the subject? I believe they have time enough and to spare. Then something might be done to prevent the terrible accidents, loss of life and property, the agony of public feeling, and the call on the public purse as evinced by the heroic conduct, but sad case, of William Lyons recently.

Even when liberal and enlightened employers are found who would not only listen but discuss the question with the architect, and adopt any plan for the better security of their buildings, does the architect put himself out of the way or give himself any trouble to point out the actual cost and the great advantages of fire-proof construction? I fear very seldom.

I am acquainted with many such cases, but with one especially, where on an estate houses intended to let for 60l. per annum are being erected without the commonest precaution against fire. With the exception of the outside walls, all the interior divisions, both on the ground and chamber floors, are lath-and-plaster partitions, where even chimney-hars are omitted, and the outside arches, apparently of bricks laid as 9-in. headers, are in reality only half-bricks laid in that way which reveals for the box shutters to the hay windows are cut away after the brickwork is carried up and where the door linings have the rebates formed by nailing thin strips of wood to plain casings.

"But whom do I advise the fashion led,
Th' incorigibly wrong, the deaf, the dead."

In building brick arches for floors, lateral thrust should, of course, be avoided as much as possible, and iron ties sparingly used. Mr. Burchett is right in this respect to recommend bricks perforated vertically.

I am persuaded that we owe the existence of many old buildings in the Midland counties to the practice of forming the floors with gypsum (sulphate of lime), which is a native mineral and easily procured. Reeds instead of laths were used; and the plaster, as it is called, was thoroughly incorporated with them, and so as to be beaten and cover both sides; the upper side was smoothed and trowelled to a polished and smooth surface, almost indestructible. I was born in a large old house erected in 1692, where all the

floors were formed in this way; though, for warmth and modern notions of comfort, some of the floors had been covered with floor-boards. The polish and smoothness of the old plaster-floors remain perfect after a lapse of 176 years; not a crack or flaw is to be seen.

The material used for the Dennett arch is, I believe, gypsum; and spaces of 12 ft. in width may be covered on this plan without any intervening support. The upper surface can be made level and trowelled to a polish, as above described. Such arches are without any lateral thrust, are like a shell, solid and in one piece. When floor-boards are intended to be used, the top surface can be left rough, and the floor-joists are mere fillets, partly inserted and fixed in the fire-proof material. The cost of fire-proof floors on Dennett's plan would be about *4s.* per square.

When large openings have to be covered, rolled wrought-iron girders are available for dividing the space: these cost about *3s. 5s.* per ton, and they may be laid 8 ft. or 9 ft. apart, the intervening spaces being arched with the fire-proof material.

In the re-construction of Kelham Hall, Nottinghamshire, after the fire, floors of this kind were used throughout by Mr. Scott; and I believe he has employed the same material extensively in the new Government offices and other works.

The plan is preferable to hollow brick arches: is light in weight, exerts no lateral pressure on the walls, and is fire-proof. Provision should be made for the floors at the time of building the walls, and salient courses two bricks in thickness should be formed, the lower projecting three and the upper five inches from the inner surface of the walls.

The space in height required for the floor is little, if any, greater than where through joists are used, as in ordinary floors.

With respect to agricultural buildings, I made drawings which, accompanied by a model, were sent to the Dublin Exhibition, for a set of farm buildings for the late Mr. E. W. Wilmot, and carried out similar works for the same gentleman, in which all the roofs were formed of hollow brick arches, up to spans of 30 ft. The arches, when finished, were covered with asphalt to carry off the rain-water. The side-walls of the buildings were only 9-inch work. Efficient ventilation was provided by louvre boarding and frame-work along the centre of the arches, and the lateral thrust on the walls was counteracted by the insertion of three-quarter wrought-iron tie-rods (a chord of the arch, in fact), placed at intervals of 8 ft. or 9 ft., passing through wall plates at the springing, and secured with nuts and screws. The height or versed size adopted for the arches was one-quarter of the span.

This mode of construction was both durable and economical, and the buildings were cooler in summer and warmer in winter than those covered with ordinary slated or tiled roofs.

The importance of cheap and improved fire-proof construction for buildings of all kinds must be my apology for troubling you with this letter.

JOHN BLENKAIN.

THE DUTIES OF THE BURGH ENGINEER OF EDINBURGH.

SOME weeks ago a correspondent, writing from Edinburgh in the name of certain sufferers from the storms, asked us for some information respecting the duties of the burgh engineer. We are now able to refer him to an opportune publication of Messrs. Blackwood, which consists in fact, of a classification, or rather codification, of the relative clauses of the numerous Acts of Parliament under which the Edinburgh police is administered.*

From this he may learn all that he desires. He will find that it is not only the engineer's duties to see to the repairs of chimney-stalks, chimney-cans, &c., but that he has also most ample powers, as procurator fiscal, in the police court, to prosecute all offenders against the provisions of the several local Acts. This does not coincide with the statement of those duties which our correspondent pointed out in the *Scotsman*; and certainly the official responsi-

bility in the matter should not be allowed to rest on that unsatisfactory footing.

In connexion with this subject we may print the following letter of the Dean of Guild, with regard to the obstruction of masons' sheds on the public streets, regarding which many complaints are constantly made:—

"As Dean of Guild for the time being, I am often applied to about street nuisances, but especially on the vexed subject of masons' sheds. If the gentlemen who so favour me with their correspondence would only attach their names to their complaints, I would satisfy them without the least delay whether they remedy them for or against me within my limited powers or not. When I have nothing more specific than initials to deal with, I cannot answer; and therefore the writers remain for days, or even weeks, under the erroneous impression that I am guilty of a dereliction of public duty.

Masons' sheds are erected on the public streets by warrant and authority of the Paving Board, under their Order as obtained, sanguine hopes were cherished that the 81st section of that Act would put a spoke in the wheel of the Paving Board, and take the mason-shed question to a great extent out of their hands; but it was soon found that the powers and privileges of the Paving Board in regard to street nuisances was reserved to them in full force and effect by section 45 of the Provisional Act. Such being the present state of the law, neither the Town Council nor the Dean of Guild Court can do anything to mitigate the evils occasioned by these masons' sheds. Unless some joint measure can be devised between the Paving Board and the Town Council, so as to reduce the nuisance to a minimum of discomfort to the inhabitants, I can see no other way out of our present difficulties. It will never do for the powers that be to attempt an antagoistic policy. That would only add to all the evils frequently complained of; and as for the masons, they have no mercy,—room and time they will take in their own despotic way.

WILLIAM LAW, D. G."

Here, it would appear, are three different local boards concerned about a very simple matter, and between them the public interest is neglected. Indeed, conflicting jurisdiction seems to be the great bane of the Edinburgh local authorities.

THE VENTILATION OF A BALL-ROOM.

In the newly-acquired house of Mr. E. Ward Jackson, at Clifton, he has adopted a plan for ventilation, which, on a late occasion, when a large number of persons were gathered together, was found to be very efficacious in letting out all gas effluvia and vitiated air; in reducing very greatly the heat of the room; and in rendering the air both agreeable from its moderated temperature, and sanitary from its quality. It is a plan so practical that it ought to be made known.

The house was lately in the occupation of Bishop Anderson, and of the Bishop of Gloucester and Bristol, and it may be mentioned by the way, was by them considered as an extremely cold house. This, it may be cursorily said, has been by Mr. Jackson effectually remedied by appliances to the outside and inside of the house, to its windows, doors, and floors, and also, by the introduction into the hall of a large gas-stove, which is said to consume its own products, without the least smell, and to be perfectly innocuous. The heat from this stove is disseminated through the corridors, the rooms, and passages; and, during the very cold easterly gales, with frost and snow, which prevailed in December, the stove was kept slightly burning by night, as well as by day. The sitting-rooms, and all other rooms, preserved their warmth through the night, and were found in the morning exceedingly agreeable. They are all kept throughout at an agreeable temperature, in cold weather, at 56° Fahrenheit, as marked by fourteen thermometers distributed through the house. This temperature may be quickly brought, if desired, to a much higher point. In the bedrooms, where heat is required, it is obtained by a very small gas stove in the room, on the same principle; and each bedroom is provided with a covered opening into the passage, near the ceiling, 10 in. by 5 in., through which any extra heat is carried off. The passages themselves are provided with an air-tight wooden valve to the roof, which can be opened or closed at pleasure by a short wire.

Thus the whole of the house and bedrooms preserve the same even temperature, and in effecting it the consumption of gas is comparatively trifling; the consumption of coals is diminished, and dust is thereby avoided.

But what we chiefly desire to speak of is the ventilation of the drawing-rooms and other sitting-rooms, on the occasion of large numbers of people being assembled. This was effectually proved recently, when Mr. Jackson and his family gave a house-warming, and received about 130 persons.

The plan adopted for thoroughly ventilating these rooms, without any perceptible draught, seems

to have been based upon the fact, that while heated air always ascends, cold air descends, each offering to the other, at all times, a considerable resisting power, and may be very easily carried out, without much expense. The two drawing-rooms are each 26 ft. long, 16 ft. wide, and 15 ft. high; the dining-room is 29 ft. long, 18 ft. wide, and 15 ft. high. In the drawing-rooms were burning eighteen full gas-lights, and in the dining-room nine.

The plan adopted appears to have been as follows: the centre-piece in the ceiling of each of the drawing and dining rooms was broken through or removed sufficiently to receive a tube of zinc 14 in. long by 10 in. wide (the breadth of the joist), which was inserted at the opening. The two tubes of the drawing-room were then carried between the joists of the room above, to the adjoining wall, where they were united, and were run up along and by the side of the wall to the other room above it, till it reached the roof; not, however, through the roof, since a slate or tile roof above it generally contains sufficient apertures through which the heated air can pass. The same also with the dining-room. The zinc tubes in the bedrooms above being afterwards covered with the same room-paper presented no unsightly appearance.

Over the lower part of the tubes in the drawing-room ceiling was placed a *popier-mâché* covering, easily obtainable, five inches from the ceiling, to conceal the opening. In this manner a direct open communication is made from the drawing-room and dining-room through the side tubes to the roof.

To prevent the rush of a down blast of cold air from the roof through the tubes to the rooms below, three points must be attended to. First, a jet of gas, with a small glass door four inches square, must be placed in each bedroom, inside the tube, half an hour before the party assemble, so as to warm the tube and produce an upward current.

Secondly, a wooden valve must be formed upon the very top of the large zinc tube under the roof, worked by a wire in the room below it, to be opened and closed, or partially closed, at pleasure. And thirdly, the drawing-room door must be always open (or there must be some other means of admitting air) to allow of the admission of the ordinary atmosphere of the hall into the rooms, and to set the hot air in motion upwards.

A certain proof, beyond the experience of all, as to the agreeable temperature and the sanitary condition of the air in those rooms, was to be found by opening the small glass door in the tube near the roof; when a rush of gas and other fetid air took place of a strongly disagreeable kind.

The plan here described has completely answered the purpose. Several medical men were present, and bore full testimony to it. Something like this has been tried by many before, but seldom, perhaps, so efficiently; a very ample tube being adopted, and carried direct to the roof; remembering that hot air is a body of great dimension, and cannot be compressed within a small compass.

Where a similar arrangement has failed to produce satisfactory effects, it would probably be found that the tubes used were too small. In a new house, of course, the shaft could be formed without even the slight disquiet that Mr. Ward Jackson's tube presents in the upper rooms.

BRISTOL.

THE LOGIC OF THE "ARCHITECTURESQUE."

HAVING perused with considerable interest the report of Professor Kerr's lecture on the "Architecturesque," I am desirous of asking a few questions for the further elucidation of his theory.

His general proposition (he must correct me if I misapprehend) appears to be contained in the following extract. The italics are mine:—

"If this be so, let me next try to define what I call the architecturesque. It is an essence of form and disposition, which (speaking vaguely at first) may be said to make architecture what it is. . . . Architecture is the fine art of the beautiful in building; and as all architecture must therefore be based upon building, I think it plainly follows that there is something which is to be superadded to building, in order to convert building, if the expression be allowable, into architecturesque. This element it is that I am endeavouring to suggest to your minds." . . .

* Provisions of the several local Acts regulating the Police of the City of Edinburgh, classified and arranged, with comparative Table, Arrangement of Sections, explanatory Notes, and Index. By James D. Warwick, S.R.C., Town Clerk. Edinburgh, 8vo. pp. 211, William Blackwood & Sons, 1868.

Thus the "architecturesque" is the essence of architecture; and it follows naturally as the Professor explains further on, that painting and sculpture, to accord with architecture, must receive "architecturesque" treatment.

So far the theory is clear, but when I read further on, "all this brings me to the great fact, that Medieval architecture is all picturesque," I naturally become confused. Nor are my difficulties lessened when again he states, "I have been for years persisting in this proposition, that all Classic architecture forms one School of Art, and all Medieval architecture another School of Art,—the latter picturesque, and the former something not picturesque. I have called it Classical for want of a better term. But if I am now right, I should call it Architecture." If the essence of architecture is the "Architecturesque," in opposition to the Picturesque, and Gothic architecture is all picturesque, it follows that Gothic architecture, which does not contain the essence, is not architectural at all. If not, what is it? I have carefully gone over all Professor Korr's reasoning, and find it impossible to get out of this dilemma. It appears to me that he himself is rather confused on the subject. He feels something in architecture he cannot quite explain, at least he does not; something that differs from the picturesque, and of which the Parthenon is the present embodiment; but either he covers too much ground with his major proposition, or the minor one relating to Medieval architecture is too narrow.

Thinking it is better for those who propound theories to support and explain them, I refrain from offering any suggestion for making the "Architecturesque" hypothesis "bold water."

T. M. R.

"THE MAGNET AS A STOVE."

AN instance of the correlation of the physical forces, as existing between magnetism and heat,—more striking, perhaps, than the one you quote under the above heading in the *Builder* of February 29,—is to be found in Professor Tyndall's work, "Heat, a Mode of Motion." The experimenter I refer to also disposes of the doubt expressed at the end of the paragraph in your journal, as to whether heat would not be "generated in such a case, whether the apparatus had magnetic power or not."

The experiment may interest some of your readers, and, briefly described, is as follows:—A small copper cup is filled with an alloy, fusible at a low temperature, and is so arranged that it can be made to rotate with considerable rapidity between the poles of a powerful electro-magnet, without, however, touching either of them. As long as the magnet is not connected with the battery, and is in fact not a magnet, the heat developed by the rapid rotation of the cup is quite insufficient to melt the alloy; but, if the connexion with the battery be completed, whilst the cup is in rotation, the alloy soon melts and drops out of the cup.

Another experiment, equally remarkable, is decided in the same work.

A silver medal is suspended in a vertical position by means of a thread, between the poles of the electro-magnet. It is not, of course, attracted by either pole of the magnet, even when the latter is in connexion with the battery. If, the circuit being broken, the medal be caused to spin by twisting the thread, nothing more than the ordinary resistance of the air will be felt; but, when the current is passing, much more resistance will be experienced, as if,—to use Professor Tyndall's own metaphor,—the medal were rotating in some viscous fluid.

H. H. G.

A NUT FOR THE PROFESSION TO CRACK.

THE following extract from a letter addressed to myself by a client of mine, with my reply, may be found worth some consideration:—

"This county is building a lunatic asylum for 30,000. They had a limited competition among three or two local architects and one engineer from London. When I ask the committee, one by one, 'Why not have a local architect?' all give the same answer, 'Oh, those fellows run us into such expenses.' Is there not something amiss in the profession, as well as in the justices, for such notions to be so common?"

This is part of my reply:—
"I am sorry to hear the result of the lunatic asylum competition in your county. I myself some years ago sacrificed to the same notion

in another locality; for, although all the magistrates acknowledged that the plans submitted by myself and my late partner in a similar limited competition for X Asylum were by far the best, and though they were exceedingly plain and simple, they chose a most indifferent work by another competitor upon the ground of his not being a professional architect.

The cause, I fear, lies deep in the English mind, in the utter severance of art from the affairs of practical life. So complete is this, that men think that, because architecture has something to do with art, and its professors are to be avoided whenever it is possible to do without them, especially with buildings of this class; as if planning and scheming to supply the requirements in the best and cheapest manner were not the principal parts of the business of an architect, and as if this could be done better by a non-professional or what they are pleased to term a practical man. * * * * *

Certain it is that an architect who knows his business can save far more than he could spend, nor would he be allowed to spend, in art; and the architect that engineers can build cheaper than architects, is amusing.

Still, it is not to be denied that there may be faults on both sides; but then, while the public run after quacks and avoid architects, they saddle the profession afterwards with the blame due to the incompetence of the very men they themselves have helped to boist into it." J. P. S.

NORWAY STOVE.

Sir,—I shall feel obliged if any of your readers will inform me how to construct the self-cooking stove used by the peasantry of Sweden and Norway, and lately exhibited at the Paris Exhibition, by which a working man may cook a dinner and keep it hot all day. W. S.

LOW ESTIMATES AND HOW CARRIED OUT.

Sir,—Many of your readers, I doubt not, feel somewhat surprised at the great discrepancy in tenders for works which appear weekly in your journal, and any information which would tend to explain or throw some light upon the way in which they are carried out, and would, I feel assured, be acceptable. Some months since I, amongst others, tendered for the erection of a fire brigade station at St. John's Wood, for the Metropolitan Board of Works, the highest estimate being 2,400l., and the lowest a trifle under 1,600l.; the latter was accepted. I paid 10s. for plans and specifications, and went through them most carefully, and priced it out to do (as the specification certainly implied) a first-rate job. After providing that the ground should be excavated to a sufficient depth to insure should be composed of brick-bats in the proportion of one of the former to six of the latter, to be thrown in white-hot, and my business taking me past it very frequently, I was rather curious to see how these instructions would be complied with, when I confess not very greatly to my surprise) instead of clean-washed Thames ballast being used, a little dirty pit ballast with a great deal of unscreened burnt clay (or ballast if you will) was being carried up on this substitute for good concrete. Why, estate detected some speculating builders doing the same thing, when he ordered and insisted that it be taken out, and proper ballast substituted; and yet, in a public building, one that the whole of the metropolitan public have to pay for, it is allowed to remain. I would, in conclusion, ask what inducement can there be for respectable builders to enter into competition jobs with so little chance of success against the "cheap Jacks" of the present day? FAIRPLAY.

BUILDERS' CHARGES FOR TENDERS.

A CASE of considerable interest was tried in the County Court of Gloucester last week—Jones & Sons versus Rees. The plaintiffs are a firm of builders at Gloucester in a large way of business. The defendant is a leading promoter of a Welsh undertaking for the erection of English Congregational churches in South Wales. In June, 1866, a committee, of which Rees was chief acting member, having appointed Mr. Paull, of Manchester, to be architect for the new church to be erected at Swansea, directed him to obtain tenders in limited competition from the firms, including the plaintiffs. Quantities were supplied or either tender not being accepted. The tender of plaintiffs was the lowest, but being somewhat in excess of the architect's estimate he was authorised to communicate firm consequently with a view to reducing the work. One of the were arranged and fully reported upon by the architect to the committee, who, after some delay, wished to enter into a contract with the plaintiffs for the erection of the building. The amount of this having been settled upon and agreed to by plaintiffs, the committee found they had been too sanguine as to obtaining funds, and they desired superintendence of a clerk of works approved by the architect. Plaintiffs demurred to such a course, but on the desire the architect, consented to withhold claim for compensation, and accept a fair amount for their time and expenses in their journey to Manchester. The founda-

tions of the church having been completed up to the ground line, the works were suspended till the spring of last year, when the committee found themselves able to enter into a contract for the superstructure. The architect was then commissioned to re-open negotiations with the plaintiffs, and ascertain if they would take the work at the rates upon which their original tender was based.

They consented to do so with a few modifications which the architect arranged, and terms of contract were prepared. Plaintiffs were called upon to provide responsible sureties, which they did, and an appointment was made with the architect to meet and settle all details for a contract. This appointment was set aside by a telegram from the committee, followed by a letter, stating that "for many reasons" they had decided not to enter into a contract with plaintiffs, and directing the architect to arrange for the work to be carried out by Messrs. Thomas & Co., of Swansea, whose original tender was next in amount above that of the plaintiffs. Whereupon plaintiffs sent in a claim of 33l. 14s. 9d., consisting of the following items:—8s. per cent. on the amount of original tender, 14l. 4s. 9d.; expenses to Swansea in 1867, for further local information, journey to Swansea in 1867, for further local information, 10l. 10s.; journey to Manchester, 10l. 10s.; second tender, 5l. 5s.; journey to Swansea in 1867, for further local information, 10l. 10s.; and for the action of plaintiffs, Mr. Paull gave evidence as to the above, and Mr. Neville, of Aberystwyth, and Mr. Jacques and Mr. James, of Gloucester, gave evidence as to fairness of plaintiffs' charges and demands, under similar circumstances, had been paid to builders for estimates. On behalf of defendant, Mr. Watkins and Mr. Rees, of Swansea, two well-known competitors of plaintiffs in the limited competition, were called to prove that under no circumstances were builders' tenders ever paid; Mr. Watkins admitted he should consider he had a claim for compensation in competition with the plaintiffs, but used, in one or two instances, in his own experience, if he had known he could recover.

Defendant admitted the item of 10l. 10s. in plaintiffs' bill, and plaintiffs withdrew the last item of 5l. 5s. The judge decided for the plaintiffs in the other three items, with costs.

NEW RACE-COURSE FOR MANCHESTER

THE following are lists of the tenders delivered for the grand stand, second-class stands, stabling for eighty horses, fencing, approaches, &c., for the Manchester Race-course Company (Limited). Messrs. Thomas Bird & Son are the architects. Quantities were supplied:—

Grand Stand.

Cochrane, Parker, & Co.	46,967 0 0
Terras	6,828 0 0
Greenup & Co.	6,300 0 0
Thompson	6,234 0 0
Yell & Son	5,915 0 0
Warburton, Brothers	5,850 0 0
Johnson (accepted)	6,189 0 0

Second-class Stands.

Cochrane, Parker, & Co.	6,073 0 0
Terras	4,856 0 0
Thompson	3,780 0 0
Greenup & Co.	3,700 0 0
Nevil & Sons	3,594 0 0
Yell & Son, Brothers	3,321 0 0
Johnson (accepted)	3,653 0 0

Stabling, Fencing, &c.

Cochrane, Parker, & Co.	5,150 0 0
Terras	5,084 0 0
Warburton, Brothers	5,020 0 0
Thompson	5,000 0 0
Greenup & Co.	4,960 0 0
Johnson (accepted)	4,930 0 0

THE EMBANKMENT WORKS.

MR. BAZALGETTE, the chief engineer, presented a report as to the progress of the Embankment works at a recent meeting of the Metropolitan Board of Works. We give some extracts from it:—

North Side of the Thames.—Thames Embankment between Westminster and Waterloo Bridges.—The whole of the dams have been completed and removed. The Westminster steamboat pier and 670 ft. of the adjoining river-wall are complete, and a further length of 50 ft. of the latter is constructed to a height of 33 ft. above the Trinity high-water mark; 100 ft. of the York-gate substructure, and 380 ft. of the wall adjoining, are also constructed to that height, and a further length of 393 ft. of the latter is complete. The Charing cross steamboat pier has been brought to levels varying from 5 ft. 4 in. to below 3 ft. above Trinity high-water mark, and of the adjoining wall 220 ft. are constructed to 3 ft. above high-water mark, and a further length of 193 ft. is complete. The Adelphi landing-stairs are constructed to a height of 34 ft. above Trinity datum: 50 ft. of the outer capping are fixed, a length of 154 ft. of the river-wall adjoining is constructed to heights varying from 5 ft. to 5 1/2 ft. above datum, and a further length of 244 ft. of the wall is complete. In the Waterloo steamboat pier the works have been carried up to levels varying from 1 ft. below to 3 1/2 ft. above Trinity high-water mark, and the junction with the No. 2 contract has been made. Filling in earth, &c., behind the embankment walls, and in the works generally, has been carried on for the purpose of the Waterloo and Whitehall Railway the lower portion of the Victoria Road, and Regent-street sewers from Scotland-yard to the Thames have been diverted, and a part of the railway tube has also been formed. The approximate cost of the whole of the works, including 18,000l. for the materials of the ground, is 443,000l., of which the sum of 5,000l. represents the past month's progress.

Contract No. 2, between Waterloo Bridge and Temple Gardens.—The works on this contract, to the extent of 2,000 ft. of the river wall, sewer, and subways contained in this contract, is now complete, and the only works remaining to be executed to finish the contract are the laying of about 1,900 ft. super.

of York landings, and the levelling of the surface of the intended roadway. The approximate value of the whole of the works completed is £20,000, of which the sum of £6,000 is due to the past month's progress.

Admiralty Pumping Station.—The buildings and works of this station are actively progressing. The iron work is fixed in its place for a height of 12 ft. The two chimney shafts are, with the exception of the lighting conductors in connection therewith, complete in every respect. The superintendent's house and the workmen's cottages are all roofed in and slated. The reservoirs for the water supply are near completion; and the tunnel under the northern outfall, for the passage of the water thenceforth to the boilers, is steadily proceeding. The approximate value of the whole of the completed works is 171,700*l.*, of which the sum of 3,950*l.* is due to the progress made in the past month.

South Side of the River; Thames Embankment.—Of the 2,370 ft. of dam and staging that had been constructed between Westminster and Lambeth Bridges, a length of 1,100 ft. has been removed, and about 750 ft. of the single pile dam and staging have been constructed above the latter bridge. Within the completed dams a length of about 2,800 ft. of the river wall has been brought to heights varying from 7 1/2 ft. above to 17 1/2 ft. below Trinity high-water mark. The approximate value of the whole of the completed works, including 20,500*l.* for materials upon the ground, is 156,000*l.*, of which the sum of 3,000*l.* is due to the progress made therewith in the past month.

THE DRAINAGE OF GIBRALTAR.

The new system of drainage works to be carried out by the Sanitary Commissioners of Gibraltar was inaugurated by a public ceremonial on the 20th February; the first stone of the new works having been then laid by Lady Airey, the wife of Sir Richard Airey, the Governor and Commander-in-Chief of the City and Fortress. The cost of the new system is estimated at 35,000*l.* The old town drainage, it is said, was spelt to improve the defences, the breakwater having led to a great nuisance in connexion with the old drainage. The new system, however, has not been gone into by the Government, nor is it to be entirely at Government cost, the inhabitants having been rated to the extent of 25,000*l.*; but the Imperial Government aid by a subvention.

The *Gibraltar Chronicle*, in reporting the ceremonial, says:—

"There is one statement made in the address of the Sanitary Commissioners to Lady Airey, and referred to in her ladyship's reply, which we would gladly see the subject of further investigation. It is said that the annual death-rate amongst the resident population in Gibraltar is 32 in the 1,000. This, compared with the mortality in England, is certainly a high rate, being equal to that of Liverpool, the worst town, as regards sanitary conditions, of any in England. At the same time, those who have lived many years on the Rock do not share the opinion that the place is unhealthy, nor have we heard that typhus fever or the other forms of illness springing from bad drainage and want of ventilation, are common in Gibraltar.

Doubtless, as in other towns, there is in the poorer quarters overcrowding, inevitable amongst those who have very large families and very small means. It seems, too, that Gibraltar is very deficient in properly constructed dwellings for the poor. In coming to a conclusion as to the healthiness or unhealthiness of the town, the rate of mortality should, we think, be compared rather with the towns of Southern Europe than of England."

The drainage and water-supply works were designed by Mr. Edward Roberts, assistant surveyor of the War Department, under the direction of Major-general Edward Frome, Commanding Royal Engineer. The contractors for their execution are Messrs. A. Kyan & Co., of London.

COURT OF COMMON COUNCIL: BLACK-FRIARS BRIDGE, HOLBORN VIADUCT, SMITHFIELD MARKET, &c.

At a recent Court of Common Council a report was brought up from Mr. Gabbit, the engineer of the new bridge in course of erection at Blackfriars, detailing the progress of the works during the last two months. The works were going on satisfactorily, but the matters relating to the diversion of the Fleet sewer, the connexion with the Thames embankment, and the railway, are in the same state as last year. No coins were found in the old bridge foundations. The new bridge, it is expected, will be opened by the beginning of next year. A report was brought up from Mr. Haywood on the works of the Holborn valley. So far as the carriage thoroughfare is concerned, it is believed that portion of the work will be completed by the end of this year or the beginning of next. The western approach to the viaduct is nearly completed.

A report was brought up from Mr. Horace Jones, the City architect, giving a detailed account of the state of the work at the new market in Smithfield. It appeared that 220 men were at present employed upon the works, and the erection of the different portions of the

market was proceeding rapidly. The market would be ready for business to be commenced in it before next Christmas. The following resolution as to markets was agreed to:—

"That to meet the urgent wants of the increasing population, it is expedient that the whole question of market accommodation be at once entered into, more particularly as to vegetable markets, seeing that Covent-garden, the Borough, and Spitalfields are almost inadequate to meet the demands now made upon them, and that it be referred to the Markets Committee to inquire into and report whether additional accommodation is not needed, and whether daily vegetable, meat, and fish markets should not be established for the benefit of the public."

The fish market, it is believed, will ere long be removed from Billingsgate to Smithfield. The Markets Committee have under consideration the question of the enlargement of Farringdon market and the removal of the fish-market.

NOTES IN HOUSE OF COMMONS.

The New Works at Burlington House.—Mr. Layard asked the First Commissioner of Works whether the works to be undertaken on the Piccadilly side of the Burlington House site had been stopped on account of an alleged interference with the rights, or, rather, he should say "lights" of the Albany; and whether, if this were the case, the Royal Academy would be able to complete the building which they have commenced, so as to hold their annual exhibition in it next year.—In reply, Lord J. Manners said that the works had not commenced in consequence of unforeseen difficulties. These difficulties, however, were on the point of being removed.

The Irish Academy.—Mr. Gregory asked the Chief Secretary for Ireland if his attention had been called to the recent operations of the Irish Board of Works at the Royal Irish Academy, and if it were true that the new heating apparatus put into the Academy by the same Board of Works was so dangerous and defective that the two insurance offices in which the structure was previously insured had refused to continue the insurance as before.—The Earl of Mayo said, in reply, that the Irish Government was not responsible for the Irish Board of Works, which was directly under the control of the Treasury. The heating apparatus at the Academy was not new, but it had recently been altered, and the insurance companies objected to the mode of water supply. He believed that the attention of the Chancellor of the Exchequer had been called to the proceedings of the Irish Board of Works generally, and that a careful inquiry would be made.

AMUSEMENTS.

Haymarket Theatre.—The new version of M. Octave Feuillet's "Roman d'un Jeune Homme Pauvre," which has been produced under the supervision of Dr. Westland Marston, and is entitled "A Hero of Romance," is a very interesting play, pointedly written, well put upon the stage, and capably acted. Mr. Sothorn as the Hero, Mr. Buckstone as an old army doctor, Mr. Compton as a dandy man of the world, and Miss Robertson, bear the burden of the piece with ease and finish; and Miss Ione Burke, Mrs. E. Fitzwilliam, and others, materially contribute to the success of the *ensemble*. The former lady, Miss Burke, has a part which, by a little more study and effort, might be rendered even more prominent than it is. We must give Mr. John O'Connor great praise for the scenery. The scene of the second tableau,—the Park of the Château Dumont (Brittany), with the terrace-walls, and the chateau in the distance; and that of the third,—Ruins of the Tower of Elfen,—are very clever and effective; and the last scene, a *salon*, is furnished with elegance. The piece is a complete success.

Mr. Henry Leslie's Concerts.—The concert on the 12th consisted of songs and glees, set forth by a large number of operants, including Madame Sainton-Dolby, Madame Rudersdorf, Mr. Cummings, and others equally well known. It was a popular evening, and very successful. On the 19th the concert was orchestral and choral, Mendelssohn being in the ascendant.

The Polytechnic.—The attention given by the audience, night after night, to Professor Pepper's excellent lecture on Astronomy, illustrated by spectral analysis, speaks well, both for the ability of the lecturer in rendering even abstruse subjects clear and interesting, and for the advanced intelligence of Polytechnic visitors.

THE RATE-PAYING CLAUSE OF THE REFORM ACT AND THE POOREE CLASSES.

GREAT ignorance of the means and habits of the poorer class of tenant householders is manifested in the clause relative to compound householders; otherwise, if not ignorance, there has been reckless indifference, and hundreds of thousands have been wilfully and unjustly punished, as it were, because some scores of thousands of the working classes have received a voice in the legislature of the country. No less than 6,000 poor creatures, women no less than men, who can hardly hold body and soul together, in themselves and their children, or a roof above their heads, by sharing it with a crowd of others, were summoned in one day for poor-rates in Hackney parish alone, and by the same rule the poor in every parish in the metropolis must suffer; and not in the metropolis alone, but throughout the whole country. Thus in Salford, a sort of Southwark to Manchester, no fewer than 3,500 summonses for poor-rates were in one week issued, and it is stated that for some time to come the parish overseers will require to have at least 800 issued every week, even after exhausting all possible means for arranging for the payment of the rates by instalments, so low, in many cases, as 6d. a week. It is a fine opportunity for law pickings, and also for the landlords of the poor people who, after paying their rates through these landlords in the form of rent, are now called upon to pay over again to the parish; and, in multitudes of cases, no doubt, for others who had formerly tenanted the houses they now occupy. Such wholesale iniquity and want of consideration for or knowledge of the poor have been the cause of revolutions and of awful bloodshed ere now; and the Government and the Legislature may depend on it that the feeling they are exciting amongst the people is a dangerous one, as the writer of this has himself some cause to know.

DISSENTING CHURCH-BUILDING NEWS.

Bradford.—The chief stone of the new Unitarian Chapel, in Chapel-lane, has been laid on the site of the fabric recently removed. The style of the architecture is Gothic, the accommodation for 500 persons, and the estimated cost, 5,000*l.* Messrs. Andrews, Son, & Pepper are the architects.

Walker (Newcastle-on-Tyne).—The chief stone of a building, intended to be used as a Primitive Methodist Chapel and school, has been laid in close proximity to Walker Colliery. The new edifice is to be erected from a plan by Mr. James Robinson, of Gateshead, on ground leased for seventy-five years from the corporation of Newcastle, and is intended to have a classic front with a Grecian pediment. The chapel, with the addition of a rising gallery, will be sufficient to accommodate 300 persons, while the school, under the same roof, is adapted for 150. The whole of the work is contracted for by Mr. Thos. Smith, of Walker, and will be completed for somewhere about 700*l.*

OPENING OF THE MILLWALL DOCKS, ISLE OF DOGS.

THESE new docks have been formally opened for business by the Millwall Docks Company. A large area of marshy ground has been converted to useful purpose by the formation of these docks. The extent of land purchased in the first instance by the Millwall Company was some 204 acres, of which they proposed to appropriate 52 acres to dock accommodation, and 152 acres to wharfs and warehouse accommodation. At present, however, there are only about 33 acres of water. The lock is said to be the largest in London, being 450 ft. long and 80 ft. wide. Its depth of water is 28 ft. in the centre. The sides of the lock vary in section at different points. They are faced with Staffordshire blue bricks to 24 ft. below the top, and have stone copings 1 ft. 6 in. deep, formed of blocks not less than 4 ft. long, well united by stone joggles. For a depth of 6 ft. below the top of the coping the brickwork is 3 ft. thick; then its thickness is increased to 3 ft. 4 in. for a depth of 10 ft.; and then for a further depth of 10 ft. the thickness is made 3 ft. 9 in. Below this the brickwork is thickened to 13 ft., a culvert being

formed in it. The upper part of the wall is backed with concrete, courses of brickwork running back into this concrete to bind the whole together. The lock-gates, which are each 43 ft. wide by 31 ft. high, are box-gates; but the river side of each gate is perforated, so that the water flows freely in or out of the box. The other side of the gate next the dock is, of course, made water-tight. The wet-dock is an extensive basin, which has been constructed in the most modern fashion. The depth of water is 28 ft. on the sill, which will enable vessels of very large tonnage to enter and discharge their cargoes. Around, on the wharfs, there are nine warehouses, and cranes have been erected capable of lifting from 35 cwt. to 15 tons, worked by hydraulic power. Sheer-legs, worked by steam, and of a capacity of 80 tons, are being erected for masting and dismanting, and the shipment and discharge of machinery and other heavy goods. Inside the wet-dock is a dry-dock 413 ft. long, 65 ft. wide at the entrance, and 80 ft. wide in the centre, having a depth of 25 ft. of water on the sill at Trinity high water. Engines and hydraulic machinery have been erected all round the docks, and will be employed in opening the lock-gates, sluices, road-bridges, and cranes. The water by which the vast hydraulic machinery will be worked will be supplied at a pressure of 700 lb. per square inch, by a pair of horizontal engines placed in a suitable building near the graving-dock. The Customs offices, contracted for by Messrs. Mills & Son, are completed. The engines and machinery have been supplied by Messrs. Armstrong & Co.; and the contractors for the whole have been Messrs. Kelk & Aird; the joint engineers being Messrs. Fowler & Wilson.

TRADES UNION FUNDS NOT BEYOND PROTECTION OF THE LAW.

At the Manchester Assizes, Mr. Justice Lush has delivered a decision of the greatest importance to trade societies. A man named Dodd, the treasurer of the Manchester Operative House Painters' Association, was charged with having embezzled about 800l.; nearly the whole of the available funds of the society. The defence set up was, that the association was an illegal one, and that the charge of embezzlement could not therefore be sustained. Mr. Justice Lush decided against this impudent plea; and, in sentencing the prisoner to five years' penal servitude, said that no greater mischief could be caused than by the notion getting abroad that, because a society was a trades' union, it could therefore be plundered with impunity. "Although it had been held that trade societies were not within the protection of the Friendly Societies Act, and, therefore, could not avail themselves of the special remedies given by that Act, they were in no sense illegal societies, and their property, as well as their persons, were as much protected as the property and the persons of any other society."

CHURCH-BUILDING NEWS.

Wentworth.—The rebuilding of the tower, nave, and porch of the church here is now advancing to completion. A considerable amount of work was found desirable to be carried out, more than was originally intended. All the windows had to be replaced by new stone windows. The late Dean Pascock commenced the restoration of the chancel, and such parts left undone are now also being restored; an east window has been fixed, the gift of a gentleman, a friend of the rector. The whole of the works throughout are being carried out by Messrs. Freeman, of Ely.

Carlisle.—At a recent meeting of the St. Mary's New Church Building Committee, the plans of Mr. Christian, the architect, were received, and, with only a trifling alteration, adopted. The style is Decorated, though early. The area of the church will be spacious; and a lofty aisle with seven lights forms the east end. The clearstory is lofty, and calculated to throw light well into the side-aisles. The principal entrance is by a porch on the north side, facing Castle-street, while a western door admits from the abbey. It is intended to throw open the whole of the space around the church into the abbey grounds. The general effect of the different religious buildings, mutually supporting each other, will, in the opinion of the architect, be very good.

York.—The Church of St. Mary, Castlegate, has for some years past been in a dilapidated condition, both externally and internally. Its dampness, also, is a considerable drawback to comfort, as are the large box pews, which will only accommodate 260 persons, instead of upwards of 400, as now seating would. The edifice internally will have to undergo a thorough renovation, the outer walls will have to be partially rebuilt, and the top of the spire, which has rather given way, will have to undergo reparation. The expenditure which will be created by all these necessary works, it is thought, will amount to at least 2,000l. A meeting of the parishioners has been held in the church to take into consideration the propriety of restoring it. At his own cost, the dean had instructed Mr. Butterfield, of London, to examine the church and prepare plans for its restoration. That had been done, and the plans were before the meeting. The parishioners gave their consent to the proposed restoration, on the understanding that there would be no call upon the rates.

Puddletinton (Dorset).—The church of this parish has been restored, at an estimated cost of 1,050l., from designs by Mr. Ewan Christian, of London, architect. The whole of the works were carried out by Mr. G. I. G. Gregory, of Dorchester, builder.

Kettering.—Warkton Church, which has recently undergone a restoration, has been reopened for Divine service. A new chancel arch has been inserted; the western gallery has been entirely removed, together with all the fittings in the nave, and oak benches have been substituted. The work has been executed under the direction of Mr. Stephen Brown, of Kettering, builder, from the designs of Mr. Slater, architect.

St. Pancras, London.—Mr. George Moore, of the firm of Copstock, Moore, & Co., of Chesham, has undertaken to build, at his own cost, a church, parsonage, and schools for a destitute district in the parish of St. Pancras. A site has been obtained near Clarendon-square, Somers-town, and it is expected that the cost will reach at least 12,000l.

St. Austell.—At a public meeting it has been resolved that the restoration and re-seating of the parish church be forthwith proceeded with, in accordance with plans and specifications which had been prepared by Mr. H. M. St. Aubyn, architect, and approved of at previous meetings of the Diocesan Society. It has further been resolved that the necessary funds be raised by subscription and other means. About 2,000l. will be needed to carry out what is contemplated, of which 1,000l. have already been subscribed.

Bathaston.—The parish church of Bathaston has been opened after restoration. A new aisle has been built, the south gallery over the west of the nave has been removed, the tower arch has been thrown open, the church has been re-seated throughout with open benches, and it will be warmed by an apparatus by Mr. Skinner, of Bristol. Gas has been introduced, the standards being supplied by Mr. Singer, of Frome. Mr. F. Freedy, of London, was the architect, and the contractors were Mr. Newman, of Bathford, and Mr. Silver, of Maidenhead.

Newcastle-upon-Tyne.—The church of St. Stephen's, in Scotswood-road, Newcastle, has been consecrated by the Bishop of Durham. The foundation-stone was laid by Sir William Armstrong towards the end of 1866. The church is in the Early Geometrical style of fourteenth century. The church will accommodate 650 persons; 500 in free sittings. The architect was Mr. R. J. Johnston.

Englefield Green (Windsor).—The dedication of the north transept, which has been added to St. Jude's Church, Englefield-green, has taken place. The transept has been erected in architectural unity with the edifice. It has a lofty open timber roof, and it is constructed of stone and brick, red, black, white, and orange tinted. At the extreme northern end of the transept is a five-light stained window, which formerly occupied a position nearer the nave. In the western wall is a large circular window, filled with trifoliations in stained glass. The cost of the had been promised or paid prior to the dedication, leaving a balance of 205l. required.

Frampton.—A new reredos has lately been placed in Frampton Church. The design comprises three gables, carved in Caen stone, over the altar, the central one being a little the highest, flanked by an ornamental arcade on each side. Under the latter is an inlaid diaper formed of bands of white alabaster, incised with

black lines and green marble eyes, the ground being a brown mottled alabaster. The portion of the reredos over the altar is lined with Maltese alabaster from Gozo, the central panel having a floriated cross, composed principally of a yellow marble, also from Malta, and resembling gold in colour. The shafts and spandrels of the arcade on each side of the altar are composed of marbles of various tints. The greater part of the inlaid marble and alabaster work was selected by Mr. R. B. Sheridan, M.P., of Frampton Court, when on a recent visit to Malta, and was prepared there. Mr. Earp, of London, carved the ornamental Caen stone work, and also the arcade and diaper work underneath it, and fixed the reredos in its position. The design was prepared by Mr. Forry, architect. The reredos is intended as a memorial of a relative of Mr. Sheridan, who has borne the entire expense.

Burn Moor.—The church of St. Barnabas, at Burn Moor, near Fence Houses, has been consecrated by the Bishop of Durham. The foundation-stone of the new church was laid on the 3rd of May, 1867, by the Countess of Durham, the cost of the whole edifice being defrayed by the Earl of Durham. The building is erected at the meeting of four roads from Fence Houses, Sunderland, Chester-le-Street, and Bowes House, and is built in the Early Geometric style, from designs provided by Mr. R. J. Johnson, of the firm of Austin & Johnson, Newcastle. The material used for the walls is variegated bricks, and the same scheme of colours is observed in the roofing.

STAINED GLASS.

York Guildhall.—Another stained-glass window has been added to those already in this Guildhall, representing pictorially the history of the city. The two first, that given by Alderman Meek and that by Mr. Farrer, represent respectively the Roman and Saxon periods, and the present one represents the Plantagenet period, the Norman period, not yet being completed, but in progress. The event commemorated is the confirmation of the great Charter in a Parliament held at York, on January 15th, 1298, in the reign of King Edward I. On the left is John de Hulton, Bishop of Carlisle, who holds in his hands the Charter, and looks to the representative of the king for his public assent to what has been done. Behind the bishop are Humphrey de Bohun, Earl of Hereford, the Constable, and Roger Bigod, Earl of Norfolk, the Marshal of England. In the centre is John de Warenne, Earl of Surrey, guardian of Scotland, and lieutenant in the North, who, in the king's name, ratifies the confirmation of the Charters. To the right are the Earls of Gloucester and Arundel, with Henry de Percy representing the Barons. Behind them stand a serjeant-at-law, and a serjeant-at-arms with his mace. This window, as were several of the others in the Guildhall, was designed by Mr. Jas. E. Doyle, author of the "Chronicles of England," and executed by Mr. Wallis, of Newcastle-upon-Tyne. In placing the new window, it is to be hoped it will not be forgotten to restore to its place in the Guildhall the old window which is described by Drake, the historian and antiquarian of York, and in the "History and Description of the Ancient City of York," by William Hargrove, 1818, p. 434, vol. iii. It was the window over the Crown or Lord Mayor's Court, and exhibits some stained glass representing the royal arms in the centre; and on the two sides of them the figures of Justice and Mercy; and underneath, the arms of the city, the sword and mace, with the date 1682; executed by Edmund Gyles, an artist resident in York.

SCHOOL-BUILDING NEWS.

Prittlewell.—New schools are in course of erection in this rising place. The building is of Kentish rag-stone, with Bath stone dressings, and there is hardly any work of a merely ornamental nature about it. The architect is Mr. Blake, of Westminster, and the contractor, Mr. Carter, of Rochford. The school-room, which will be divided by a moveable partition, separating the boys' department from that of the girls, is about 50 ft. long by 20 ft. wide, and the class-room is about 18 ft. square. The dwelling-house contains living-room, kitchen, and scullery on the ground-floor, with four bed-rooms above. An under-ground tank receives all the rain-water

from the roof, and is of sufficient size to render any failure in its supplies improbable. The total cost of the building is estimated at 1,500l.

Tannorth.—The new Grammar-school building, designed by Messrs. Spragg & Joyce, of Stafford, architects, and now in course of erection, by Mr. C. Clarkson, approaches completion.

Bangor.—The chief stone of a new building for the Bangor National Schools has been laid on one of the most desirable sites in the town for the purpose. The spot in question is a triangular piece of land, sloping to the south on its principal frontage, just above the road leading to the Garth Ferry, and below the road leading to Upper Bangor, running on the east side of the Palace grounds. A spot to place the required buildings being thus provided, instructions were given to Messrs. Kennedy & O'Donoghue, of Bangor and London, architects, to prepare the necessary plans and specification, which, after receiving the approval of the Committee of Council, were submitted for tenders by advertisement. The amounts of the tenders received were as follows:—David Roberts, Aher, 2,988s.; John Roberts, Chester, 2,950l.; John Thomas & Sons, Bangor, 2,863s.; W. T. Rogers, Beaumaris, 2,716l. 9s. 9d.; Hugh Rowlands, Carnarvon, 2,654l.; Joseph Hughes, Llansantffraid, 2,596l.; William Williams, Bangor, 2,579l.; Richard Parry, Menai Bridge, 2,546l. Mr. Richard Parry's being the lowest tender was consequently accepted by the committee, the architects' estimate being 2,500l. The schools will comprise, first, a school-room for 190 boys, 85 ft. 9 in. long by 18 ft. wide, and 16 ft. 6 in. high to the collar beam, with detached class-room 15 ft. by 14 ft., approached by a porch, at the end of which is a lavatory. Second, a school for 190 girls, 64 ft. 9 in. long by 18 ft. wide, and 16 ft. 6 in. to the collar beam, with class-room, porch, and lavatory. Third, a school for 100 infants, 30 ft. long by 20 ft. wide, and 15 ft. 6 in. high to the collar beam, similarly approached, and having the same conveniences as the two school-rooms before described. Fourth, a master's residence, comprising a parlour, kitchen, back kitchen, and three bed-rooms, of the sizes required by Government. There are also playgrounds to each division, a kitchen-yard to the residence, together with a small garden. The front elevation, which faces the city, is a gabled composition, having lancet triplets and other windows, the roof line being broken by smaller gables and dormers over the entrances, windows, &c., and a bell-turret, set off into several stages, forming a central feature. The dressings in front will be of a kind to harmonise with the rubble-work walls, and of brick at the back and less prominent parts. The ventilation is to be on Boyd's principle, and the whole of the desks are to be arranged in groups, divided by curtains. The roofs will be of dressed American timber, lightly stained, the principals being supported on stone corbels.

Books Received.

UNDER the title "Practical Remarks on the Drainage of Land," Mr. W. H. Wheeler, C.E., has issued in a pamphlet form the papers recently published in our pages with his initials. Many may be glad to have them in this more handy shape. — In the sixteenth volume of the "Collectanea Antiqua," Mr. C. Roach Smith has given an interesting and appreciative biographical notice of the late Frederick W. Fairholt, and announces his intention of publishing hereafter in a separate shape Mr. Fairholt's own journal, and completing the biography. — "A Yorkshireman's Trip to Rome in 1866," by W. Smith, jun. (London: Longmans & Co.), is a pleasantly written little record of a pleasant trip, but does not pretend to afford any special information or comment. — "Second-grade Freehand Drawings," designed and adapted by Alfred Copham, of St. John's School, Ladywood, Birmingham (Simpkin & Marshall), comprises fifty graduated outline drawings calculated to exercise the eye and hand. — Mr. Eugene Rimmel has issued, as a pretty little book, "Recollections of the Paris Exhibition of 1867" (Chapman & Hall). It pretends to be nothing more than a surface view; but being illustrated by a number of engravings (principally borrowed from Mr. S. C. Hall's fine catalogue, now in course of publication), it forms an agreeable drawing-room souvenir of a great event.

Miscellaneous.

FREE LIBRARIES IN LEEDS.—A public meeting has been held in the Leeds townhall, the mayor in the chair, to consider the advisability of adopting the Free Libraries Act in the borough. There was a very determined opposition, principally on the grounds that free libraries were not used by working men, but by a superior class; that the rates in Leeds now amounted to 7s. 7d. in the pound; and that the present time, with the distress now existing in the town, was inopportune. When the vote was taken, however, the mayor ruled it was in favour of the adoption of the scheme.

THE REGULATION OF RAILWAYS BILL.—The Bill introduced into the House of Lords by the Duke of Richmond is one essentially for the regulation of the conduct of the affairs of railway companies, and will, if adopted by Parliament, establish a supervision calculated to improve railway interests and to protect the public. Companies will be required to publish before each half-yearly meeting uniform accounts, and to give an estimate of the proposed expenditure out of capital for the ensuing half-year. There is a penalty of 50l. for falsification of accounts, recoverable against the auditor or other signatory of the company. The Board of Trade is to have power to appoint inspectors to examine into the affairs of a company, and the condition of its undertaking. The Government propose measures to secure the safety of the travelling public. On the other hand, companies are to be protected from extortion in compensation for accidents.

THE CONTRACT SYSTEM IN CALCUTTA.—The Governor-General remarks in connexion with the failure of the new Custow-house sheds in Calcutta, that "the experience of the last few years clearly shows that the system of contracts for large works, as in force in Calcutta, has entirely failed, and there has been a large waste of public money." As regards new buildings, the system adopted is scarcely a contract system at all: the work is of course superintended by Government engineers, and the materials are all supplied by Government, and it is only the labour that is let by contract. The consequence is that nearly all these contracts are taken by native mistresses, as Europeans cannot compete with natives for labour only. In spite of extra supervision the work of native contractors, as compared with that of respectable European firms, is dilatory and unsatisfactory in the extreme, as any one acquainted with the history of buildings in Calcutta for the last few years can testify. The writer advises the appointment of a committee to inquire into the working of the contract system in Calcutta.

WORCESTER CATHEDRAL RESTORATION: THE NEW REVEDOS.—The new revedos, which has been given by the Dean, is nearly completed. The principal portion of the work is in the finest alabaster, varied with marbles and granites of the most choice and rare descriptions, and decorated with gold. In the central portion of the revedos, there is first a height of plain highly-polished alabaster, upon which rest moulded plinths and bases of the same material. These are surmounted by columns of Languedoc and verd antique marbles, and of granite, crowned by capitals of carved foliage, forming five niches, the centre and largest of which contains a sculptured figure of our Lord, in alabaster of the purest tint, representing him in the act of giving benediction. The figure stands beneath a canopy of inlaid mosaic marbles, Sienna, grayot, and emperor's red. The canopy is completed by a finial in white alabaster, relieved by blue, red, and green marbles. In the niches which support the central shrine on each side are the figures of the four evangelists, Matthew and Mark on the right hand of our Saviour, and John and Luke upon His left. Over the canopies, or rather between the gables in which they terminate, are the heads of the apostles Peter, Paul, James, and Thomas, and over these again is a tier of angels. The gables are completed by carved finials, and the whole is surmounted by an elaborate cresting, above which is a second tier of angels. In the gables on the left are the heads of Moses and David, and on the right the heads of Samuel and Isaias. The sculpture has been executed from the designs of Mr. Gilbert Scott by Messrs. Farmer & Brindley, of London; and the erection of the revedos has been under the superintendence of Mr. Farrow.

CHARGE FOR TAKING OUT QUANTITIES.—Messrs. André & Hornblower prepared the quantities for the Sefton Park contract, and guaranteed them to the Improvement Committee of the Liverpool town council. Their charge is 1,000l. On a motion in the town council for the adoption of the recommendation of the committee, that the council should pay Messrs. André & Hornblower, an amendment was carried, by 34 to 15, that the recommendation should be postponed till the recommendation [of the committee] to confirm the contract with Mr. Campbell was considered.

MEANS OF TECHNICAL INSTRUCTION.—A correspondent writes to the *Manchester Guardian*:—"The rumor is, I believe, perfectly well founded that a munificent friend to popular improvement has offered to give a sum of 100,000l. to be devoted to the purpose of promoting technical education. For the present the donor refuses to have any announcement made of his name; but he has taken counsel of some of the persons best qualified to advise him as to the most useful mode of allocating his splendid gift among the communities that are, by their numbers and activity, most likely to turn it to good account."

VERIFIED CAOUTCHOUC.—In a recent number of the *Moniteur de la Photographie*, it is stated that M. Marion is putting forth a new invention, destined, perhaps, to be of importance to photographers. The new product appears to occupy a position halfway between glass, which is too fragile, and paper, which is too opaque. Its description seems to correspond with one of the forms of the English invention called parkesine. According to M. Lecan, the so-called verified caoutchouc has the suppleness of paper and the transparency of glass, without its brittleness. The use to which this transparent film of india-rubber is destined is to receive from the glass negative the film of collodion bearing the photographic image. It can then be put away in a portfolio or box, until it is required to print from it as a negative; so that the most valuable subjects can thus be preserved, packed, or travel without the slightest fear of breakage.

COAGULINE.—This is a new transparent cement, it appears, the production of operative chemists in Stockport. Its adhesiveness and tonacity are said to be extraordinary. Glass, leather, wood, stone, ivory, bone, or minerals can be pieced or joined by it; and so tenacious is it that, when thus used, it will resist a strain of 224lb. or more. Heat and cold, fire and water, are successfully resisted by it. In piecing glass or crystal with it, its transparency renders the junction imperceptible, and its adhesiveness, in fact, makes the broken glass or crystal as good as new. Its usefulness has led to the introduction of a leather line for window cords, the splice of the cord being joined by the cement, and thus an endless, smooth, and regular hand is produced. Its uses are described as being innumerable. The producers (and discoverers, we presume) of this new cement are said to be Messrs. Kay, Brothers, of Stockport, operative chemists.

BRITISH ARCHEOLOGICAL ASSOCIATION.—At the meeting of the British Archeological Association on Wednesday evening, the 11th, Mr. T. Wright, V.P., in the chair, a number of forgeries were exhibited by Mr. Cuming, who remarked that two small bronze figures then before the meeting were copies of genuine figures in the possession of two gentlemen present. It was interesting to notice that the fabricators of copies of Indian hills had stolen them in the Roman fashion; and there was a small copy of a Greek bronze vessel, with three feet, such as the Greeks had never put under them. Mr. Roberts said that a remark of Mr. Planché's on the subject of these forgeries was worth repeating. He had said that the ready sale for these things was an evidence that there was a widely extended interest felt in such matters, and should make us hopeful of the future of archaeology. Mr. Gunston exhibited a series of knives which had been dug up in Clerkenwell, manufactured in the sixteenth century, some of them of the time of Henry VIII., and ranging on to the close of the century. He also showed a very pretty little urn of Samian ware which had been dug up in Cannon-street about two years since. The discussion on the bronze urn, said to be that of Tanagra, was resumed, and further evidence was brought forward, but not sufficient to satisfy some gentlemen present, that the bronze was a genuine antique.

THE DRAWING OF THE THRONE, HOUSE OF LORDS.—We have received a letter from Mr. E. W. Pugin, denying the truth of Mr. Talbot Bury's assertion in our last. We are forced to decline inserting it.

CARBONIZED PAPER.—Mr. J. E. Hoyer, of Philadelphia, remarks the *New York Tribune*, has invented a new kind of writing and printing paper. The improvement consists in charging the paper with an earthy carbonate. Common writing-ink, of the palest description, when applied to it, becomes intensely black. The mineral surface given to the paper prevents "greasiness," and allows the ink to flow freely. It also takes printing-ink more readily, and produces a black and smooth impression.

LECTURES ON ART BEFORE THE ROYAL DUBLIN SOCIETY.—Professor Macmannan recently lectured on "Sculpture," in the theatre of the Royal Dublin Society House. There was a full attendance. The lecture was illustrated with a collection of plaster casts, placed so as to correspond as nearly as possible to the several epochs in the history of the art of sculpture. Mr. Macmannan commenced by deploring that there is in Dublin no sculpture gallery adequate to the representation of the several stages of development through which sculpture has passed, from its infancy in remote Greek antiquity down to the present day.

ENCROACHMENT ON OPEN SPACES.—Earl Spencer, it is said, has been exciting the ire of the people of Wandsworth by leasing an ornamental lake, of nearly three acres, to an architect or builder, who is about to drain it and build over the site.—It is believed that the negotiations as to the purchase of Sir T. Wilson's rights to Hampstead Heath are *in statu quo*, owing to the price, \$,000, per acre, which had been demanded by Sir Thomas. Further inquiry is to be made on the part of the Marylebone vestry.—It is intended by the owner of Sobu Pool, says the *Birmingham Gazette*, to drain the pool, fill it up, and let it out for building purposes. Our authority shares the regret of the people in the vicinity that the only considerable sheet of water in the town should be thus disposed of. The only alternative, he adds, is a public subscription, or a limited company.

DISTRICT EXHIBITION OF ARTS AND MANUFACTURES IN ABERDEEN.—Arrangements are now far advanced for an Arts and Manufactures Exhibition. It is intended that the whole collection exhibited shall be drawn from the northern counties of Scotland, except in respect to the works of native artists and the products of native workmen's skill or ingenuity, which will be sought for wherever they can be procured. Some branches of industry, such as granite cutting and polishing, are almost peculiar to the district, whilst in others, such as shipbuilding, special excellence has been attained. In respect to art, however, and for comparison, works of art and art manufacture not native to the district, or even to the country, will be received. The Queen has consented to patronize the undertaking. The Prince of Wales allows himself to be named president, and the list of its supporters already includes nearly all the nobility and prominent men of all classes in the north of Scotland. It is contemplated that the exhibition will take place in the months of July, August, and September, 1869.

THE METROPOLIS GAS BILL.—The draft of the Bill brought in by Mr. Morrison, Mr. Locke, and Mr. Gorst, to amend the Metropolis Gas Act of 1860, and to make further provision for regulating the supply of gas to the metropolis, and for other purposes connected therewith, has been published. The Bill contains a hundred clauses. By this Bill it is proposed that the Metropolitan Board of Works, or the Commissioners of Sewers, shall have compulsory power to purchase the undertaking of any company (if notice of such intention be given within six months after the passing of the Act), and in case of inability to agree to terms, that question shall be determined by an arbitrator, to be appointed by the Board of Trade, on the application of either party. The price to be charged by the several companies for gas, from the present time to January, 1870, is to be 4s. per 1,000 cubic feet up to the standard of sixteen candles, except in the case of the Independent and the South Metropolitan Companies, which are to charge 3s. 4d.; but after that date the price charged by any company is not to exceed 3s. 9d. The companies may in 1871 appeal for a revision of the scale.

PROPOSED LIVERPOOL FINE-ART GALLERY.—We regret to hear that in consequence of their heavy pecuniary liabilities, the Liverpool town council have resolved to postpone the erection, at a cost of 18,000*l.*, of a Fine-Art Gallery, to which good intent we have before referred.

CHARTER HOUSE SCHOOLS.—The *Guardian* states that the erection of the new buildings for the Charter House School at Godalming has been entrusted to the hands of Mr. Hardwick, architect, and that a governors' meeting will be held immediately to consider his designs.

SAFETY APPARATUS FOR ENTERING POUL AIR.—M. Galibert's apparatus consists of an air-reservoir, with two tubes attached, the one for the exhaled air extending just within the top of the bag, the other for the air to be inhaled to near the bottom. The outer ends of the tubes are connected with a single mouthpiece, and the person using it secures all the advantages of valves (without the danger which might arise from valves being used and getting out of order), by simply placing his tongue alternately on one or other of the orifices within. Goggles are employed to protect the eyes from irritation, and the nostrils are closed by a small spring clip. M. Galibert's apparatus has been adopted in France by the Ministry of Marine, the Paris Fire Brigade, and by numerous other public bodies and private firms, and it has just been exhibited and tried in London, under the direction of Mr. T. Brown, C.E.

EDUCATION WANTED TO INFLUENCE TRADES UNIONS, AND TO MEET FOREIGN COMPETITION.—Two working men have just delivered public addresses in Birmingham, according to *Arist's Gazette*. One was Mr. Robert Applegarth, the able secretary to the Amalgamated Society of Operative Carpenters and Joiners; the other, Mr. Hibbs, one of the artisans who went in a representative character to the Paris Exhibition. The former treated on Trades Unions; the latter on Foreign Competition with English Trade. Different as these topics may appear, they led the two speakers to one and the same conclusion. Mr. Applegarth wound up his speech with saying that the great want of the working classes was an efficient system of non-sectarian education; while Mr. Hibbs said, what they had to do was to throw themselves with all their might into that new movement for education, not committing themselves to any scheme until they had well pondered over it. Let them at least resolve that their children—the future artisans of England—should be better educated than themselves.

TENDERS.

For alteration and addition to Mr. Cardland's premises, Roman-road, Old Ford. Mr. Iron, architect.—Dean (accepted) £280 0 0

For the renovation and repair of the Parish Church of Avelon Gifford, Devon. Mr. Henry Elliott, architect.—
 Matcham £3,700 0 0
 Stevenson & Croker 3,150 0 0
 Call & Pethick 2,654 0 0
 Condy, Brothers 2,440 0 0
 Elliott 2,307 0 0
 Bone & Son 2,280 0 0
 Ruth & Sons, and Chas. Ruth, Junr. 2,341 0 0
 Steer 2,241 18 8
 Hannaford & Luckraft 2,170 0 0
 Willocks 1,987 0 0

For hand-room and training kitchen at the St. Mary-lebone Parochial Schools, Southall. Mr. H. Saxon Snell, architect.—
 Harding £285 0 0
 Tull 817 0 0
 Eustace 795 0 0
 Keys 798 0 0
 Eustace 795 0 0
 Manley & Rogers 790 0 0
 Wards & Baker 770 0 0
 Gibson, Brothers 745 0 0
 Brown (accepted) 732 15 0

For new wing and stable buildings to Urmaton Lodge, Wimbledon, for Mr. Frederick Thompson. Mr. J. H. Good, architect. Quantities supplied by Mr. L. C. Riddett.—
 Nicholson £2,670 0 0
 Barton & Moreland 2,626 0 0
 Colls & Sons 2,342 0 0
 Ariss & Son 2,316 0 0
 Webb & Son 2,300 0 0
 Adamson & Son 2,270 0 0

For the erection of Wesleyan Sunday School premises, George-yard, Hill. Mr. W. Botterill, architect. Quantities not supplied:—
 Steels & Darneley £1,225 0 0
 Halls 1,190 0 0
 Barrett 1,173 12 0
 Raynard 1,158 8 0
 Waller 1,130 0 0
 Marshall 1,108 15 0
 Brown 1,061 0 0
 Habbershaw 1,064 8 0
 Hutchinson 1,009 0 0
 Jackson (accepted) 993 5 0

For John's-place School (St. Philip's), Stepey, for Mr. E. Denison. Mr. Iron, architect.—
 Goddard £390 0 0
 Larkle 370 0 0
 Smith 365 0 0
 Paine 355 0 0
 Brown 354 0 0
 A. & J. Smith 335 0 0
 Johnstone (accepted) 307 0 0

For new shop-fronts for Longbays & Co., Commercial-road. Mr. W. Smith, architect.—
 Including Plate-glass.
 Crabb & Vaughan £848 0 0
 Excluding Plate-glass.
 Sabej £510 0 0
 Eaton & Chapman 475 0 0
 Ennor 467 0 0
 Earle 425 0 0

For alterations and additions at 223, Upper-street, Islington. Mr. W. Smith, architect.—
 Parrah & Vaughan £360 0 0
 Bradly 383 0 0
 Pask 355 0 0
 Sabej 350 0 0
 Eaton & Chapman 393 0 0

For erecting dwelling-house and rebuilding stables at Buck-street, Camden-town, for Mr. Barrow. Mr. R. W. Hart, architect.—
 Langmead & Way £650 0 0
 Tanner 650 0 0
 Stephens & Batagh 645 0 0
 Catepool & Cooper 50 0 0
 Kelly, Brothers 547 0 0

For Congregational Church, Exeter. Mr. John Tarring, architect. Quantities supplied:—
 General Estimate. Spike in Bath Stone.
 Inch £9,998 19 0
 Per-ram 6,681 12 8
 Call & Pethick 5,514 0 0
 Mous & Sons 5,541 0 0
 Kenushaw & Co. 5,259 0 0
 Force 5,452 0 0
 Luscombe 5,150 0 0
 Tozer 5,085 0 0
 Stephens & Son 4,493 13 2
 Pollard & Son 4,400 0 0
 Hragg & Dyer* 4,278 5 0
 *Accepted.

[This is an interesting specimen of estimating certainly; remembering especially that the difference are produced by the prices alone, the "quantities" having been supplied.]

For alterations and additions to the Sussex County Prison, Lewes. Mr. Henry Card, county surveyor. Quantities supplied by Mr. B. H. Nunn:—
 Perigo £16,154 8 6
 Nutt & Co. 14,400 0 0
 Williams 13,378 6 2
 Fatman & Fotheringham 13,285 0 0
 Henshaw 12,778 0 0
 Hughes 12,590 0 0
 Nightingale 12,352 0 0
 Berry 12,110 0 0
 Kirk 11,990 0 0
 Howell 11,715 0 0
 Hall 11,445 0 0
 Cheeseman & Co. 10,990 0 0
 Chappell 10,693 0 0
 Perry, Junr. 10,444 0 0

[We understand that the quantities named by the top seven contractors were provided by one surveyor, and those used by the following seven were furnished by another.]

For the enlargement of the Port of Hull Society's Sailors' Orphan Home, Park-street, Hill. Mr. W. Botterill, architect. Quantities not supplied:—
 Hutchison £3,495 0 0
 Barrist 3,317 8 0
 Clarkson 3,291 0 0
 Jackson 3,230 0 0
 Habbershaw 3,220 0 0
 Sergeant 3,177 0 0
 Marshall 3,146 0 0
 Halls (accepted) 3,081 0 0

For the erection of five pairs of semi-detached residences at New Malden, Surrey. Mr. W. Sim, architect.—
 Kelly £5,850 0 0

For a pullio-house, with cottage and shop adjoining, at Clever, Harks. With power to use certain old materials on the grounds. Mr. W. Sim, architect.—
 Gray £690 0 0

For additions to Bull's Cross National Schools, Enfield. Mr. Thomas J. Hill, architect:—
 Brett £263 0 0
 Hayes 520 0 0
 Field & Sons 512 0 0
 Fatman, Brothers 5 8 0

For the erection of warehouse, Whitecross-street. Mr. T. C. Clarke, architect:—
 Kilby £1,783 0 0
 Turner & Sons 1,772 0 0
 Conder 1,750 0 0
 King & Sons 1,680 0 0
 Abraham 1,635 0 0
 Mortar 1,627 0 0
 Webb & Sons 1,596 0 0
 Kelley 1,572 0 0
 Screnener & White 1,476 0 0
 Henshaw 1,439 0 0

For alterations and additions to No. 23, Pembridge-gardens, Notting-hill, for Mr. P. P. Gordon. Mr. John Taylor, architect:—
 Corry £498 10 0
 Higgs 473 0 0
 Clement 419 0 0
 Lathley, Brothers 418 0 0
 Stoner 388 0 0
 Kilby 389 0 0

The Builder.

VOL. XXVI.—No. 1312.

Architects and the Volcano.



SOUTHERN Italy should be the paradise of architects. No country in the world can show nobler, more romantic, more lovely sites for palatial buildings. None can show worthier occupation of such sites. None possesses a greater variety and abundance of building materials. The traces of Roman grandeur still mark the buildings of to-day, for they, like the structures of Rome herself, must be built so as to resist the shock of an earthquake. For this reason, building south of the Alps is a serious occupation. No little pestilent rows of brick huts,

like those that attend on the industry of our great manufacturing centres, spring up in the purlieus of Florence, of Turin, or of Naples. The duration of such houses as are now swelling the circumference of London would be at once certain and uncertain in Italy. It would be the latter, because no law has been discovered as to the periodicity of earthquakes. It would be the former, because they would exist only till the moment of the first shock. Such a wave as howled the towers and bellries of Naples in 1858, causing in that city great terror though little damage, but overwhelming thirty thousand sufferers in Calabria, would, if it occurred in London, leave hardly a single building to be shaken by the replica, or dreaded return shock, always the most severe.

With the necessity of erecting substantial buildings arises the necessity for the employment of architects. The profession comes into daily requisition. The solid palaces which form the main buildings of the cities, and, to a great extent, of the country at large, are too important in the eyes of their owners to be left to the mere chance. They often need the eye of the expert. Built with the intention that they shall endure for at least a century without any very material repairs, it is yet certain that numerous works of a slight nature will be required within that term in order to maintain that durability. Hardly a single palace is to be seen without cracks, or the significant autographs of the earthquake. The massive and noble palace of Caserta itself shows, in several places, a narrow vertical rent from roof to foundation. Immediate attention must be paid to each signal of danger, and this attention must be given under the direction of the family architect. No wonder that these gentlemen abound.

Again is Italy the home of the architect, because there he has the field to himself. He is not jostled unpleasantly by the engineer. The civil branch of that youthful and vigorous profession is unrepresented in that part of Europe. The only engineers there are those of the *Ponti e Strade*, the *Ponti et Chaussées*, the military officers answering to our own Corps of Royal Engineers. Their numbers are limited, and they very rarely interfere with the archi-

tect. It was to the latter that the construction of railways, when not carried on by foreign energy, was committed under the old regime. What a loss to the profession has been the result of the different course adopted in England! If the four hundred and ninety millions which the men of the school of Stephenson and of Brunel have laid out on our iron roads had only passed through the hands of English architects, what might not have been the result.

The Italian architects, then, constitute a numerous body of men, including members of high and cultivated talent, and exercising no slight influence on their contemporaries. In a sense unknown to ourselves, they are expected to exercise a constant vigilance, to care for the health of the buildings under their charge, as a family physician will attend to the health of his patients—not waiting for formal summons, or for positive malady to declare itself, but looking in over and anon to suggest the timely one stitch that always saves the nine.

As they are thus expected to maintain that which is old, they are not unnaturally consulted as to that which is new, or which is to be in the future. In all cases in which the surplus capital of this country has been invited to fructify under the genial influence of the Italian climate it is the architect who has offered to the foreigner the rare and exceptional privilege of thus enriching himself. Plans of all kinds,—railways,—the progress of which nothing but the subtle and persistent treachery of successive Governments could have arrested,—ports and basins, roads through thickly populated but pathless districts, boulevards and arcades in the plethoric capitals, mines and factories, all these means of investment have been pressed upon the attention of Englishmen, who were supposed to have money to lay out under the authority of Italian architects. In most of these cases a simple division of labour was proposed: the English engineer or architect was to find the money, or to find the men who should find the money; the Italian would answer for the spending of it. From the canalisation of the Po to the restoration of the ancient port of Brindisi, as the land terminus of the Indian mail route, the same arrangement has been contemplated by the adroit *savoir faire* of our Italian friends.

Again, the Italian architect is eminently happy in the materials at his command. The people are born masons. If you are about to build, you have, in nine cases out of ten, only to sink down a few feet below the surface of the vineyard or garden in which you intend to erect your abode, to find an ample supply of tufa for your walls. This volcanic product, the agglomeration of the fallen products of long extinct volcanoes, resembles in its building properties the chalk of this country very closely indeed. It has not the purity of colour of white chalk, being of a grey, or drab, or violet tint when first exposed to the air; but it cuts very much after the manner of chalk, and it shares with that mineral the characteristic of forming reliable masonry, if protected from frost, or from soaking wet. We could point to many instances of obalk walling in this country, faced with brick, and thus forming economical and durable work.

Frost is a rare phenomenon in the south of Europe. Rarely more than two or three times in the course of the year is a slight scale thrown off from the surface of the tufa walls of the vineyards and gardens by its silent but irresistible agency. In buildings of any pretension to architectural importance, the tufa, which forms the mass of the structure, is protected from the injuries of the weather by brick or stone facing, or by the use of plaster or stucco. The Italian masons have peculiar facilities in the use of lime. As has been previously noticed in the pages of the *Builder*, the establishment of a lime-pit is always the first practical step taken towards the erection of a building. The unmixed

but well-slacked lime remains for years under a slight film of water; and the readiness with which it yields its aid to the mason, the plasterer, the maker of *scagliola*, the beautiful artificial marble so common in the churches, or to the noisy services of the men who form the heated floors, is perfect.

Not only the tufa, which thus forms the main substance of Italian masonry, but every other requisite of the mason, is readily to be met with in the districts to which we refer. Vesuvius himself, and many silent outlets of former volcanic fury, supply a hard and readily-worked stone, admirably suited to form the coigns, lintels, and jamba of domestic buildings, as well as to serve for a solid pavement to the streets. The *scala* limestones of the Apennines afford a finer, and not less durable, material, as well as sending chips and rough blocks to the lime-kiln. Volcanic sand is not rare, associated at times with the *lapilli*, or beds of small volcanic pebbles, that form a concrete capable of a finish so exquisite as to make a ready substratum for the art of the fresco painter. The most usual, and, with the sole exception of marble, the finest, floors for a mansion of importance, are of this material, which is beaten into place for a fortnight without intermission, and then carefully painted in figures. Marble itself is a native product, and, in the severe heat of the summer, the luxury which results from the introduction of a marble floor, or even of a marble staircase, is so great that a house supplied with these expensive fittings seems to be situated in a distinct and much cooler climate than the adjoining mansions, with staircases of lava, and heated floors. Thus the architect, in these favoured regions, while his skill is constantly in request, has close under his hand an abundance of the finest materials fitted for the exercise of his ability.

Vesuvius, the symbol and concentrated expression of that force which shows its terrible energy in earthquakes, is thus a great friend, if not of architecture, yet at least of the architect. The best of friends, however, have their failings, and in this respect the fiery crater does not possess greater immunity from dangerous caprice than is common to human patrons. Very recently a disaster has occurred in the very heart of the city of Naples which people have not been slow to attribute to the activity of the volcano. If they are right in this opinion, it is far from improbable that very unpleasant proofs of the correctness of their views will be hereafter furnished from the same source.

Among the most striking and peculiar features of the neighbourhood of Naples, are the large buildings which, in several different directions crown the summit of lofty hills, often looking down a precipitous bluff on the water, or on the shore beneath their battlements. The old Angevin palace at *Vico Egnense*, built by the brother of King Saint Louis of France, is a well-known instance. So is a monastery not very distant from that same palace, where the walls of the chapel seem so far to overhang the face of the lofty rock on which they stand, as to impress the passer-by with an instinctive dread; so very little seems necessary to cause chud and cliff together to topple over into the blue waters of the bay. In the city of Naples, a hill some 250 ft. high, shuts out the "west end" from the centre of the town. This hill, precipitous towards the sea, is covered with buildings. One noble palace, recently restored on its crest, has its upper apartments, which are usually the principal rooms, ascended to by a series of marble staircases, containing 170 steps, and the view from this elevation is one of the wonders of the place. Nearer to the sea, and commanding a steep zig-zag ascent up the seaward bluff, stood a large monastery, now converted into a barrack. The face of the hill was covered with a revetment of masonry, at the foot of

which burrowed a small row of shops and dwelling-houses of a humble description.

It is now stated that it has been long matter of remark that this mountain was in an unsafe condition. Large fissures are said to have been visible in it from top to bottom. A year ago (but we must take the statement with the usual caution as to Italian *viva voce* evidence) the delegate of the quarter reported his opinion of the danger to the city architects, but investigation was deferred till "*domani mattina*," which, in that part of the world, generally falls on the Greek kalends. The attention of these gentlemen received a terrible call on the 28th of January, when the whole face of the hill came down without any further warning, hurrying the houses at its foot, and—it is even yet unknown how many—inmates and passengers. The alarm and excitement were naturally intense. By daylight the crowd on the spot was so dense that the troops were required to preserve order. The architects of the city were, of course, on the spot, and the expedient was adopted of appointing a commission to examine the mountain. That an immense deal of theory was ventilated on an occasion so favourable for the Italian love of speculating, there can be little doubt. What rather shocked our less material minds is the fact that for *thirty-six hours*, while the impression was general that many wounded sufferers might yet be living under the *débris*, *nothing was done* to rescue them. A Venetian military engineer, whose name deserves record—Signor Zampari—endeavoured immediately on the occurrence of the catastrophe to commence a tunnel through the *débris*, in order to reach the site of the houses. His proceedings were suspended by authority. When this precious time had been lost, he was allowed to proceed, and worked incessantly for seventy hours, the city architects, of course, opposing so unprecedented a step. Another tunnel was driven towards the same spot beneath the level of the street itself, but with the lapse of time the human interest in the case vanished, and the spot gradually came to present only the usual features of work carried on for the Government in Italy—"sleepy men and half-grown *gamins* being engaged in carrying off the rubbish in small baskets." The entire want of energy and resource in a people that are far from being callous or unkindly, and through whom a sudden excitement runs like a shock of earthquake itself, is a mournful characteristic of the scene.

Whatever be our own national short-comings, and it must be confessed that the history of our public works has not been free from the occurrence of fatal accidents provoked by incredible carelessness or foolishness, there is one feature of our character of which we may be justly proud, and that is the manner in which every Englishman, by a common instinct, pulls off his coat in an emergency. Let him hear that life or limb is in peril, and he never doubts to share that peril if he can in any way hope to bring aid to the sufferers, or even to gain certain intelligence of their fate. By land and sea, in the coal-mine and in the life-boat, this unselfish and noble promptitude never fails at the call of danger. It is a characteristic that may even console us for the fact that our houses are not so habitually looked after by properly educated architects as is the case in the Italian cities.

The chief interest that now attaches to the scene of this calamity depends on the question whether we have had the last word of Vesuvius in the matter or not. The cause of the accident has been attributed either to the percolation and accumulation of rain behind the revetment, or to the gradual loosening of the face of the hill by the vibration attending that prolonged and splendid eruption of the volcano which has scarcely ceased. If the account given of the vertical fissures in the hill be true, there can have been no accumulation of water capable of producing the fall by hydrostatic pressure. The vibration from the Vesuvian shocks, though of the nature of earthquake, is far lighter than have been many of the actual earth-waves that from time to time pass over the whole country. In 1858, for instance, the whole shore for miles in circuit appeared to be permanently elevated some eight inches, as shown by the level of the waters in the bay. As it is the last straw that breaks the camel's back, so the last of a series of vibrations may have concluded an operation that had long been silently in progress. But it must be borne in mind that, in all cases, sharp high mark centres or nodes of geological action. A sudden break of continuity, a contrast of elevating and of depressing forces, must have occurred beneath

this exact spot at the distant time when the hill of Monte di Dio rose, or when the shores of Santa Lucia sank down. And just at the base of the mountain, giving certain indication of connexion of some kind with antihorrean fire and energy, bubble warm and sulphureous springs. It is thus quite possible that what has been called a land-slip is, in fact, an indication of a direction of the volcanic force towards Naples itself. The city lies, as it were, between two fires,—Vesuvius to the south-east and Solfaterra to the north-west. Its position recalls forcibly to the traveller the aspect of Lisbon. The Tags now rolls over the spot where, in the Great Earthquake of 1755, the quay, covered with human beings, sank suddenly to a fathomless depth. For a volcano to open in the Santa Lucia, close to that famous Castello d'Uovo, under the foundations whereof, according to the legendary derivation of the name, lies the egg on the security of which depends the salvation of Naples, would be a calamity neither without precedent nor without warning. It will be an immense relief to the Neapolitans if they can persuade themselves to cast the blame of their impotence on the supineness of the city architects rather than on the activity of Vesuvius.

Not foreign to the question of probable geological change in Italy is the intelligence recently received of a gradual but steady depression of the shore of the Lago di Garda. The physical state of Italy seems almost as feverish as its political condition.

ON THE UTILIZATION OF SEWAGE BY IRRIGATION.*

3. Flat Flooding or Submersion.

FLAT-FLOODING may be considered as a very modified form of catch-work irrigation. The land upon which it is used requires no other external conditions than those of being tolerably level and free from irregular depressions or elevations, and of just sufficient inclination to prevent the accumulation of sewage to any great extent. This is, perhaps, the cheapest form of irrigation practised, and where the object is rather to utilise the grosser impurities of sewage than to render it perfectly clear, it may be tried with moderate success. Great care is necessitated in the selection of the soil, which must be well drained, as this system has perhaps a greater tendency to stagnation than any other,—an evil which destroys vegetation, ruins the land, and is very detrimental to the surrounding atmosphere, rendering its locality, indeed, neither more nor less than a noisome swamp. The sewage enters on one side the inclosure by an overflowing conduit, and, after moving slowly over a very considerable extent of ground, is passed out at the other. There is no doubt that occasions may arise in which this method may be pursued with advantage, from its economy of cost and slight trouble; yet it must be understood that, to extract the utmost possible advantage from sewage irrigation, greater perfection of means must be used.

The mode of irrigation by submersion, as practised in Northern Italy and other countries bordering the Mediterranean, materially differs from the foregoing, which, as has been said, is simply catch-work in its most modified form. In the rice cultivation of these countries, the inclosure is completely circumscribed by light banks, with provision for admitting the sewage or manuring liquid, which is allowed to entirely submerge the land to a depth of several inches, where it is left to be wrought upon by evaporation and the absorbing properties of the soil. There is little doubt that the benefit to the crop derived from this method of utilisation is great, yet this benefit is almost counterbalanced by the prejudicial effect of the thick, unwholesome vapours exhaled by such stagnant and watery surfaces upon the health of the vicinity. Much might be done to mitigate this evil by good drainage, yet it must always exist more or less. Under our dull, watery sky, unfavourable to evaporation, and in the midst of our teeming population, this system would not be tolerated, even if it could be adapted to a suitable crop; whereas in the West of England the former method has been attended by good results.

4. Sub-irrigation.

By sub-irrigation, which is said to be limited extent in some parts of the Continent, is under-

stood that mode of applying the sewage, not from the surface or from above the roots of the plant, but from below the surface, whence the liquid is drawn upwards by the capillary attraction of the soil particles.

Perforated or very porous drains are laid down, which from time to time are completely filled from the source of supply, and are stopped up, so that their contents shall have no other means of escape, save by the capillary action of the surrounding particles of soil, which are supposed to exercise this property chiefly in an upward direction. The construction of these drains is special, being laid very near the surface, inasmuch as the superior depth of ordinary drains would render them almost wholly useless for this purpose. But the very avoidance of this evil, by the construction of shallow drains, induces an alternative evil of scarcely less gravity—that of stagnation. To understand this clearly, it will be simply necessary to briefly remind the reader of the principles of common land drainage.

Drains, which are laid down for the purpose of ridding certain uppermost stratum of soil of its superabundant water, and rendering it dry, light, and porous, do not receive these waters in their downward descent from the surface: on the contrary, it is only after passing below them and having thoroughly saturated the subsoil up to their level, that the water, rising upwards flows into them, and is carried off. In all ordinary soils, therefore,—that is, in soils which are not excessively absorptive—the horizontal plane defined by the position of the drains constitutes a distinct boundary between two conditions of soil; namely, soil in a productive state, free from superfluous moisture, and accessible to air; and soil in an unproductive state, crude, stagnant, and permeated with water. This indesirable result of drains is not, however, productive of harm in the case of those of ordinary depth; but when the shallow system of drainage required by sub-irrigation is used, a degree of permanent coldness and stagnation is induced near the surface, very injurious to the productive power of the soil. Nor is it attached to the double system of drains usually adopted in surface irrigation, since in this method both systems of drains are free outlets by which the drainage is speedily carried off, admirably adapted to keep the soil in its normal condition. Again, in very light porous, and sandy soils,—perhaps the only soil upon which it would be possible to avoid the insuperable evil of stagnation,—the capillary attraction of the particles of earth above is not sufficient to counteract the gravitating tendency of sewage away from the roots of the plant, a result which would effectually destroy the chief end of sewage utilization, namely, profit. Further, it is well known that no manure can convey hence to a crude, unworked soil, and the soil in immediate contact with any underground pipes, must necessarily partake of this crude nature; therefore under these conditions the application of sewage must be fruitless.*

Fourthly, sewage matter gravitating through an unworked soil, such as subsoils invariably are, cannot be so effectually cleansed of its organic or inorganic impurities as sewage passed through a quickened soil.

Lastly, the periodical choking up of the pipes used in sub-irrigation is a defect which could hardly be avoided; even ordinary drains may be rendered useless by the accumulation of foreign substances entering through very minute interstices; and it will be scarcely thought that sub-irrigation will not be infinitely more liable to this annoyance. It may, therefore, be held, so far as our present experience of this method has proved, that as a means of utilising the sewage of towns, the system of subterranean irrigation is essentially wrong in principle and practically useless. As a means, however, of purifying sewage from much of the organic matter it contains by turning a large area into a vast natural filter-bed, this mode is worthy the attention of those who are sceptical as to the practicability of profitable utilisation under certain circumstances.

Sundry small experiments have been tried in sub-irrigation, but the author is not aware of a single instance in which in this country any practical benefit has accrued from it.

* The difference between the subsoil and the arable surface soil, or the crude and the cultivated soil, supposing that both contain the same amount of nutritive substances, can only be founded upon this, that the cultivated ground contains the nutritive substances of plants, not only in a more uniform mixture, but also in a finer form.—Liebig's "Natural Laws of Husbandry," p. 61.

* See pp. 146, 168, and 202, *ante*.

Dr. Thudichum's Plan.

The necessity for the separation of the liquid from the solid portions of the human excreta, and these again from the ordinary house and street refuse, which goes to form what is now universally understood as sewage, has been long and powerfully advocated by men whose opinion claims some degree of consideration, although hitherto no satisfactory plan has been evolved with this end. By the most of these advocates, there is one thing which appears to be too often lost sight of, to wit, the need of some means of dealing with the more dilute portion, after some other fashion than the collapsed methods of precipitation. It cannot be disputed that the collected voidings of human beings may, without extraordinary difficulty, be rendered into an excellent manure; but if it be proposed, as we have invariably seen it to be the case, practically to utilise this portion only, by what means is the crying nuisance of polluted streams and water-supply to be abated? It has already been explained that, independently of the contents of the water-closet, town sewage comprehends matter which, few will pretend to deny, ought not to be passed into running streams.* A thousand other ingredients of filth combine to swell the contents of the common sewer, which, under the present condition of things is discharged into the nearest stream. To effect the thorough cleansing of our water-courses is the main central object of all the vast agitation which has arisen in this regard of late years; and this—the all-important question—the method of separating the urine and feces of human beings from the contents of the sewers, leaves, so far as can be gathered from the various schemes of the projectors, entirely undisturbed. Are we required then, while utilising this small portion, which may be regarded as a drop to the ocean of sewage, to abandon the great aim of utilisation? It avails little to assert that after the closest refuse is abstracted from the sewer, the fouling of rivers will not go on as before. As well might it be said that the abstraction of the sewage of Woolwich and Greenwich from the Thames, would effect the purification of that vast volume into which the combined filth of the metropolis and a hundred other towns is being poured night and day. It has, indeed, been proposed to treat the remainder with lime with a view to precipitation; but after the experience which has been so dearly bought on this score, such a proposal can receive little credit. Another objectionable feature is the great cost necessitated by a two-fold system of drainage which at the same time does not effect the separation of the rainfall from the ordinary sewage.

Dr. Thudichum's proposition to the Metropolitan Board of Works for dealing with the London sewage is, to use his own words, "founded upon the discovery of a process by which a most valuable portable manure can, without difficulty, and at comparatively small expense, be procured from urine," and is in outline as follows:—Urines are to be attached to water-closets, which ensure the urine and feces being conducted separate and distinct, the one from the other. By this means the urine is to be brought to the sewers, through which it is proposed to conduct it by a system of pipes contained within the drains and sewers, main and intercepting, to the outfall at Barking Creek, there to be dealt with, and converted into a portable manure. In addition to the manure, the other component parts of the urine would, at a trifling additional expense, yield most valuable products; amongst others, purpurate of ammonia, or murexide, a magnificent purple dye, estimated by Dr. Thudichum to be worth 1,000l. per ton. In this way the product of the urine only would amount to the gross sum of 1,365,000l. per annum, or 10s. per head of the population.

The remaining portion of the sewage of the metropolis, consisting of surface water, street lavois, local and other matters, is, by this plan, to be conducted, as at present, through the sewers to Barking Creek, to be treated by the lime process, with a view to the utilisation of the product as manure.

Another proposition for dealing with the sewage of towns generally, from the same projector, was to dispose of the liquid voidings by products,

laid in main sewers, to be combined at suitable stations, or at the outfall, in tanks, and thence carried by road and rail. In conjunction with this mode of treating the urine, a system of deodorization by dry earth and paper bags was to be adopted for the feces. The manifold advantages of the foregoing methods of dealing with this important question are enumerated with considerable force by their author, who is very severe upon those who assume "sewage" to be an "unalterable entity," and terms the water-closet "the most stupid of all inventions that ever interfered between man and his first duties." The author has, with the singular aid of his knowledge of the structure of the human form, built up a theory, which, however, has the disadvantage of being unillustrated from the practical basis of experimental proof.

When, therefore, Dr. Thudichum's theory is opposed to the experience of the past, and we are told, in the face of the most undoubted testimony to the contrary, that sewage contains nothing that is valuable for agriculture, or any other human purpose, beyond the excretions of men and animals, we may, without great violence to justice, suspect that he who tells us this speaks not as an impartial judge, but as a strongly-biassed advocate, who, with his own commodity in the market, lustily decries all other wares.

Separation of House Drainage from Rainfall.

By those who see in the extreme dilution of sewage in its present state, the chief objection to the economic utilization of its fertilising ingredients, it has been proposed to avoid such dilution by the construction of two separate and distinct systems of drainage. By one of these it is proposed to convey the rainfall alone, and by the other the household refuse, including fecal matter. As, in the event of sewage irrigation becoming a chief means of utilization, this will be one of the most important and difficult questions affecting it, it may be expedient to enter into a short examination of the arguments for and against the adoption of this system of separation.

In designing a scheme of works for the utilization of sewage, under the combined system of rainfall and sewage, there is this indispensable feature, namely, the necessity for making provision in the construction of such works for the maximum rainfall of the district, in addition to the maximum flow of sewage proper. To effect this, there are three alternatives,—firstly, the undue flooding of the lands under irrigation; secondly, the construction of a hy-wash, or storm overflow, by which the surplus waters shall pass into their natural outlet; and thirdly, the construction of a reservoir capable of storing the surplus. On the other hand, in laying out a scheme under the separation system, the flow of sewage is steady and unvarying, and the works may be constructed in accordance with the maximum consumption of water alone.

The arguments in favour of a separate and distinct set of sewers for the reception of the sewage proper are chiefly as follow:—First, the liquid being more concentrated in form is more easily manageable. When it is intended to pump sewage this is unquestionably an advantage, as it tends to lessen the cost of lifting. Instead of laying down pumping apparatus to correspond with the maximum rainfall and flow of sewage, or constructing huge storage reservoirs, the requisite power need only calculate upon the basis of water-supply.

Secondly.—Regularity of flow. No district, however favoured by nature, can at all times provide for the uniform distribution of storm-water, by the ordinary methods of irrigation, without heavy flooding. To avoid this, the construction of storm overflows becomes necessary, which must unavoidably cause a certain waste of the fertilising material, and in some measure affect the purity of the outlet stream.

Thirdly.—It has been stated that the extreme dilution of sewage caused by the rainfall materially diminishes the commercial value of the manurial ingredients it contains; that these may be more profitably applied in a stronger solution.

In favour of the combined system these arguments are met on almost equal terms. To the first, in respect of the cost of pumping, it is allowed that where no outlet by gravitation alone can be provided for the surpluses or storm-waters, such cost must perforce be greater; but that there are few cases in which the well of the pump is placed so low as not to admit of an outlet. The power, therefore, need only be calculated on the basis of the ordinary rainfall and water supply. To the second, it is replied

that the providing of the hye-wash aforesaid will obviate heavy flooding, and produce a degree of regularity in flow not inconsistent with profitable management; that such hye-wash, in sending storm-water down the water-course, does not send them in the form of sewage, but simply in that turbid condition which pertains to every stream during a period of heavy rain. That these joining a similar current, are borne rapidly away without the slightest ill effect. That if it be asked what becomes of those rich contents which a freshet is supposed to bring down a sewer, it is answered that the scourgings of the sewer are the first results of the storm, and are retained by the grating at the outfall. To the third argument it is said, that as yet it is by no means definitely settled that the manurial elements of sewage would be productive of greater results in a less diluted form, in so far that, although there is a limit to dilution, the actual experience of sewage irrigation renders it doubtful whether such limit has been reached; and it is well known that water alone, judiciously applied all the year round, has a most beneficial effect upon the land. In fine, it is asserted, when the pith of those objections is extracted, they are found to amount to an allegation that, under the combined system of main drainage, perfection in utilization is not attained,—to which its advocates are prepared to submit.

In return, manifold objections are alleged against the adoption of the separation system.

In the first place, it is argued, our chief aim is to render our water supply as pure as possible. To do this, we must not only refrain from polluting it with house refuse and fecal matter, but it is absolutely necessary that all the matters heretofore described shall be withheld. The thick, muddy impurities of the streets and courts of a large city, full of the dung of beasts and other animal matter, cannot be poured into a stream without injury to the water for all drinking and culinary purposes; and these constitute but a minor portion of the filth which, besides household drainage, sewage contains. Again, instead of forthwith easing the rates of communities, a double system of drains would add enormously to their already weighty burden; perhaps 50 per cent. on the original cost of severing. In the third place, drains into which the watercloset refuse enters, but from which rain-waters are excluded, would require frequent flushing by artificial means; otherwise sediment would be deposited and silted up to the prejudice of the drainage flow. Lastly, gradients which are perfectly practicable where the rainfall goes to swell the volume of the sewage, would not suffice under this method; which, in a flat district, with slight fall, like Hull, would prove a formidable objection; and there are few towns without certain localities wherein all the skill and energies of the civil engineer are not taxed to maintain the sewers in a wholesome and efficient condition. On the whole then, it is said, it will be found that, whereas the advantages to be derived from this method are slight, its defects, on the contrary, are numerous and weighty enough to render the change inexpedient.

To decide upon this, the critical point in sewage irrigation is at present no easy task. The question at issue lies within a very small compass: is it expedient for the sake of certain contingent advantages, which have not as yet been sufficiently demonstrated by experience, to double, or nearly double, the entire system of main drainage in a town? A satisfactory solution cannot be derived until a just comparison of the net results in two parallel cases shall be within our power; one illustrating the combined system, and the other the separation system. There can be no doubt that circumstances may exist in which two distinct systems, communicating with each other, are advisable, and there are already instances in which some of our eminent engineers have proposed to adopt it.

Captain Liernur's Method.

The removal of human voidings and their attendant gases by means of the pressure of air, or pneumatic force, has recently attracted some attention on the Continent, more especially in the Netherlands, where it is, to some extent, in present operation. The chief exponent of this principle, Captain Liernur, whose views have been especially advocated in a late publication by a Dutch engineer, proposes to dispose of the closet refuse of households by forcing it through pneumatic agency along certain subsidiary and

* "The Sewage Question." By Frederick Charles Knepp. London, 1867.

* Dr. Hawkesley stated at the Leamington Congress, 1856, "That the dry-earth system effectually relieves the towns of the necessity for sewers, but not of drains and conduits to carry off the rain-water and the water used for domestic purposes;" but he did not state by what means he proposed to deal with the contents of these.—*Leamington Congress Papers*, pp. 69, 60.
† Rep. Met. Sewage, 1864: App. 288, et seq.

main pipes into central tanks, fixed underground at the crossings of streets. These tanks, or, to speak plainly, cesspools, are of cast-iron, purporting to be so put together that all escape of gas or odour is prevented, as well as loss of percolation downwards, and are from time to time cleansed by the removal of their contents in carts or boxes to their final destination for agricultural purposes. What the advantages of this system may be over many others involving the cesspool principle, which have been rejected as impracticable, does not very plainly appear. Mr. Krepp, in the work above alluded to, expends much energy in denouncing cesspools as deadly and dangerous, and straightway proceeds to plead frankly for the construction of these iron "reservoirs" at the busiest points of public resort: in fine, to dot the town or district with cesspools on a grand scale. It is idle to talk of hermetically sealing these tanks; the gases invariably find egress at the joints, and rising to the outer air, whether palpably to the senses or not, are subtly absorbed into human lungs. Before the question of sewage utilization can be solved, this fallacious principle of hoarding up and concentrating in our very midst the pernicious exhalations of sewage must be utterly discarded. No time should be allowed for fermentation and putrefaction, but the source of danger should be hurried out of reach without delay, and dealt with by a form of deodorisation at once simple and beneficial.

The Land and the Crops.

The Land.—In the selection of the site for the utilization of sewage, much of the success which may attach to the enterprise depends upon the nature and condition of the soil to be treated. There is no doubt that in cases where it is stated to have been tried and failed, the want of success is due to want of judgment in this regard, coupled with that stiff, unyielding, impervious soil, should make such a grateful return by this means of tillage as soils naturally dry, light, and porous, well-worked and pulverised, so as to render it greedy of the liquid manure. But, as what is necessary to complete the process of utilization is not only the absorption of the water by the soil, but the extraction by chemical affinity of the manurial properties contained therein, it would be a mistake to insist, as has often been done, that very loose gravelly, or pure sandy soils alone are adapted. Mr. Latham says,—"The purification of sewage is due to a very beautiful property possessed by all soils to a greater or less extent, and that is, the affinity the soils have of separating the fertilising matter from the sewage, and holding it until required by the plant. *Clay soils* have a much greater affinity for fertilising matter than pure sandy soils." Therefore, although less absorbent of moisture than sandy or gravelly soils, light, well-opened clays purify as effectually. Mr. Latham even goes so far as to say that "clay soils excel in production any other when treated with sewage."

Nevertheless, it is considered by agriculturalists generally that sandy soils surpass all others in the proportionate benefit which they derive from the application of every kind of manure. Liebig says† that, "in comparing a fruitful sandy soil, with an equally fruitful loam or marl, as regards the nutritive substances contained in them, we are surprised to find that the sand, with one-half, or even one-fourth of the total substances contained in the loam, will furnish an equally rich harvest. To understand this circumstance properly, we must remember that the nutrition of a plant depends less upon the quantity than upon the form of the nutriment in the soil, just in the same way as, for example, half an ounce of animal charcoal presents as large an acting surface as half a pound of wood charcoal. If the small quantity of nutritive substances in the sandy soil presents as large a surface for absorption as the larger quantity of those substances in the loam, the plants must thrive as well upon the former as upon the latter."

We must also recollect that the most prolonged and successful experiments in sewage irrigation have been conducted upon sandy soils, with results proportioned to the purity of the sand. The celebrated Craigentiny meadows at Edinburgh were originally of this nature, being, in fact, neither more nor less than sea-sand blown into dunes or billocks by the wind.

The experiment which is now being tried at Aldershot, with hopeful results, is upon the drifted white sand of Aldershot Heath—the most barren of soils. At Croydon the land consists of sand, with a subsoil of gravel, on the porous chalk formation; and very recently excellent results have been reported from the poor gravelly soil at Barking. On the other hand, the success of the application of sewage to the heavy clay at Norwood cannot be doubted; and at Rugby—where, however, the result has not been so decidedly favourable,—the land is on the lia formation. Mr. Lawes states that the soil most suitable for the application of sewage is the lightest that can be procured—a porous, sandy land.* Professor Way, before the select committee, said that he would select a pure sandy soil in preference to any approaching a clay, and that such a soil would become a light friable loam by the deposit of the suspended matters in sewage; at the same time endorsing Mr. Latham's theory, by adding that sand is inferior to clay in its retention of the materials of manure.†

It would appear, therefore, that experience has conclusively demonstrated that two totally different soils—clay and sand—are alike highly favourable to the utilization of sewage; the chief condition of success being a light, dry, workable state of the soil, whatever it may be. This being the case, we are justified in the opinion that sewage irrigation is adapted to every quality of soil.‡

M. P.

"THE HEALTH AND HAPPINESS QUESTION"

An address, of which the following is an outline, was delivered in the Town-hall, Brighton, on Friday evening, the 20th instant, by Mr. George Godwin. The chair was occupied by Mr. Douglas Fox, and the hall was filled with an attentive audience:—

When I was invited by a committee of gentlemen to say something to you about "Town Swamps and Social Bridges," the title of a little book, one of a series written by me several years ago, to set forth the condition of the metropolis and our large towns, I was at first strongly disposed to decline. My ordinary occupations are heavy, and, moreover, I feared that, after talking and writing of the subject for many years, I could say little that was fresh and would interest you. Learning more, however, of the views of the gentlemen who have organized these lectures, and being led to believe that some good might be done by even a weak word in season, I have willingly come to you, though at personal inconvenience, and I ask your kind and serious attention on the ground that the subject of my talk is of the utmost importance to every man, woman, and child in the kingdom, let their position in the social scale be what it may. The public health is a public question, and a matter of the deepest public interest. The well-being of the whole must depend on the well-being of the individual. When we call down Happiness on the head of our friend or benefactor, we put Health before it,—Health and Happiness to you," is the cry,—and well we may do so. The rich man without health has little, the poor man has nothing.

As with the separate members so with the state as a whole. The state that is not healthy decays, and weakens, and perishes.

"It fares the land to hastening ills a prey,
Where wealth accumulates, and men decay."

And how have we shown our appreciation of this fact? By careful teaching and careful tending? By removing all adverse influences and guarding each bud of promise till it had reached an age of strength? On the contrary, by the most culpable indifference and neglect, the most profligate waste of energies and life. Men, women, and children are exposed, and expose themselves, to circumstances under which healthful life is impossible; under which decency and virtue are little less so. Much has been done of late years to render widely-known the simple fact that people cannot exist without air, and moreover that the air must be renewed; must be pure. It has been written and printed, and shouted, that air which has been breathed is no longer fitted to sustain life. Dip a lighted taper into a bottle and it will burn for some

time, but fill the bottle with your breath and the taper when put in will be extinguished. The same gas that is needed to keep the taper alight is needed for respiration. Without oxygen the lamp of life also expires. You all know this every one, we might suppose, knows this. Nevertheless, thousands and hundreds of thousands do constantly in direct violation of the requirement. An examination of the way in which human beings are herded together in towns shocks and startles.

"Overcrowding" means want of pure air, and want of pure air means debility, continued fever, death, widowhood, orphanage, pauperism, and money-loss to the living. It ought to be unnecessary now to give proof of its deadly doings: still, it may be well to recall the facts of the incident in the military hospital at Versailles, where for several years, in a certain month, being about a week after the arrival of the king at St. Cloud, there regularly occurred a fatal epidemic of typhoid fever among the soldiers. It never attacked the civil population, nor the officers. The cause was simply overcrowding. The garrison ordinarily consisted of about 500 men; but when the king came the number was increased to 1,200. The inmates were in consequence closely packed in small rooms, and fever and death came at once amongst them. The non-commissioned officers, better fed and never sleeping more than two in one room, escaped.

I have recently revisited a court in Drury-lane described by me several years ago. It is now nearly as bad as it was then. Every room is thickly occupied. The inhabitants are of the dangerous classes. Haggard and drunken women, with every trace of womanhood gone, are in the pathway; and there are swarms of children, some trained to begging, and others, it may be feared, to worse. In the majority of the houses the rooms are small, and the staircases are narrow and without ventilation. In two of the houses, 37 persons, I was told, lived in each, but it would probably be nearer truth to say that each house of 8 rooms contains on an average, including children, 40 persons; and as there are 21 houses, we have here 840 persons of the worst class pent up to their own destruction and the danger of the public. I will not distress you with any description of the condition of the inmates.

In a decent-looking house in Islington, occupied by workmen and others, I found that 9 persons slept in one of the rooms (12 ft. by 14 ft.), a father, mother, and 7 children. If shoemakers worked in the attic; and in each of the other five rooms there was a separate family. I could quote scores of such cases of overcrowding in what would seem to be decent houses, but the repetition might tire. No words, even aided by the pencil, can give a full idea of some of the dens which are occupied by a lower and different class: many born to evil, and without the power to rise; others the victims of more recent misfortunes or their own conduct. The world has still an interest in improving their condition: children as yet innocent cry aloud to be rescued from the otherwise inevitable gulf. In some places in the eastern districts quite recently visited I have found 11, and in three cases 14 persons occupying a single room. By the Sanitary Act of 1866 power is given to authorities to interfere and prevent such cases of overcrowding, but the difficulties in the way are found to be great and comparatively little has yet been done.

700 cubic feet is shown to be the smallest space, under ordinary arrangements, that will afford one person healthful sleeping-room. In apartments such as I have described, the occupants have not one-sixth of the required space. In hundreds of rooms that I have seen, each occupant had not more than 80 cubic feet! The drawings I now show you will give you some idea of these places.

Some of you may perhaps fail to see the connexion between overcrowding, evil structural arrangements, and disease. When, however, you find that in one part of a certain parish, for example, where the conditions are good, twelve die annually out of 1,000 living, while in another division of the same parish, where the conditions are such as I have described, twenty-eight die each year in 1,000, the connexion must surely be obvious. Some dwellings furnish a regular supply of fever-cases, which supply stops when structural improvements are made. It may be affirmed that there are thousands of houses where health, decency, or virtue is scarcely possible.

* Paper read before Society of Engineers, April 9, 1866.

† Natural Laws of Husbandry, p. 138.

* Rep. Met. Sewage, 1861: 4540.

† Rep. Met. Sewage, 1861: 4739, 4933-36.

‡ To be continued.

When the difference effected in death-rate per thousand living is mentioned, it may not convey to all my hearers its full meaning. A few words will serve to make it more obvious. The annual death-rate to 1,000 persons living in London in 1867 was 23; in Manchester it was 31 to 1,000. If we call the population of Manchester 250,000, it will be seen that had the same rate prevailed as in London 2,000 fewer persons, under Providence, would have died there in the year. The fact that the death-rate of the small towns and country parishes was only 17 per 1,000 during the year, and that even there many conditions not favourable to health are allowed to exist, shows how much sanitary work remains to be done in the large towns. Lessening the death-rate of the metropolis by 1 in the 1,000 only, means saving about 3,000 lives *per annum*,—a very serious matter surely. The Act for regulating common lodging-houses has worked very well: fevers have ceased to infest them; and the manners, even, of those frequenting them, especially with reference to the provinces, are much improved. Similar good results will follow the exercise of proper supervision over other houses let to various families. The Act that gives the power was greatly opposed on the ground of interference with private rights and the inability of the poor to afford better lodgings; but as I ventured to urge in various directions at the time, a man is not permitted to knock on the head those who are dependent on him because he is poor; neither should he be allowed on that ground to kill them with bad air, and set up a fever-still for the benefit of his neighbours. "An Englishman's house is his castle," is a good saying; but, surely, it should not protect the ill-doer.

Typhoid fevers continue to be destructive of life, and that, too, not so much in the dwellings of the poor as in those of a higher class. It is clear to all who have well considered the subject, that these diseases result from the neglect of sanitary laws. The parish inspector, the medical officer of health, and the sanitary police have been at work in the courts and alleys, crowded back-slums, and common lodging-houses, and have effected great improvements in many quarters,—lessening the prevalence of disease. It is not too much to say that the inspection by competent persons (armed with certain powers) of the town and suburban dwellings, of all classes, indeed of dwellings in the country too, will be productive of the greatest advantage.

I should be glad to say something of the workplaces in which many thousands of young girls pass their lives and are destroyed; milliners, artificial-flower makers, feather-dressers, and others; but time will not permit.

To discover the cause of preventible illness in many cases is difficult; it needs technical knowledge in the observer. The close proximity of the cesspool and water-supply is the unsuspected cause of an immense amount of illness and death. Years ago I brought forward cases in proof of this, and the belief has been terribly confirmed more recently. The history of the Broad-street pump, Soho, afforded striking examples; as did the outbreak of fever at Terling, not yet stopped. [The speaker then gave some particulars of this disaster, and the lessons to be drawn from it.]

Some matters in our own houses call for notice from the Health point of view. As, for example, bad foundations, permitting dampness; thin and porous walls,—contributing to the same evil, and increasing the cost of firing; defective drains and traps; want of ventilation—supply of pure air and removal of bad; insufficient height of rooms; want of pure water; wasteful means of heating; smoky chimneys; want of light (dark rooms give a larger amount of sickness than light ones); and the defective paving of yards and areas. Never allow a trap to be open. Never close a fire-place. Evil is often produced by the damp site on which buildings are placed; and yet, at the present time, new streets may be seen where the scavengers are depositing liquid sweepings, masses of decomposing animal and vegetable refuse, and other abominations; and upon these, presently, the walls of houses will be raised, without the slightest arrangement to keep down the moisture, or prevent dangerous exhalations.

[At this point of his address, Mr. Godwin said he had seen some things that day in Brighton which had greatly shocked him; not because they were worse than might be found elsewhere, but because one expected to find in Brighton all the arrangements for perfect health: one expected to find in a place situated geographically

and geologically like Brighton all that which would bring about a good state of things. One would not, he said, expect to find in such a town as this any health-destroying back-slums, or any small rooms filled with people without the possibility of air getting access to them. He then described the condition in which he had found Dorset-street, Thomas's-street, Derby-place, Pimlico, Claremont-street, Carlton-street, and Orange-row: in some cases badly drained, and in others ill supplied with water, although there was a good supply of the latter in other parts of the town. Improvements were most seriously wanted in these smaller districts of Brighton: the houses had no opening, no windows at the back; and the rooms were so small that persons were living where it was impossible to retain health; without which happiness was quite out of the question. He was glad to hear of the existence of the Brighton Sanitary Association, and the good it had done; and of the appointment of a medical officer of health. ("We haven't one.") "Then the sooner you get one the better," said the speaker; and he proceeded to state that what had been done had lessened the death-rate in Brighton from 25.8 in 1865 to 21.7, which meant that 300 persons were saved during the year. But the notion of finding a death-rate of 21 in 1,000 in a place like Brighton was simply preposterous. He had no desire to reflect upon the authorities; he knew the difficulties they had to contend with. But it was desirable they should know the effect the state of parts of the town had upon a stranger.]

I have already alluded to the effect upon the inmates of such dens as have been described. An assertion that I ventured to make some years ago, "As the home, so the people," is beginning to fix itself in the popular mind. It has been made the text of essays and the motto of associations. Widely admitted, it would be certain to produce good fruit. I have tried to add to this another:—

To drain and pave,
Means raise and save.

The connexion, perhaps, is not at once obvious, but it is, nevertheless, undeniable. Drainage alone will not do everything, but it is an important first step. There is evidence from Salisbury, Ely, and other towns that hundreds of lives have been saved by the improved drainage introduced.

As the education and the training, so are the children; as the children, so are the men and women. If we would have the sons of the struggling classes grow into orderly, sensible, and striving citizens, we must give them a road out of the slough, show them the value of order, and furnish them with weapons for the strife. Moreover, in a limited island-space such as that of Great Britain, the true greatness of the nation and its ability to sustain its poor could not but be vastly increased, were the foundations of life well and securely laid by improved arrangements promotive of health and vigor, so as to raise the samina of its manhood to a high pitch. And it is not the improved condition of the matured man alone that would thus be realized: the fact that vigorous parents lead to a vigorous progeny is no less obvious; and thus the nation would improve, physically speaking, in an accelerated ratio, were more care and attention given to the rearing of infants. The condition in which thousands are now brought up is fearful to contemplate. The result is what might be expected. Beneath the feet of society exists an army of ruff and desperate men and women, unsuspected and unheeded for. They are to be counted in thousands. An execution or a local riot sometimes brings them into daylight and the streets; but at ordinary times they are to be found only where they live massed together, and under such conditions that improvement is impossible. From the vice-producing quarters to which I have referred, the prisons are supplied, and in these places the convict, when liberated and in prison, finds his ease of operations in continuing what he considers the business of his life.

Whatever is spent on education is saved twice over, and more, in prisons and police; to say nothing of the mighty saving of misery and life. This is pretty generally admitted. But we are very slow to act upon it. Some of the hinderances are found where one would scarcely expect to discover them. When all things are ripe for a large extension of the blessings of education, even Religion and Conscience step forward, and, with a resist-to-the-death expression, bar the way. Not that they are opposed to education; they have got beyond that after long reflection; they

desire that education should be given, but it must be their own sort of education, and mixed up with their own menstrem.

And so neglected weeds grow apace, and instead of corn we get deadly-nightshade: instead of men and women with honest hearts and clear minds, we get "roughs"; and from roughs come burglars, garotters, and murderers.

The cost of crime is enormous; in fact, it cannot be counted. It operates in a hundred ways. The expense of the machinery towards punishment of crime alone amounted in 1866, according to judicial returns, to three millions.

Three millions sterling *per annum*, and this is not all. Another million, at least, should be added for the interest of money expended on buildings, the salaries of various officials, and items. And each year it becomes greater!

Convicts in England, according to returns, cost 34l. 7s. a head per annum. What do they cost the country when they are free? The number of the criminal population in England and Wales was computed in the year 1864-5 to be 145,000, and I believe this to be enormously under the mark. Including beggars and persons subsisting by other disgraceful means, the number has been calculated at 250,000. Let us, however, take the first to be the number, and say there are 145,000 persons, 117,000 of whom are at large, destroying instead of producing, living upon the industry of others,—taking from the community instead of giving to it. World 60l. per annum a-piece be too much to put down as the loss caused by them to the community? No, nor enough, and yet at that sum we get nearly six millions to be added to the other four millions; or ten millions sterling a year, the cost of crime. If part of the cost of pauperism were added to this, as it might fairly be, the amount would be raised some millions more.

It is from such homes as we have contemplated that the ranks of the dangerous classes are recruited day by day. It is a disgrace to us that we should have such a class as "roughs";—it means short-sighted parsimony and criminal neglect. The thousands of children running the streets of London and other places may be very nearly what we choose to make them. Humanity, Christianity, economy, self-interest, are all in favour of rendering them decent members of a society. See that every child be awakened to a perception of the difference between good and evil, and receive the elements of knowledge. As the education and the training, so, I venture to repeat, are the children; as the children, so are the men and women. Improve the homes, raise the standard of health, and teach the children, and we shall soon cease to have "roughs";—we shall soon lessen the numbers of the dangerous classes.

It would be a saving in money, a saving in misery beyond calculations, if the unheeded-for Arabs of our streets were gathered up and sent, at the country's cost, to the best schools in Brighton. Children have been called the poetry of the earth; beams of light; and "living jewels dropp'd unstrain'd from heaven!"

"Childhood is the bough where slumber'd
Birds and blossoms many number'd."

If society get but a deformed and hurtful stamp instead of a flowering, gladdening, good-giving tree, the blame and crime are society's own. Every child is a white page on which may be written good things; an impossible mass which waits to receive beautiful forms. The blame be on those who permit the page to be blurred, and the forms to be made repulsive. Children are the sacred trust of the State. The neglect of this trust—a great sin—brings its own great punishment. There is danger to the State in the increase of large masses of neglected poor; and these masses are supplied from the heaps of neglected children who survive the dangers they are exposed to.

It is of the utmost consequence that a knowledge of the laws which govern human life should be given to women. A frightful loss of infant life occurs through their want of this knowledge. The difference in the proportion of deaths amongst infants in various localities shows that this loss is unnecessary. Thousands of preventible deaths which occur, both in London and the provinces, from other than sanitary imperfections, are clearly to be traced to the ignorance of the mothers of the simplest principles of healthful management. In the schools in which the future mothers of the next race of English workmen are being educated, attention should be given to the instruction of the young, not only in sanitary matters, but as to the structure and

functions of the body. To the mothers we have to look for the education of the world. "When shall I begin the education of my child," said a young woman once to a wise man; "it is now four years old?" "Madam," he replied, "you have lost three years already. From the first smile that gleams over an infant's cheek, your opportunity begins."

Our workhouses, hospitals, manufactories, all need improvement. There are fairly-arranged hospitals on very bad sites: there are bad hospitals on comparatively good sites; but there is hardly an instance, in this country at least, of both hospital and site fully embodying those sanitary principles which are essentially necessary for the rapid recovery of the sick and maimed. Air of sufficient purity is not to be obtained in towns. Every existing town hospital ought, therefore, to be removed into the country, if it be possible to do so. At a moderate distance from towns land is much cheaper than in close-built places; and there are many large hospital establishments covering considerable areas of ground in crowded and valuable parts of towns and cities, which might be removed to the country not only with incalculable advantage to the sick, but with great pecuniary gain to the hospital establishment. Even in so vast a place as the metropolis, a few casualty wards, where accidents might temporarily be seen, rooms for the examination and the reception of cases, and suitable vehicles for transferring them to the country, would be all that would be necessary to effect the reform. A great mistake has been committed, as it seems to me, in the choice of a site for the new St. Thomas's Hospital.

The fundamental idea of all hospital plans ought to be this,—to have pure fresh air in every part of the building. Fresh air is the *sine quâ non*.

Unless a building be so planned that the sick shall breathe air as fresh within its walls as they could do externally, they will suffer in a ratio corresponding to the degree of impurity. The infirmaries of many of the workhouses are in a most, discreditable condition, and call for immediate improvement.

Do not be impatient of taxation for sanitary improvement. Illness paperizes and demoralizes. Better sanitary arrangements would lessen poor-rates immensely.

A Bill is now before the House of Commons, brought in by Mr. McCullagh Torrion, which would give power to authorities to enforce the removal of houses dangerous to health and life, and enable them to afford facilities to societies willing to rebuild or re-arrange them in a fitting manner. It is to be hoped that it will become law.

Repeating an observation I have made elsewhere, I would say, in conclusion, that it is scarcely possible to estimate the amount of misery, remorse, and crime produced by unhealthy houses. Apart, however, from the avoidance of extreme evils—sickness and death—a home should be a place of repose, cheerfulness, and comfort, where the worker may gain fresh strength and energy for the daily struggle. Dulness, gloom, apathy, ill-temper, will not produce this. We all know what trifling matters will change a career, and that the misery of a life may be born of a chance observation. The connexion of these remarks with our subject will be seen at once. Amidst had domestic influences the spirits flag, the temper changes. Breathing bad air, suffering from the effect of damp, the world looks dark, the heart is heavy; cheerful effort is out of the question; kindly companionship is withered; and jangle and anarchy take the place of mutual encouragement and healthful converse, which develop the affections and powers. The occupants of such houses as we are contemplating do not live; they only pass their time—and a very bad time it not seldom is. Life, which should be a blessing, is often made a curse by an unhealthy house and its consequence—an ill-ordered home. Besides remedies of evils referred to, we want also more colour in our houses, pictures, flowers, and a garden; the effect of these on the spirits, and so on the health, the thoughts, and the habits, is greater than some imagine; and the same argument will apply in calling for the well-ordering and proper adornment of towns.

To ensure the largest amount of general happiness, let us do our best to promote the general health. And this, after all, is not wholly unselfish; for happiness, it has been said, is a perfume that you cannot shed over another without a few drops falling on yourself.

At the close of the address the chairman (Mr.

Fox), Mr. Thorncroft (assistant overseer), Dr. Füssel, and others, in very interesting speeches expressed their entire concurrence in the remarks of the speaker. Mr. Councillor Davey, chairman of the Sanitary Committee, stated the healthy in every respect. A vote of thanks, moved by Mr. Henry Willett (who in the course of an able address, said he had hoped to see more of the clergy present), was given to Mr. Godwin, who thanked his audience, and moved a vote of thanks to the chairman, which terminated the proceedings.

EXCAVATIONS ON THE PALATINE.

AFTER the preamble on the earlier undertakings in the search for antiquities on the Palatine, we may take a brief review of what has hitherto been achieved within the Farnese grounds by the works ordered by the French emperor, and under the direction of Signor Rosa. We cannot attempt to support all the theories advanced by that learned gentleman, as the inscriptions on posts, like sign-boards, indicate according to his conclusions respecting every ruin and every site. In most instances there is little or nothing in the ruins extant to announce their character, save in respect to the magnificent fragments of cornices, friezes, pavement, and glances, in an extent of low structures, interspersed with a few loftier piles of brickwork, a column, and great variety of such marble debris as manifest the former splendours of halls and imposing ruin-masses stand in the gardens not comprised within the French property, where the totality of hitherto excavated remains has rather, indeed, the appearance of a vast ground-plan, traced in lines of brickwork, and more or less occupied in every part by the remnants saved from past grandeur, than that of an excavation presenting any unity of design or architectonic effect. It is evident that the Cæsars, one after another, successively destroyed, or at least disregarded, the erections of their predecessors; the buildings of one being contradicted by or sacrificed to those of another, without regard to the symmetric character of the whole; and in many instances, more ancient—some, indeed, very richly-adorned—structures being reduced to mere foundation-works for the support of the imperial chambers raised above. Thus the vaulted halls, to which we descended at some depth, and which were long erroneously designated "Baths of Livia" (see *Corinne*), attest by the beautiful decoration of their ceilings, in fresco-painting and gilt stucco-relief, a manifestly palatial in these interiors, left for ages inaccessible, since their sacrifice to more important buildings raised above them, but now the art-works of the past, may be referred to and are now, though unattractive, seen by daylight; their decorations having much suffered, evidently belong to a suite, the entrances and other parts of which are recognizable; and the deep vertical channels along the walls, for wood-work, as apparent, gave rise to the popular error respecting the imaginary "Baths." We may begin, however, from the approach to the terrace in front of the villa built by Pope Paul III., a pleasant residence looking east and westward. An extent of lofty halls still retaining their roofs, divided into parallel aisles, of irregular in scale and plan, are entered from the lower level, southwards, below the elevated site of that villa: nothing could be more dismal than those interiors, the inner range of which can never have received natural light save through the doorways communicating with the outer. It is probable they are the buildings of Caligula, or the structures forming a new front above the Via Sacra, raised by Vespasian after he had destroyed the greatest portion of the vast Neronian palace. Farther to the south opens a wide which ascends a steep road, with its massive ancient pavement, and recognised as the *Via Nova*; the ascent at this point, as the *Summa Porta Magonia*, one of the three (or, according to some writers, four) gateways in the walls

of the city ascribed to Romulus. To our right, as we follow this road, rises from the hollow an enormous mass of concrete, or rubble work, propped up in the lower part by brick and hewn stone work, manifestly of very ancient date, and which Signor Rosa identifies with the terraced-substructure that supported the temple of Jupiter Stator, vowed by Romulus before the battle with Latius (Liv. i. 12), and rebuilt in fulfilment of another vow by Attillus Regulus, Consul, according to his engagement, self-imposed, before the Samnite war (Liv. x. 36-7), this restored temple having stood from A.U.C. 458 to A.D. 65, in which year it was destroyed by the fire under Nero. Arrived at the summit of the ancient way, past the site of the Porta Magonia, we reach a vast extent of roofless buildings extending to the western ridge of the hill, and supposed the palace of the Flavian emperors, begun by Vespasian, continued by Titus and Domitian, with the character of which period in art the rich decorations, here found in marble fragments, well accords. Among these quadrangular buildings is a peristyle, once surrounded with columns, and evidently rich in decorative details, supposed the *Comatio Sicilia*, where Pertinax was surprised by the Praetorian guards on the day of his death. Another is styled (we quote from the sign-boards) *Jovis Comatio*; another, *Tablinum*; another, *Atrium Publicum*, as the edifice thrown open to the citizens by Nerva (Pliny, *Pomegry, Trajan*), and one of the smaller interiors is recognised as the *Lararium* by its altar still erect, with reliefs of religious ministers. Rich and varied are the decorations in the larger halls, the friezes, cornices, graceful candelabra of white marble, and intarsio pavements in geometric patterns, filled up with porphyry, serpentine, giallo antico, &c. Here and there we see portions of incrustation, showing a correspondent surface of coloured marbles, particularly the Numidian *giallo*, on the now reduced walls. Some mutilated husks of good style are seen, among other such relics, on plasters thrown up for their display. At the western ridge of the hill extends a series of terraces, which appear to have been reached by steps, leading probably to a portico, that may have served for contemplating the spectacles in the Circus Maximus, that lies below.

The character of one interior, as a basilica, with its semicircular recess for the tribune, remnants of a marble screen in front, and also of the columns that divided its area into three aisles, is sufficiently evident, and justifies the conclusion that this may be the Basilica Jovia mentioned in the Acts of two martyrs, Silvester and Lawrence, who suffered A.D. 264; and further westward we enter a roofless court, designated *Nymphorum*, with an ample elliptical structure for a fountain, in two stories, the higher surrounded by niches, once adorned (we may suppose) with sculpture, the lower with a broad channel; some portions of massive fluted columns, of giallo antico, remaining here to attest the richness of architectural details at the pleasant spot where Cæsars and their empresses may have whiled away the hours of summer-heat. Beyond this range of hills, westward, rises a restored colonnade, Corinthian, with shafts, in Caryatian marble monoliths, on bases here found, immediately below which, on the further side, we look down into an *stys*, where a monument of imposing character, and evidently high antiquity, meets the astonished gazer,—two lofty interiors, divided by a rectilinear wall, built in square-hewn blocks of lithoid tufa, the masonry like that of the *Tamliarium* in the capitol, and supposed referable to about the same date, within the century before our era, or about the period of Sylla (138-78 B.C.), the origin and purpose of this solid structure being now pure matter of conjecture, though we must certainly assume some edifice for public reduced to a mere cellar, or foundation, for the support of later buildings. Beyond extends an area with fine intarsio pavement, supposed a library; and further, immediately at the brow of the hill, another roofless interior, surrounded with a ruinous circle of terraces rising stepwise, which Rosa designates as an academy or hall for declamations, where classic poets may have recited their verse to imperial and courtier audiences. North-eastward from this point we descry another ample terrace, the site, no doubt, of some conspicuous building that stood in the centre, on a lofty basement of concrete, supported by buttress walls of peperina stone, with several portions of fluted shafts, in the same stone, and other architectural fragments, ar-

anged for view upon the spacious level, here being recognisable the stylobate of a temple, which Rosa identifies with that to Jupiter Victor, vowed by Fabius Maximus during the third Punic war (Liv., x., 29), and which stood from the year of Rome 439 till at least as late as the close of the fourth century, being mentioned by the Regionaries. The festival of Jupiter Victor, held on the Ides of April, is described by Ovid in the "Fasti," l. iv. We must turn back in the direction whence we started, to visit, at a point nearly central, a long walled corridor, evidently subterranean from the first, now, indeed, almost totally deprived of its ceiling, which we see was covered with coloured mosaics, representing birds and other ornamental designs in compartments,—a building supposed to be of the time of Tiberius, and to have served for private communication between different wings of the palatial residence; some noticeable detail here—the restoration, in coarse, careless work, of the original black and white mosaic pavement—leading us to infer a comparatively late appropriation of this corridor. It is apparent, and especially at this point, that the Palatino was divided by a wall into two portions; the height to the south called *Summa Velia*; that to the north, *Germalis*; the imperial building having long concealed this natural formation; and Tiberius's covered way serves to unite the two, or rather the edifices overlooking that valley from opposite terraces. Here, too, was found a plain massive altar, circular, with a shell-like cavity at the summit, and dedication, inscribed in large letters by the pontifex, Cneius Domitius Calvinus, a personage conspicuous in the wars between Caesar and Pompey. Further northwards we reach the *Aguradorium*, assumed site of the Augustan College, which was restored by Hadrian, now reduced, in fact, to little else than an apparently natural mound, with terraces-summit shaded by ilex trees. An epigraph, relating to that college, was found near this spot (see Gruter's series) confirmatory of its local claims. And from this point we overlook a long extent of low vaulted chambers, all on the same plan, and with the rudest species of black and white mosaic for pavement, referred to the buildings of Tiberius,—perhaps the ground-floor story inhabited by slaves in that emperor's addition to the Augustan Palace. As we skirt the hill side, westward and northward, our attention may be distracted from things near to the beauty of nature and of the distant city views, the Jovianic height, the winding Tiber, the Trastevere quarter, the Capitol, and the Forum, with many of the monuments that attract all Europe to those historic sites; but the most striking group of imperial ruins is that which suddenly spreads before us on our arrival at the north-eastern angle of the Palatine, overlooking the Forum, or, rather, its southern portion. Here we find ourselves in the upper story of two vast systems of building, divided into lofty vaulted halls ranged parallel, and only lighted from the entirely open side by which each is entered, the two stories being utterly without accordance in plan and symmetry in design, even the partition walls falling to coincide; the higher and more recent having been built without regard to the lower story—and here, as so often observable elsewhere among the Palatine ruins, one emperor's work precisely answering to the purpose of spoiling, in effect at least, that of another. It is the great wing added by Cneius Calpurnia, who first extended the imperial buildings to this side above the Forum, that we recognise in the lower structure; that of Nero, raised above and absorbing his predecessor's works, in the upper. Some remains of painting, two groups of figures, and stucco reliefs, in panels on the vaulting (the latter, in the lower halls, particularly graceful), remind us of Pompeian art, and may well be ascribed to the Neronian period.

These gloomy halls seem to penetrate into the heart of the hill, range within range, the innermost, in some instances, lighted by orifices at the roof, but for the most part in darkness only dispelled by the faint light struggling for entrance through doorways from outer chambers. In those where daylight prevails have been erected the few sculptures, busts, and other fragments here found, on antique pilasters. Portions of a marble grating have been placed along the edge of a terrace that traverses the higher story, and which, we are told, is no other than the bridge ordered by the insane Caligula to communicate between his palace and the Temple of Jupiter in the Capitol. The ominous gloom of these imperial halls, now rather like cavernous excavations than the abodes of,

sovereign grandeur, accords well with the darkest memories and most horror-striking deeds that cast their shadows over the story of guilty despotism in Rome. Along the ground-floor, near the north-eastern angle of the hill, extends for some distance the ancient pavement of the *Clivus Victorine* that passed through a gateway, *Porta Romana*, one of those in the primitive Romulean walls, now represented by a restoration in brickwork of the imperial period. Returning to the villa of Paul III., we observe on the platform before its western part the lower part of a round chamber, called *balneum*, and probably one of the bath-rooms in Caligula's palace. Not far off is a pile of brick ruins, quite isolated, long supposed the sole remnant of Augustus's Palatine library, as seems confirmed by the discovery, in digging beneath that spot, of columns in precious marble and fragments of colossal statues in basalt (see Burgess's notice of these made in 1720); and, farther to the south, near the limits of the Farnese estate, Rosa places the Temple of Palatine Apollo, some portion of the stairs before whose front he has seen (as he tells us), beneath the road that ascends towards the Convent of S. Bonaventura, from the arch of Tivoli. We may be sceptical before such designations, on the placards put up by the learned director, as the "staircase of Cacus," the palace "where Tanquilla addressed the people from a window after the death of Tarquinius Priscus" (Liv., i., 41); the site of the house of Cicero, on the slopes overlooking the Via Sacra, may be admitted; but when we are required to believe that on a grassy platform, north-westward, stood the "Tugurium Faustuli," or cottage, where Romulus passed his childhood, we may ask whether modern Roman antiquarians can to this day persist in ignoring the school of Niebuhr, and all the attainments of thought and research due to the impulse given by that historian?

Before leaving we should visit the museum of sculptures and other antiques found in the course of these works, now occupying an out-house of the villa, most noticeable among its contents being the casts from originals already taken to Paris of a torso, one of the many replicas, from the celebrated Faun of Braxilles, and of another figure (little more than a torso) of a winged Cupid, with quiver and bow, the latter object inferrible, but no longer seen; also some expressive busts, and a graceful draped female figure, probably a Venus, still left in the marble original; besides columns, lamps, glasses, and every species of coloured marble, alabasters, &c., in the profusion found in so many similar Roman collections. We should advise the visitor to choose for Palatine rambles the hours near sunset of an autumn or spring evening, when the effects of light and shade among these labyrinth of ruins, and the solemn beauty imparted by the hour to monument and mountain, to city and landscape, seen from these grounds, cannot fail to impress and delight,—to remain in memory among the unforgettable things of Rome.

Roma.

THE MUNICIPAL OFFICES OF LIVERPOOL.

In our last volume* we published some descriptive particulars of the large building which has been erected by the Corporation of Liverpool with the object of concentrating all the various municipal establishments, which have hitherto been scattered over the town, to the serious inconvenience of the public. We now give an elevation of the building and the two principal plans.

We may repeat that the building is a quadrangle, comprising about 4,800 square yards. The style is Corinthianesque, treated freely, the capitals being composed from English forms instead of the acanthus. The height of the building to the upper cornice is about 60 ft., and to the roof of the pavilion between 80 ft. and 90 ft. A tower, about 200 ft. in height, rises from the centre of the front.

The cost of the building, without land or furniture, has been about 100,000l.

The contractors were, for the brick-work, Messrs. Holme & Nicol; stone-work, Messrs. Parker & Son; carpentry and joinery, Messrs. Haigh & Co.; plastering, Mr. Jones; plumbing, Mr. Credlin; warming and ventilating, Messrs. H. Price & Co.; bells, Messrs. Warner & Sons; clock, Messrs. Penlington & Hutton; &c.

The building was begun from the plans of Mr. John Weightman; but has been almost entirely carried out by his successor, Mr. E. R. Robson, the present architect to the Corporation.

The building is occupied; but the spire is not yet wholly completed.

The following references show the appropriation of the various apartments:—

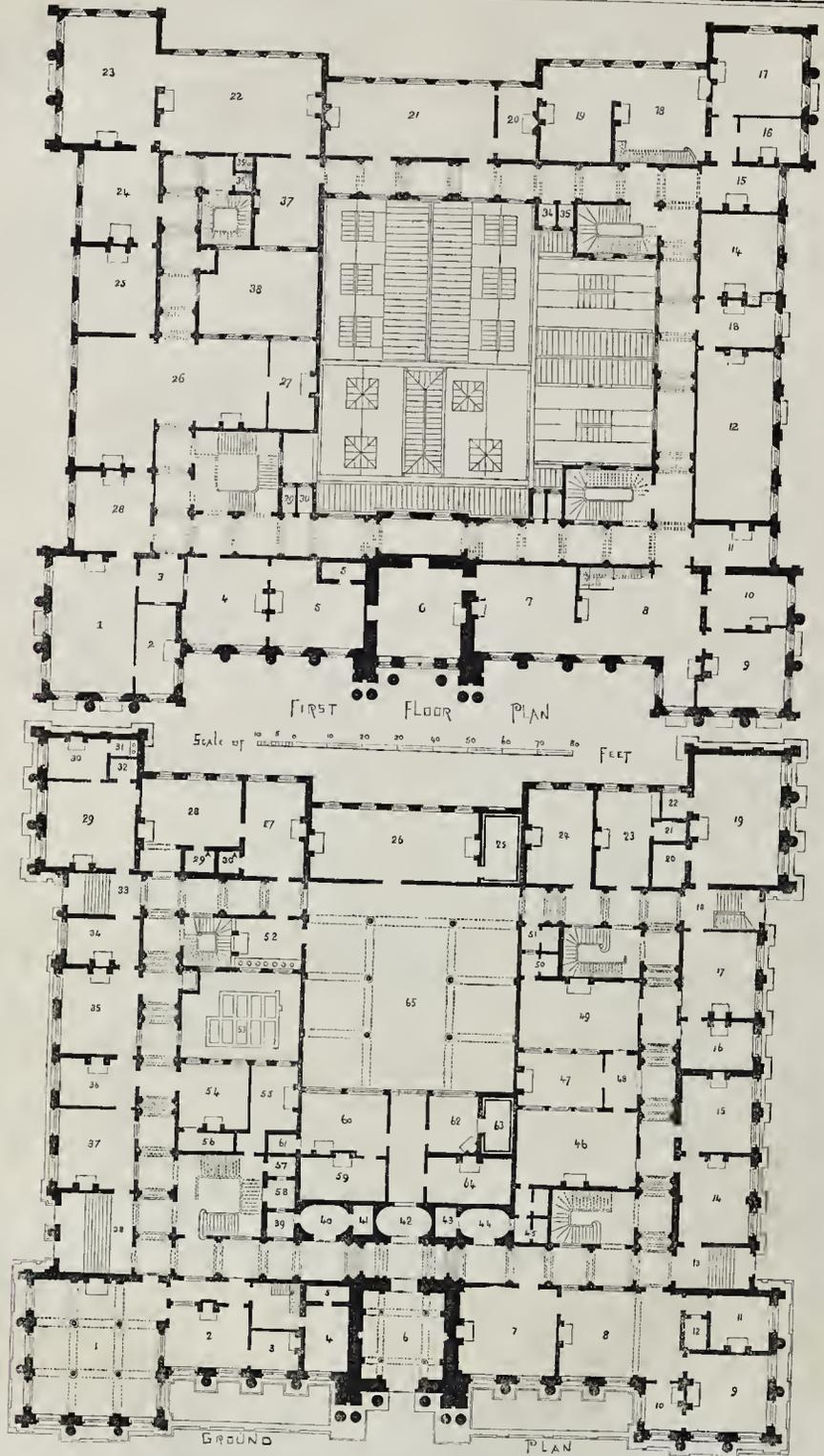
- Basement.**
Under rooms, ground floor, Nos. 1 to 5. Treasurer's store-rooms.
Under Nos. 7, 8. Joiners' shop.
" 9, 10, 11, 12. Town-clerk's store-room.
" 13, 20, 21, 22, 23, 24. Water engineer's store-room, &c.
" 14, 15, 16, 17. Licensing Department.
" 18. Arcade entrance to basement.
" 27, 28, 29, 30. Gas-testing department.
" 34 and 35. Nuisance department, outside inspector's office.
" 37. Scavenging department, outside inspector's office.

- Central portion of basement used for stores and lumber.**
Ground Plan.
No. 1. Borough treasurer's public office.
2. " " private office.
3. " " retiring office.
4. " " strong-room.
5. " " safe.
6. Entrance-hall.
7. Finance committee-room.
8. Town-clerk's clerks' office.
9. " private office.
10. " waiting-room.
11. Compensation clerk.
12. Safe.
13. Entrance.
14. Deputy borough solicitor's office.
15. " " office.
16. Deputy prosecuting solicitor.
17. " " clerk.
18. Entrance.
19. Law stationer's clerks.
20. Strong-room.
21. Safe.
22. Lavatory.
23. Deputy registrar's clerks.
24. " " and water committee-room.
25. Strong-room, " extra writing clerks.
26. Treasurer's office for outside writing clerks.
27. Inspector of nuisances' private office.
28. " " safe.
29a. " " safe.
30a. " " safe.
29. Inspector of Scavengers' public office.
30. " " private office.
31. " " lavatory.
32. Safe.
33. Entrance.
34. Chief inspector of health.
35. Inspector of lodging-houses.
36. Clerk's private office.
37. Medical officer's private room.
38. Entrance.
39. W.C.
40. Lobby.
41. W.C.
42. Lobby.
43. W.C.
44. Lobby.
45. W.C.
46. Watch committee-room.
47. Sub-committee-room.
48. Vestibule.
49. Health committee-room.
50. W.C.
51. W.C.
52. Lavatory.
53. Area.
54. Smoke inspector's office.
55. Messengers.
56. Strong-room.
57. Lavatory.
58. Area.
59. Auditor's private office.
60. " clerks.
61. Lavatory.
62. Treasurer's chief clerk.
63. Strong-room.
64. Debuture-room.
65. Treasurer's public office.

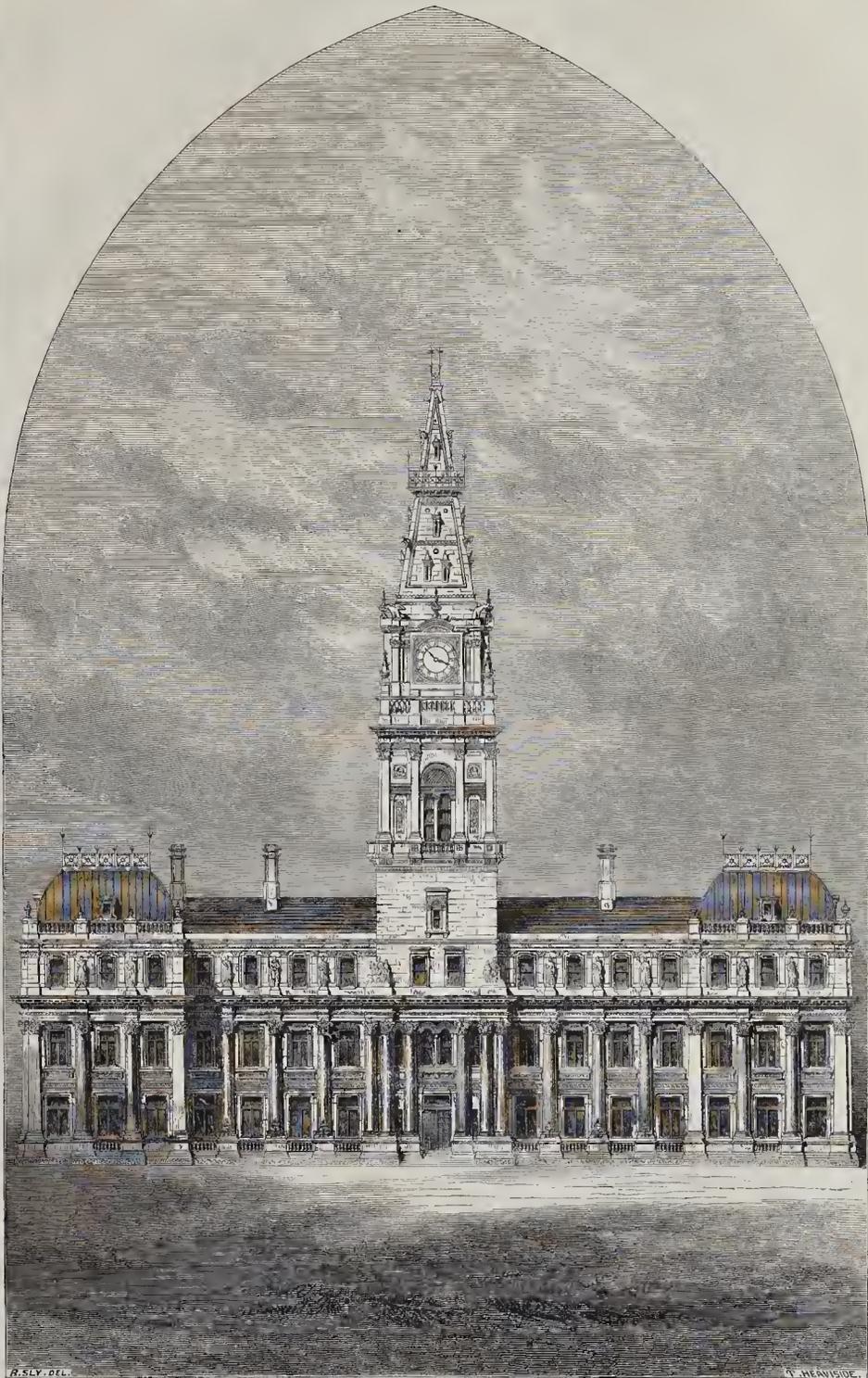
- First-floor Plan.**
No. 1. Deputy building surveyor's general office.
2. " " " plan-room.
3. " " " vestibule.
4 & 5. Rent collectors' department.
6. Architect's plan-room.
7 & 8. " drawing offices.
9. " private office.
10. Compensation clerk.
11. Waiting-room.
12. Deed-room.
13. Deputy town-clerk's chief clerk.
14. " " private office.
15. Waiting-room.
16. Assistant water engineer.
17. Water engineer.
18 & 19. " general office.
20. " chief clerk.
21. " public office.
22 & 23. Borough engineer's drawing office.
24. " private office.
25. " chief clerk.
26. " "
26. Paving clerks.
27. Surveyor of drainage.
28. Deputy engineer.
29 to 34. W.C.s
35. Lavatory.
36. W.C.
37. Plan-room.
38. Area.

Second Floor.
Above rent collectors' department, keeper's room.
Above architect's department, drawing-office for ditto.
Above water engineer's department, drawing-office for ditto.
Above Borough engineer's department, drawing-office for ditto.

* Vol. xiv., p. 313.

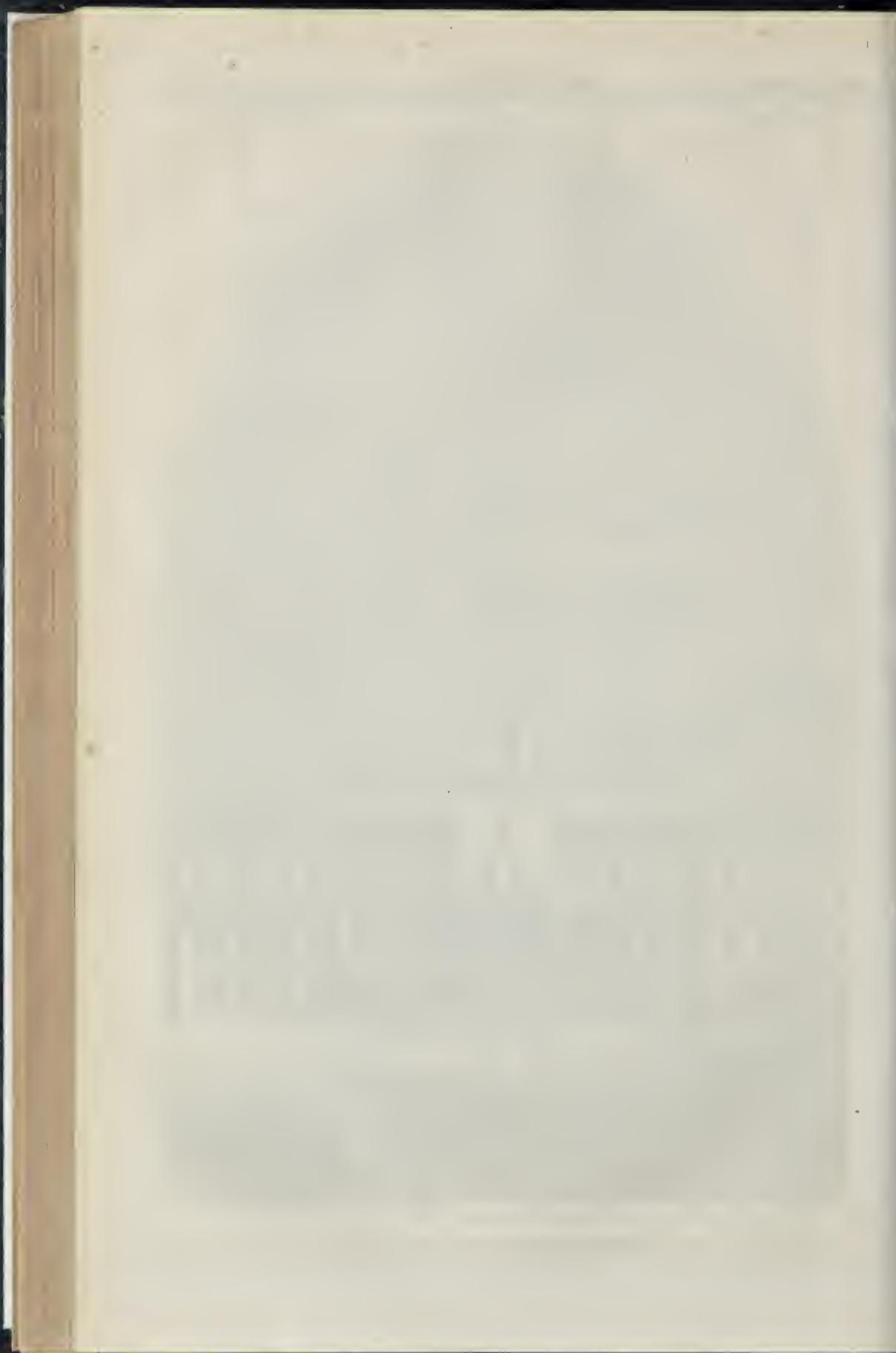


THE MUNICIPAL OFFICES, LIVERPOOL.



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THE MUNICIPAL OFFICES, LIVERPOOL.—MR. E. R. ROBSON, AND THE LATE MR. JOHN WEIGHTMAN, ARCHITECTS.



"SHARROW CHURCH."

THE architects of this handsome church are Messrs. Blackmoor & Mitchell-Withers. In connexion with the illustrations of it published in our last we gave the name of Mr. Mitchell-Withers alone.

THE STAGE.

Royal Princess's Theatre.—The revival of Mr. Boucicault's version of "Jeannie Deans," has proved quite successful. The trial scene is as effective as ever, the adapter appearing as the Counsel for the defence, and the firing of the Tolbooth at the close was so real, that some of the theatrical critics present on the first night expressed their belief that the intention was to burn down the house and get rid of them all at a blow, or rather a burn. Mrs. Boucicault as Jeannie Deans, touches the hearts of her audience more than once; and Mr. Leeson makes a quaint Dumbdiekes. Mr. J. G. Shore (*Arvyll*), Miss Litton (*Effie Deans*), and Mrs. Chas. Harcourt (*Mrs. Murdochson*) deserve a word of praise.

St. George's Opera-House.—Mr. German Reed's season terminates on (this) Saturday evening, March the 28th. We must congratulate Mr. Reed on the success of it. His endeavours will, we hope, lead to the permanent establishment of English opera under his spirited direction. Madlle. Liebhart's engagement was a capital move.

THE UNIVERSITIES AND ART-TEACHING, BY AN ARTIST.

ONE of the advantages of public discussion consists in obtaining individual experience and conviction, for where so many conflicting interests and opinions exist, education may be compared to a figure not only having many sides, but like one of those cut crystals which glitter at every angle, so lucid and imaginative that the mind's eye is dazzled by its contemplation.

As an artist, it is natural that I should look at the question in an artist's point of view, and I am fully aware that people are as easily apt to be led away by their pursuits as by their feelings.

Education is a work of the *mind*, mind in the abstract having no material existence visible to the human eye. A substance must be given to thought—an image (so to speak) to the intellect—before it can be made transferable, just as a Bank of England note which, in itself, possesses no intrinsic worth, is the representative of solid metal.

There are only two ways of doing this, viz., by the language of *form and words*. A thing speaks for itself—is a recognised fact—the surest record of its own integrity—an acknowledged testimony of a truth—a mirror to the mind.

On the other hand, "a man may possess all the tongues which Babel cleft, but if he have not a knowledge of the *solid things* contained in them, as well as the words or lexicons, he is no more to be esteemed a learned man than a yeoman or tradesman completely wise in his own mother dialect."

Why education should be so exclusively conducted as an affair of books, no reasonable cause can be assigned; for words, in themselves, either in their structure or likeness, convey no idea of things; and to attempt to educate people only through books is like trying to squeeze a kilderkin into a half-pint measure. Books cannot alone contain education; and it is a question, more especially in the exercise of the industrial arts, worthy of consideration, how much the world has gained by the invention of printing, in so far as the *solid things* are concerned.

If the ancients were worshippers of wood and stone, in the present day we are idolators of words. Ancient mind is revealed in form as well as letters. Phidias and Socrates, the two greatest men of almost any age, were by profession both sculptors, as well as priests and philosophers. Each died in prison, a martyr to his mission—the elevation of mankind.

In the language of form, Wisdom was represented springing, fully armed, out of the head of Jove, and placed on the Acropolis, as the presiding Deity of Athens. In words, "Wisdom," says Solomon, "is the image of God"—each an example in its own way, an expression of mind. Taking, however, still higher, the highest ground, for revealing the most sublime and

sacred truths, God himself hears testimony of Himself in like manner; for "as words are the image of our intellect," even so was Christ "the express image of God. He was begotten of the Father, even as our words are the children of our intellect." "The word was made flesh."—"This is my body," &c., &c.

And yet, with all this clear evidence, both Divine and human, of a great necessity, the language of form is not even recognized, or its most simple and elementary principles taught in our schools or universities, otherwise than as a mere accomplishment; whereas, on the Continent, large provision for education in art, as an essential accompaniment to all intellectual cultivation, is made, not only in the more professional schools, but in every school, and of every grade, each in proportion to its grade and object. In the elementary school, the purely people's school, elementary drawing fitted for the people's purposes is taught. In the district provincial secondary school this preliminary instruction is further developed. In the college and university, whilst opportunity is given for its manual cultivation, a higher object is aimed at—the philosophy on which it rests, and by which it is regulated, both intrinsically and in its relations to the other departments of human thought and action, is pursued. There is scarcely a university without its regular chair of aesthetics, its gallery of casts, drawings, and engravings, as well as library, to which the student can refer from the pages of his author for illustration whenever he needs. It is something to study antiquity in this double mirror,—one day dwelling on the fatal fortunes of Læocœon and his sons, in the impassioned lines of Virgil, and the next pursuing and completing the poem in the still more powerful production of the statuary. Our classical education is not a knowledge of its antiquity; it is scarcely a knowledge of its classics: they know the language of words, but they do not know the language of form; they leave out one-half of ancient mind. It is not by mere mechanisms of versification the solid things can be appreciated, or as a philosophic graphic expression of the general intellectual and moral elements of the age and country.

Without such accompanying inquiries, no one can understand Homer or Virgil as Homer or Virgil ought to be understood; it is not merely to understand, but to appreciate, both through philology and art. The spirit is not less written in the Venus, Læocœon, Apollo, the Elgin and Egina marbles, than in the pages of Hesiod, Homer, or Horace.

Æschylus, and Sophocles, and Euripides have no nobler—nay, truer—commentary, more steeped in their own spirit, more thoroughly, more accurately themselves, than the myths of those splendid vases, which are the admiration of mankind, and without their aid it is vain to hope to reach, through the language, the literature, much less the general mind, of a country.

Science undoubtedly has accomplished great things to redeem other shortcomings; but it must be remembered that the greatest work of eminence has been self-educated. Their school has been the universe, their Creator the guide; they found "tongues in trees, hooks in the running brooks, sermons in stones, and good in everything." They derived their knowledge from observation and the exercise of those faculties (as well as by the use of those senses as instruments) in acquiring knowledge which are not recognized in our curriculum.

Gonius is the gift of God; it is an affair of great moment in what manner its growth is sustained, and any mistake on this point is fatal. I have seen a child of four years old draw a Bantam cock flapping its wings without difficulty, and a full-grown man unable to imitate a pill-box without suffering as much agony in the attempt as though he had swallowed the contents.

"There is a vigilance of observation, and an accuracy of distinction, which neither rules nor precepts teach." By the exercise of this faculty, the first link in that long chain of discovery was the fact (which to many minds would seem trifling and unimportant) of Galvani's discovery of the convulsion of a dead frog, which chanced to lie near an electrical machine while a spark passed from it, and he examined the precise circumstance under which the convulsion took place. One of the persons also concerned in modern electrical researches was a youth, my pupil, William Jenkins, whose discovery of a shock from a single voltaic pair of plates formed the occasion and subject of Faraday's ninth series of Experimental Researches; and this branch of modern discovery is not of mere theoretical

interest, but has culminated in such practical applications as the Atlantic Telegraph, which has influenced the intercourse of nations, affected the fate of empires, connected the Old World with the New, and been instrumental in giving happiness as well as employment to millions of people.

It is the office of genius to open ever fresh combinations and resources, for the exercise of national industry, whilst upholding the greatness of a country, equalising labour and capital, keeping pace with the times.

Surely, if university extension means anything, besides conferring degrees and the abolition of tests, it might recognise *mind* in art as well as literature, for, "like twin cherries, they grow on the same stem." It is not by attaching D.C.L. to a name, or ceremonial observances, and conventional ornaments, or picture-making (which is the business of an artist). This important movement can be effectually accomplished but by founding an art school, where the *language of form* can be initiated, and requiring the same degree of efficiency in the examinations as, at least, on a level with philosophy, Latin, and Greek; and no just reason can be given for a neglect which is a source of such grievous consequences, in every way, to the whole community.

The prosperity of the country is vested in our educational institutions. The university is the precedent, being the representative of mind and intellect. Education in these days means not only religion and virtue, but a right application of knowledge to the wants of the people.

WILLIAM RIVIERE.

GARTH STONE FOR LONDON.

EVERY ONE who has paid attention to the subject of building materials in the metropolis must have arrived at the knowledge of two broad facts; first, that stucco, as now used, is the standing reproach of London architecture; and, secondly, that the efforts to introduce stone into our public buildings have been attended with more signal failure and disappointment than any other great city in Europe can have experienced in that respect.

The inquiry would be long which would lead to a correct knowledge of the causes that operate to produce this state of things: they are, doubtless, to be traced partly to commercial, partly to natural influences. Meanwhile the difficulty remains; our public taste is impugned, and the durability of our edifices compromised.

Lately we have examined some specimens of a remarkably fine sandstone, from the millstone grit formation, near the mouth of the Vale of Llangollen, North Wales. This stone is not a new discovery, and it seems strange that attention having been once called to it, no efforts have been made to render it subservient to a requirement of the metropolis, which points precisely in its direction; and at a moment when so many large public works are either on hand, or just about to be commenced, it seems to be a matter of great importance that the claims of such a building material should be strongly tested.

In 1861 a committee was appointed by Government to inquire into the state of the Houses of Parliament, and to suggest a remedy for the decay of the stone in that structure. In the minutes of evidence attached to the report made by this committee, we find Mr. Burnell (himself a member of the committee) saying,—

"Perhaps, going a little beyond the immediate subject before us, I may mention that in the course of this week I was sent down purposely to examine the series of formations which are represented on that table,—the millstone grit,—and I may be allowed to express my regret that we in England do not with that class of material, which we have so easily at hand, employ, as the French engineers and architects do, those harder and more lasting materials." The millstone grits to which I refer are those of the North Wales formation, near Riehon, called the Garth stone, close to the canal and close by the railway."

Mr. Tite, M.P., the chairman of this committee, appears to have followed up the suggestion, for we remember that he produced at the Metropolitan Board of Works a specimen from one of the quarries referred to; and, after stating that the price per foot cube in London would be about 2s., gave his authority to the statement that it would be equal for all the purposes required for the Thames Embankment to the granite, which at the time was with difficulty obtained at more than double that price. Indeed, as to the qualities of the stone they almost speak for themselves. It is one of the purest sandstones, in which the grains of quartz are cemented

together by a silicious cement almost as indestructible as the quartz itself, and if evidence were wanted to prove its power of resistance to atmospheric influences, the Abbey of Vale Crucis and the Bridge over the Dee at Llangollen, both built of this stone, present themselves to show how little effect has been produced upon it by many centuries of weathering in a mountain district.

We add part of a report by Mr. T. W. Keates, F.C.S., upon a sample of the stone sent to him for examination:—

"This stone is compact and uniform in texture. Its specific gravity is 2.120, consequently the weight per cubic foot is 132.4 lb.; the ton weight measuring 18.9 cubic feet.

The composition of the stone is as follows, per cent.—	
Silica	80.10
Carbonate of lime	4.30
Alumina	4.20
Oxide of iron	8.00
Moisture	.97
	98.77

The iron is partly in the form of carbonate which makes up for the loss."

Here is a material which we are quite disposed to think may be advantageously used in the metropolis,—a material which may help to make London a city of stone instead of stucco; and it seems to us that those who have the command of the carriage of this or the like material, from whatever part of the country it may be obtainable, have a great responsibility if, by excessive demands for freight, they deprive themselves of our London market and the public at large of the great benefit of a supply of this article of stone at a price that may compete with that of a less enduring and a less desirable material.

FARADAY AS A DISCOVERER.*

AN interesting and graceful memoir of Faraday as a discoverer has been written by his able successor and personal friend, Dr. Tyndall, whose knowledge of the philosopher and the man was complete, and enabled him to do full justice to his subject in every sense. We have all heard much of Faraday's gentleness, and sweetness, and tenderness, says Dr. Tyndall; and it is all true; but it is very incomplete: you cannot resolve a powerful nature into these elements; and Faraday's character would have been less admirable than it was had it not embraced forces and tendencies to which the silky adjectives "gentle" and "tender" would by no means apply. Underneath his sweetness and gentleness was the heat of a volcano. He was a man of excitable and fiery nature; but through high self-discipline he had converted the fire into a central glow and motive power of life, instead of permitting it to waste itself in useless passion. "He that is slow to anger," saith the sage, "is greater than the mighty; and he that ruleth his own spirit than he that taketh a city." Faraday was not slow to anger, but he completely ruled his own spirit; and thus, though he took no cities, he captivated all hearts.

Faraday, as his biographer elsewhere remarks, was more than a philosopher: he was a prophet; and often wrought by an inspiration to be understood by sympathy alone. The prophetic element in his character occasionally coloured, and even injured, the utterance of the man of science; but, subtracting that element, though you might have conferred on him intellectual symmetry, you would have destroyed his motive-force.

His experiments were always suggested and guided by his theoretic preconceptions. His mind was full of hopes and hypotheses, but he always brought them to an experimental test. The record of his planned and executed experiments would, Dr. Tyndall does not doubt, show a high ratio of hopes disappointed to hopes fulfilled; but every case of fulfilment abolished all memory of defeat: disappointment was swallowed up in victory. In dealing with his hypotheses he incessantly took them down, as an architect removes the scaffolding when the edifice is complete. "I cannot but doubt," he says, "that he who, as a mere philosopher, has most power of penetrating the secrets of nature, and guessing by hypothesis at her mode of working, will also be most careful, for his own safe progress and that of others, to distinguish the knowledge which consists of assumption,—by which I mean theory and hypothesis,—from that which is the knowledge of facts and laws." Faraday himself,

in fact, was always "guessing by hypothesis," and making theoretic divination the stepping-stone to his experimental results.

When, from an Alpine height, the eye of the climber ranges over the mountains, he finds that for the most part they resolve themselves into distinct groups, each consisting of a dominant mass surrounded by peaks of lesser elevation. The power which lifted the mightier eminences, in nearly all cases lifted others to an almost equal height. And so it is with the discoveries of Faraday. As a general rule, the dominant result does not stand alone, but forms the culminating point of a vast and varied mass of inquiry. In this way, round about his great discovery of Magneto-electric Induction, other weighty labours group themselves. His investigations on the Extra Current; on the Polar and other Conditions of Diamagnetic Bodies; on Lines of Magnetic Force, their definite character and distribution; on the employment of the Induced Magneto-electric Current as a measure and test of Magnetic Action; on the Reversive Phenomena of the magnetic field, are all, notwithstanding the diversity of title, researches in the domain of magneto-electric induction.

Faraday's second group of researches and discoveries embrace the chemical phenomena of the current. The dominant result here is the great law of definite Electro-chemical Decomposition, around which are massed various researches on Electro-chemical Conduction, and on Electrolysis, both with the Machine and with the Pile. To this group also belong his analysis of the Contact Theory, his inquiries as to the Source of Voltaic Electricity, and his final development of the Chemical Theory of the pile.

His third great discovery is the Magnetization of Light, which Dr. Tyndall likens to the Weisshorn among mountains,—high, beautiful, and alone.

The dominant result of his fourth group of researches is the discovery of Diamagnetism, announced in his memoir as the Magnetic Condition of all Matter, round which are grouped his inquiries on the Magnetism of Flame and Gases; on Magnecrystallic Action; and on Atmospheric Magnetism in its relations to the annual and diurnal variation of the needle, the full significance of which is still to be shown.

These are Faraday's most massive discoveries, and upon them his fame must mainly rest; but even without them sufficient would remain to secure for him a high and lasting scientific reputation. We should still have his researches on the Liquefaction of Gases; on Frictional Electricity; on the Electricity of the Gynnotus; on the source of Power in the Hydro-electric machine (the two last investigations being unmentioned in the foregoing memoir); on Electro-magnetic rotations; on Regulation; all his more purely Chemical Researches, including his discovery of Benzol. Besides these he published a multitude of minor papers, most of which, in some way or other, illustrate his genius.

"Taking him for all and all [concludes his biographer], I think it will be conceded that Michael Faraday was the greatest experimental philosopher the world has ever seen; and I will add the opinion, that the progress of future research will tend, not to dim or to diminish, but to enhance and glorify the labours of this mighty investigator."

The self-devotion of Faraday as a philosopher,—he disliked to be called a physicist, and always spoke of himself by preference as a philosopher,—was most disinterested and admirable. At a certain period of his career he was forced, as he said, definitely to ask himself, and finally to decide, whether he should make wealth or science the pursuit of his life, as he could not serve both masters, and was therefore compelled to choose between them. After the discovery of magneto-electricity his fame was so noised abroad that the commercial world would hardly have considered any remuneration too high for the aid of abilities like his. Even before he became so famous, he had done a little "professional business." This was the phrase he applied to his purely commercial work. His friend, Richard Phillips, for example, had induced him to undertake a number of analyses, which produced, in the year 1830, an addition to his income of more than 1,000*l.*; and in 1831, a still greater addition. He had only to will it to raise in 1832 his professional business income to 5,000*l.* a year. Indeed, this is a wholly insufficient estimate of what he might, with ease, have realized annually during the last thirty years of his life.

*While re-studying the Experimental Researches with reference to the present memoir [says Dr. Tyndall], I sought to ascertain the period when the question, 'wealth or science,' had presented itself with such emphasis to his

mind. I fixed upon the year 1831 or 1832, for it seemed beyond the range of human power to pursue science as he had done during the subsequent years, and still to pursue commercial work at the same time. To test this conclusion I asked permission to see his accounts, and on my own responsibility, I will state the result. In 1832, his professional business income, rising to 6,000*l.*, or more, fell from 1,600*l.* 4*s.* to 1,651*l.* 9*s.* From this it fell with slight oscillations to 621*l.* in 1837, and to zero in 1838. Between 1839 and 1845, it never, except in one instance, exceeded 921*l.*; being for the most part much under this. The exceptional year referred to was that in which he and Sir Charles Lyell were engaged by Government to write a report on the Haswell Colliery explosion, and then his business income rose to 1121*l.* From the end of 1845 to the day of his death, Faraday's annual professional business income was exactly zero."

Taking the duration of his life into account, this son of a blacksmith and apprentice to a bookbinder had to decide between a fortune of 150,000*l.* on the one side, and his undowered science on the other. He chose the latter, and died a poor man. But his was the glory of holding aloft among the nations the scientific name of England for a period of forty years.

The outward and visible signs of fame were also of less account to him than to most men. He had been loaded with scientific honours from all parts of the world. Without, probably, a dissentient voice, he was regarded as the prince of the physical investigators of the present age. The highest scientific position in this country he had, however, never filled. He declined to accept the chair of the Royal Society.

PROFESSOR LEVI ON "OUR WORKMEN."

A LECTURE has been delivered in the Temperance-hall, Townhead-street, Sheffield, in connection with the Sheffield Chamber of Industry, by Professor Leone Levi, F.S.A., London, on "Our Workmen, their Labour, Rewards, and Trials." The Mayor occupied the chair. The lecture was a very able one. In alluding to the national influence of the working classes, the lecturer said: Collectively, the working classes exercise considerable influence on the welfare of the nation. Their income on the aggregate is something enormous. I have estimated upon very good bases, though necessarily in a general manner, that the 12,000,000 persons at work annually earn 418,000,000*l.*, giving a proportional income per head of about 19*l.* per annum, or 85*l.* 10*s.* per family. The accumulation of capital among the working classes has been very great of late. In 1830 the number of depositors in savings-banks was 17 in 1,000 of the population, and the amount of deposits averaged 1*l.* 3*d.* per head. In 1848 the number of depositors was 39 in 1,000, and the amount of deposit 20*s.* per head. In 1856 the number of depositors was 47 in 1,000, exclusive of the depositors to the Post-office Savings Banks, and the amount of deposits 30*s.* per head, inclusive of the deposits in the Post-office Banks over and above the amount invested in friendly societies, building societies, and co-operative associations. These are cheering evidences of progress, though, indeed, the working classes might accomplish a great deal more, were they more careful and more saving, more persistent in labour, and more economical of their time and opportunities. There is one great source of absorption of the working man's earnings, and that is drink. It is a sad, very sad fact that in the United Kingdom as much as 80,000,000*l.* a year are spent in drink, upwards of 50,000,000*l.* of which, at least, are spent by the working classes! What a large proportion does that constitute of their earnings! Can it be that any one having 25*s.* to 30*s.* a week will expend upwards of 5*s.* a week in drink, and that mostly for the gratification of one individual member of the family, regardless of the limited resources, amounting almost to penury, of wife and children? To say nothing of the evil of drunkenness, that fruitful source of crime, riot, and sorrows without number, is there any comparison between the momentary sensual gratification of drinking to excess and the enduring happiness resulting from a comfortable home? Home! If any of our working men have not got it yet, resolve, and tell your wife of your good resolution. She will aid it all she can. Her step will be lighter, and her hand will be busier all day, expecting the comfortable evening at home when you return. The table will be ready at the fireside; the loaf will be one of that order which says by its appearance you may eat and come again; the cups and saucers will be waiting for supplies; the kettle will be singing; and the children, happy with fresh air and exercise, will be smiling in their glad anticipation of

* Faraday as a Discoverer. By John Tyndall. London: Longmans, Green, & Co.

that evening meal when father is at home, and of the pleasant reading afterwards.

When we speak of our working men, we cannot, indeed, help including our very selves in the great number. Labour is with us a second nature. To forego our duties, to neglect our calling, and to indulge in idleness, would be to accelerate the end of our existence. And we need not be ashamed of our calling, nor despair if it be a lowly one.

Work, work, be not afraid!
Look labour boldly in the face;
Take up the hammer or the spade,
And blanch not for your humble place,
There's glory in the shuttle's song;
There's triumph in the axill's stroke;
There's merit in the brave and strong,
Who dig the mine, or fell the oak.

SCIENTIFIC AND ART INSTRUCTION.

THE Department of Science and Art have issued an Explanatory Memorandum to accompany the Minutes of 21st December, 1867, already noticed in our columns. As respects scientific instruction, it is stated that the payments are only made for the instruction of students of the artisan or weekly wages class, and those whose incomes are less than 100*l.* per annum. The teacher, to be qualified to earn payments on results, must have taken a first or second class, unless he has obtained some University degree. Six royal exhibitions of the value of 50*l.* per annum, tenable for three years, are given in competition at the May examinations. Three of these are to the Royal School of Mines in London, and three to the Royal College of Science in Dublin. Free admissions are given to the courses at these institutions to all who take gold medals. To schools of art held in rooms devoted to art-instruction, the aid consists of the following payments, in addition to others similar to those awarded to night classes—20*l.* on account of every artisan satisfactorily instructed in art; 15*l.* or 30*l.* on account of art pupil-teachers; 5*l.* or 10*l.* on account of students trained for art-teachers or national scholars; 3*l.* on account of free studentships to artisans submitting advanced works; 10*l.* on account of expenses of annual report and examination. The night-class aid towards art-instruction of artisans in elementary schools in literary, mechanics', or similar institutions, consists of payments of 10*l.* or 15*l.* on account of artisans or their children above twelve years of age satisfactorily taught drawing of the second or third grades; of prizes to successful students; and of payments towards the local expenses of examination.

THE MANCHESTER TRADES' UNION OUTRAGES REPORT.

THE report of Mr. Pickering, Mr. Barstow, and Mr. Chance, has been issued as a Parliamentary paper. It is addressed to the chief commissioners now sitting in London.

The examiners commenced their inquiry at Manchester on the 4th of September last. They found that the members of several of the unions of brickmakers and bricklayers throughout the district had destroyed their books containing the accounts of their expenditure and the minutes of their proceedings. In one case five chests containing books were broken open by order of the commission, but all documents relevant to the inquiry had been removed.

They then proceed to give an account of the cases brought under their notice, commencing with the Stockport Operative Brickmakers' Union. Various accounts are given pointing to acts of intimidation, outrage, and wrong, promoted, encouraged, connived at, and committed by the unionists. These statements were publicly made and reported on at the time. Manchester, Oldham, and Bolton were the other places dealt with. The commissioners find that within the past ten years no masters' association has committed any intimidation or outrage in the district. All the outrages recorded were instigated and sanctioned by the several trades' unions. They were deliberately planned and executed, in furtherance of a system which had for its objects the subjection of both masters and men to the rules of the union, and the destruction of the freedom of labour. When a master had rendered himself obnoxious, a meeting of unionists was held, and if either a

resolution or a tacit understanding was come to that an outrage should be perpetrated, the measures for carrying it out were left to the officers, and the funds of the society were available for the purpose. The largest sum which the examiners found had been paid was 20*l.*, and the share which generally fell to the lot of each man engaged in the transaction was 1*l.*, though the amount varied, and in others the money paid for destroyed, but in others the money paid for outrages was frequently entered as "certain expenses," and in others a sum total was put down without any explanation whatever. These modes of making up the accounts seemed to be so well understood that the auditors never objected to them. The books were always open to the inspection of members of the union, and the examiners have no doubt that the expenditure of the money and its object were well known.

POVERTY, DISEASE, AND "JERRY" BUILDING IN LIVERPOOL.

A VERY interesting, though painful, discussion on this subject has taken place at the meeting of the Liverpool health committee. Dr. Trench, the medical officer of health, stated, that in spite of the efforts of the health committee, "jerry"-builders and others managed to evade the laws and erect buildings, hundreds of which were mere living tombs. He also pointed out as a curious fact, that while many of the streets through which the north-west breezes (prevalent at Liverpool) could blow direct from the sea were comparatively healthy, the streets nearest the mouth of the river had been, for the most part, built so as to exclude the westerly wind, and that in those districts fever and other diseases were rarely, if ever, absent. It was, he said, painful to think, that while the town council could vote thousands of pounds for parks, in which the working population could have but very moderate enjoyment, it seemed almost impossible, with the present legal enactments, to purify and cleanse quarters of the town where fresh air, light, and cleanliness were so necessary. He invited members of the committee to accompany him in his tours of local inspection, and if they found his observations warranted, support him in obtaining better sanitary laws. Mr. Robinson, a member of the committee, said it was a painful fact that in Liverpool, the richest port of the United Kingdom, one in every eleven of residents in the parish was in receipt of parochial relief—20,000 persons being out-door, and 5,000 in-door paupers. To return to "jerry"-building, we may add, that this week the Liverpool magistrates fined two builders of this class for building houses without mortar, street-sweepings having been employed as a substitute.

THE SEWAGE QUESTION.

Ipswich.—The sewage of Ipswich, as is the case with the sewage of Norwich and many other large towns, is likely to prove a nuisance to all those connected with the town. At a recent meeting of the Ipswich Dock Commission it was stated that the Harbour Master had reported to the committee that the town sewage sediment had been found in various parts of the New Cut. The basin in the Cliff Bight, which was made in 1865, so as to provide a depth of 11 ft. of water below ordinary low tides, had been reduced in depth to 3 ft. below the ordinary low tides, and had, in fact, become unfit for the purpose for which it was intended. The Town Clerk had been communicated with, and the matter was now reported to be under the consideration of the town surveyor.

Norwich.—A special meeting of the local board of health has been held for further consideration of the contemplated sewage scheme. Mr. Johnson explained that the Board had already sanctioned the expenditure of 21,000*l.* for the purchase of land for the pumping station and for contracts; and that the rest of the estimated cost of 60,000*l.* was made up in three contracts, two for sewers (16,000*l.* each), and the other for branch drains, amounting to 7,000*l.* He also mentioned that 10,000*l.* of the sum would be required for the completion of the northern drainage, and showed that this sum must be expended whether they went on with the scheme or not. He stated that by having it

done with the rest of the work about 25 per cent. might be saved, and that his conviction was that nothing but the sewage being taken from the river would satisfy the injunctionists, reminding the Board that not only had they to remove excrementitious matter from the river, but also the refuse and offscourings from the gas-works, manufactories, &c. It was important that the Board should come to a decision that day, because to-morrow they would have an unusually long list of competitors for these contracts, and he hoped the Board would now do its duty manfully. He concluded by moving—

"That this Board do authorize the Sewerage and Irrigation Committee to negotiate for the loans required for the construction of the sewage works, not exceeding 60,000*l.*"

The motion led to a long and warm discussion, an amendment being moved,—

"That before proceeding with this scheme, it is expedient that a full representation of the position in which the Board is now placed in reference to the sewerage be made to her Majesty's Government, with the view to obtain their assistance and advice; and that this be done by memorial, followed by deputation."

A large number of councillors took part in the debate, after which the original motion was carried by thirty-four votes to sixteen, so that the scheme will go on without further delay. At some parts of the proceedings the opponents of the irrigation scheme gave expression to their feelings in such a manner as to call for rebuke from the Mayor.

THE STUDY OF SCIENCE MORE THAN RECREATION.

IN reading over in your journal the report of the paper upon "Technical Education" read by Mr. Randall, F.G.S., before the Society of Arts, I was struck with a remark that emanated from him, and to which I must take exception. The paragraph runs as follows:—"He had been made a Fellow of the Geological Society in consequence of his studies in that science, which he looked upon merely as a recreation." I am of opinion, personally, that the study of geology and kindred sciences, or, in fact, any study, ought not to be looked upon as merely recreative; neither does it prove so, as I, and doubtless many others, know full well, who have devoted their leisure hours to it.

That it is a recreation I have no doubt, but it is combined with a good deal of downright hard study, which means work, more especially to those who have few or no opportunities of attending lectures and discourses, and whose progress and success depend entirely upon their own exertions. Neither do I think that any one about to commence, or having in view, the study of science, would do so for the sake of mere recreation: he would, I presume, have in view some higher, and, perhaps, more worthy object,—a desire to store his mind with facts, to increase his knowledge, to improve his abilities, and with the fair hope that he would hold his own amongst, and perhaps instruct, his fellows; and that it would prove in the course of life of no little benefit, from his superior attainments, if well applied.

Perhaps an illustration, out of many, from my experience may be of interest to some of my own class of your readers.

Some few years ago I was engaged abroad upon a line of railway, and where machinery of any kind was difficult to obtain, costly when obtained, and then only after months of waiting. The lines used upon this line of works were of an aluminous and slightly hydraulic nature, hard to burn and difficult to grind, especially with our imperfect appliances, would not slack like ordinary lines, took but a small proportion of sand, and the works proceeded but slowly. I had been present but a short time, when I one day observed to my superior, who was passing,—by the way, he was a retired officer of the army and of high rank,—it was a pity no limestone could be obtained in the neighbourhood; for it would be a large saving in expense and progress, and not take a much greater proportion of sand. His only reply was, "Ah! my dear fellow, you don't know this country yet: there is no limestone within a couple of hundred miles of here." I, however, thought differently, but said nothing. In a few days I rode to the base of a range of hills distant a few miles, and where I soon discovered a beautiful hard, white, compact crystalline limestone, of superior quality, and afterwards other descriptions of lime. I need

scarcely remark that these were afterwards used upon the works to the benefit of my employers, and therefore to my own. This was not all: the very stone had frequently been observed by my superior—the officer of rank,—as well as by others; but they had no knowledge of its nature, and if ever thought of, concluded it was quartz, as one of them afterwards said. A similar circumstance occurred when in Wales some time ago.

And now, sir, in conclusion, I think, should any such distinction as suggested by Mr. Randall be conferred upon men who devote their energies to the attainment of excellence in their several branches, these aspirants would surely not devote their energy, time, &c., for the mere recreation. Would they not rather do so for the supposed benefits that would accrue for their superior knowledge, skill, and ability which would result if properly applied? With all due respect for Mr. Randall, such is the opinion of a

CARPENTER.

GREAT LONDON.

From a central elevation Caractacus viewed his old domain. He was amazed at the vast expanse of roofs, the many thousand chimney-stacks, all sizes and shapes; pots vomiting smoke; factory shafts; church spires, towering structures; the net-work of railways (like a spider's web); and Old Thames suffering from congestion. He was informed that the population numbered millions! and that there were 4,000 miles of roads. A statistical account was given of our requirements; our progress in arts; *improvements* in war implements for slaying men miles off (science of slaughter); transmitting messages instantly to all nations on earth; that we have peopled new-found lands; conquered ancients, who now bow allegiance to us. "Extremes are here," said he, "riches and poverty, vice and virtue." Our fame is pre-eminent; but all our deeds will not stand analysing. We are mainly fed by foreigners,—steam-agents constantly rushing to and from all quarters of the globe with supplies. In the event of no aid from other climes we betide us, for then will London fall.

He was sad while speaking these words:—"Degenerated descendants! ye have indeed built a mighty Babel; but it is rushing, crushing, artificial life, with symptoms of decay. I see men perishing from want; others heaping up mountains of uncountable wealth, the fools or knaves! It was not so in my time here. Are there no green fields? Look beyond Streathamrise, over Stamford-hill from Essex towards Hendon. Enough!" he cried, "I am anxious to depart, and thankful I am out of it." His form was wafted through the smoke over (black) St. Pauls.

R. T.

THE DONJON OF COUCY.

SIR,—The account you publish of the Castle of Coucy would lead one to suppose the donjon still retained its vaulted floors and the conjectural ridge-like finish, and, indeed, had suffered nothing serious to its stability. When I saw it about five years ago, there was no vestige of any of its vaultings beyond their twelve carved springers; nor, indeed, could there be, since the mining ordered by Cardinal Mazarin in 1652, as two fissures, a foot wide at top, and descending to the base, would probably have been fatal to the monument ere this, but for the great iron bandages which M. Viollet-le-Duc says the wick the present weather-proof roof, and which encircle it below the great windowed parapet. This grandest of all castles was thus saved from the fate of our grandest English one, that of Corfe, whose superb donjon fell a year ago, in the gale of "the London." The magnificent cornice, moreover, of Coucy, though "overhanging both ways," and cut on both sides, as the account should have added, into two tiers of crumbling leaves, intelligible miles off, is not "about twice the thickness of the wall," the wall, or rather parapet, is about 5 ft. thick, and the top about 9 ft., perfectly flat when I walked round it, weather-worn, and without the least trace of having ever received another course. It is certainly not the case, therefore, that it "slopes upward into a ridge," nor do I see that this was at all necessary for the support of the *hourdes*. M. Viollet-le-Duc founds this imagined finish on an old engraving, and says fragments were found, in the fosse, both of this "glacis,"

and of the four strangely-placed, unmeaning pinnacles, which may have belonged elsewhere.

This monarch of castles has none of the picturesque charm for which British ones are chiefly valued, being, in fact, like the Pyramids, too grandly simple to acquire much picturesque interest, even in ruin; but every architect should study it who visits Reims, as he should also the most unique trigon of almost first-rate cathedrals, and their highly-interesting towns, Laon, Soissons, and Noyon, within which, and about equidistant from them, Concy stands.

E. L. G.

THE ARCHITECTURESQUE.

A CORRESPONDENT in your last number suggests a dilemma with reference to the theory which I ventured to offer in a recent lecture. In reply I need only say that the interpretation of my language upon which it is based is quite mistaken. There is one point raised, however, which is a fair question, and in the present condition of architectural opinion, ought to be fairly met,—namely, the effect of my theory upon the rivalry of Gothic and Classic. My notion is this: if the Architecturesque has a reality of art-essence, then, firstly, all good architecture must necessarily possess it; but, secondly, some architecture may possess something more; whilst, thirdly, other architecture may possess nothing more. Gothic architecture, for example, may owe its peculiar charms to its essential super-addition of the picturesque; whilst Classic architecture may owe its equally peculiar charms to its essential reliance upon the Architecturesque that I have advanced this as an illustration merely, not as a doctrine: I lay no stress upon it; it is no part of my theory. My proper thesis goes no further than the inquiry whether what I call the Architecturesque is a reality or not; if a reality, then I ask my brethren to turn it over in their minds and see whether it can be brought into the form of useful doctrine.

R. K.

A WORKING MAN ON EDUCATION.

SIR,—The *Builder* from its commencement has advocated the social, sanitary, and educational well-being of the industrial classes, and great benefit to them has resulted therefrom; and I feel sure that the various educational movements of the day will have the valued and able support of your journal. The great agitation which is a portion of the upper and middle classes from their spate on this important matter; and at last it is spate that all who are capable of appreciating the advantages which education confers upon the community, are in earnest to establish a thorough educational system. Nevertheless, some workmen are sceptical as to the reality of the movement, and are impatient at the neglect of this vital question by the governing classes. I confess that to me it does seem that the leading idea of many of them has been, that "ignorance is bliss," so far as the working classes are concerned, and therefore it would be folly to make them wise. And, judging from the debate on the East London Museum Bill, some hereditary legislators think so still. I think education has made some little advance since I went to school, for there neither grammar, history, nor geography was one of the essentials of workman's education. All I was taught of grammar was to pease at a come long enough to count one, and so on up to the period, or full stop. I do not remember hearing anything about art or science, and yet at that period an advanced education was taught the poorer classes in the French and German schools. Many intelligent workmen cry out most strongly against the present and past government. And even now much doubt is expressed as to their ability to comprehend the nature of the crisis, and the wants of the people. I think great blame is attached to all classes, and one is sorely at deep in the mud as the other is in the mire, as up to the present education has been a bone of contention between the so-called educating parties, and between them the masses have been horribly mutilated. And I am almost sure that our own professed interest in us, but few of them understand our wants, and our capabilities for learning.

The evils resulting from the neglect of a well-ordered educational system in the past is now bearing fruit. As the majority of workmen in this country take but little notice of passing events, whilst their limited wants of food and beer are supplied, they are content. That rude leaving the country is nothing to them. Technical and general education is with them a matter of perfect indifference; they follow the track their fathers walked in. The want of little or nothing has as yet been done to supply it. Many of them who can read indifferently will manage to spell through the police-news columns of *Lloyd's Newspaper* on a Sunday afternoon, and then content themselves with public questions ends. Their houses, as a rule, are in a deplorable condition; and in their most flourishing periods they are but one degree removed from pauperism.

The truth must sooner or later be told to the condition of a large portion of the people in towns and cities; of their ignorance and neglect of everything of an elevating and ennobling character. And I think when their condition is fairly known that it will be evident to the most obtuse and bigoted intolerant that compulsory education is needed, not only to teach the first elements of knowledge, but also to teach the duties and science of life, whereby they will be able to avoid the excesses which every intelligent man deprecates. The advantages of a system of

education which would give the working classes the means of knowing themselves, and of the improvement of their condition in their own hands, and by the influence of their respectability, are so raised the status of their class that the evils which now afflict them would soon be things of the past. Let then the State, for the present at least, provide for the rising generation the means to acquire the principles of knowledge and morality, and the opportunities for retaining that already acquired, and still further strengthening it on their errand at school; and then, people of ignorance, there will be a reading and a thinking that which will have become a necessity and form a part of their daily existence. The statesmen who are far-sighted enough to sow the seed will reap a rich harvest, and have an exceedingly great reward."

Already quacks and nostrum-mongers are at work, making capital out of this question. A few evenings ago I was at a meeting. On leaving, a bill was handed to me, headed, "The Technical Education of the People." After giving an extract from a speech of the chairman of the Society of Arts, in support of these views, it stated, "that the opening of the British Museum, National Gallery, &c., on the only day when they can be visited by daylight, and without fatigue, by the working classes, would be unjustly, and might be expected to fail in elevating the artistic and moral taste of the people." It is therefore proposed that all those who believe there is a great work to be done should at once turn their attention to the "opening of free libraries and museums on week-day evenings." An Act is already upon the statute-book for the establishment of them in every town, and it only awaits sufficient enlightenment to put it in force, and thus give the industrial classes opportunities to cultivate a taste for science and art. Reading for knowledge would soon form a part of their every-day duties; a higher and a better feeling would be created; the habit of encroaching upon the day of rest and forcing Sunday labour would be abandoned; and soon be scouted by those who now advocate the morals of the people would rise with their educational requirements, and which are so prominent would fall before the intellectual advancement of the people.

After writing the above I had some doubts as to whether it was interesting and suitable to the columns of the *Builder*; but I altered my mind, and attended a meeting at St. John College, on the opening of museums, &c., and I felt that, excepting three or four speakers, the others went away so weary of the mark, that I determined to send a working-man's thought in the hope that I should be able to show the working men's wants. JACK PLANT.

IMPROVEMENT OF GLASGOW.

GLASGOW ARCHITECTURAL SOCIETY.

At the last meeting of the Glasgow Architectural Society, the City Improvement scheme was under discussion, Mr. John Honeyman presiding.

Mr. Thomson read a paper on the subject, of which the following is a summary:—It is clear that, except in the great thoroughfares, the streets of Glasgow are cluttered with shops and warehouses occupies very much of the amount of population in a locality, and of course the value of property and the rent. In the most densely populated area in the plan, the superficial space of ground set down to each inhabitant is about 31 square yards. I have made a diagram showing an area of 352,440 square feet, including surrounding streets, upon which may be accommodated very considerably more than the requirements of the New Police Act, a population of 10,234—that is, nearly 343 square yards for each inhabitant—only a small fraction more than the present. I make it up thus:—There is space in the plan for 112 streets, and towards the surrounding streets contain 124 shops and 2,272 apartments, which in the lower localities mean and allowing 9 feet for the height of ceiling, gives over 100 cubic feet, which by the Police Act provides space for 3 adults, or taking the mean, about 4 individuals. It will be seen that the plan allows a block of ground 1,068 ft. by 339 ft., having streets for general traffic round it, and subdivided by narrow streets for local traffic only. Keeping in view the statement made by Mr. Stevenson, that the way to secure more of the ground, make the open spaces unequal, I have shown a leading street 60 ft. wide on one side, 60 ft. on the other, and two cross streets 50 ft. wide each, with the sub-divisions of streets are each 32 ft. wide in the middle and 16 ft. at each end. The main feature of the plan is that the spaces are all open at the ends upon. There is, instead of a continuous detached tenements of 48 ft. in length, with 16 ft. spaces between. These led alternately into streets covered overhead with glass, and lanes providing access to coal and amongst children. These covered streets are intended chiefly as play-grounds for the young, where they may run about under shelter and out of danger from carts and other vehicles. But the warmth which would result from this method of building would be conducive to the health and comfort of all. As to the expense, I propose to build the walls of the covered streets with brickwork, stone walls, the more than sufficient to provide for the glass carried up in the gutter behind the smoke flues, no harm could arise from the spread of contagious disease.

ST. PANCRAS SCHOOL COMPETITION.

The Guardians of St. Pancras have awarded the first premium of 150l. to Messrs. Giles & Biven for the best design for the parish schools at Levensden near Watford, and have resolved to carry out the plans with some modifications. The estimated cost is 31,300l.; and, in lieu of the premium and commission, the architects are to receive 1,000l. for superintending the erection of the building. The premium of 100l. for the second best design is awarded to Mr. Peck; and the third of 50l. to Mr. Manning.

COMPETITIONS.

St. Andrew's, Hereford.—A number of designs have been sent in and examined. Last week a meeting was held for the purpose of making choice of one of them. On a motion to receive a report recommending this, it was moved as an amendment that it be referred to a committee to consider the claim of Messrs. Smith, and to report to a meeting of the General Committee to be held on the 3rd of April. On the amendment being put to the vote, eight hands were held up for it and eight against it. The amendment was declared lost. The original resolution was then put to the vote, with the same result. Lord Cowper remarked that they had now come to a dead lock, and an adjournment having been suggested, it was agreed to adjourn until Friday.

FROM MELBOURNE.

BEFORE he left Australia, Prince Alfred laid the memorial stone of a new graving dock at Williamstown, Melbourne. This dock, now in course of construction, will, when completed, be 420 ft. in length over all, and 400 ft. long on the floor within the entrance. It will be 97 ft. in width on the top, and the entrance will be 80 ft. wide in the clear. At ordinary spring tides there will be a depth of water of 24 ft. 6 in. on the sill at low water, and 27 ft. at high water. The entrance will be closed by an iron caisson. The dock is built of the basaltic stone of the neighbourhood, known as limestone, and is estimated to cost, when complete, with pumping engines, &c., 185,000*l.* The dock-yard comprises an area of fifteen acres, and includes the present patent slip, which is capable of raising vessels of 2,000 tons; and within this dock-yard workshops for the several trades connected with ship-building will be erected. The works of the dock were commenced in November, 1864, and its completion is expected by the end of 1869. Engineer: Mr. W. W. Wardell, inspector-general of public works, assisted by Messrs. W. H. Steel and A. C. Todd. Contractor for works now in progress: Mr. J. Leggatt. Resident inspector: Mr. H. Woods. After laying the stone his Royal Highness embarked, and bade adieu to Victoria.

GAS.

At Wilton the price of gas is 7s. 6d. per 1,000; while at Salisbury it is 5s. In Devices it is 4s. 2d. per 1,000 ft., and at that price the works yield a profit of something like 700*l.* a year.

The Wolverhampton Gas Company have declared the usual dividend of 5 per cent. for the half-year (free of income-tax). The reduction in the price of gas to a uniform rate of 2s. 9d. per 1,000 cubic feet, announced in February, 1867, came into operation on the 1st of October last, but the full effect upon the reserve of the company could not be ascertained until the close of the present half-year, ending 30th June next.

The Richmond Gas Company have declared their usual dividend of 10 per cent., together with a bonus of 6s. 8d. per share, which would itself be about 1,000*l.*

Books Received.

A Treatise on Smoky Chimneys; their Cure and Prevention. By F. EDWARDS, Jun. Fifth Edition. London: Hardwicke. 1868.

The fact that five editions of this brochure have been already called for shows the extent of the evil it is intended to combat. Mr. Edwards wisely makes evident that the causes of smoky chimneys being very various, the remedies are so too, and must be applied intelligently and according to circumstances. The book contains numerous suggestions which may usefully be considered as well before building a house as after it has been found that the chimneys smoke.

The Waterworks of London; and on various other Waterworks. By ZERAH COUBURN and WILLIAM H. MAW. London: Spott.

The contents of this volume are articles reprinted from *Engineering*. It is divided into three parts. The first gives a detailed account

of each of the London waterworks; the second an account of proposed schemes for supplying the metropolis with water; and the third is on waterworks and water supply in other parts of the country and abroad. The whole forms an important volume on water supply, and is illustrated by numerous good engravings.

VARIORUM.

COUNTRY TOWNS, and the place they fill in modern civilization. By the author of "Three Months' Rest at Pau." London: Bell & Daldy. This is a thoughtful and useful volume on the advantages and disadvantages of country town life, and how to increase the advantages and diminish the disadvantages.

"If small towns," says the author, "surrounded by country aspects and elements, furnish so much healthy development for the body; if in this healthy physical development they contain the germ of much healthy development of character; if they are open to a sort of education which unites the advantages of school and home; if the very faults of their habits and manners are on the natural and healthy side; and if they give special opportunities for cultivating the charities of life on one hand, and public spirit on the other,—have we not a warrant for upholding them as the best field for the production of good, sound, human material to fulfil the highest purposes of civilization? We do not want country towns to supply us with very learned, or very scientific, or very accomplished men,—for these are the growth of special gifts and opportunities; but we want something more valuable, men of strong sense and high principle, who will put down evil, alay strife counsel wisely, and act faithfully in their own little spheres.

Let us add one more to the advantages country towns possess; their happy leisure, their freedom from the crush and turmoil or busier social life,—from its exciting stimulants, its grinding pressures, its dreadful wear and tear. . . . There is hardly a question which agitates the public,—education, strikes, the social evil, ritualism, relief of poor, &c.,—which does not press upon men in the shops, and vestries, and committees of a country town;—indeed, as abstract questions, but as a duty, or the neglect of it. Therefore we are inexcusable if we allow the mental inertness of country-town life to beset us. All have not special gifts of genius, but breadth of sympathy, and a spirit of intelligent interest in things around us, may be cultivated by all.

No with regard to other things. To keep ourselves young in the power of innocent enjoyment, to keep our selves true against vanity and all forms of faleness, to cultivate courtesy and real refinement, to practise the charities and amenities of life, to serve our neighbourhood and generation,—we can do all this; we can thus far shape and complete our character by resolute will and the aid of God's Spirit, and make ourselves wise and true, gentle and valiant Englishmen,—though we may be destitute of polished manners, polite accomplishments, and literary tastes."

Miscellaneous.

THE LYNN DOCKS.—The foundation-stone of the wet dock now in course of rapid construction at the northern end of the port of King's Lynn, has been laid. The stone formed part of the sea-wall of the dock. The contractor is Mr. W. F. Lawrence. The stone laid was a large mass of concrete, one of a number of blocks of a similar composition which will be used in the construction of the work.

PROPOSED LUNATIC ASYLUM FOR THE BOROUGH OF SOUTHAMPTON.—The County Asylum getting more crowded, pauper lunatics from Southampton and Portsmouth have been removed from it, and the lunatic commissioners have intimated to the town council of Southampton that they will require the borough to erect an asylum of its own, or conjointly with Portsmouth. The estimated cost of the new asylum is stated at 16,000*l.*

WINDOW FOR GUILDHALL, LONDON.—At the last meeting of the Lancashire Cotton Famine Fund, it was stated that a fine painted window, as a grateful memorial of the generosity of the citizens of London on the occasion of the calamitous famine, and the result of a penny subscription among the cotton operatives, will shortly be set up in the Guildhall. The history of its creation should be placed upon or below it in English, and in letters that could be read by all. Some of the inscriptions on modern windows convey no meaning whatever to nine out of ten of those who look upon them. The last meeting of the Cotton Famine Fund, when it was determined to divide the balance of the fund now in hand, amounting to about 9,800*l.*, among the principal towns in Lancashire, in aid of infirmaries and dispensaries *pro rata*, according to population, was presided over by Alderman Cotton. Such coincidences often occur: thus the morning papers the other day, mentioning the attendance of the Prince and Princess of Wales at the Obolop Royal, St. James's, showed that, while the service was performed by the Rev. A. Sitwell, the anthem was "Stand up and bless the Lord."

HORSHAM COTTAGE HOSPITAL.—At a meeting held in the Literary Institution, Horsbarn, Mr. W. E. Hubbard in the chair, it has been resolved to establish a Cottage Hospital in the neighbourhood; and a committee has been appointed to carry out this object, with Mr. Edward Bostock as hon. secretary.

BEADON'S PATENT DOOR-HANDLES AND OTHER FASTENINGS.—The object of this invention is to get rid of the annoyance and expense arising from defective methods of fixing door-handles. Those attached to the spindle by a screw in the neck of the knob cannot be nicely adjusted or secured. Others which are attached to the escutcheons soon get out of order, because the screws by which the escutcheons are fixed to the door draw out, especially when the wood has been thinned by the insertion of a mortice-lock. Beadon's patent plan adjusts the knob, and fixes it on the lock-spindle between screw-nuts, the escutcheons serving as bearings. They are simple, strong, and cheap, and certainly deserve a trial.

THE WEST LONDON HOUSE PAINTERS' AND DECORATORS' MUTUAL IMPROVEMENT ASSOCIATION.—We are glad to repeat that this association has been started with the idea of imparting to its members a more thorough knowledge of the principles and practice of ornamental decoration and colour. It is governed by a committee of seven members, also a chairman, secretary, and treasurer, and the members meet for the purpose of study on certain evenings. Members of the trade are admitted into the association on the payment of 1s. entrance fee, and a contribution of 1d. per week. The meetings are at present held on Friday evenings, at the St. John's Working Men's Club, Kirkman's-buildings, Tottenham-court-road. Mr. Cave Thomas was to lecture on Fresco on Wednesday evening last.

NEW USES FOR PAPER.—In America, pails, washing-basins, and pans of all sorts are being made out of paper. They are light, particularly cool, and may without injury be placed in an oven till the water in them boils. Greenhicks are not the only evidence of the advent of the paper age in America, therefore. There was lately a "paper ball," in which the dresses were made of paper. Paper collars, cuffs, &c., we suppose, are also to be had in America as well as here, and they are making Manila broad-brimmed hats of paper. Extremes meet, so do east and west—the Japanese and the Americans. Paper hats and cloaks and paper pocket-handkerchiefs are in common use in Japan, and all our American friends want to complete their paper age in the paper pocket-handkerchief; the paper spittoon they no doubt already have.

A MEETING-ROOM WANTED.—Charles Ashby, a plumber, applied to the Lord Mayor the other day, on the part of some working men, for leave to meet in the Guildhall. He said the recent meeting at St. James's Hall ascribed the existing want of employment to the effects of foreign competition and of free trade, but that line of argument was so manifestly repugnant to the views of many working men present, himself amongst the rest, and the result of the meeting was altogether so unsatisfactory, that they were desirous of having another convened for the discussion of the question, and under conditions calculated to secure a fair hearing on all sides. The difficulty was that all places for public meeting in London were to men like them so costly, and were besides inadequate in size. Mr. Ashby said that he was of opinion that strikes were driving trade from the country, and he was prepared to state the reasons for that opinion at a public meeting. He knew men who, under the existing state of things, worked under a feeling of terror. The Lord Mayor replied they were the more fools on that account. Let them, he said, emancipate themselves forthwith from such thralldom, and work for any master who might be willing to employ them, and at such wages as he might be able to afford. As a rule, no honest man need be under such apprehensions. In the end, the Lord Mayor told Mr. Ashby that he himself could not grant the use of the Guildhall. The privilege of affording the use of the hall for a public purpose lay with the Common Council, and Mr. Ashby left with the intention of applying to them. If he can show that there are a number of artisans desirous of testifying their opinion, and that they have amongst them men capable of conducting such a meeting properly, it is to be hoped that the Common Council will afford the opportunity desired.

NATIONAL PORTRAIT EXHIBITION.—The arrangement of the third and final collection is now making progress at South Kensington. There is no want of portraits; indeed the great difficulty is to find space for those already received. The exhibition will consist of portraits of eminent persons who have lived during the present century, and of many distinguished people who flourished prior to that time, forming a supplement to the whole series. In all there will be about 900 portraits, and efforts are being made to open the exhibition, which promises to be of greater popular interest than its predecessors, on Easter Monday.

FALL OF A WALL AT THE SOUTHERN EMBANKMENT.—Two men, with several others, were engaged in Fore-street, Lambeth, in pulling down several buildings, and carting away the materials, in order to clear away the space required for the Thames (Southern) Embankment, when suddenly a portion of brickwork, about 20 ft. long, was observed to bulge and totter; and, although an alarm was promptly given, enabling the majority to run away, before the two referred to could escape the wall fell, and they were buried beneath the ruins. It was found they were so seriously injured about the head, face, and other parts of the body, as to require their immediate removal to St. Thomas's Hospital, where they remain in a very precarious condition. Several other men were slightly injured by being struck with bricks, &c.

TEMPLE-BAR.—The City architect (Mr. Horace Jones), replying to a question in the Court of Common Council as to the rumours of the alleged insecurity of Temple-bar, said he had brought the matter before the City Lands Committee, and received their instructions to make a careful survey of the whole structure. Although he believed it had suffered a great deal from settlements of the fabric at various times, there was nothing of that kind that he could see of recent date. The joints from which mortar had fallen were now being filled in with fresh cement, and no further settlement of the structure had taken place. Mr. Fricker, however, amidst some cheering, gave notice of a motion for the next court, to the effect that the removal of the Bar would greatly facilitate the enormous traffic continually flowing into and from the City, and that the City Lands Committee be instructed to cause the fabric to be removed forthwith.

PANIC IN A THEATRE.—The Rev. R. Stanton, an Independent minister, recently delivered the 1st of a course of lectures to the working classes in the Sheffield Theatre Royal. The subject was the *Tomorrow tragedy*, and very nearly terminated tragically to a great number of persons. The place was crowded to excess. A cry of "fire" was raised, and a scene of the wildest confusion ensued. Two women precipitated themselves out of the boxes into the pit, falling on to the heads of those below them. Women and men scrambled out of the boxes to the stage, smashing the chairs and music-stands in the orchestra and the foot-lights on their way. Others broke through a skylight at the back of the stage, and dropped from thence into a yard. Some found their way underneath the stage, and, pushing their arms through the grating into the street, besought those outside to smash the grating and let them out, as the place was on fire. There was no loss of life. The alarm of fire was groundless.

SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—On Thursday last, Mr. W. Cave Thomas gave another of his series of lectures on painting, the subject on the present occasion being "An Attempt to Systematise the Methods of Oil Painting." Mr. Madox Brown was in the chair. The lecturer said that if the grand style ceased with the neglect of mural painting, on the other hand the revival or discovery of oil painting multiplied pictures; and he next drew attention to the different methods for obtaining transparency of colour and solidity, the former quality being seen to perfection in jewels and in painted glass, which afforded a clue to the painter; and he concluded a very able and scientific lecture with hints as to the employment of pigments, and other interesting particulars. Mr. H. Warren confirmed some remarks of the chairman as to the justness of the principles enunciated, the neglect of which had given rise to some curious pictorial effects, instancing a picture of a man in armour, by Vanduyke, over which the artist had painted a man in velvet, in which, however, in the course of time the original picture had re-appeared underneath.

NAVAL HOSPITAL FOR JAPAN.—We are glad to find, by the *Lancet*, that the usual estimates include the sum of 25,000l. for the erection of a naval hospital at Yokohama. Those who know the insalubrious condition of Hong Kong, the only naval station we possess in the Eastern seas, will appreciate this intention of Government, since Yokohama is an essentially salubrious climate as Hong Kong is the reverse.

WORKING MEN'S COLLEGE.—A deputation, consisting of the Rev. the Principal F. D. Maurice, Mr. Thomass Hughes, M.P., Mr. Lindlow, Mr. Lishfield, Mr. W. Cave Thomas, and Mr. Jennings, waited upon Lord Robert Montagu to solicit Government aid in carrying out the new buildings for the art classes, museum, &c., at 45, Great Ormond-street. We understand this assistance is likely to be granted.

THE NEWCASTLE CENTRAL EXCHANGE DOME.—This dome was recently destroyed by fire; and the proprietors being unwilling to re-erect it, a proposal to do so by subscription, as it was regarded as an ornament to the locality, has been made, and the town council have agreed to subscribe 120l., and others additional sums, amounting in all to 400l. It will be stipulated that the dome be insured; and, if again burnt, that the money be used in re-erecting it.

VALUE OF LAND IN LIVERPOOL.—The Liverpool Corporation offered for sale by auction twenty-nine plots of land suitable for building purposes in the principal thoroughfares of the town. The competition, however, was very slow, and only three of the lots were sold. Although the reserve price was not mentioned, it was understood that in several instances it amounted to 32l. per square yard. One of the plots sold was bought by the occupier, Mr. Rigby, publican, for 32l. per yard. The other lots were sold for 5l. and 7l. 10s. per yard respectively.

THE ISLINGTON WORKHOUSE.—Some of the parishioners do not feel quite easy about this matter, and express an opinion that scarcely sufficient care was exercised in making the selection. It is said that the buildings, according to the design chosen, will cover 7 acres 3 roods of land! It was stated at a meeting in the parish of St. Pancras the other day, that although the architect's estimate was 30,000l. (for 1,000 persons), the alterations made in the plans had brought the amount up to 70,000l. The Board should take advice upon the subject before it be too late.

OIL TESTER.—A patented machine for testing the lubricating qualities of various oils is being introduced by Messrs. John Bailey & Co., of the Albion Works, Salford, Lancashire. The apparatus consists of a bed-plate, two pedestals, fast and loose pulleys and strap, fork, two brass steps with weighted levers to produce friction, an indicator to show the revolutions, and a thermometer to indicate the temperature produced. The exact money value of oil may be arrived at as follows:—Suppose a certain quantity of No. 1 oil on the machine shows 200 deg. by being driven 10,000 revolutions; No. 2 oil shows 200 deg. and 7,500 revolutions, or 25 per cent. less value; in addition to this practical way of obtaining a result, the machine may be driven to a higher temperature, to see which oil produces the worst residuum.

FIRE IN THE CITY: SAFETY IN CLOSED DOORS. A fine old mansion in Devonshire-square, Bishopsgate, once inhabited by the late Bishop of London (Blomfield), took fire last week, it is believed in spirit cellars beneath it. The occupier, Mr. Hart, was roused in the middle of the night by his wife, who smelt fire, and having ascertained that the house was on fire, Mr. Hart caused his wife to arouse the female inmates, and himself awoke his wife's father, a man of seventy-two years of age, and conducted him to the outer door, and having left him in the street, carefully shut the door, and ascended to the upper floors, where he found the other inmates already on the roof, and assisted them to a place of safety. Other doors inside were shut, and by the aid of the fire brigade the fire was confined to the one house where it began. The furniture in the drawing-room, and a valuable library, as well as other property, were saved, and the firemen regarded the result as something like an unusual triumph over "the devouring element." It was observed that wherever the doors had been shut the fire had failed to penetrate, even although the doors were blackened and charred. The fine old staircase was completely destroyed.

STRIKE AND LOCK-OUT AT SALTAIRE.—The harmony of this celebrated model establishment has been disturbed by a strike of weavers, who urged their employers for an immediate advance of wages, on the ground that other employers in the district gave higher wages than Messrs. Salt's firm. The firm promised a rise, if on investigation they should find it to be the fact that others gave higher wages; but this reasonable proposal did not seem to suit the views of the weavers, who immediately struck work. Messrs. Salt being offended, and indeed not believing that there was any truth in the assertion of the weavers, shut up their whole establishment, which seems to have brought the weavers to better views, as they agreed forthwith to return to their work, pending the inquiry originally proposed by Messrs. Salt.

TENDERS.

For rebuilding house and shop, Commercial-road, E., for Mr. Colson. Mr. Iron, architect:—
Moyle (accepted).....£217 10 0

For the erection of warehouse, No. 154, Minories. Mr. N. S. Joseph, architect:—
Hight.....£3,948 0 0
Myers.....3,871 0 0
Newman & Mann.....3,858 0 0
Ashby & Sons.....3,729 0 0
Axford & Whittier.....3,709 0 0
Ashby & Horner.....3,685 0 0
Conder.....3,651 0 0
Piper & Wheeler.....3,618 0 0
Broome & Robinson.....3,624 0 0
King & Sons.....3,575 0 0
Hill & Keddell.....3,525 0 0
Henshaw.....3,498 0 0
Brass.....3,485 0 0

For alterations and additions to the Plymouth Work-house. Messrs. Dweley & Son, architects. Quantities supplied:—
Elliot.....£2,757 0 0
Jenkins.....2,629 0 0
Call & Perbick.....2,411 0 0
P. Marshall.....2,038 0 0
Price.....2,029 0 0
J. Marshall (accepted).....1,865 0 0

For building a sixty-quarters mulling at Preston, next Faversham, for Messrs. Shephard, Neame, & Co. Mr. Benjamin Adkins, architect. Quantities supplied by Mr. Thos. M. Rickman:—

Contract No. 1.—Builder's Work.
Stid.....£3,866 0 0
Austen.....3,230 0 0
Eppit.....1,150 0 0
Shrabole.....3,698 0 0
Creed.....3,055 0 0
Solih (accepted).....2,835 0 0
Gotham.....2,575 0 0

Contract No. 2.—Smith and Engineer's Work.
Smyth & Co.....£898 15 0
Drury & Biggleston.....865 0 0
Garrett & Co.....649 0 0
Weeks & Son.....639 10 0
Spencelayh & Archer (accepted) 618 0 0

For house at Coolhurst, near Horsham, Sussex, for Mr. C. Scrase Dickens. Mr. M. Dighty Wyatt, architect. Quantities supplied by John Young:—

	Local Stone.	Add Ransome's Stone.
Myers & Sons	£8,229 0 0	£ 210 0 0
Cheel	5,415 0 0	465 0 0
Abraham	5,174 0 0	491 0 0
S. Simpson	5,319 0 0	288 0 0
Simpson & Son	5,209 0 0	449 0 0
Ashby & Sons	4,995 0 0	480 0 0
Ennor	4,775 0 0	400 0 0
Langmeir & Burge	4,849 0 0	373 0 0
Henshaw	4,763 0 0	445 0 0
Ashby & Horner	4,800 0 0	440 0 0
Piper & Wheeler	4,597 0 0	440 0 0

For new warehouse, No. 19, Basinghall-street, City, E.C. Mr. Herbert Ford, architect:—

Turner & Sons.....£4,133 0 0
Brass.....4,746 0 0
Piper & Wheeler.....3,877 0 0
Mann.....3,775 0 0
Crabb & Vaughan.....3,839 0 0
Broome & Robinson.....3,845 0 0
Pritchard.....3,740 0 0
Henshaw.....3,614 0 0

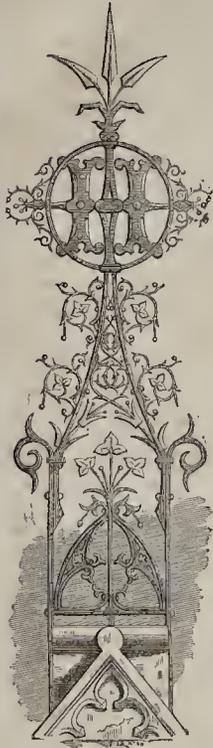
For erecting two warehouses, Trinity-court, Aldersgate-street, City. Mr. John Collier, architect. Quantities supplied by Mr. J. S. Lee:—

Wilson (too late).....£3,999 0 0
Rogers & Richards.....5,193 0 0
Axford.....4,965 0 0
Carter & Sons.....4,948 0 0
Nightingale.....4,943 0 0
Kyes.....4,703 0 0
Gammon & Sons.....4,717 0 0
Scrivenor & White.....4,612 0 0
Deards.....4,585 0 0
Langmeir & Wey.....4,492 0 0
Crabb & Vaughan.....4,474 0 0
Wood.....4,389 0 0
Sharpton & Cole.....4,339 0 0
Foale.....4,035 0 0
Henshaw (accepted).....3,567 0 0

For an oratory, Kensal Green, for Baroness Wald. Mr. Pugin, architect:—
Hill & Son.....£350 0 0
Hodgson.....290 0 0

The Builder.

VOL. XXVI.—No. 1313.



The Old Crosses of Gloucestershire.

HERE and there, in the market-places on the waysides, and in or near the churchyards of Gloucestershire, stand the remains of about eighty crosses. We have to call to mind that the county contains three hundred and thirty-eight parishes, two cities, and twenty-six market towns before we can realize the proportion this number bears to its extent. Between thirty and forty of these crosses are now represented only by inconsiderable fragments: in some cases only by their steps, in others only by their sockets; but there are also included in the number some of the most interesting examples of these monuments in the kingdom. Mr. Pooley* has diligently collected measurements and drawings of all the known remains, including those reduced to such fragments as we have mentioned, and, aided by the somewhat meagre particulars afforded by the county history and traditions, has placed his survey in the hands of the public in the form of a pleasant unpretending volume. His collection includes illustrations of crosses that were once famous, but are not now to be found, as well as of some that have been removed and others that have been restored. Gloucester, for instance, once possessed a fine old cross which stood at the point of intersection,—the “cross”—of its principal streets. It is marked in Speed’s map of Gloucester, 1610, and an engraving of it is given in the *Vetusta Monumenta*; but not a stone of it has been preserved. Mr. Pooley reproduces this illustration of the lost treasure. The vicissitudes of some others are represented with like care. Bristol cross has likewise been removed; but it has been preserved, and a new one, carrying out its sentiment, placed on its site. Some half-dozen have been restored with more or less feeling. As in other parts of the country, some of them are built in close proximity to wells; and in one case antiquaries

find it difficult to decide whether the dwarfed pyramidal structure close to a spring was originally intended for a cross or a well-cover.

Of all the Gloucestershire crosses, perhaps that of Bristol was the finest. Mr. Pooley relates its vicissitudes with more detail than he is able to give in most cases. A town clerk in the reign of Edward IV., who must have been an archæologist in his day, has left a drawing, among the archives of the city, of what he considered was the aspect of Bristol in the Saxon era (?). He shows a four-sided walled city having an embattled gateway at each angle, from which four roads depart, all meeting in the centre of the town, thus forming a St. Andrew’s cross. At the point of intersection he places the High Cross. The first historical mention of the structure occurs in a MS. calendar, where the year 1247 is given as that of its erection, when Bristol and Redcliffe became one town and the two former markets were merged into one; “and both being made one were kept where now it is, and a faire cross there built, viz., the High Cross, which is beautiful, with the statues of several of our kings.” This account does not, however, quite tally with other evidence, which gives the exact date as 1373, and the occasion of its erection a desire to commemorate a charter granted by Edward III., in which the municipal difficulties of the burghesses were diminished. Hence, we may conclude that tradition handed down the existence of a cross upon the spot shown by the Medieval town clerk in his restoration, and that, as in these later days, it has in the course of centuries been more than once removed and replaced. It is pretty clear that the memorial of Edward III. is the cross that stood down to the year 1763, when it was given by Dean Barton to Sir R. C. Hoare, of Stourton, who removed it to his seat, and had it erected there at a cost of 300l. It was a building of three stages, surmounted by a spire, the whole being 39 ft. 6 in. high. The first stage was an open arcade; the second a series of four niches filled with the full-length statues of the kings who had been benefactors to the city; and the third another range of canopied niches, each having the figure of a monarch seated in it. It was built of a coarse grained oolite, the liability to injury from frost and rain, being guarded against by polychromatic decorations. The upper stage of statues appears to have been added in 1633, when it was placed in efficient repair, though somewhat marred by the curious design of its new pinnacle. Mr. Pooley finds evidence that it was re-painted and gilded in 1697 with such sumptuousness as to rival every structure of the kind in the kingdom; and in 1733 taken down at the request of a silversmith living close by, who feared that it would fall and kill him. It remained for a time in the Guildhall forgotten, when Alderman Price exerted himself in its favour, and got it erected in the centre of the College-green; but in 1763 it was again protested against and pulled down, and thrown into a corner of the cathedral, where it remained till the dean, mentioned above, gave it to the owner of Stourton. In 1851 a feeling of regard, or compunction, or regret, induced the burghesses to build a new cross, and place it on the site this interesting relic first occupied, which was done at a cost of 450l.

Cirencester Cross has shared a similar fate, so far as it is removed and rebuilt in private grounds. This was of a different form from those of Gloucester and Bristol, and not more than 20 ft. in height. It was a tall shaft standing on a solid base raised on steps, or on a calvary. The capital of the shaft possessed some sculptured decorations, and was surmounted by a cross. There were six crosses in the town about eighty years ago; but this is the only one that has been preserved. It was removed first to the neighbourhood of a fine avenue of firs in Oakley Park, the seat of Earl Bathurst, and thence to

another spot in the same park. The same form of cross exists at Clearwell, Ayltherton, and Sydney, diversified only by the number of the steps, the ornamentation of the pedestal, and the absence or presence of the shaft. That at Clearwell has a new shaft. The pedestals and steps of the two latter are the only remains.

A different form of cross exists at Iron Acton. It is called a preaching cross, and is built in the churchyard, on the north side of the church. This structure is raised upon three octagonal platforms, rising one above the other, and diminishing in size. It consists of four arches formed by four buttresses connected by groining ribs to the capital of a central shaft. Three of the arched spaces are divided by transoms with cusplings, while the fourth is quite open to admit of the entrance of the preacher. On the crown of the vault of this first stage is a four-sided shaft, having a niche on each face. The basement to this shaft is ornamented by eight shields clasped in the hands of winged figures. The surmounting cross no longer exists; but when present the structure probably measured about 30 ft. in height. Four of the shields are charged with the emblems of the Passion, two are incised with armorial bearings and two are left blank. The armorial bearings give our author the date of the cross (*circa* 1430). This is the only example of this form of the cross in the county.

Mr. Pooley was fortunate enough to discover the head of a remarkably fine cross at Amney Crucis. The base and shaft stood in the churchyard, but, as in so many other cases, the head was gone. This, which he found under a heap of rubbish in a recess on the south side of the church, has now been restored to its proper place, much to the intensification of the interest of the locality. More than this, it appears to be the only evidence extant that illustrates the title of the parish, Amney Holy-Rood. Raddes accounts for the name from the circumstance of a large cross being there; and Sir Robert Atkyns mentions that it is derived from the Holy-rood in the church. But the newly-found head of the cross suggests another version. In one of the four niches is a representation of the Virgin and Child, which Mr. Pooley considers is a testimony to the rights of Tewkesbury Abbey (likewise dedicated to the Virgin) over this church and parish. In the second niche is the complete Rood, to signify, as the image of the Virgin did with reference to the abbey of which she was patron, that this church was dedicated to it. In the two smaller niches, one at each end of the oblong block of stone forming the head, are two figures, one of which our author reads as Gyraldus, first abbot of Tewkesbury; and the other as Robert Fitz-Haimon, a Norman knight, who, at the suggestion of his wife and the pious Gyraldus in question, rebuilt Tewkesbury Abbey. Altogether, taking the costume and style of architecture into consideration; our author concludes that a subsequent abbot, Parker, erected the monument at the close of the fourteenth century as a testimony of the dependence of the church and parish upon the abbey; as an authentication of their title; and as a perpetuation of the memory of the abbot and knight who founded the establishment at Tewkesbury.

Among the mutilated remnants the cross at Westcote is remarkable for the suggestions it makes of its heauty before destruction. The base alone remains. This is 2 ft. 1 in. in height and 2 ft. 1 in. in diameter, of an octagonal form, each face of the octagon being recessed as a trefoil-headed niche, with a standing figure in it, having the appearance of thirteenth century workmanship. It is a mere wreck; but the fate of the village or church to which it is supposed to have belonged is still more melancholy. There was once a village called Coombe Baskerville in this parish, and this bit of the cross is the only memorial of the fact that has ever come to light within the memory of the oldest inhabitant.

* Notes on the Old Crosses of Gloucestershire. By Charles Pooley, F.S.A. With numerous illustrations on stone and wood. London: Longmans, Green, & Co. 1868.

Village and church have as completely disappeared as a Mediæval crop of hay.

The nearest approach to the type of the celebrated Yarnon cross in Oxfordshire is in Didmarion churchyard. Here it is called "the preaching stone," though when the present incumbent came to the parish only the top of the broken shaft was above ground, the octagonal socket being buried in accumulations of soil. On four of the faces of its base are four half figures sculptured in high relief, which are, probably, intended for the four evangelists. It is now raised on two stone steps, set diagonally; had these been circular, it would have resembled the Yarnon cross still closer. The Biskay cross differs from any other. This well-known object consists of a panelled hollow hexagon, surmounted by a hexagonal truncated spire, ornamented with cusped arches and recesses. Probably portions of the original base and summit are both missing, though a small modern cross finishes the structure at the present day. At the angles of the hexagonal pedestal are columns supporting cusped arches; and half-way up the pyramidal cover, at the angles, run thick fillets. Mr. Pooley tells us that the good villagers once kept their baptismal font upon the top of this cross, though, to their credit, they have now removed it into the interior of the church. This is the cross which some archaeologists say is, perhaps, an isolated campanile. The villagers call it "the bone-house," and it has been considered a well-cover. Our author says,—

"There is a traditional belief that some one was drowned in a well in the churchyard, and that the well was ordered to be closed, and this building erected over the spot. This is mere conjecture. The truth more probably is, that formerly a spring, since dried up, rose there, which, according to custom, was protected from pollution by the erection of this building over it, and at the same time consecrated by having a cross fixed on the top. The circumstance of the baptismal font having been placed there would lead to the supposition, that at one time it was used in that situation for baptismal purposes, and perhaps water was obtained from the clear spring below."

At King's Weston, in a garden in the rear of King's Weston House, is a cross which is said to be the Sailors' Cross, or one to which mariners paid their devotion as they sailed up and down the Severn. It is of a type very common in the county,—a tapering shaft squared at its foot by broaches, with a solid broached socket set upon three steps. Ivy has grown upon it up to its summit, which, however, is not more than 9 ft. from the ground. That this is ground not yet explored by the archaeologist we may assume from the discovery of the foundations of a chapel close by a few years ago, concerning which no information appears to be at hand. At Calmsden there is a tall tapering wayside cross, with a spring of clear water bubbling at the foot of it. It is placed on four steps, and is composed of a pedestal, a hexagonal monolith, and a cube, the four sides of which face the cardinal points. Placed there in the early part of the fourteenth century, or in the days when the Knights Hospitalers of Jerusalem were located at Quenington, close by, this structure has escaped the rough treatment that so many have experienced. The charm it gives to the elm-shaded nook in which it stands is great. Mr. Pooley's labours will doubtless secure the preservation of many fragments that might otherwise have been lost sight of; freshen many memories; and serve as an agreeable indication of what Gloucestershire possesses in this department of archaeology.

IMPERIAL ARCHITECTURE AND IMPERIAL FINANCE.

THE architect, whatever may be his political bias, must confess a weakness for the French empire. Whatever other claims the second ruler of the house of Buonaparte may have on the gratitude of France, he must at least be regarded as a great builder. We may criticise style, we may say it is easy to build at the cost of others, we may apprehend evil consequences from over-building; but, after all these and many other objections are exhausted, the architectural facts remain. The second Emperor of the French cannot be said to have found Paris brick and to have left it marble; but if he found it fit for the capital of France, he bids fair to leave it fit to be the capital of the civilized world. The completion of the Louvre alone would have reflected no slight glory on the reign of any monarch of the line of St. Louis. The name of the ferocious

Alva is borne by the busiest street in the world, the *Via di Toledo* of Naples, which was a long, straight, military road, pierced through city and suburb by that unsparring veteran, but which in width and grandeur is in no way comparable to the *Rue de Rivoli*, although incomparably more picturesque. For the painter, indeed, and for the antiquary, Paris is now to a great extent spoiled, no less than it is for that erratic and characteristic group of natives whose chief delight is in the building of barricades. The citadels of *Émeute* are overthrown; the centres of insurrection are brought under direct lines of fire. The new quarters for the garrison of Paris are no less admirable for their military convenience than for their architectural fitness for their object. Masked guns may at any moment enforce that supreme reason which is the logic of a man who holds an army in hand. In these piles of palatial buildings, miles of broad street and broader boulevard, careful and studied provision at once for the proper accommodation of metropolitan traffic (so much needed in London) and for the supply of possible political or military exigencies, it is impossible to ignore the genius of a great builder. As to the cost, we have a word to say; but it is so common to see money melted away without result, that in a case where the result is colossal we must be excused for lingering on that fact with the admiration which it demands.

But the building energy of the empire is not confined to Paris. Activity is normal in the France of our day. Lyons, long a stronghold in which discontent could entrench itself at the shortest notice, is no less transformed than the capital. Marseilles would be unrecognizable by the good bishop whose devoted life during the ravages of the plague has consecrated his memory by a more indisputable canonization than that against which the "Devil's Advocate" is called on to plead at Rome. Nearly two milliards and a quarter of francs—a sum equal to ninety millions sterling—have been "borrowed" since 1852 by the towns, departments, and communes of France, including Paris; so that the past fifteen years have been good times for all those who live by the click of the trowel or the blow of the mason's hammer in France; good times for most of those who live by the compass and drawing-pen.

It is evident that the question how far this extraordinary architectural activity has been over-stimulated and unnatural is one of immense importance. With us, where the architect still earns a living (to the envy just now of his sturdy but starving brother, the engineer), the lesson to be derived is one of no small importance. It chiefly concerns us to read it aright. Two main perils are likely to follow a forced activity in city building: the one is, that the consequent rise of rents may bring discomfort and distress on the population; the other is, that the accumulation of workmen is such as to make it a grave political danger to discontinue their occupation. We may add the great sacrifices often entailed on the poorer classes of citizens, or at least of city dwellers, by the "improving away" of their humble abodes. For the rent—its struggle between the owner of capital invested in expensive residences for due return on his outlay, and the inhabitant who, not discontented at the price of that which, *bon gré, mal gré*, has been substituted for it—will, no doubt, sooner or later, adjust itself. But the temper of the people will not be improved in the process, and spent to a considerable amount must fall upon some one; and the some one always ultimately means the public. The second danger is one which we can less realise in this country. Its magnitude is evident to those who are familiar with the genius of the French nation, or even with the facts of French history. The worst of it is, too, that, whatever may be its magnitude, it has been actually incurred, and that, even within the past few months, significant hints have been given that it is by no means imaginary.

The reconstruction of Imperial Paris, of an Augustan Lyons, a Julian Marseilles, the stimulus given to the labours of the architect and the engineer by the powers of the prefects of departments, is, however, but a small portion of the magnificent expenditure of the Second Empire. During its fifteen years of existence, it has spent, exclusive of the above-named departmental outlay, eleven milliards of francs more than the total expenditure incurred during the fifteen preceding years of parliamentary government. Of that sum about eight milliards

has been derived from increased taxation, and the remainder from the expeditious resource of loans.

The main evil of reckoning without one's host is the probability that the operation will have to be repeated, and that to the satisfaction of the latter. It is a long account, that has been running up for the last fifteen years, and although the veritable host, the French nation itself, has not yet called for the reckoning, a sort of programme of the Bill has just been sketched by M. Horn, and that in very formidable figures. Yet the whole case is far from being exhausted when we have grasped the summary of the *Bilan de l'Empire*.

There can be no doubt that the national expenditure, or rather the administrative expenditure, of the French empire has been on a scale of unprecedented magnitude. Not only so, but it may be said with perfect propriety that it has increased, is increasing, and ought to be diminished. It is something to disentangle the purposeful confusion of the French budgets. It appears that in these documents the most instructive point, the sum total, is generally so studiously veiled that it is only by a degree of clear-headed investigation, for which few men of adequate ability have time to spare, that it becomes evident what is actually expended from year to year. There are budgets ordinary and extraordinary, prospective budgets, rectifying budgets, supplemental budgets, and definitive budgets. The amounts of three or four years, in different stages of "rectification," are continually referred to together; and the habit prevails of stating all those various items rather in a relative than in a positive manner. The increase or diminution of an amount, as compared with the magnitude of the amount devoted to the same purpose in some other estimate, or in some former year, is the main feature visible in the reports of the finance ministers. To present actual facts and definite totals in a few intelligible lines seems to be repugnant to the genius of imperial finance.

It is, therefore, a service to those to whom the stability of political institutions is matter of concern, to bring clearly before their view the main and gigantic outline of the French revenue, and the far more colossal outline of the French expenditure. It is in the comparison of the two that the gist of the question lies. It is much to know that France has been living, financially, since 1852, at the rate of 30,000,000 sterling a year. It is more to know that the Imperial Government commenced by spending 12,000,000 sterling per annum more than its predecessor. It is even more to know that, after fifteen years of rule, that Government is now spending 12,000,000 sterling per annum more than it did at its commencement, or 24,000,000 more than its predecessor. But it might be the case that this great increase in expenditure was only an indication of the elastic and vigorous growth of the national prosperity. In itself, a large expenditure may be regarded as a sign of wealth. To say, then, that the France of 1868 is spending more than a third more than did the France of 1840, may be met by the rejoinder that the difference is the result of a healthy and robust development of the elements of national grandeur.

It is here that the importance of clear and distinct statement becomes apparent. The import of the facts thus far may possibly give rise to differences of opinion; but the actual facts are not matters of opinion, but of definite knowledge. As to the wisdom or the reverse of a liberal expenditure there may be room for discussion; there can be no room for doubt as to the result of a steady, unchecked, augmenting increase of debt. This certain test of progress or of decline cannot be altogether concealed. While raising revenues unknown to the earlier rulers of France, the financiers of the empire have more than doubled the national debt. Since the year 1854 eight loans have been authorized, amounting to a total sum of 125,480,000. The floating debt, which will only be partially reduced by means of the 18,480,000 loan of the present spring, amounts to 25,000,000 more. The same profusion of expenditure,—for to expend continually 10 or 12 per cent. above your income is profusion,—marks the proceedings of the minor administrations of the country no less than that of the ministry of finance. The cities and corporations of France, including Paris, have, as previously stated, raised loans to the amount of 90,000,000 sterling within the same time. Exclusive of this the State alone has steadily and systematically exceeded its income

large as that income has been, during the whole time of the Second Empire. The loans which have met and, as it were, veiled that excess, have been placed on the market in a manner unprecedented before the present reign. The ultimate source of revenue, the public, has been appealed to directly, and not, as in ordinary financial operations, through the agency of the larger capitalists. The readiness with which the country people of Franco have laid out their savings in the investments offered from time to time by the Government has increased the horrowing power of the latter, and removed that check which is imposed by the experience of men accustomed to operations of a monetary character. Confidence, no doubt, is thus to some extent shown in the Government, while, at the same time, the bonds of society may be drawn closer by interesting the poorer classes in the stability of existing institutions. But a facility in anticipating the resources of the future, which must be termed a fatal facility, has financial perils enough in its wake to counterbalance any such political advantages.

The loan of the present year has this special feature of evil promise. It does not even profess to be the last of a long series. On the contrary, on the very face of the application it is shown to be a mere loan on account; not providing for the floating debt, which is only reduced by about a third—not even providing for the expense of the re-organisation of the army—in fact, doing nothing but give temporary and partial relief. Temporary relief, at the cost of permanent and intolerable burden. So long as M. Fould was at the head of the finance department—so long, indeed, as his application to that able financier to take office on his own terms, in case of need, was possible—France was always in a state of hopeful expectancy as to her finance. If revenue did not meet income this year, it would do so, it was anticipated, next year; if not, certainly not later than the year after next the equilibrium would be established. For the first time this promise has now disappeared. Loan this year does not mean no loan next year. Quite the contrary. The revenue of this year being insufficient to pay the outgoings, including the interest on former loans, 18,480,000*l.* is borrowed to stop the gap, and to increase by the additional interest which the tax-payer has to provide to the burdens on the already insufficient revenue of next year.

There is one set-off to this gloomy picture—a picture which is by no means that of France alone, but which more or less accurately represents the state of affairs over the greater part of the European continent. The property of the French railways will ultimately revert to the State. In 1865 the net revenue derived from the railways was 12,500,000*l.* The augmentation of the gross revenue during the past year was a little over 2,000,000*l.* Thus, if the French national debt could be kept within the limits which it attained in 1865, there is reason to hope that by the year 1955 the whole burden of the *Rente* would be removed from the shoulders of the tax-payer and provided for by the self-collected revenue of the railways.

It is rather a long period to wait. There is that amount of hope in the distance; but what a distance! How does experience in other countries tell us that the expected benefit may be discounted before it arrives? As it is, if the present rate of increase of the French debt be maintained, a sum equal to the whole capital represented by shares and debentures will be added to the existing debt within thirty years. Within the ninety years at the expiration of which the French nation is to enter on the proprietary enjoyment of its railway revenue, three times the total amount of the entire railway capital will have been borrowed to make both ends meet. The hope and comfort of 1955 is therefore somewhat cold.

The inadequacy of godsend to restore the balance of national income and expenditure is being illustrated even as we write. The vast and hereditary property of the Church, in the former kingdom of the Two Sicilies, has just been cast into the seething oculo of Italian deficit. What is a network of railways in comparison to that long accumulating and fertile estate—the harvest reaped by the clergy, where their influence was most irresistible, in the very garden of Europe? Wherever you see a spot specially favoured by nature, rich in the heaviest growth of grapes, shaded by the loftiest stone vines, dark with arcades of orange-trees, or glittering with the silvery foliage of the olive, throughout Southern Italy, you may be sure it is

the property of the Church. Such a boon, or such a robbery, call it as we like, should have extinguished extreme poverty for the remainder of the century. How far will it go? The telegraph makes answer as we write:—"Comte Cambrey Digny demonstrated that not more than 574,000,000 lire of ecclesiastical property were available to remove the deficit of 1868 and the forced currency. He deemed it necessary, therefore, to meet the deficit of 1869 by new taxes." The actual amount of the Church property has never yet been clearly known. Eighty millions sterling was spoken of as a low estimate when the idea of seizure first assumed a definite form. The evaporation of this noble property into a miserable contribution towards the deficit of only a couple of years, is one of the most striking and appalling lessons of modern national finance.

We have been almost alone in the English press in calling, and repeatedly calling, the attention of our readers to that which, in our deliberate opinion, is the first European question of the day. Even war itself, uncertain in its outbreak, is now for the most part brief in its fury, and chiefly injurious, in its permanent effects, by the increase of debt which it involves. The steady, certain, and rapid increase of public debt menaces more unavoidable general distress, and probable internal convulsion, all over Europe. In Paris the minds of men are now becoming fixed on this feature of the political situation of the day. Four pamphlets have appeared within the month of March, grim satires upon the "inspired" and feeble "*Vives de la Dynastie Napoléonienne*." The last of these publications, an examination by M. Achille Mercier, of the *Grand Livre*, or record of the public debt, distributes the burden between the successive Governments of France in startling proportions. Eleven per cent. alone was incurred by the old régime, Three per cent. by the Parliamentary Government of the Restoration and the July Monarchy, Eleven per cent. by the First and Second Republics, and Seventy-five per cent. by the First and Second Empire!

The attempt is now being made to galvanize into artificial life the failing attractions of the foreign loan market, and the most unusual profit, upon paper, is promised to those who will take shares in a species of consolidated foreign loan company. It is, of course, possible that among a number of foreign indebted Governments some may continue to meet their engagements for a year or two longer than others. Any man who thinks it wise and safe to invest money so as to obtain a promised or even an incipient return of 15 or 20 per cent. can generally find the means of doing so. There is a west-end discount market in which such rates are current, no less than on the foreign hedging markets. But we cannot too distinctly repeat that, unless some vast revolution occur in European finance, the cessation of the payment of dividends on the national debt of Europe is, with few exceptions, a question of time alone. And when the crash comes in one State, it is not very likely that neighboring stocks will be permanently stable. We have called attention in these pages to the rapid growth of the metropolis of England—a fact unparalleled in the march of European civilization. London doubles her size in forty years. The debt of Imperial France laughs at the slow progress of the London builders. It has more than doubled itself in fifteen years. *Vive la dette!*

ON THE UTILIZATION OF SEWAGE BY IRRIGATION.*

The Crop.—From the principle and conditions of sewage irrigation, its peculiar fitness for the cultivation of grass lands has long since been definitively settled, and hitherto there has been discovered no other crop which so fully repays its application, or which, indeed, can receive beneficially the whole year round, the constant flow of the liquid. We find, therefore, in all those districts where the systematic utilization of sewage is being carried out, grass, in many varieties, is the staple product. Other crops must arrive at a mature growth ere they can be reaped with profit; but with grass it is not so; it may be cut with advantage in a green state, and so disposed of; or, again, it may be eaten on the ground at various stages of growth, and by these means several successive crops may be

obtained. This important quality of reproduciveness, the facility of its cultivation, and the readiness with which the ground may be turned to irrigation purposes, render the adoption of the grass crop by far the most profitable. Where a root is cultivated, the judicious application of sewage may be attended by immense benefit; but the crop cannot be repeated, nor can the liquid, which is at all times flowing, be regularly administered even during the one growth. Consequently; although arable lands may be made accessory to the utilization of sewage, and thus reap considerable advantage, grass lands alone can be relied upon to develop to the full extent its true commercial value.

Cereals are not adapted for beneficial cultivation by methodical or regular irrigation, as, generally speaking, the climate of England contains of itself too much humidity, without artificial addition. It is in fine dry climates, under an unclouded sky, that the soil gives forth the finest crops of wheat and other grains; whereas, on the contrary, universal experience has shown that the richest pasture-lands are found under a moist sky. Moisture in a cold country is indicative of a temperature comparatively mild and equable; and a mild temperature, with moisture, promotes the rapid growth of grasses; it is certain, moreover, that the grasses most rich in nutritive properties, especially in milk-producing, are those of rapid growth. In putting sewage-manure in regular quantities on corn lands, you are supplying proper ingredients in a too diluted form; in bestowing it, in like manner, upon grass lands, you are supplying these same ingredients in their most beneficial form.

Still, there are occasions when every crop may derive benefit from a timely application of sewage, as when in tender growth, after a protracted period of drought, it would have the same invigorating effect as a shower of rain, besides a certain manual power. The dressings in these cases must be very light, and carefully administered; and where the crop has attained any weight, and the use of the hose and jet rendered hurtful, special preparation of the ground will be required, an expense which may weigh so heavily as to take away the profit. If, however, by a very flat system of catch-work, at slight cost, sewage is thus brought into use upon cereal crops, undoubted benefit will accrue during a dry season.

The almost universal application of the sewage irrigation principle has been illustrated by a remarkable series of experiments at the works of the Metropolitan Sewage Company, at Lodge Farm, near Barking, which have been fulfilled upon so extensive a scale as to be deemed conclusive. The land is of the poorest kind, the gravelly sub-soil coming up to the surface in many places. Of this soil, about sixty acres was in 1866 prepared for irrigation, partly by the system of bed-work, and partly by catch-work,—no fertilising material of any description having been previously applied, with the exception of the harrowing in, here and there, of a thin and patchy coat of rye-grass of the past season. The results are described as being nothing less than wonderful.* On one piece, eight or ten tons per acre of rye-grass were cut early in April, ten or twelve tons were cut in the middle of May, and twelve tons again in the week ending June 22nd. This was sown in the August of the preceding year. Another small piece adjoining, which had been in potatoes, was sown in September, and did not yield the first cutting until early in May, when it produced not less than sixteen tons per acre; after which, in the week ending June 22nd, it produced a crop of fifteen tons to the acre. This is stated to have received 4,000 tons of sewage per acre. From a very poor gravelly slope, seven acres in extent, upon which was sown 2,400 tons of sewage to the acre, twenty-five tons of grass was taken in two cuttings. Mangel-wurzel, potatoes, lucerne, flax, and wheat were all remarkably luxuriant under certain applications of sewage. On two parts of a poor field of wheat the plant was strong and thick, with ears plentiful and large, the only explanation of the difference being that here during the early growth of the crop three or four slight dressings of sewage had been administered.

In this way Alderman Mechi has found sewage to be good for every kind of crop, and as a special preparation for subsequent crops.† For when the ingredients of fertility may not forthwith be utilised by the plant, the soil retains

* See pp. 146, 163, 202, and 222, ante.

* *Agricultural Gazette*, July, 1867.

† *Rep. Met. Sewage*, 1864: 3333, 3100.

them until required. A very clear illustration of the expediency of treating wheat crops with sewage in their earlier stages of growth was given in evidence by Mr. J. Dales. During seven years that gentleman applied nothing but sewage to a field of ten acres, which returned crops of wheat of unusual quality and quantity, yearly increasing, so that the last year's crop was the best. The application was regulated during two or three months every year.* We are also given to understand by Baron Liebig that in the *Commune of Oligheim*, near Rastadt, in Salzburg, sandy, unproductive soil was converted by the application of sewage into flourishing cornfields.† The Earl of Essex, experimenting upon sewage, marked out two adjoining acres in the centre of a field of wheat, to one of which he applied 270 tons of sewage, and to the other none. On being reaped, it was found that the first acre returned a value of wheat in excess of the second amounting to 3*l.* 1*s.* 6*d.*, or 2*d.* per ton of sewage applied.‡

The above cited examples of the successful utilisation of sewage in grain cultivation are too numerous and consistent to be considered as exceptions to the general rule; and, although the more important of them have not been subjected to the conclusive test of time, yet they afford a very good *prima facie* proof that few circumstances exist in which this manurial agent may not be utilised advantageously, either alone or as an accessory. It must be understood with reference to cereals, that no such quantities as have been instanced at Barking in the growth of ryegrass can be applied. It is generally held that a free and constant application of diluted manure tends more to the increase of straw than of the grain itself.

Maricic, or Italian ryegrass and clover, has been found by experience, both here and on the Continent, to be peculiarly adapted for irrigation, and it is therefore preferred to all other crops for this purpose. It is naturally of a rapid, luxuriant growth, and most readily avails itself of the fertilising properties of sewage. So extraordinary is this facility that it has been credibly asserted that as much as 100 tons of Italian ryegrass per acre has been reaped in a single year, while of ordinary grasses the quantity has reached 30 or 40 tons.§ With solid manure we have the authority of Mr. Lawes that 12 tons is the maximum quantity in ordinary grasses; but the most remarkable fact in connexion with this wonderful luxuriance of growth is that, according to the analysis of Professor Way, grasses irrigated with sewage contain 100 per cent more meat-making matter than grasses not so irrigated.¶ Experience, too, has shown that the milk from cattle fed on this grass produces far more and finer butter than usual, and is consequently in much greater demand. The old fallacy, therefore, that forced growths produce thinness and indelicacy in the article grown is thus once more signally refuted.

The fact that hitherto ryegrass alone has been found to possess this uncommon property of beneficially utilising sewage the whole year round, has been cited by the opponents of sewage irrigation as a fatal drawback to that system. It is asked,—Where is the market for such enormous quantities of a single product to be found, supposing that the whole of the town sewage of this country were to be applied to its growth? It is asserted that such a market does not exist. This assertion cannot be maintained. There has been of late years a charge laid against English agriculturalists of a tendency to curtail the cultivation of the wheat plant and extend the cultivation of pasture. Each year finds the extent of corn-lands decreasing through the high prices of manures and other causes, while the production of live stock increases. Every year the burthen of foreign importation grows heavier, as well in cattle as in corn; but far more seriously in the latter than in the former. Whatever tends to lessen this grievous burthen should be pursued with energy, and every discovery in agricultural science should be received as another step regained towards national solvency. The immense production of

food for live stock in the shape of sewage-grown ryegrass must inevitably lead to the stoppage of foreign importation, and ultimately to the restoration of corn-lands to their original purposes, manures of every kind being brought down in value. All the irrigation farms in the neighbourhood of large towns are stocked with cattle, which, as has already been said, are reared in fine condition, producing the richest milks and the finest flavoured buty.* It is possible also that the making of hay by artificial means may soon be introduced as an efficient auxiliary.

On the cultivation of ryegrass, the land must be broken up and sown every three years. If this be neglected, a steady diminution of crop may be anticipated.

In summing up the advantages derived by the crop from sewage irrigation, the exceeding value of the temperature it presents must not be omitted. It is a consideration of no mean importance, that in a country like England, whose climate is bleak and uncertain, we have at our disposal a vast supply of liquid manure, which, while it is rich in all the elements of vegetable food, comprehends also the quality of regular temperature, so that in winter as in summer, nay, even when the snow is on the ground, the process of vegetable growth may be uninterrupted. And in the colder weather, when its effect is enhanced in value, this temperature riss in proportion as it is needed,—a result, due no doubt to the more habitual use, at that season, of hot-water for household purposes. Conversely, when the temperature of the atmosphere passes a certain limit of heat, that of sewage has a grateful and cooling effect on the soil. In reference to this subject, Mr. Latham says,—“From an experiment made during the winter of 1864 upon the irrigated fields of South Norwood, and carried out during a period of severe frost, he was enabled to cultivate a crop of ryegrass which was only sown in the early part of the month of November, and when measured at Christmas in the same year the plant was found to be 6 in. in height, and was then growing luxuriantly; and during the following year that crop was cut six times, the last of which was within one week of Christmas-day, 1865. The first crop measured 35 in. in height; the second, 40 in.; the third, 42 in.; the fourth, 32 in.; the fifth, 34 in.; the sixth, 14 in.; the total length produced, 187 in., which realised 40*l.* per acre.”‡

Mr. Latham's tables referring to the temperature of sewage at Croydon and Norwood, show that during the months of February, March, and April, 1865, while the temperature of the atmosphere varied from 32° to 67°, the variation of the temperature of the sewage at the outfall was only between 43½° and 55°; giving in the former case a difference of 35°, and in the latter a difference of 61°.

Sanitary Effects of Sewage Irrigation.

As to the Purification of our Water Supply.—In treating of the question of the utilization of sewage, we must always recur to the pre-eminent consideration to which it has reference, namely, the restoration of our riverine waters to their normal purity. If we make, then, a brief inquiry into what has actually resulted in this respect, we shall thereby be enabled to arrive at a proper conclusion as to the purifying effect which irrigation has, or is supposed to have, upon the sewage of towns, and, correlatively, upon those currents which heretofore have been infected by the infusion of such sewage matters. If it be proved that, after sewage has been applied to the land, by a process harmless in itself and at no impracticable expense, the residue—that is, the great volume of water by which the ingredients of fertility are transported—goes to swell the

hulk of our water supply in a pure state, there is needed no further demonstration of the expediency of adopting such a process in all convenient situations. For by no other means has this been accomplished. So important is this point, that irrespective of commercial return, or, further, even if such process were conducted at a certain pecuniary loss, the laws of public health determine it to be our bounden duty to promote its universal adoption until better substitutes be found.

At Croydon, after a litigation costing 10,000*l.* and after every conceivable expedient had been resorted to, the Board was absolutely compelled to have recourse to irrigation; and the river Wandle—the fouling of which originated so many lawsuits with the conservators, and ultimately proved of immense benefit to the cause—now receives the sewage water in as pure a state as clear river water ordinarily is, so that the fish in the stream come close up to the outlet, and have been found within it.* The engineer states that the water after purification is purer than that supplied by many metropolitan companies, and gives the following figures:—

Water supplied to towns contains	
of solid matter	21 grains per gall.
Sewage contains	39 ” ”
Sewage after utilisation contains	25½ ” ”

From this it appears that the amount of solid matter in a gallon of purified sewage water is but two grains in excess of the solid matter contained in the same quantity of the ordinary water supplied for human consumption.

Against this, however, it must be stated that an analysis of the sewage of Edinburgh before and after irrigation, made for the late Mr. Smith, of Deanston, recorded very different results; that whereas, before irrigation the sewage contained in the gallon 324 grains in suspension, and 87 grains in solution, after being passed five successive times over the soil, it contained but two grains in suspension and 72 grains in solution; thus showing that while the abstraction of the suspended matters was almost complete, only 16 per cent. of the matter in solution was taken away.†

The apparent inconsistency between the results of Croydon and those at Edinburgh is capable of a very simple explanation. At Croydon the mode of application has been reduced to a comparatively perfect system, under the supervision of an engineer whose name has been justly identified with the progress of sewage irrigation. At Edinburgh there is no system. The sewage is in the hands of certain owners of land, by whom, or by whose tenants, it is applied by a very rough system of catchwork, with such prodigal profusion that in many cases it passes off in a flood without the slightest percolation into the soil, and in a perfectly discoloured state. Evidence to this effect was given by Mr. Lawes, who certainly can be supposed of no undue prejudice in favour of sewage irrigation.‡

The degree of purity which has been obtained at Croydon must, therefore, be admitted as a practical illustration, capable of further improvement, of what can be effected by sewage irrigation, when conducted in a careful and scientific manner. When this result is compared with the results of all other methods of purification hitherto tried, many of which have absorbed a serious proportion of the rates annually levied for sanitary purposes, it cannot be rejected as doubtful or in any way unsatisfactory, and may be reasonably accepted as a valuable solution of the most important item in the sewage difficulty. The endless variety of circumstances in which our populous districts are placed may no doubt prove a barrier to the universal adoption of irrigation as a remedy. Yet an impartial estimate of its merits and demerits cannot fail to leave a well-grounded impression that it is destined to take the foremost place in the progress of agricultural and sanitary reform.

The powerful chemical action of arable land in decomposing and absorbing the dissolved constituents of liquid manure has been long known to agriculturists, and such a thing as its draining off in a violently discoloured state after percolation through an arable stratum is unknown under proper management. Lichig says, “Diluted liquid manure, of deep brown colour and strong smell, filtered through arable soil, flows off colourless and inodorous; and not

* Rep. Met. Sewage, 1864: 3766-70. The first crop scarcely paid Mr. Dales, as it yielded only 33 quarters per acre; but at the seventh year he had six quarters and one sack.

† Rep. Met. Sewage, App. p. 318. It would appear, however (see Liebig's Natural Laws of Husbandry, p. 273), that the sewage here referred to was excrementitious matter alone.

‡ Rep. Met. Sewage, 1864: App. p. 346.

§ Rep. Met. Sewage, 1864: 2575.

¶ Rep. Met. Sewage, 1864: 2579.

** Rep. Met. Sewage, 1864: App. p. 345.

* “I cut my grass several times a year, winter and summer, and it is preferred by cattle to any other, and as they milk better, and are in a better condition than when fed on anything else, I sell to all the cowkeepers in the neighbourhood; and what is very singular that, although winterfeed has been given in the neighbourhood, not a single beast fed on sewage grass has been attacked.” Letter of Mr. Samuel Cousins to Mr. Latham, September 29, 1866. *Lesm. Congress Papers*, p. 145. Mr. Cousins is the lessee of the South Norwood Sewage.

On this subject the Earl of Essex writes, “Doubts have been raised as to the fattening properties of sewage Italian ryegrass. I have had 13 bullocks 2½ years old, feeding entirely and solely on cut ryegrass in the yard all the summer, never having an ounce of cake or corn since they were born, and have sold some of them for nearly 20*l.* a piece. Better or fatter beasts, full of inside fat, could not be wished for, which is proved by the eagerness of the hutchers to have six which I have left.”—*Rep. Met. Sewage*: App. p. 345.

† *Leamington Congress Papers*, p. 142.

‡ Paper read before the Society of Engineers, April, 1868.

* *Report Met. Sewage*, 1864: 2228.

† Paper read before Society of Engineers, April, 1866.

‡ *Leamington Congress Paper*, pp. 214-215, Mr. Bauld's paper.

§ *Rep. Met. Sewage*, 1864: 4,698.

nerely does it lose its smell and colour, but the ammonia, potash, and phosphoric acid which it holds in solution are also more or less completely withdrawn from it by the soil, and this to a far greater degree than by charcoal.* (Concerning the supposed direct action of the roots of living plants upon the dissolved organic matter in sewage, there has existed and still exists, no small confusion. We repeatedly see it stated that soil alone will not deprive water of substances thus held by it, but that the living organization of plants is needed to effect a chemical change in the sewage. A few words will dispose of this somewhat prevalent error. The soil alone is the medium by which the chemical transformation of manure is effected, and the plants themselves have no inherent power to chemically dissolve and imbibe their food-constituents. To again quote an eminent authority: "A plant is not, like an animal, endowed with special organs to dissolve the food, and make it ready for absorption. This preparation of the nutriment is assigned by another law to the fruitful earth itself, which in this respect discharges the function performed by the stomach and intestines of animals."†

We see, therefore, that the suckers or root-tubers of ordinary plants can only absorb their nutriment through the digestive medium of the earth,—a process than which nothing can be more natural. The reason why the roots of growing plants have a tendency to facilitate the purification of sewage does not then lie in its capacity to deal directly with the dissolved matter it contains, but in the fact that as rapidly as the particles of earth assimilate the manurial elements, the plant in turn assimilates them to herself in their transmitted form, and thus preserves the land from becoming physically overcharged. A very pointed fact illustrative of this property of soil is, that upon lands where sewage irrigation is carried on it is found that the first crop after the winter season is the heaviest, showing that during the non-period of growth of plants the soil retains the enriching elements of sewage.

At Norwood, the results have equalled those of Croydon; and at Aldershot Camp, where a sanitary injunction was procured against the polluting of the river by the precipitation process, water is more fit for drinking purposes. At Bagby, where the operations from beginning to end were grossly mismanaged, the ground being one time parched and at another drowned, Mr. Walker has stated that, with proper treatment, the water went off in a clear state, although, when drowned and reduced to the condition of a morass, the land of course allowed the sewage to waste.‡ The result of similar judicious treatment at Edinburgh has already been described, and to this cause are invariably traced parallel results elsewhere.

The fact, therefore, that land possesses the property of restoring impure waters to their former purity, by retention of the organic and inorganic matter they contain, may be said to be fully established; and in the present uncertain state of our water-supply, the accomplishment of this end cannot be held as of less than national benefit.

As to its Influence upon the Atmosphere.

Amongst the many attempts to prove the deficiency of sewage irrigation to meet its sanitary requirements, the opponents of this system have taken their stand upon the argument, that the constant presence of so large a volume of impure fluid, as in the case of the sewage of a large city must inevitably tend to corrupt the whole of the surrounding atmosphere, and engender the baneful effects of cholera and other swamp fevers. We are warned, in prophetic diction, that rinderpest, and new and portentous diseases in mankind, will be the unfalling concomitants of sewage irrigation, as well as aggravated forms of typhus and other maladies but too well known; and it is plainly pointed out that in every movement in this direction we are but blindly preparing a scourge for our own backs, in the shape of a pestilential swamp, fated, like the Campanian marshes of ancient Rome, to decimate the land. § To those who have anything like a just con-

ception of the perfectness to which scientific drainage may be carried, and of the quickened action of the soil under its influence, or who know from experience the effect of irrigation upon town sewage, such wild prognostications can only excite an emotion of unmixed wonder that men professing to be followers of science may be so blinded by prejudice as thus to proclaim their ignorance. But as there are many who, while taking a lively interest in this subject, are not enabled by their own scientific or professional knowledge to refute or estimate at its true worth the value of these statements, some little examination into this matter will not be amiss.

Sewage in a stagnant and putrid state, and sewage flowing freshly and rapidly on to the area of absorption, are two very different things. The former gives forth foul emanations; the latter is without perceptible smell, and is perfectly harmless. A handful of sewage-water, such as is delivered on the crop in irrigation farms, may be held to the nostrils without any appreciable inconvenience. As in every condition of water, sewage, if allowed to accumulate and stagnate in any quantity, either in reservoirs or in ill-conditioned sewers, turns to putridity, and becomes dangerously offensive; but in the case of irrigation it is not so. The liquid rapidly traverses evenly laid pipes or brick culverts, and is poured down to its destination in a perfectly fresh state.* It is then passed through the soil—a natural deodorizer of the most efficient kind; and under proper management, as soon as decomposition sets in, the offensive particles are assimilated to the soil and the plant. When this process has taken place, the special system of drainage before mentioned relieves the moistened soil from all superfluous water and danger of saturation. By this means, therefore, of incessant motion or circulation, the fluid is never brought to a stagnating condition; all concentration of offensive gases is effectually avoided; and the state of the atmosphere is such that hardly the faintest odour can be detected during the summer months. So, on the green slopes of high-lying pastures, the pure water falling from the clouds in great abundance enriches the soil and strengthens the herbage, passing off the land harmlessly; while the same water falling upon a flat, boggy, retentive soil, creates a swamp and endangers human life. Accordingly, the argument that the manipulation of town sewage under irrigation is likely to engender baneful effects is destitute of foundation. It is only when its impurities are found in drinking-water, or when the gases they exhale are dangerously exalted by fermentation, that the presence of sewage is to be feared.†

M. P.

TWELVE MONTHS AGO.

BRITISH ARCHITECTURE AT THE PARIS EXHIBITION.

We are reminded of the bustle and excitement of this time last year—of expectation disappointed, of hopes raised only to be dashed, of longings unfulfilled—which accompanied the opening of the Great Exhibition of 1867 at Paris, by the appearance of the Report of the Paris Exhibition Architectural Committee, which has now closed its labours, not without some gleams of sunshine to enliven its last hours.

And, indeed, it would be a pity to let the whole remembrance of this last great display pass away without some lesson drawn from the event, at a time not too remote to notice some of the details of the picture in a mere general retrospect, nor too near to prevent any comprehensive view by the close proximity of detail.

So we gladly recur to the document before us, or, rather, to the events to which it refers, especially as it shows most clearly and distinctly that in the art of architecture at least Great Britain was not behind in the exhibition of works of artistic and constructive building that indicate in a way no mere architectural studies can do the practical importance of the art, and the position which it occupies amongst us at the present day. Speaking now of group I alone (Fine Art—"Architectural Designs and Models"), we may say it was a wise resolution of this committee which limited the selection of drawings at first, when space was valuable, to such designs as

were intended for actual execution, or such restorations as might reasonably be expected to assume some practical form; for thus almost the whole of the exhibits in the British Architectural Court were of a character which showed that the every-day considerations of site, cost, materials, &c., had in a measure ruled the design.

Of an exactly opposite character were the exhibits, generally speaking, of France and the rest of the world,—a circumstance which we could not but greatly regret at the time. The scope thus afforded for magnificence and castle-building in the air, by ignoring all these practical considerations, was too wide, and offered a temptation too strong for the imagination of any artist to resist; and, consequently, an immense number of drawings in illustration of "projects" not likely ever to be realized were contributed by all these exhibitors. While no one would wish to restrain the grand ideas of an architect under such circumstances, no one would argue that designs so produced were calculated to show the real practicability or the real living value of the art so represented. Of course, in a still less degree, would mere academic studies, or fancied restorations of ancient tombs, or the ruined temples of Classic times, be likely to show the state of modern architecture. Yet this representation of modern art was surely the chief if not the sole object of the exhibition; except, perhaps, in the inner circle, devoted to the history of labour, where drawings of ancient buildings might not have been out of place.

In a table compiled by the hon. secretary, Mr. C. F. Hayward, it is seen that Great Britain alone exhibited more than twice the number of designs for actual execution exhibited by all the rest of the world put together; and, with this remarkable fact before us, we think we may fairly congratulate the committee on the result of their labours, and award them our thanks for their perseverance, without which we are assured individuals could not have contributed sufficiently to vindicate the position which we are arrogant enough to assume for Great Britain in the art of architecture.

Further, by comparative figures, it is seen that the Royal Academy and the Architectural Exhibition were not the less teeming with drawings, for all this drain on the resources of the profession; and it must be further remembered that three times as many drawings as were sent to Paris were of necessity rejected for want of space, and that the profession generally was too much occupied with several unusually great and important competitions to give any time to the preparation of special drawings for the Paris Exhibition.

We must refer our readers to the report itself for the how, and the why, and the wherefore, as to photography being added at the last moment, and eventually hung in out-of-the-way places amongst ironwork, tiles, and furniture; but, while lamenting the result, we must not forget the exigencies of the case, and how difficult it is for the executive of any exhibition to suit the various and often extravagant requirements of exhibitors to the dire necessities of limited time and space.

Forgetting, then, most of the little troubles now over, we may fix our minds upon the lesson before us, and draw from the result consolation for the disappointments of the commencement. Turning to the list of awards, we see no reason to complain of the want of appreciation on the part of the jury of the British Exhibition; for do we not see that the fortunate Mr. Waterhouse obtained a grand prize for his Manchester Assize Courts, consisting of a special bronze medal, with the substantial addition of 100 of those ordinary gold medals, called Napoleon; while besides, to Mr. W. H. Lynn, to the late Capt. Fowke, and to Mr. E. M. Barry, were awarded gold, silver, and bronze medals respectively? Thus we may fairly congratulate Architecture on obtaining a far greater proportion of the awards than were obtained by the sister arts in the adjoining galleries; and we understand no *honourable mentions* were permitted in connexion with the Fine Arts.

The Department at South Kensington also deserves the thanks of the profession for its care in forwarding and returning all the drawings, and for the offer of the loan of frames where required, as well as for the organization of the preliminary exhibition; although, to say the truth, some disappointment was naturally felt at the lateness of the arrangements of the drawings at Paris, notwithstanding that this preliminary exhibition was closed in January. The desire also to produce a catalogue on the 1st of

* "Natural Laws of Husbandry," p. 67.
 † "Natural Laws of Husbandry," p. 114.
 ‡ Rep. Met. Sewage, 1864: 3658 to 3632.
 § Throughout the Lexington Congress papers, there is to be found a multitude of vague assertions of this kind, none of which are supported by substantial evidence. A letter from Mr. Samuel Cousins, lessee of the farm at Norwood, plainly demonstrates the slight foundation of such statements.—See p. 145.

* "From the time of using the closet at any particular house in the town, the time occupied by the contents in passing through the drains, through the straining beds, and out again into the river, varies from a minimum of four hours to a maximum of six hours."—Mr. B. Latimer, *Locam. Congress Papers*, p. 151.
 † To be continued.

April, although most of the drawings not being hung were put away out of sight, lest the emperor should see the incompleteness of the Exhibition, led to some ludicrous mistakes in the list, calculated to keep up the due observance of All Fools' Day; but, upon the whole, the result may be deemed satisfactory, even if it lead to the resolve to do better next time. But it is not only architects' designs in the shape of drawings and models that seem to have gained awards; for in the Art Manufactures Court as many as fifteen prizes or honorable mentions seem to have been achieved; so that as the exhibitors numbered about thirty, every other one, at least, may congratulate himself on being recognised. It will not be expected from what we have said in our former criticisms on the objects exhibited in this court, that we agree entirely with the manner in which these awards have been distributed, nor consider the right "exhibits," to use the current phrase, always to have been chosen for this distinction; but, upon the whole, the committee are probably justified in assuming a congratulatory tone to their exhibitors.

Whether or not the whole result, however, in this particular branch of their labours was worthy of the extraordinary efforts required to be used, and the numerous chances of misunderstanding and risk of objectionable interference with tradesmen and manufacturers, we must leave the committee themselves, who surely must have felt the hurthen of them most, to judge; but we gather from the report that notwithstanding all drawbacks, they would at any similar future opportunity recommend a similar course to be pursued,—of course with hopes of greater success; but as the time is probably far distant when exhibiting art-manufacturers will have any opportunity of benefiting by the disinterested labours of a committee of British architects subscribing their money to guarantee them against any distinctive failure, we may safely leave the consideration of this subject for the present.

At the same time we may remark upon the progress made—in the exhibition at least of Architects' Art Design—since the '51 Exhibition, when Pugin's name alone stood prominently out in bold relief as the designer of art-furniture, though of course rather of an ecclesiastical, and entirely of a Mediæval, character.

In the '62 Exhibition, a long list of names connected with art-workmanship appear; and now, in this '67 display at Paris, almost every work of this special architectural art-manufacture owes its design to some well-known architect.

The fact is in itself a justification to the committee in stating that they have done their best to "vindicate the right of the architect to design, or control the design, of important adjuncts to his ordinary work."

Financially, it appears, that the chief portion of the heavy expenses of this Art Manufactures Court (Group III.)—expenses which, let us say, were most unduly increased by the want of system and arrangement on the part of the French authorities, have been partially met by *pro-rata* subscriptions from the exhibitors themselves, but not entirely so; and thus the dividend to be returned to the guarantors—thirty-four in number—though satisfactory in itself, leaves those gentlemen minus about three guineas each, as well as the time, trouble, and anxiety given to the conduct of the whole business.

ON ARCHITECTURAL SCULPTURE.*

IMMEDIATELY that man has satisfied the necessity for shelter, he seeks to relieve the sense of monotony produced by his rude dwelling, by effecting a contrast of some kind, which he does in one of three ways,—that of form, of light and shade, or of colour. At present our concern is with the first two, and chiefly the second. He is not, however, free to express his thought as to him shall seem good; he is limited by the material conditions of the kind of edifice to be decorated, the material he has at command, and the climate he works under. Hence different styles of architecture and systems of ornament,

* The following is an abstract of an address delivered by Mr. Cressy to the students of the Lambeth School of Art, on the occasion of the annual distribution of prizes, on the 17th ult. The principal illustrations were derived from the collection of casts formed by the lecturer's late father, and recently presented to the Lambeth School of Art, which is now rich in Roman art, but requires some additional specimens of Greek and Mediæval work.

varying greatly, yet each may be good in itself, have peculiar beauties, and be subject to certain definite principles of art.

The earliest architecture we have, Egyptian, is peculiarly instructive on all these points. The religion of Egypt led to a peculiar disposition in plan, combining the temple, the palace, and the tomb. Their climate compelled, above all things, shade. A cloudless sky, a sun approaching the vertical, rendered the hypothetical arrangements of the Greeks, and the bold fenestration of the Northerners, inapplicable. Their buildings had small openings for the direct admission of light immediately below their colossal architraves. Hence their illumination was chiefly by reflexion, consequently neither high nor low relief would have been adequately appreciated. Their contours were, therefore, extremely simple, and their decoration depended on gigantic intagli, relieved by colour, forming the richest, most harmonious, and for its place, most consistent decoration applicable under the circumstances. Again, the system of decoration by intagli protects the surface of the sculptured object, and ensures its durability, while the extreme hardness of the granites and syenites, of which so many Egyptian monuments are built, lends itself to the sunk decoration, and opposes itself to a free treatment of relief.

Turning for a moment to a partly contemporary class of monuments we find an opposite mode of treatment. The Assyrian edifices appear to have been abundantly lighted from above. Their purpose was chiefly civil; they were either temples nor tombs, but palaces; while the material, comparatively soft alabaster, readily yielded to the chisel: hence we find the walls covered with spirited scenes, in extremely low relief. The shadows projected would only tell as broad black lines defining the main outline of the subject, whilst the minor details were rendered more visible by means of colour.

The conditions of Greek art differ wholly from the preceding. The climate, though sunny enough, is not the rainless sky of Egypt. True, the chief monuments are temples; but the cheerful mythology of the Greeks developed itself in a very opposite direction to the African nature worship; while their material leaves nothing to be desired, either as regards facility in receiving or durability in preserving the impressions of the artist. Obviously, as well as historically, the Greek decorative architecture was based upon an imitation of constructive forms, which fortunately afforded the requisite contrasts both of form and shadow to relieve the sentiment of monotony. We can conceive, that to a Greek a brick-built tenement would have been weariness to the flesh; but he did not rest satisfied with the contrasts which his constructive lines afforded; he needed the bolder and more diversified, as well as more subtle, and by degrees slowly he arrived at that perfection which we find in the Parthenon. Here we have three separate modes of decoration:—First, the great group in the tympanum of the pediment. The space to be decorated is triangular, with a back-ground of deep shadow; hence the sculptor arranged a group of perfect statues entirely separate and detached from the back-ground, and telling as lights against it. The massive treatment and individuality of each personage insured the intelligibility and distinctness of the parts. The bounding line of the architecture, especially its triangular form, the absence of divisions, and the simplicity of the mouldings, gave unity to the whole group. The metopes have to fulfil other conditions. In lieu of a triangular pediment we have a long flank of many equal square spaces; instead of a deep black back-ground, a series of shallow recesses partly shaded by the cornice. A single composition would be out of place here; we therefore have a suite of independent groups. Detached statues would project beyond and interfere with the lines of the architecture; we therefore have alto-reliefs, strongly relieved against the back-ground, but attached thereto, and, instead of telling as lights against a dark ground, we have an infinite number of high lights, half-lights, and shadows projected on a ground mainly light. Again, in place of a triangular space, each metope is rectangular, bounded by the horizontal lines of the cornice and architrave, and the vertical lines of the triglyph: hence, in his disposition of the limbs of the several groups, the architect sought to give them as much as possible diagonal directions, or at least intermediate between the vertical and horizontal, while an additional contrast was obtained by the oppo-

sition of the composite form of the centaur to the individual form of the man. Still further and subtler contrasts are afforded between the lines of drapery and the nude as well as by the contrasted action of the limbs in each group, and their open action to avoid unnecessary complication, and throwing the shadows upon one another. The third mode of decoration, the Panathenian frieze, was designed to meet quite other conditions. Placed beneath a relatively narrow portico, no direct light could reach it; the illumination was consequently wholly by reflection from the pavement. High relief was, therefore, out of the question; the figures could neither be made to tell as in the pediment as light on a dark ground, nor as in the metopes as themselves casting shadows on the ground; but the generally diffused light enabled the sculptor, by means of a skillful conventionalism, abundantly to tell his story. To do this, the outline of the figures next the ground does not sink or die into it, but cuts it at right angles,—that is, stands up vertically from the ground, and is even in some places nuderent to get deeper shadow; so that the general composition next the ground is indicated by a narrow but deep line of shadow. On the other hand, all the details within the outline are subordinated, the limbs against the figures, the figures against the horses, the drapery and the accessories are much less relieved than nature, so as to produce no shadows broad enough or deep enough to interfere with the main outline. In all gold the basso-relievo parts nearest the spectator are least relieved; those nearest the ground most relieved. In mezzo-relievo, on the other hand—especially small objects like coins, vases, and decorations to be viewed closely,—greater relief is given to the hair, the ear, and generally to the parts nearest the eye, and less relief to the features and other parts nearest the ground. In coins this treatment has condoned greatly to their preservation, as we often see the hair and relieved parts have, by their projection, protected the features and more delicate portions.

With the Greeks, although in the triple temple of Athens, Paandrous, and Erechthens, the Ionic, and in other buildings the Corinthian order, attained great perfection, as is seen from these casts of the capitals and mouldings, yet the Doric undoubtedly attained the highest perfection. With the Romans it was otherwise: that eminently practical people cared more for the building itself, for its destination and suitability to their wants, than for its ideal perfection. Nor were they such good sculptors as the Greeks: hence they sought to relieve the monotony of their surfaces by giving greater force and enrichment to the strictly architectural members, which these casts from Roman buildings abundantly exemplify. Even in these Greek feeling, or, at least, the principles of Greek art, are discoverable. Contrast the acanthus-leaf of the Temple at Tivoli with those of Jupiter Stator; the one is bladdery, swollen, innane,—in fact, my father believed them to be rather cores than finished leaves, and that sharpness was given by a stucco coat,—the other is sharp, bold, clear; the lobes separated by deep shadows; the veinage of the leaf indicated by clear, sharp, fine lines. Compare again the endless diversity of the Greek with the tendency to mechanical repetition of the Roman, beautiful as are some of the decorations of the friezes—Antoninus and Faustina, for example,—their repetition produces on our minds a sense of the very monotony they were intended to relieve. The egg and tongue, in the contrast between the exquisitely rounded elliptical contour of the egg and the sharply edged and pointed tongue, leaves nothing for the eye to desire; but how it wearies by its incessant repetition! Several of the Roman examples of enriched head and torso are in themselves absolute perfection for their place and purpose; but all repetitive architectural ornament tends to produce a sense of weariness and monotony, which the vitality of Greek and Mediæval sculpture entirely destroys. Not that the Romans had no sculptors, and very skilful ones, too; but their tastelessness was the death of their art. There never were two more wonderful monuments of man's skill and ingenuity entirely misplaced than the Trajan and Antonine columns. Their archaeological value is above all prices; their artistic, nil. To design such a series of bas-reliefs and wind them spirally round a tall column, so that no human eye could possibly read them, argues a perversion of right reason almost incredible. That the French should have repeated the greatest mistake a Roman architect ever made, is still more incredible in so clear-sighted and artistic a people.

The merit of some of the bas-reliefs themselves is very high, and a good opportunity is now afforded at South Kensington of observing their design and execution.

The long night which, so far as art is concerned, followed the ansversion of the Roman empire, is broken by the gleam which we derive from the growth of Byzantine art broadening into full sunshine, as it gradually communicates its influence to the West, and by that somewhat neglected, but, for our present purpose, very illustrative derivative from it, viz., Saracenic. Here we have the same climate, the same materials, in Asia, Egypt, North Africa, and Spain; and yet all is changed. The prophet's prohibition against the direct imitation of nature prevails through the wide extent of the empire of his successors; yet, in the hands of the skillful artists employed by them, so far from becoming a hindrance or impediment, a new style of decoration, perfectly suitable to the faith, the climate, and the purpose of the Mussulman, is wrought out. No more instructive lesson can be given to the young artist than is afforded by the successful struggle with the limitations imposed on art by Mahomedanism. The limits imposed by Protestantism are often lamented by those confined within them; but surely, if ours be the purer faith, it ought to lead to greater results. Starting from the data bequeathed by the decaying Roman civilization, see how the Northman worked out the problem how best to relieve the monotony of his buildings. His materials, his purpose, and his climate differ alike from Egyptian, Assyrian, or Greek. His materials are smaller, compelling the use of the arch; his climate leads him to look from within outwards. He has not yet the skill for representative sculpture, though his imagination is ever fertile and active. Hence his boldly-projecting corbel tables, supported by the admirably grotesque inventions of his imagination, his deep and elaborately enriched doorways, the great feature of early Norman work,—both divisions of his architecture procuring the broad masses of shadow requisite to relieve the monotony which would otherwise result from his flat unbroken wall, or broken only by shallow buttresses. See then how he enlarges upon his shadows, how he surrounds his buildings with arcades, more or less deeply recessed, to get more and more shade, less and less unbroken wall; and how his entrance door recedes till we get the deep cavernous openings of Notre Dame, at Paris, literally overflowing with the wealth of its decoration; and then observe how the architect has subordinated the parts to the whole. Nearest the eye the treatment is very low relief; shadow is not needed there; and as in the Parthenon frieze, the low relief is better read. As we mount towards the tympana of the porches, the relief holds us until in the range called the Galerie des Rois, far above the spectator's eye, the sculptor displays his skill in separate detached figures—individual statues, in fact; while above these, again, nothing interferes with the severe simplicity of the constructive lines. Compared with the sculptures of the Parthenon, doubtless, thirteenth century art leaves much to be desired, but there is also in its teachings many of the lessons which the great works of the great age so emphatically demonstrate. The modes in which the contrasts we have so constantly insisted on are worked out, widely vary. For instance, the alto-relievos which surround the choir at Notre Dame, and which may be advantageously studied in the casts from them at the Crystal Palace, doubtless depart widely enough from the classical canons, and their naive simplicity is calculated to provoke a smile in those unused to the study of that particular school of art. Yet see as compositions how dramatic they are. Compare, for example, "Christ disputing with the Doctors" with Hunt's celebrated picture, where every detail is elaborated with the conscientious care which characterises that great painter. Yet, I confess, the *naïveté* of the thirteenth-century sculptor speaks home more forcibly than the elaboration of the nineteenth century painter. The doctors are, in his version, ordinary grave old men of the period, on an elevated bench or judgment-seat. Christ is not the attenuated Syrian youth of the ascetic turn prematurely self-conscious of his mission. He is a little child, contrasting forcibly with the age and gravity of the surrounding personages; but mark His dramatic action! His little arms are raised to the height of the knees of the doctors

to snatch the book of the law from their grasp. The sculptor could not with the resources of his art indicate the questions heard and asked. What he can give is: the contrast between the new and the old,—the innovating action of the one, the conservative tendency of the other,—the suppression of the book of the law by that which this Child shall teach, is all here. Can we read the story as plainly in the picture?

Fully to treat on the merits and beauties of the architectural sculpture of the Christian period would require, not one, but many lectures. The object of the present address will have been answered if it stimulates the students of the Lambeth School of Art to a more careful and earnest study of those principles which are common to the best art of all periods, and to the manner in which they are worked out in the examples which we are so fortunate as to possess.

PICTURES FOR GUY'S HOSPITAL.

MR. JOHN ABSALON has done a good act, and done it well. He has reproduced in distemper, and of large size, ten of his best-known pictures, and has presented them to the governors of Guy's Hospital for the decoration of one of the sick wards of that institution. They are bright, pleasant pictures, suggestive of genial acts and smelling of new-mown hay. For many a year, we may expect, they will tend to amuse and cheer suffering occupants of the ward. It is a noble gift, and Mr. Absalon deserves warm thanks for it. Our impulse is to express a hope that the example may be followed by other artists, but reflexion puts the wish into another shape. Why make such adornments of our public buildings—such solace of suffering poor—contingent on the munificent willingness of an artist to sacrifice? We would rather therefore express a hope that corporations, directors, boards of guardians, and others, may be led, by what Mr. Absalon has done, to consider with what good effect artists might often be called in by them to cheer and elevate. The "distemper" Mr. Absalon has introduced would be welcomed in every hospital.

RIVER EMBANKMENT AND PLANTATION.

At this critical juncture of the season a few remarks from an old *habitué* of the Temple, as to the desolate appearance of the wide range of reclamation so long rescued from the slime of the Thames, may not be inopportune.

The *Builder* has long since argued for the quay-wall and the plantation, and now that the walls are nearly finished we look with shame at the wide expanse of levelled plateau, extending a mile from Westminster Bridge to the Temple Gardens, and containing over 200 acres, left in waste,—the weeds and grass germinating from the old border terraces to the magnificent walls of granite; and houlders, piles, snags, and waste being scattered fitfully throughout! How long is this to last? or are we to be treated with a repetition of the Victoria-street and Farringdon-street oases?

However good the architectural finish of the quay-walls and landings may be, in this especial position the ornate of plantation is indispensable: the aspect is most favourable for the growth and the telling effect of noble forest trees. The plane, beyond all others, is most suitable to the position, as being the freest of growth, the most unobtrusive, and ornamental. No more stiff and formal poplars; of them we have had lately too much, as in the Horticultural Gardens and Exhibition-road; and although the elm thrives at Buckingham-stairs, and other nooks of the old river banks, it is dingy at best, and lacks the fresh freedom of the lime, which graces the Parisian boulevards, and lends refreshing shade to *gilttons* and indulgent loungers upon chairs beneath.

The display of a double line of plantation, alternately ranged, on either side of a route, 100 ft. wide, would be gorgeous; from above as on the river bank; from below, as contrasting with grand architectural creations as yet in embryo, and, perhaps, in the artist's studio.

There is ample time yet this season to plant out forest trees, especially limes, which are nearly a month later; and these would strike at once, and flourish upon the loose rich soil of the embankment, and might be of ten, twenty, or

even more years' growth; but these at ten or twelve years' would soon luxuriate and spread, thus gaining a year if planted in April, or even in May. The planes of Park-lane, of over thirty years' growth, were moved inwards late in May, and have stood it; but that was a case of urgency, and done at a heavy expense.

Taking the length of embankment at a mile, or 1,760 yards, then each line would consist of 176 trees, at a distance of 30 feet apart, making a total of 352, in alternate ranges, and giving shade throughout the whole length; as the branches would spread across, at least to the centre, at every length of five yards, thus affording to us professionals and to all pedestrians a continuous cool shade from the Temple to the Halls of Westminster.

Any nurseryman would supply and plant these 352 trees at a small cost. They could be had from Hounslow, but Messrs. G. Gibbs & Co. would furnish them and respond for the rich issue of shade and splendour. Surely the Commissioners of Woods, or even the Board of Works, could bestow upon the metropolis, out of their stores of nursery saplings, two or three wagon-loads to form a belt richer than that of Saturn, at least, in sunshine. There are now in the parks transplanted limes, awaiting in their crowded beds open and permanent situations, more than would furnish and headify the melancholy and hungry range which festers in desolation in the arterial centre of the metropolis. It is now the 31st of March: there is a month or more to do it properly and effectively. The Board has but to mark out the two lines; and if the subways or alignments of sewage require change or removal, that could not much injure the young nurselings, which would acquire fresh strength every season from the passing stream alongside, and might, if requisite, be transplanted.

We may and probably shall have to wait a long time for the completion of streets of access to the Embankment; and longer still for the temples and terraces which have been foreshadowed in the speculative architect's studio. So far as the vicinage is concerned it is worse than ever, for whole ranges are kept untenant awaiting speculative changes and improvements: witness the Adelphi and other riverino terraces and approaches; no houseowner knows how to value his tenement *in transitu*. We have no Baron Hausman, and but little public spirit or authority for great municipal improvements, even in the most important and vital portions of the metropolis; twenty-five years of desolation in Victoria-street and Farringdon-street are evidences of dread defaults in this respect. The improvement now sought for is, however, a small item as to the expense, although great and invaluable as to its effect and utility for popular intercommunication; and that, too, upon a central line, which would be a relief to general traffic, and a solace to professional men connected with the Houses of Parliament and all the Inns of Court.

QUONDAM.

SIDMOUTH, DEVON.

POLWHELE, in his "History of Devonshire," says that "the valley of Sidmouth is one of the prettiest spots of enclosed land, and most cheerful to the eye, in Devonshire;" indeed, there is no place on the Devonshire coast, not even famed Torquay itself, that can vie with or exceed it for beautiful scenery. The valley averages two miles in width by six miles in length, and runs from north to south. It is bounded on its east and west sides, and at the north end, by richly wooded and brightly verdant hills, which rise to 500 ft. and 700 ft. above the level of the sea.

The views from these hills of the valley and the surrounding country, on the one hand, and of the lofty deep-red cliffs and the wide blue sea, glowing and sparkling in the sunshine, on the other, are very delightful. In spring and summer the valley is like a well-kept garden. Leafy lanes and woods, sunk deep in the rich red soil, and high hedgerow banks, covered with luxuriant ferns and beautiful flowers, interspersed with elms and oaks of richest foliage, divide and intersect the valley; while numerous apple orchards, just hursting into blossom, and their floors glittering with daffodils, are scattered in all directions.

The town of Sidmouth faces the sea, in the opening of the valley, to the south. It has a noble esplanade, more than one-third of a mile in length, commanding fine views of the expanded sea; and the bold headlands of the new

red sandstone formation stretching far away on either side. The town is a favourite health resort, and was formerly the most fashionable watering place on the coast. It is Thackeray's Bournemouth, in "Pendennis;" and Ottery St. Mary, six miles distant, with its picturesque church, is his Clavering St. Mary in the same tale.

The drainage of this beautiful watering-place is being greatly improved from the plans and under the direction of Mr. John Phillips. The sewage of the town, until recently, discharged into into the little river Sid, near its mouth, which is nearly always closed by a shingle bar thrown up by the sea. A long stagnant pool was thus formed, the emanations from which were very unpleasant, especially in dry warm weather. This objectionable feature, however, no longer exists, the sewage having been diverted from the river, and carried direct into the sea by large cast-iron socket-pipes, firmly bolted to each other, and to wrought-iron piles driven alongside them. The pipes are laid under the beach, at the east end of the esplanade, and are continued to low-water mark, where the sewage discharges imperceptibly and inoffensively at all times of the tide. The bathing-place, which is near the west end of the esplanade, one-third of a mile distant from the outlet-pipe, is not affected thereby. A connection made from a bell-mouth near the outlet with the river, enables the surplus water of the river, during heavy rains, to pass down the sewer into the sea, instead of inundating the marsh fields, and the haemements of the adjacent houses, as it used to do on such occasions.

The new outlet has been laid several feet below the level of the old one; and a new main sewer has been put down from it through the lower part of the town, where the drainage was very defective. A further length of 1,000 ft. is about to be continued to Woolbrook Glen, at the west end of the esplanade, and thence up Clifton-place. Woolbrook Glen is a retired but pretty spot, looking out upon the sea. It was some time the residence of the late Duke of Kent, her Majesty's father, and the scene of his death. Here a crystal brook, flowing between bright green lawns, falls into the sea. It is intended to connect this brook with the sewer, so that a portion of the water may always pass into it, and keep it well flushed and clean. Branch sewers will also be laid from the main sewer along the principal streets, at lower levels than the present drains. These sewers will thoroughly drain the subsoil, and afford improved drainage from the houses.

The sewer is rather of novel construction, owing to a sufficient quantity of bricks for the work not being obtainable within a reasonable distance of the town. The invert consists of three courses of stoneware blocks; that is, a centre course, and a smaller one on each side of it, with bird's-mouth joints; all properly bonded, and laid solidly in concrete. The sides and crown are formed of well-mixed concrete, made of five parts of clean sharp shingle of various sizes collected on the beach, and one part of best tested Portland cement. The sewer executed is like a stone throughout. It is also even and smooth inside, perfectly hard, and as strong and durable as brickwork. Under ordinary circumstances, the cost of constructing a sewer as described would be about two-thirds that of brickwork, but in this case the expense will be nearly the same as brickwork, owing to the necessity of sending the cement, and of employing skilled labour, from London. In all places where clean sharp shingle or gravel is obtainable, there is no reason why sewers should not be constructed of it and Portland cement. Great care, however, must be observed in mixing the materials, and also in well and solidly placing the concrete in the work.

The town is supplied with water from the Cotman Spring, which is distinguished for its brightness and purity, but is limited in quantity. Another spring, equally good and more plentiful, oozes out of the rocks at Muttermoor, about 150 ft. above the level of the town. It is the origin of the Woolbrook. It is proposed to impound this stream at a suitable elevation, and to lay pipes from the reservoir into the town. The two streams combined will give an abundant and constant supply of pure water not only for domestic purposes, but for flushing the drains or watering the streets.

Besides the beauty of its scenery, Sidmouth is a very healthy place. Its death-rate is as low as 16 in 1,000 of the population; and, as good drainage tends to lower the death-rate of towns, it is thought that the drainage-works

here will in time cause the death-rate to be less even than it is now. The temperature of the air is also remarkably equable. In winter the mean temperature is nearly 4° warmer, and in summer it is slightly cooler, than London. The air acquires this equability of temperature from the mild influence of the Gulf stream, which, by constantly supplying the British seas with its tepid waters, imparts warmth to the passing breeze in winter, and cools it in summer. The mild climate which Sidmouth enjoys is due partly to this cause, and partly to its sheltered situation. Its mildness is also indicated by the numerous exotics and other plants which flourish in the open air, even through the winter months, with surprising luxuriance and splendour. The air also contrasts most favourably with that of other watering-places on the coast, both in regard to equability and humidity. With these advantages there is no reason why Sidmouth should not be as much frequented as it was during the first half of the century.

THE TRADES MOVEMENT.

Councils of Arbitration and Conciliation.—A conference between employers and workmen has been held in the Grand Jury Room, Townhall, Derby, to make preliminary arrangements for the establishment of a Council of Arbitration and Conciliation in this town and neighbourhood. The mayor presided. A provisional committee, consisting of ten workmen and ten employers, was appointed to draw up a code of rules, to be submitted for the approval of a future meeting.

Arbitration in the Potteries District.—Mr. J. E. Davis, stipendiary magistrate, having, at the request of the arbitrators, agreed to act as umpire in the arrangement of a dispute which has arisen between the builders and the carpenters and joiners of the district, met the arbitrators, comprising six employers and six operatives, at Longton, for the discussion of the difference. The only point at issue is the hour of leaving off work. Last year, Mr. J. S. Forhes, acting as umpire in a dispute involving the hour of finishing the day's work among other things, laid down half-past five p.m. as the time of leaving off; but this arrangement the employers state to have proved very inconvenient, and in December last, acting upon one of the rules, they sent notice to the men of their desire to revert to the old hour of leaving off work at six o'clock. The operatives objected to this course, and hence the reference to arbitration. The arbitrators failing, after a long discussion, to adjust the difference, an appeal to an umpire became necessary, and Mr. Davis was unanimously agreed upon for that office by the arbitrators. The case on each side was laid before the learned stipendiary with the utmost fairness, good temper, and courtesy, and the difference was very fully and frankly discussed. Mr. Davis promised to communicate the result in a few days.

The General Builders' Association and the Trade Unions.—A memorial has been presented by the various branches of the General Builders' Association to the Royal Commission on Trade Unions. In relation to trades unions, the memorial suggests—

"That the Secretary of State should appoint a registrar of voluntary associations, with power to certify that the rules of such associations were not contrary to law and public policy—law and public policy being reconsidered as suggested.

That all associations whose rules were so certified should have a quasi corporate character, and be empowered to hold property end to sue and be sued.

That the accounts of all such associations should be publicly audited, in a manner similar to that adopted under the Poor Law administration. The expense of such audit could be met by charging registration fees. And the misappropriation of funds should be punished by heavy fines, as the mere disallowance of certain items of account would act as no bar to misappropriation."

Legislation embracing these points in connexion with voluntary associations generally, would, they believe, fully and satisfactorily remedy all evils, now matter of complaint on the part of trade unions particularly. In the second place, in relation to the general question of the present unsatisfactory condition of the intercourse between masters and workmen, as so amply evidenced, they remark, by the prevalence of strikes and lock-outs, they think that condition could be best improved by the establishment of courts of conciliation and arbitration. The registration of masters and workmen entitled to vote in the election of their respective representatives might, the memorialists remark, furnish a means of de-

fraying the expenses of these courts. In the building trade the payment of a penny per month by each workman, and a penny per month on each one of the average number of men he employs by each master, would produce about 100,000*l.* per annum. This might readily be collected through the masters, power being given to them to deduct the men's proportion from their wages.

Intimidations by Masons' Labourers at Bury.—At the Bury petty sessions, John Rostron, labourer, was charged with having, together with Edward Egan, threatened to take away the life of Charles Crawshaw, for the purpose of inducing him to cease being employed by Messrs. John & Thomas Dewhurst, builders, Heywood. The labourers in the employ of the Messrs. Dewhurst had solicited an advance of wages; and as their request for 22*s.* per week had not been complied with, they struck work. Other workmen had taken their places, but in almost all instances they left off work because they were in bodily fear from the violence threatened by the workmen on strike. The magistrates, after hearing evidence in the case, said it was one of the worst ever brought before the bench at Bury, and they would mark their sense of it by visiting it with the heaviest penalty in their power,—viz., three months' imprisonment with hard labour.

Amalgamated Society of Carpenters.—It is only on special occasions that the pleasure is afforded of recording so sociable and enjoyable an evening as that recently passed at the Freemasons' Tavern by the members of the Amalgamated Society of Carpenters and Joiners. The new ball-room at half-past seven was filled with long tables, at which from 400 to 500 persons, members of the society, with their wives and daughters, sat, to enjoy a substantial tea. At nine o'clock, Professor E. S. Beesly took the chair, supported by Mr. T. Hughes, M.P. for Lanbeth, and various other gentlemen, including the secretary of the society. The chairman, in commencing the proceedings of the evening, said he must admit that some trade societies had acted in a most shameful manner, by enforcing rules which might be of benefit to their own trade but were injurious to society at large. But he could safely say that this society had not one such rule. He hoped that ere long all trade societies would come to see the necessity of only adopting such rules as should be not only beneficial to themselves but calculated to promote the welfare of society at large. Mr. Applegarth, the secretary, made a statement with reference to the society, which was, he said, now eight years old. They had started in June, 1860, with 11 branches and 350 members, and very little funds. They had now 205 branches, above 8,000 members, and more than 15,000*l.* in band. During their eight years of life they had spent more than 30,000*l.*; and during the past year alone they had paid to members 5,271*l.*, which was equivalent to saying that they had supported during the ten weeks of hardship 8,800 members. Mr. T. Hughes addressed the society, especially dwelling upon the benefits of co-operation, which he hoped to see extensively carried out. The meeting was enlivened with music and dancing.

Discussion on Trades Unions.—At the Wootton Bassett Reading-room Society's meeting recently, a paper was read by Mr. R. T. Hawkins, "On Trades Unions," and was followed by a discussion on the subject. The paper treated of the operation of trades unions and their effect on prices and wages, their relationship to labour, and maintained that unionism sets up the terror of the few over the weakness of the many.

Strike of the Building Trades in Geneva.—The building trades workmen at Geneva have struck work, it would appear, by order of the International Workmen's Association, which extends its branches in every part of Europe, and of which the committee and head-office reside in London. Last summer, it will be remembered, a general assembly, composed of delegates from all parts of the world, met at Lausanne a few days before the opening of the Congress of Peace, which sat at Geneva; the committee acting in obedience to orders transmitted from London. This committee, it is said, has been acting at Geneva, and from thence last week issued instructions that a proclamation should be posted on the walls of that city con- voking a meeting of workmen for the purpose of deliberating on what measures should be adopted to obtain an increase of wages, in default of obtaining which a general strike would be decreed. The places of rendezvous

were scolded upon, and the workmen ordered to meet in various parts of the fanhours, preceded by drummers. The only men who responded to this call were masons and carpenters, and these not men working at Geneva alone, but at Lansanne and other towns on the lake; they mustered to the number of 1,200, and, after marching round the city, assembled at the Stand, where proceedings commenced. On the motion of a working mason a general strike was decreed. On the following morning a great proportion of those who had taken part in the procession struck, but not all. The rest, however, obeyed under the pressure of organized companies, who went from one factory to another, insisting on the men at work obeying the injunctions they had received. Having accomplished this part of their mission, these delegates, who were chiefly strangers, not only to the canton, but even to the Swiss Confederation, proceeded to every manufactory in the town, and, addressing the journeymen—tinsmiths, founder, and mechanic—at work, commanded them to lay down their tools and join the strike: those who were unwilling were threatened with violence if they presumed to disobey. These mandates were imposed on all workmen, not only at Geneva, but at Lansanne and all the neighbouring cities. The utmost consternation prevails in Geneva, where the result of the strike on the trade of the city, it is believed, will be disastrous.

The *Journal de Genève*, of March 24, contains a long article complaining of foreign intervention in the relations between the Geneva master builders and their workmen. It says the masters did not refuse to listen to the demands of the workmen. "They confined themselves," it says, "to rejecting the intervention of a foreign society, whose head-quarters are in London, and which has no legitimate place in our republican institutions."

CONGRESS OF GERMAN ARCHITECTS.

We have been requested by the president of the Architectural Society of Hamburg, Dr. F. G. Stannmann, to state that the fifteenth meeting of German architects (held annually, but in different cities) will take place in that city from the 1st to the 4th of September next. We need not remind our readers that Hamburg is reached in forty-eight hours from London, and we are sure that English visitors will be much welcomed.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

At the meeting of the British Archæological Association last week, Mr. Holt exhibited the iron lock of the *desecrated* of the parish church of St. Michel, Beauvais—a beautiful example of fourteenth-century ironwork. A letter from Mr. Roberts, who was unable to be present, detailed the result of inquiries made in Florence on the subject of the bronze urn said to be that of Tanaquilla, which, it appeared, was but doubtfully considered in Florence. Mr. S. Cuning said he had from the first considered the bronze a forgery, and one made by persons who did not mind their unities. One of the ornaments was a vessel of about 500 B.C., another was of about 150 B.C., and there was a representation of a bough pot of very recent character, which seemed to have been copied from printed books of the last century. Mr. Bailey exhibited a Roman remains dug up in Lombard-street, and bearing undoubted marks of having passed through fire—confirming the history of the fire in the days of Boadicea.

BELGRAVIA AND SOUTH KENSINGTON NEW ROAD.

ALTHOUGH the act for this great public improvement received the Royal assent in August, 1866, no progress has yet been made, as it was obtained at a time of great monetary difficulty. The matter is now, however, in the hands of some of our capitalists; but as the amount required for the purchase of the house property to form the road from Westbourne-place across Sloane-street on to the Pavilion-land, and from the other end of the Land into the Grange at Brompton, involves an amount of 326,944l., the company applied to the Metropolitan Board of Works to contribute one-half that amount to-

wards one of the grandest improvements ever made in the west-end of London, connecting those important districts by a grand boulevard. The Board did not find themselves able to comply. The company then applied to the vestry of Chelsea for an allocation of the improved rates that might accrue during a period of twenty-one years. A deputation from the company had an interview with a committee of the vestry on Friday last week, and after a long conference it was resolved: "That this committee recommend that the improved rates to be created by the company be allocated to them for a period of fifteen years." The vestry took the matter into consideration on Tuesday last, and on the motion of Mr. E. O. Symons, the recommendation of the committee was carried by a considerable majority.

THE LEIPZIG THEATRE.

On the Augustus Platz, at Leipzig, where the world-known yearly fair is held, opposite the museum, a new theatre has been erected, which is reckoned amongst the finest in Germany. The promenade commencing on the east side leads to the new Temple of the Muses, a picturesque background, to which the agreeable ornamental water hard by the building forms a beautiful foreground.

The fulfilment of the paintings, the hall, and the decorations, was given to Government Architect Laughaus. To connect the *magasins* to the main building and to use them, steep sloping ground was made on the Promenade, whereby a terrace, in two flights leading to the ornamental water, was formed. The sculpture on the front was finished in the factory of Mr. Czarnikow, of Berlin.

The sculpture and paintings inside were executed by the best obtainable artists, and unite simplicity and beauty.

The ornaments which decorate the new theatre were executed after designs of Architect Laughaus, in an artificial stone, and cast zinc, by Czarnikow.

The modelling of the cast work was undertaken by the artists, Professors Hagen, Wittig, Luerssen, and Schiele.

The artificial material is well spoken of, and has overcome all the prejudices which at first were against it, since the ornaments executed in it (also by Czarnikow) at the Corporation House and town theatre of Riga have stood well.

The most prominent object in the external decoration, is the large frontispiece in the central tympanum, 56 ft. long, modelled in high relief by Professor Hagen, representing Poetry inspiring the other arts. In the centre of the surface stands the figure of Poetry, with a crown of glory upon its brow, distributing with both hands crowns towards heaven. On each side are two winged spirits, also distributing wreaths and laurel branches; to the left kneels Music, a fine female figure, leaning on her lyre, listening to the inspiration. To the right Painting; then follow Architecture and Sculpture, also embodied as female figures, recognisable in the attributes. Technical skill, which is necessary to art, is represented by a bearded man, who is explaining machinery to a boy; the mural crown and Lipsia, leaning on the town arms, conclude the representation to the right; whilst on the left a beautiful dancing couple, with Love and the three Graces, form the end. The grouping of the whole is good. An acrotorium, 14 ft. high, also by Hagen, terminates the principal pediment of the building. It includes the god of art, Apollo, in flowing garments, with lyre and double pipe; at his feet sits Calliope, the muse of song; and Clio, the muse of history.

The theatre consists of a centre and two side-wings, or pavilions, each of which is decorated with reliefs in artificial stone, the modelling of which Wittig has executed admirably. The relief on the right side represents the Triumph of Bacchus. The god of refined enjoyment and of youthful beauty, provided with his necessary attributes, stands in the centre; close to him are the love-disappointed Ariadne, and Amor, the god of love; to the right a Bacchanalian is blowing the double pipe, and a young Satyr is walking by the side of the skipping goat, whilst another Bacchanalian is playing with a panther, the allegory of phantasy and ferocity; to the left another Bacchanalian is dancing grotesquely with a boy, to the sounds of bells and tambourine. A little apart from this group sleeps an intoxicated Pan, contrasting

gross sensuality with a young Bacchanalian crowned with vine-leaves.

The relief on the left side, perhaps in consideration for the use of this part of the building, which contains the *Foyer*, represents the Triumph of Ceres. This goddess, the tamer and benefiter of mankind, is handing some ears of corn to a rough soldier and his little boy, whilst with the other hand she is giving a basket of fruit; at her feet kneels a woman engaged in planting a vine. Right and left are the indispensable forerunners of all husbandry, working in metals, working in stone, pottery, and ploughing, all represented by male figures.

Luerssen had some difficult work to perform. The five groups, each 7 ft. high, on the end wall of the pillared hall of the centre are executed by him in the composition. Each of these contains, as centre and chief figure, one of the Muses between two winged spirits in the form of children;—Terpsichora, the Muse of Dancing; Erato, of Love; Polyhymnia, of Declaration; Euterpe, of Joy; and Urania, of Astronomy. The various mythological figures are so naturally represented by their form and attributes that even a visitor unlearned in classical antiquities easily guesses their meaning. The smaller figures for filling the corners above the bow-windows of the main building—namely, three pairs of Victory, partly sitting and partly leaning, are also by Luerssen, who by their completion has overcome a technical difficulty. Both the pinnacles of the pavilion, ornamented with swans, which, as is well known, represent Music, are also by him.

The terminals for the four angles of the upper story of the theatre, as well as the rest which are to adorn the various corners and pediments, are modelled by Schiele, who has executed this part of the work beautifully. Particularly worthy of note are the heads of the Muses ornamented with shells, the singing swan on the five-stringed harp, and the candelabra guarded by couples of winged griffins.

Within the theatre a piece of machinery for raising the curtain in its full extension is worthy of note, and is said to answer well. The auditorium is arranged for 1,800 persons. The whole of the building has been carried out at the cost of 500,000 thalers.*

REFERENCES.

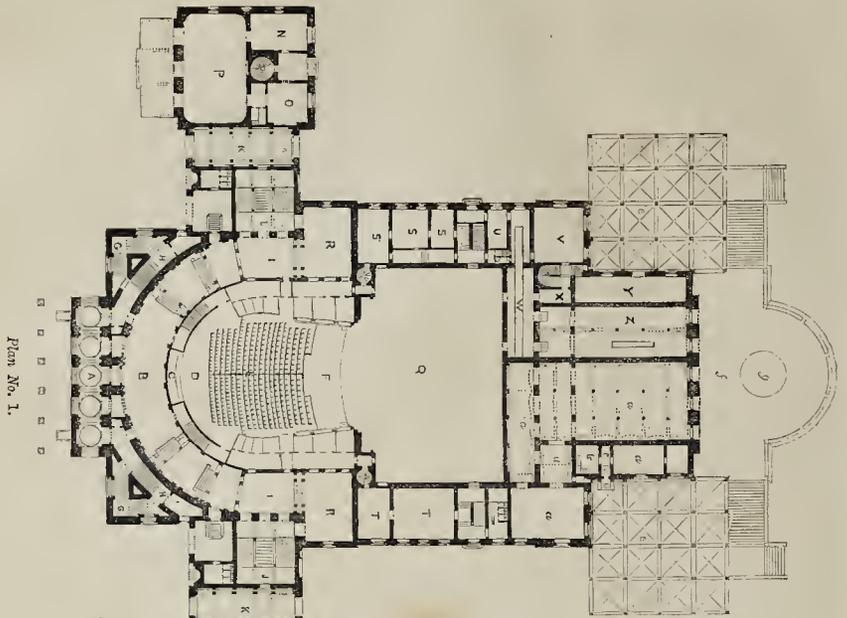
No. 1 Plan.

- A. Hall.
- B. Vestibule.
- C. Cloak-room to pit, under which is pay-box.
- D. Pit.
- E. Stalls.
- F. Orchestra.
- G. H. Staircase to 3rd and 4th circles.
- I. Lobby.
- J. Staircase to 1st and 2nd circles.
- K. Passage.
- L. Room for the refreshment proprietor, over which is the entresol.
- M. Refreshment-room.
- N. Saloon.
- O. Room for the confectioner, over which entresol.
- P. Confectioner's room.
- Q. Machinery under stage.
- R. Cloak-room to stalls, under which is room for orchestra.
- S. Dwelling-rooms for inspector of the house.
- T. Statists' or supernumeraries' room.
- U. Porter's room.
- V. Lamp-room.
- W. Horse-dost.
- X. Lobby.
- Y. Painters' room.
- Z. Store-room for accessories.

No. 2 Plan.

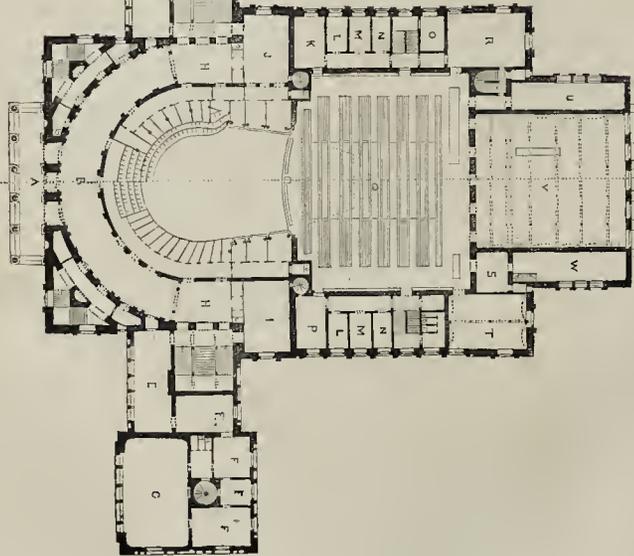
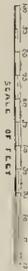
- A. Balcony.
- B. Foyer.
- C. Rehearsing-room; in the evening for the use of refreshment proprietor.
- D. Rehearsing-room; in the evening for the use of conductor.
- E. Communication 1st circle.
- F. Refreshment-room for refreshment proprietor.
- G. Manager's room.
- H. Wardrobe.
- I. Lobby to 1st circle.
- H. I. Lobby to 2nd circle.
- I. Balcon for reading plays.
- J. Director's room.
- K. Assembly-room.
- L, M, N. Dressing-rooms.
- O. Hair-dressing-room.
- P. Principal dancers' room.
- Q. Stage.
- R. Property-room.
- S. Store-room.
- T. Store-room for side-scenes, over which is pulley-room.
- U. Joiners' workshop.
- V. Store-room for rolling-scenes.
- W. Store-room for small ditto.

* In another number we shall give a longitudinal Section.

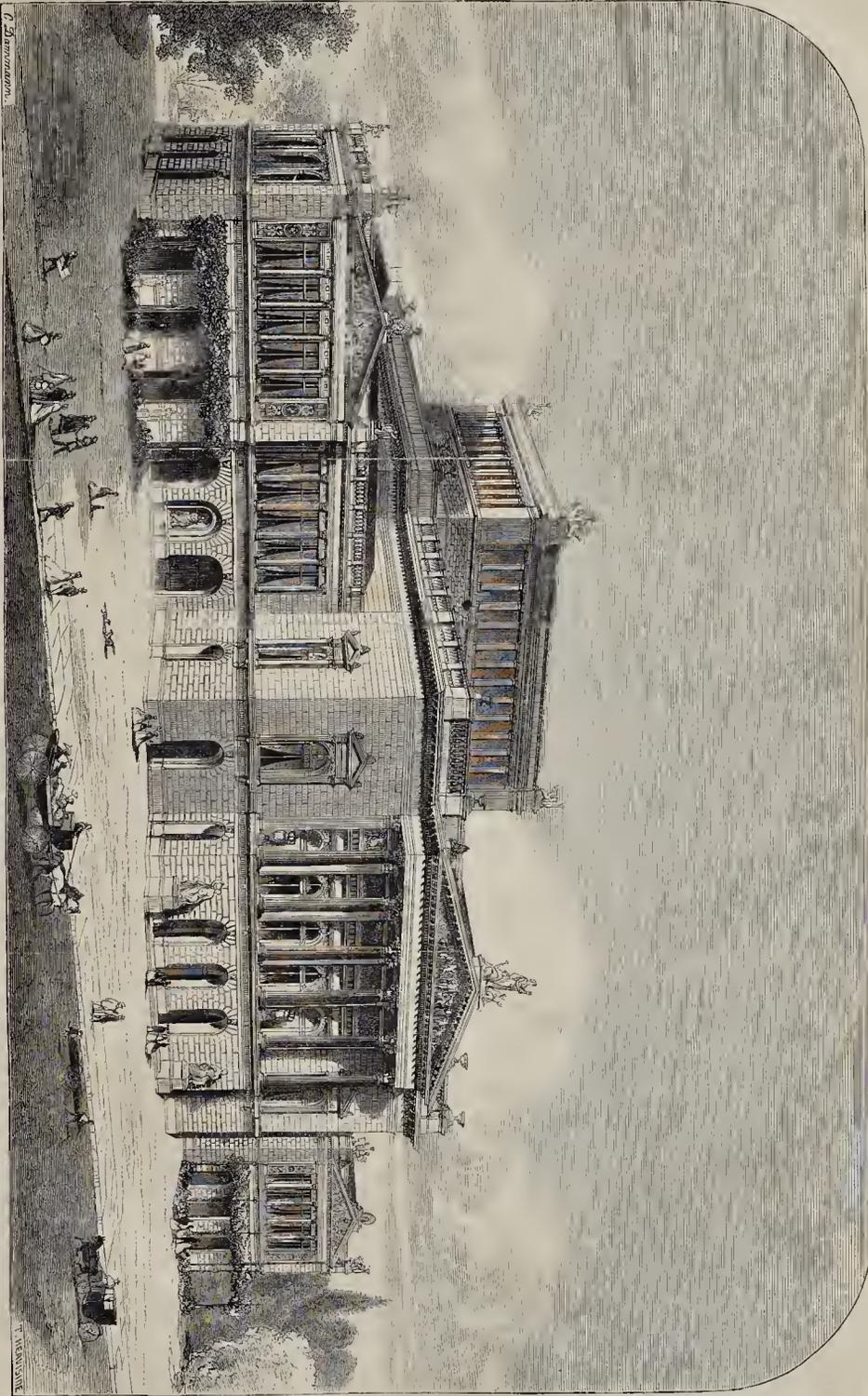


Plan No. 1.

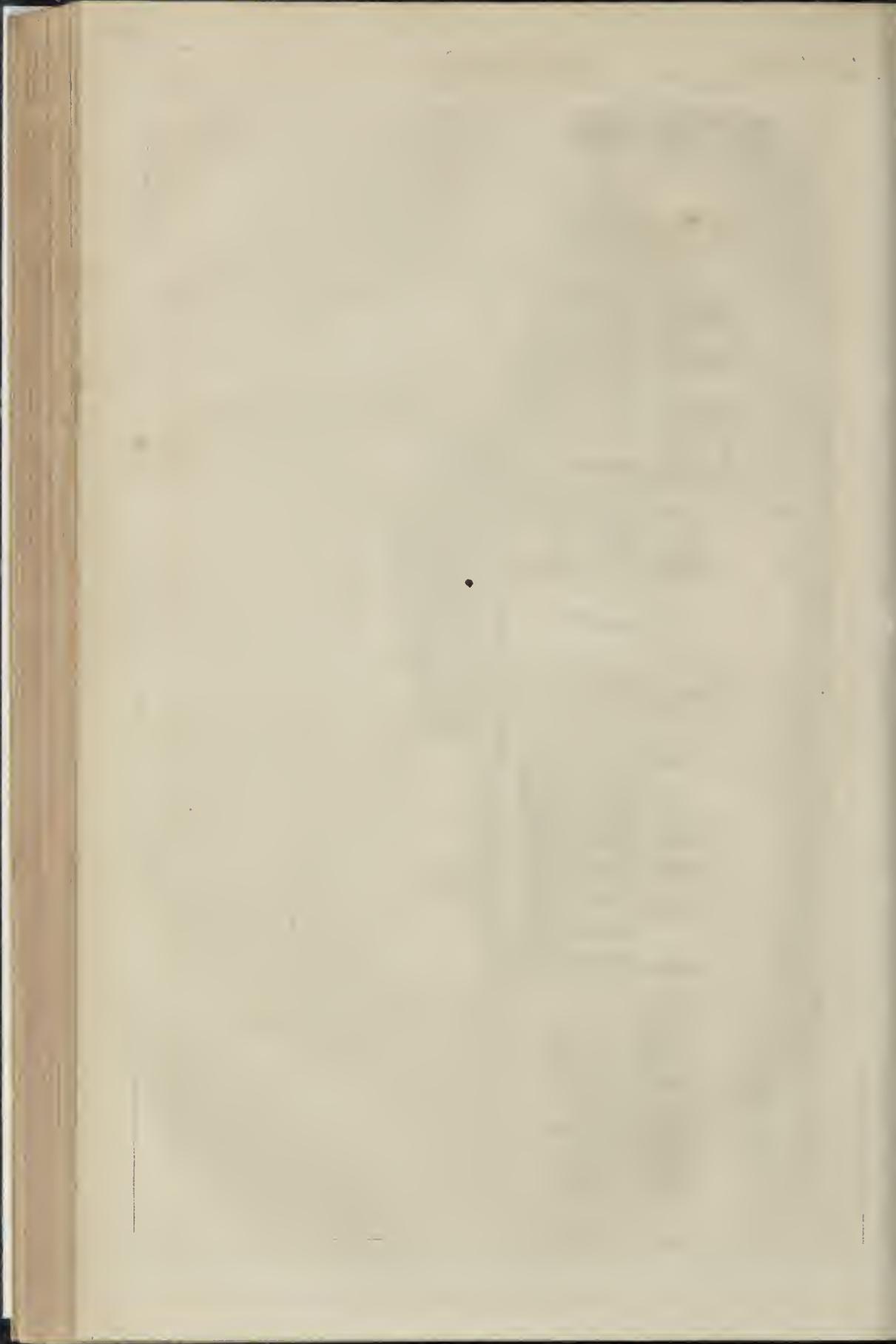
THE LEIPZIG NEW THEATRE.



Plan No. 2.



THE LEIPZIG THEATRE



THE AERONAUTICAL SOCIETY OF GREAT BRITAIN.

At a general meeting of this new society held in the theatre of the Society of Arts, the Duke of Argyll in the chair, the proceedings commenced by the reading of a paper by Mr. Heath "On the Control of Balloons by Pressure," and the paper was illustrated by models. The peculiarity claimed for the system is that the prime agent is nature, the simple apparatus used having in effect a mere resistance to the ordinary action of natural laws governing fluids. Another paper was read by Mr. Brown, who showed that in ballooning the chief thing was not the amount of force at the disposal of the aeronaut, so much as its proper application. The chairman quite agreed with this, but thought that science must be much more advanced before (as the reader of the paper had suggested) a machine like a steam-engine would have wing power to move itself. At the same time, there could be no doubt that science would by and by discover a lighter moving power than steam. The next paper, contrived by Mr. Alexander, C.E., was upon power in relation to weight in aerial navigation; and a gentleman who commented upon it said that some very important evidence upon this point had recently been given in the fact that Mr. Spencer had actually flown 100 ft. by his muscular strength alone, not merely by leaping down from an eminence, which was no flying at all, but by flying horizontally. At the coming exhibition of the society this gentleman had promised to fly every day, probably the whole length of the Crystal Palace. The subject of human flight was continued by the reading of a paper sent by Mr. Artinshall, of Manchester, accompanying it being a sketch of wings and machinery, the total weight of which was only 15 oz. The chairman, in conclusion, said the next meeting would be on the 25th of June at the Crystal Palace, when there would be an exhibition of models and some ballooning.

A mechanic of Glasgow, we may here add, has designed a machine which is intended to move through the air by flapping wings, which are to be driven in such a manner as to imitate the motion of a bird's wings. The motion of the wings is produced by a steam cylinder, fitted with a piston, the piston-rod carrying a cross-head, which is coupled by links directly to the wing; beams, which are fitted to shafts, running about three-fourths of the length of the machine.

Aeronautics is a subject which we have for many years regarded as a hopeless one, and have occasionally helped to keep before the public; and we are glad to find an Aeronautical Society making it up under influential auspices.

MANCHESTER TOWN HALL COMPETITION.

In consequence of Messrs. Donaldson and Street having placed the design attributed to Messrs. Speakman & Charlesworth first, as regards architectural merit, and second, as regards plan; while the design by Mr. Waterhouse was placed first as regards plan, and fourth as regards (external) architectural merit; they were requested to make a second report as to their reasons.

Mr. Heron, the town clerk, in his letter to them, said,—

"Considerable difference of opinion exists in the sub-committee as to the meaning intended to be conveyed by your report, and especially upon the points referred to in this communication; and it is, therefore, very desirable that you should be as explicit as possible in replying to the questions now asked, and generally in giving any additional information which you may, under the circumstances, consider will be valuable and useful to the corporation. I have respectfully to ask for information on the following points, to be understood that in all cases it is in relation only to the plans of 'St. Valentine,' 'Double Triangle,' 'Spandam,' and 'True to the Line,' that further information is desired. In considering your report, it was stated by the sub-committee that there was an apparent inconsistency in placing 'Double Triangle' first in point of merit in relation to architectural design, &c., No. 1, and second in point of general arrangements, &c., No. 2, and yet recommending the adoption of the plan sent in by 'Saint Valentine,' which are placed by you fourth in point of merit as regards No. 1, and first in regard to general arrangements and other matters referred to in Nos. 2, 3, 4, and 6. The sub-committee desire to have any explanation or further information which may appear to you to be desirable in relation to this part of your report. The sub-committee are also anxious to have the best opinion which, from the information afforded by the plans and descriptions, you may be able to give as to the acoustic properties (No. 5) of the large hall and of the council chamber in the four sets of plans before referred to, as this question is deemed to be of great importance. The sub-committee also desire to know in what order of merit you would place such four

designs upon the important matter of construction, and also shortly your reasons for any opinion given. They also desire to know whether, in your opinion, the plans of 'Double Triangle' and 'Spandam' could be carried out for the amount named by the authors, viz., in the first case 235,250*l.*, and the second 261,775*l.* It is also stated by some members of the sub-committee that defects in the plans of 'St. Valentine' are pointed out in your report, and various improvements and alterations suggested, whilst no similar observations are made in relation to the other three plans; and it is therefore assumed that they were not in your opinion open to any similar objections."

On Monday a second report from the referees was accordingly brought by the committee to the City Council, and the following note from Professor Donaldson accompanying it was read:—

"Mr. Street and myself herewith forward our second report upon the drawings sent in competition for the proposed new town-hall of Manchester. We trust that the sub-committee will be pleased to consider that we have been induced to submit to them our unreserved opinions as a confidential communication in the discharge of our duty, undertaken at their express desire. At the same time that we shrink from no responsibility, still we desire to respect the susceptibilities of our professional brethren, and hope that the sub-committee will not publish this second report, as we desire to avoid any steps that might be supposed to detract from the professional character of any of those gentlemen who have so honourably entered upon this competition, and displayed so much talent. We feel assured that the mayor and corporation will feel that no step should be taken which could tend to lower the competitors in the public estimation, or to interfere with the high position they so justly occupy."

A long discussion ensued as to the propriety of reading the report to the meeting. Ultimately, however, this was done; but it was determined that it should be regarded as confidential. We need scarcely say to those who know anything of public assemblies that this means nothing, and that the contents of the report will be made public.

Referees may always make up their minds to this, that anything that is written ceases to be private.

The result of the meeting was that the designs of Mr. Waterhouse for the new town-hall, sent in under the signatures of "St. Valentine," were selected.

COMPETITIONS.

St. Andrew's, Hereford.—On the 27th ult. the committee proceeded to select a design. On the first ballot, "Well considered," the design with a device, "All things considered," and that marked "3,000*l.*," were selected from the fifteen designs exhibited. On the second ballot "3,000*l.*" was left out; on the third, "All things considered;" and on the fourth, "Well considered" was unanimously chosen.

The envelope accompanying the successful design having been opened, it was found to contain a card with the name of "Mr. John Johnson, 35, Moorgate-street, E.C."

It was then agreed to appoint a committee for the purpose of communicating with the architect, going into the estimates, and other purposes specified.

The design selected is in the style of the thirteenth century. The estimate of 3,000*l.* does not include the warming apparatus, the tower, painted windows, encaustic tiles, or elaborate ornamentation of any kind. The old walls are to be used, and the sound portion of the old materials.

PROPOSED NEW STREETS AND ROADS AT BRISTOL.

Mr. Rawlinson, C.E., from the Local Government Office, London, has held an inquiry at the Bristol Guildhall, in reference to land proposed to be taken by the Board of Health for the forming of new streets in various parts of the city. The proceedings lasted several hours, and the question of the new roads at Clifton excited attention and argument *pro* and *con*. The inspector said there would be a special inquiry by a Bural Acts Inspector as to the churchyard. In other two cases the questions raised would be dealt with by the arbitrator. The inspector proceeded to consider the Clifton road, proposed to be carried from Victoria-square, through Boyce's-buildings, to Rodney-place. Two alternative roads were proposed by the opposition; one took the church of St. Valentine's, and went through Carter's stables; and the other passed near the memorial church, and came out at Saville-place. Both these schemes, but principally the first, were pressed on the inspector as more desirable than the Board of Health plan; while some gentlemen urged that there should be two routes—one through Boyce's-buildings, and the other

through Carter's stables. The inspector said Parliament would not allow the Board of Health to propose an alternative road and schedule the property thereof. If two roads had been petitioned for he could have recommended the abandonment of one of them, but he could not, under the existing circumstances, introduce a second. It was out of his power to recommend two roads, though he was rather inclined to think that two would be a great advantage. They had power to make roads by consent out of the current rate, and he should imagine, in such a place as Bristol, a 2d. or 3d. rate would make the Merchants'-road. It was arranged that Mr. Ashmead, the city engineer, and Mr. Ashmead, sen., on behalf of the opposi-on, should accompany the inspector when he went to view the proposed roads.

CHURCH OF ST. BARTHOLOMEW THE GREAT, SMITHFIELD.

This remarkably interesting church, the most valuable relic of the twelfth century possessed by London, was re-opened for service on Sunday last, after having been closed for some time for works of restoration, under a committee who have liberally subscribed, gathered, and spent upon it something like 6,000*l.* The announcement by the newspapers that the building has been restored will lead many to feel much disappointed when they visit the church; for its present aspect is to our eyes sufficiently miserable, and only those who know how much money an old building can absorb will believe that 6,000*l.* have already been spent upon it. At the east end there is a wretchedly ugly arrangement of iron girders and columns to carry the upper part of the wall. This, with lowering the accumulated ground within, and the drainage, don'tless ran away with a good deal of money. Truth to say, however, we are disappointed with the show made for the expenditure. The tomb of the founder, Rabere, on the north side of the chancel, has been repaired and decorated. We cannot praise the painting of the figure.

CONSTRUCTION OF FIREPROOF DWELLING HOUSES.

This subject being one in which most of your readers are much interested, it is desirable to circulate any practical information upon the matter that your numerous readers can contribute: I therefore venture to state a few facts that have come under my own observation for whatever they may be worth. Most of the buildings that are erected under my superintendence I make practically fireproof; and with this object in view, I have tried the "Dennett arch," Philipp's patent concrete floor; brick and tile arches, &c.

The "Dennett arch" requires 1-inch rise to the foot span, and about 7 ft. spans may be considered the average; the crown of the arch will be 5 in. thick; the ceiling joists may be either notched to hold on to the flange of the girder, and embedded in the material of the arch, or spiked to a plate bolted to the underside of the girder, occupying in vertical section from 1½ in. to 4½ in., to which add 1 in. for the plaster, and 2 in. for the wood floor above, will give a total vertical section of from 16 in. to 18½ in., as against an ordinary floor, with 9 in. by 2 in. joists, and 1½ in. floor boards, 11½ in. In my practice I omit the ceiling and the wood floor; the former I set to the curve, finishing with paint or distemper, and with the addition of a few lines and stencil decorations on the ceiling, and the flange of the girders. In rooms over 12 ft. high, I add a cornice or string of small projection a short distance down the wall, and so contrive a tolerably decent effect.

Ceilings so formed may be elaborated to a considerable extent, as circumstances may indicate.

Most floors are covered with carpets, kamptulicon, or floorcloth. If carpets are to be used, a fillet let in the floor all round gives good nail hold, and a Brussels carpet over a layer of thick brown paper is quite as comfortable in result as if laid on a board floor; kamptulicon is cemented down to the finished surface of the "Dennett arch," which, from its even surface, is better for that or floorcloth than boards.

It is common to over-sail to receive the "Dennett arch," producing a very awkward core

for a cornice. I get, however, the same result by setting my walls in from the general face about a quarter brick, the height of the haunch of the arch, and three or four courses above for convenience in working, to be filled in afterwards.

In the execution of floors constructed with the "Dennett arch," as with all concretes, expansion fillets must be used without fail, even in the smallest spans, or the walls will be disturbed or fractured more or less; and, although an architect may see that there is no structural danger, it is regarded as something very dreadful by a client, and may damage the architect's reputation.

Phillip's patent girder and fireproof floor is a combination of their patent girders placed about 5 ft. apart, with slotted flooring bars or laths, and concrete filling in; the ceiling is floated to the underside, the slotted bars forming a key as ordinary laths. The surface of the floor may be either boarded on 4½-in. joists, bridging from girder to girder, or finished with tiles or cement. The construction is very simple, involving no special contrivances; the girders are built in as the walls rise, and the floor may be formed when most convenient, or the floor may be finished off as a roof—the lower portion of the building occupied, and the execution of the remainder deferred.

Never using quarter or trussed partitions, I have the floor girders calculated to carry the half brick partition walls, which are executed with perforated bricks with a view to carrying out the fireproof system, and forming a more substantial and permanent class of work.

Comparative Cost, Thickness, and Weight, say of a Floor for a Room 22 ft. by 17 ft.

Ground Floor (exclusive of sleeper walls).—4-in. by 4½-in. oak sleepers (4 ft. by 2 in. centre to centre), 4½-in. by 2-in. joists, 1½-in. ploughed and tongued clean yellow batten floor, &c., 70s. per square	£13 6 2
Half-brick arches, 5 ft. 6 in. centre to centre, spandrels filled in and surfaced for carpet, 88s. 2d. per square	17 9 4
First Floor (same area).—Two 12-in. by 10-in. fir girders sawn down and bolted, 7-in. by 2-in. joists, 1½-in. yellow batten straight joint floor, 3½-in. by 2-in. ceiling joists and ceiling, say 17½ in. finished thickness, 120s. 4d. per square	22 11 7
"Dennett's Arch," with ceiling and wood floor as before described, 16 in. finished thickness, 216s. 4d. per square	42 8 10
"Dennett's Arch," without under-draw ceiling, surfaced for carpet as described, average thickness say 10½ in., 165s. per square	30 18 10
Phillip's patent floor with ceiling and wood floor 8½ in. finished thickness, 137s. 1d. per square	35 1 9
Phillip's floor finished with plaster surface for carpet, 8 in. thick, 175s. 6d. per square	32 18 0

I do not quote these data as evidence of the best thing that can be done, but as a contribution towards the general fund of information on the important problem of how to construct dwelling-houses or offices fireproof at an economical rate.

THOS. CHAS. SOBRY.

SOMETHING LIKE A CHURCH.

SIR,—Is church architecture keeping pace with the general development of the age? Churches of the present day, instead of out-rivaling those of past times, rather fall short, in size and execution, of the works of our forefathers, as displayed in old cathedrals. Now, really, considering the power, intelligence, resources, wealth, and influence of the present time, and of this, the greatest empire of the earth, something handsome might be accomplished to transmit as a memorial to future generations. However good any new church may be in itself, any one congregation is not capable of erecting such a memorial church as is now spoken of. But, sir, unity is strength; and on this sound truism allow me to propound a scheme which, if carried out, will effect the object.

Over no very large area of London, I dare say, will be found eight churches; and were these eight churches brought together into one central place, they would be equally serviceable for the congregations. Well, suppose a space of several acres set apart for a memorial church: we might have, clustered together, in one imposing group, eight different churches, of one style of architecture (say the truly British, second period of Pointed), with a common tower in the centre, and spire 600 ft. high. The spire would be the highest building in the world. The tower and spire might have towards their base galleries for statues, &c., and farther up balconies for views, to a height, say, of 500 ft.,

with at the same time immense bells, and an illuminated clock of eight dials, visible in clear weather all over London. Of course, all the improved constructive science of the present day would be brought to bear upon the work, both as regards durability and elegance. The building, standing apart by itself, as in the centre of a square, and accessible on all sides, would be known by some appropriate, short, distinctive, national name.

Eight congregations (they might be of different denominations) could easily carry out the scheme: besides, there is no doubt the Government and City would aid the national part of the undertaking.

I trust to see the matter taken up by some of our influential and patriotic gentlemen and architects.

PROGRESS.

"THE DRAINAGE OF LAND."

HAVING perused with considerable interest the paper on the above subject by "W. H. W.," as published in your issues of the 18th and 25th, of January, and the 8th and 15th ult., I think you may perhaps give publicity to a few notes confirmatory of the views advanced by the writer. The particulars I have to submit comprise practical observations by a land-agent and agriculturist, who, in the course of conversation some little time ago, on the subject of drainage and the beneficial results arising from the use of large-sized pipes in drainage operations, narrated substantially what I am about to submit to your readers. On reading the first part of the paper published on the 18th of January, I was so forcibly impressed with the coincidence of ideas, particularly on that part which treats on "Air and Warmth," that I was induced to write to Mr. Milner, the gentleman referred to, to favour me briefly with his experience on the point, as illustrated by using large drain-pipes, who replies as follows:—

"The first time my attention was directed to using large pipes was a remark made by one of our tenants. Having been engaged in draining a portion of extra wet or damp land, he used 3-in. and 4-in. pipes; ever since he has always had an unusual increase of crop, which I attribute to the large amount of air admitted through the unoccupied spaces in the pipe not required in running off the water. The air is heated and permeates the subsoil, communicating nourishment to the roots of the plants, and causes vegetation to act very rapidly. I have on different occasions drained partially patches of land with large pipes, and have always found the same results. I am of decided opinion, that by using not less than 3-in. and 3½-in. pipes, the result would be large returns. I may mention, that wherever a stiff retentive subsoil is drained, such as we have in this locality, I would not recommend drains to be cut deeper (using the size of pipes as described) than 2½ ft., and not more than 16 ft. apart. This depth and this distance apart I have found to be remunerative; but deeper and more apart I have found to be the reverse."

With these observations before me, and the tabulated statements of the beneficial results of "air drainage," as contained in the first part of the paper adverted to, I had expected the writer would have recommended a larger size of pipe than 2 in. diameter for the small or feed drains. I can, however, perceive that in the case of a feed-drain of considerable length a 2-in. pipe, with the "air-drain," as experimented upon by Mr. Hutchinson, might admit as much air as a feed-drain of similar length with a 3-in. pipe without the air-drain at the upper end. In reference to the air-drain, would a pipe continued from the last horizontal pipe, at the head of the drain, and communicating with the surface, not answer all the purposes of a cross drain at the upper end, connecting all the feed-drains? I can imagine this would even be better, as in the case of an air-drain constructed by connecting the upper ends of five drains, the air-drain being open at each end. In this case the air-drain would only give two air-outlets to five drains, whereas the simple introducing of a pipe from the upper end or terminus of each feed-drain communicating with the surface would give five air-inlets. An objection might be taken to the liability of ordinary 2-in. or 3-in. drain-pipes, placed vertically or at an angle, communicating with the surface, getting disarranged. This might be obviated by using a vitrified socket-pipe, with a proper bend, in one length, suited to the particular depth of the drain. The item of cost in drainage is no doubt an important consideration; and when the writer, under this head, states the average price at the maker's yard in the counties to which his paper has special reference, "is 2½s. per 1,000 for 2-in. pipes, and 42s. for 3-in. pipes," I can readily see a material reason for recommending a 2-in. pipe as suitable for the ordinary small feed-drains.

If, however, a 3-in. pipe would give generally the same extra increase of crop as stated in Mr. Milner's experience; or if similar beneficial results generally attended the adoption of air-drainage, as given in the experiments of Mr. Hutchinson, any extra cost incurred by using a 3-in. pipe instead of a 2-in. pipe, or by adopting air-drainage, would be repaid in the first year's crop—a circumstance which carries with it strong recommendations for using 3-in. pipes, and which might be supplemented by air-drainage at a comparatively trifling cost, by adopting the plan suggested of using vitrified earthenware pipes, communicating between the drains and the surface. This mode of air-drainage possesses the additional recommendation of not being necessarily confined to the head of the drains, but may be used wherever and as often as the drainage surveyor deemed advantageous. In this district of Lincolnshire the question of cost between a 2-in. pipe and a 3-in. pipe is not so material, as the current price of 2-in. pipes at the yard is 17s. 6d. per 1,000, and for 3-in. pipes 26s., each pipe being 14 in. long; while pipes of similar length in Surrey or Lincoln would be 2½s. 6d. for 2-in. and 49s. for 3-in. As a manufacturer, I am aware a considerable diversity of opinion has existed, and still exists, as to the size and shape of pipes best adapted for drainage purposes; but I believe opinion in this district is generally settling in favour of a 3-in. pipe for the small or feed drains, and the main drains in proportion.

The original paper and foregoing observations have special reference to arable land. Another aspect of the drainage question might be discussed with interest to numbers of your readers, and one which proprietors and occupiers must shortly come to some proper understanding upon, namely, the drainage of hill pasture, moorland, or the sheep-walks of England and Scotland. While arable land, efficiently drained and economically carried out, will admit of a consequent rent-charge, comprehending a good interest for capital expended, and repayment of principal in twenty-one years, and at the same time remunerating the occupier, instances, so far as I am aware, are not so general of experiments on the description of land to which I allude, proving they have been equally remunerative, or would bear a similar rent-charge; on the contrary, there is a feeling amongst occupiers that the drainage operations cannot be carried out to their remuneratively on the terms on which capital is obtainable from public companies or drainage associations, a circumstance which would suggest to proprietors the consideration whether they ought not to meet this difficulty by advancing capital on easier terms, or giving to enterprising tenants leases of such extent as would enable them to drain their respective holdings, receive a fair interest, and be repaid their capital during the currency of the lease. I forbear to enter further upon this question, trusting the hint incidentally thrown out may lead some of your correspondents to take up the subject, and furnish a paper as interesting as that you have recently published, by "W. H. W." W. H.

DRY EARTH SYSTEM OF SEWAGE UTILIZATION.

SIR,—Will you kindly allow me space for a few remarks on that portion of "M. P.'s" paper in your number of the 7th ult. which is headed "The Dry Earth System of Sewage Utilization"?

1. The earth to be used in closets need not be black, as "M. P." states; any surface-earth will answer the purpose, only, the less of chalk there is, and the less sand in it, the better. That which I have used now for ten years is the earth lying on a chalk substratum; and more than that, most clays will answer the purpose. When, some six years ago, Major Nugent, R.E., under orders from the War Office, experimented on the use of the system at Portland, he told me that the blue Oxford clay, though more difficult to break up and sift, appeared to him to possess greater deodorizing power than the rich Portland earth. This is a point which, with reference both to a given supply of earth and to the manufacture of manure for light soils, is well worthy of observation. Again, this dry earth or clay for use in closets ought not to be pulverized. That the manure manufactured may have its full effect, the mixed soil and earth should be pulverized; but for use in closets all that is required is to sift it.

2. In attempting to relieve "M. P.'s" misapp-

prohension on the subject of the supply of earth to a given town, I omit all reference to the metropolis; for however feasible the introduction of the system may be in certain districts, until smaller towns have tried it, the advocacy of its general introduction is futile.

I will take in preference a town with 7,000 inhabitants, situated in an agricultural neighbourhood, and I think I shall satisfy "M. P." that a sufficient supply of dry earth to the town shall not only be without prejudice to that neighbourhood, but with vast advantage to both town and country. In the first place, it is no mere supposition, but a fact fully established by the continually increasing experience of ten years, that as soon as the excretions have been deodorized and absorbed, and the mixed mass dried, that mixed mass may be used in a closet or urinal with the same efficacy and the same safety as the unmixt earth. For such immediate use, however, I do not plead. In the town of which I speak there is a school of eighty boys, in which now for three years the system has been adopted. The contents of the closets fall into a vault, which also serves as a urinal. This vault does not require emptying oftener than once in three months; so that a sufficient quantity being provided for six months, and this being used four times, there may be an interval of four months and a half between these several uses of any portion of it. I may here observe that the removal every three months is made in open day in the High-street of the town without offence to any one. Well, sir, on the estimate of 38 lb. per head per week, the population of 7,000 persons would require, if the earth should be used four times, from 1,500 to 1,600 tons a year; or if the coal ashes of the town should be mixed with the earth in the proportion of one-third to two-thirds, only about 1,000 tons would be required. At present, for cleansing the water-closets and flushing the sewers of this town, there are pumped 1,000 tons of water a day! Now, supposing the town to depend for its supply entirely on the surface earth of the neighbourhood, there would be no need of the excavation of a single foot of soil, much less of five acres 13 ft. deep, or sixty-five acres at 1 ft. All that is taken in this way is only borrowed to be repaid with interest from the 4,000 or 5,000 acres within two miles of the town; a quarter of a ton an acre, or less than a quarter of an ounce a square foot, would be a sufficient loan for the year, and each ton so employed in the closets during the year, ought at the close to be worth at least 5s. But then if the supply of manure should be more than the neighbourhood would require, there are clay pits and clay hills at no great distance from many such towns. And besides this, great use may be made of street sweepings and of local ashes, used in certain proportions.

If the contents of a closet be removed into a vault or chamber of suitable size, there is no need of the frequent removal of which "M. P." speaks, "every day or every week." From a vault within the walls of a parsonage-house near me, the practice for three years has been to remove them once in a month. From that of my day-school with ninety-boys, once in six weeks; from the school before mentioned, once in three months. Two vaults on my own premises, for a family averaging twelve persons, require to be emptied only once in six months. By removal at such intervals the addition to street traffic could not be great.

4. If the value of the manure be such as is now assigned to it by the united testimony of farmers, gardeners, and one manure dealer (3s. and upwards, according to the number of times the earth is used), the cost of drying either on a large or small scale is, in comparison with that value, a very trifling consideration.

5. The idea of putting any charge on the earth supplied to the poor has never, so far as I am aware, been entertained, unless they should retain the manure for themselves. In this latter case I know them to require very little inspection.

6. "M. P." does not seem to be aware that dry earth is just as available in "slaughter-houses and knackers' yards" as in closets. Some of my first and most trying experiments were on the horrible refuse of a slaughter-house. The butcher from whom I obtained it has told me that by what I taught him I saved him more than ten shillings a week,—such, at least, he reckons the value of this stuff mixed with a load of earth. In the case both of "the slaughter-house and the knackers' yard" the refuse mixed with earth should be removed to a large fly-yard. For hospitals the system appears to me

to be in every respect unexceptionable and perfect; stables may be cleansed by the same means; and, lastly, the removal and utilization of sink-water and slops by sub-irrigation or otherwise (Prospectus of E. C. Company) renders certain the prevention of the pollution of rivers.

7. "M. P." in his statement respecting the marketable value of night-soil, forgets how that value must be affected both by the necessity of its removal, and by the offensiveness of the operation. The earth, after it has absorbed the excretions, is so perfectly inoffensive, that I have known some that had been mechanically mixed taken the same day to London in a box in his carpet-bag by a chemist; and by two engineer's clerks it was taken wrapped in brown paper in their side-pockets.

The difficulties in the disposal of night-soil afford no illustration, then, of the removal of mixed earth. To any one who knows those iron troughs at Aldershot, it can be no wonder that the War Office has to pay 500l. or 600l. a year for the removal of the contents, besides a vast sum for various disinfectants. The wonder to me is that, when for some such sum they could not only annihilate all smell, but with the manure saved turn scores of acres of that sandy desert into a rich sward, they can hesitate to change the system. Our barracks generally, and our public schools of every description are, in their uncleanliness and the indecency of their latrines, a disgrace to civilized society.

HENRY MOULE.

ARCHITECTURE IN THE BIRMINGHAM SPRING EXHIBITION.

SIR,—Being on a visit to Birmingham, I have more than once visited the Architectural Room, making notes respecting the various drawings as I went through. As an architect of some position, I feel convinced you will not refuse to allow me a little space in your paper for their insertion.

The Gothic style appears to preponderate over Italian, and the examples of both styles are on the whole good. The designs of Mr. J. G. Bland may be mentioned as very thoughtful studies in Gothic architecture, the views of Strond and Acock's-green churches being worthy of remark. This gentleman has, I believe, distinguished himself by structures, in which polychromy is used extensively, chiefly in brick-work. Mr. J. A. Chatwin's designs for St. Augustine's Church, Edgbaston, and St. Lawrence's Church, Birmingham, show a knowledge of Gothic, and a considerable amount of aesthetic feeling. Mr. G. Holmes's designs are also worthy of remark. Mr. John Davis, jun., sends three elaborate drawings. Assuming that he is a young man, the drawings do him credit. The coloured drawing is not so satisfactory, being somewhat crude and approaching to tawdriness. The drawing by Mr. F. Barlow Osborn is a successful attempt to adapt Gothic to commercial requirements. It has a solid substantial appearance. The drawing of Norwich Cathedral, by Mr. Bakewell, is an interesting and faithful representation of the interior of that noble edifice. Among the other Gothic works must be mentioned those of Messrs. Nicholls, Ingall, Veall, &c., many of whose designs are satisfactory. Among the classic contributors are Messrs. Chatwin, Yeoville Thomason, Holmes, Bateman & Corser, Phipson, Plevius, most of whose designs are good.

A LONDON ARCHITECT.

THE BED OF BUILDING STONE.

It was my misfortune that I was not present at the reading of Professor Ansted's paper "On Building Stones." And now, using the almost solemn words which commence every section of the Building Act, St. Vict., what is the result of the discussion? Do we know which is the proper bed of a stone when taken from the quarry? I say, emphatically, we do not. I never found a mason with the stone on his banker that could tell me more than this, namely, the vertical and horizontal bed. We know this well enough, but we want to know more than this. We really do not know now which is the natural bed of the stone.

This is the point that I wish to direct the Professor's attention to,—Which is the zenith and which is the nadir of a stone? It was taken for granted that we knew all about it, and there-

fore it was not alluded to. I do not believe this problem has been solved; yet I think it is one well worthy of investigation. The delamination of the stone surely has something to do, I think, with the placement of it in a building, according to its natural growth or formation. Reverse the order of nature, fight against it, and you have a difficult battle; but study nature, follow her laws, and you will discover cause and effect.

I wish, therefore, to direct attention to this question. Which is the zenith and the nadir of a stone?

I believe the microscope would probably tell us this. We know the molecules of stone assume particular figures well known to the geologist.

The inference drawn is, that until you can place a stone in its natural bed you have not fully tested the durability of the stone. Turn a skin inside out, and your shoemaker will show you that it will resist water penetrating; but how about stone reversed?

A. J. HISCOCKS.

A PLAGUE STONE?

A STONE has been turned up in the market-place of Stockport, 24 in. long, 14 in. wide, and 15 in. deep, hollowed into a cup on the top about 4 in. deep. It is a sandstone grit from the old quarry behind the "Wizard," at Alderley Edge. It is supposed to be the old "plague stone," which was common at the time of the Great Plague, at market times, containing vinegar, to pass money through or fumigate all articles from an infected district. The stone has the peculiar appearance of bird-foot marks running through the sandstone, not impressions, but appearances—white streaks.

Can one of your correspondents give me any information about "plague stones?" I can only say that the stone is exactly the same as that old stone base of a modern pillar at Mottram St. Andrew, which marks the spot at which the market was held during the plague; at least, this is the tradition of the neighbourhood.

T. K.

THE ARCHITECTURESQUE.

WITHOUT staying to ask whether "all Picturesque," "primarily and radically Picturesque," and the "essential superaddition of the Picturesque," are convertible phrases, meaning precisely the same thing, now that we have Professor Kerr's explanation that his "proper thesis" goes no further than an inquiry whether what he calls the Architecturesque is a reality or not, we can deal with his views under another and simpler aspect.

It is, however, only by weighing his words and testing his illustrations, that we are enabled to arrive at the meaning he attaches to the term Architecturesque; and it is impossible for any one but himself to disconnect it from the meaning imputed to it by his own language. What we wish to know is, if there be such a thing or essence as the Architecturesque in the sense in which he puts it forth—not if there be a quality in architecture which might aptly be expressed by such a word.

The general impression conveyed by the lecture is, that the Architecturesque is the essence of beauty in architecture, founded upon regularity, symmetry, and system, and is a species of beauty directly opposite to the Picturesque. This principle he more fully brings out when he draws the contrast between the Gothic and Classic schools, the one being founded upon the Architecturesque, the other not upon architectural but the Picturesque principles. We can only examine his theory by the light he himself throws upon it; and if the specific meaning attaching to the word leads up to fallacious conclusions, either it is not founded in reality and architectural truth, or he fails to convey his meaning to us.

Possibly some subtle fallacy underlies his theory, also why does the explanation of it involve a change of position? We are not now told that Gothic architecture is founded upon the picturesque, but that the picturesque is an "essential super-addition," which, if I interpret rightly, means that Gothic architecture cannot exist as such without extraneous aid, and that it is necessary to introduce a new principle more architectural in its nature and origin.

Throughout the lecture Mr. Kerr hardly appears conscious that in coining his word by a

process he thinks parallel he is really inverting the order in which the term Picturesque arose. The Picturesque is not a beauty founded upon pictures on the principles of painting, but is a convenient and appropriate name for classifying a peculiar beauty widely distributed in nature, and the parallel word in nature to the Architectures would be the *Naturalæque*. On the one hand, the Picturesque is not a name for the "symmetry of irregularity" found in nature, and is a specific natural beauty that all see, feel, and acknowledge; while architectural beauty is variable, and being nearly all conventional in the Classic, and conventional and natural in the Gothic, it is difficult to arrive at the essence of its beauty and fix it in a word.

Like flowers, it may possess several essences; but while flowers do not cease to be flowers because of this, architecture will not the less cease to be architecture because the essence of its beauty is different in the Gothic to what it is in the Classic. If we use a term to signify a beauty peculiar to architecture in opposition to beauties not architectural, we must invent a word that will apply to all styles and periods; and I cannot at present see why the picturesque is not as legitimately an architectural beauty as symmetrical rigidity. As a mode of conveying an idea of the treatment necessary for architectural accessories, I am inclined to think it may have its use, though in the enlarged sense shadowed forth by Mr. Kerr,—in which it is placed in a parallel position with an all-prevailing natural beauty. It will hardly be admitted into our vocabulary. If it be admitted, the long perspective of "esques" with which we are likely to be inundated, cannot be anticipated without alarm. Potters, upholsterers, and other art-workmen, will be wanting terms to describe the essential beauties of their arts; and though, in the sense of importance, their claims for such a distinction may not be so great as ours, yet in principle we could not avoid admitting them, for doubtless each art possesses its own peculiar principles of beauty.

For starting an interesting subject containing plenty of "nuts to crack," Mr. Kerr deserves our thanks; but it would be cruel for him to leave us to clear up all the difficulties ourselves.

T. M. R.

THE GREAT BELL OF ST. PAUL'S CATHEDRAL.

In giving a brief history of the great bell of St. Paul's, in the *Builder* of the 14th of December, 1867, I stated, on what was considered the best authority, which I now produce, that the bell was made in 1709. The following is an extract from a letter written by Messrs. Mears, of Whitechapel, in March, 1855, with a view to decide this among other questions:—

"St. Paul's great bell was made at this foundry by our predecessor, Richard Phelps, in 1709."

Moreover, Sir Henry Ellis, in his edition of Dugdale's "History of St. Paul's Cathedral," 1818, p. 184, says:—

"Sir Christopher Wren, in his Answer to the tract entitled 'Frauds and Abuses at St. Paul's,' gives us the history of the present bell."

And here it is worthy of remark that Sir Christopher's "Answer" was published in 1713: so that it could not possibly give the history of any bell cast at a later period.

A few weeks ago, however, I found from a "rubbing" of the inscription that the present bell is dated 1716, which would seem to indicate that it was recast in that year. But to set this point at rest, I sought for some further evidence. Accordingly, by the kind offices of Mr. F. C. Penrose, architect, I ascended the south tower and made a careful examination of the bell. Subsequently the Rev. W. Sparrow Simpson, librarian of the cathedral, permitted me to have access to the "Folio Accounts," and very kindly assisted me in my researches.

The result appears to be that Richard Phelps recast his former bell, dated 1709, in the year 1716.

A word in conclusion, by way of throwing out a hint for the consideration of the authorities at some future period. Believing that the present great bell is quite sound, and satisfactory in certain other respects, I venture to say that it is possible so to alter its form and relative thickness,—without recasting,—as to render it capable of producing a fine tone.

THOMAS WALESBY.

FOOTWAYS ON THE THAMES EMBANKMENT.

A REPORT was presented at the last meeting of the Metropolitan Board of Works from the Works and General Purposes Committee, stating that they had issued an advertisement for tenders for footways and fences on the Thames Embankment (North), contracts Nos. 1 and 2, submitting specification for the works. In reference to this subject the following report from Mr. Bazalgette, the chief engineer to the Board, was presented:—

"Thames Embankment Footway and Temporary Approaches.

"Pursuant to the reference of the Board of the 13th ult. to the Works Committee, to make arrangements for opening the Thames Embankment and for footways during the ensuing summer, I beg to report that,—

To form the carriage-way along the face of the Embankment would not at present be prudent, because it would have to be taken up for the construction of the Metropolitan District Railway underneath it.

The specification and drawings now submitted by the committee for the approval of the Board provide for the formation of a paved footway, 20 ft. wide, along the face of the Embankment, from Westminster Bridge to the west end of the Temple-gardens.

Two approaches will be connected with Westminster Bridge, one down the steps to and along the new Westminster steam-boat pier, and the other at the back of the pier by a gradual incline from the level of the bridge down to that of the Embankment. A subway for foot-passengers is to be formed from the Houses of Parliament, underneath Bridge street, to the station of the Metropolitan District Railway; and I am now in communication with Mr. Barry with a view to submitting for the consideration of the Board a design for the continuation of the subway to give access to the Westminster steam-boat pier, and for allowing foot-passengers to cross the footpaths on the Thames Embankment to any part of Westminster without encountering the carriage traffic in the locality.

A temporary paved foot-approach is proposed to be formed from Villiers-street, Strand, to the Embankment roadway and Charing-cross steam-boat pier. Some arrangement will have to be made with the South-Eastern Railway Company in order to maintain the full width of this approach at the upper end; and it would be to the public advantage and their own interest that they should also form an approach by steps from the footway at the side of the Charing-cross Railway bridge down to the Embankment footway.

A third temporary paved foot-approach would be formed from the steps at the side of Waterloo Bridge, giving access between Wellington-street and the Waterloo steam-boat pier.

The fourth temporary paved footway approach would be formed from the steps at the end of Essex-street, Strand, to the Temple steam-boat pier, which, for the present, would be the eastern end of the Thames Embankment promenade. A communication may also be made to the Strand, Temple-gardens if desired by the representatives of that property.

The whole of these footways will be fenced off by temporary wooden fencing, and may be opened to the public in the course of the coming summer.

J. W. BAZALGETTE, Engineer."

The report of the committee and that of the engineer were adopted.

The District Railway Company stand in the way of a completion of the carriage-way on the Embankment.

THE EDUCATION OF THE PEOPLE.

THE NATIONAL SUNDAY LEAGUE.

Sir,—In the generally sensible and well-reasoned letter of "Jack Plane," in the *Builder* of Saturday last, a most unwarrantable allusion is made to a body of working men united for what they conceive to be for the enlightenment and elevation of their class by obtaining facilities for visiting our national museums and art treasures on the Sunday afternoon; and whom your correspondent calls *quacks* and *nostrum-mongers*, insinuating that the education question has been unfairly pressed into the programme of the National Sunday League, as a means of raising capital. Now, sir, some of the council of the League are subscribers to, and readers of, the *Builder*, and on their expressed desire I ask you to allow a vindication. "Jack Plane" and a prospect of the bills which have aified. I enclose a copy of the National Sunday League, as published twelve years since, which shows that the elevation of the people in art taste was then a primary element of the movement and a national necessity, now so generally recognised.

As he has given extracts to suit his purpose from the *Builder* in question, permits me to put it fairly before your readers by the introductory paragraph.

"All parties in the State now admit that the people can no longer be debarred from the educational advantages which are enjoyed by other civilised nations, and the late Exhibition in Paris has demonstrated that England will fail to maintain her pre-eminence in the markets of the world without increased facilities for the technical and artistic culture of her artisans.

The superiority of the French workman in matters involving taste, is almost unanimously attributed to the fact that they are, from infancy, enabled on the Sunday afternoon to visit the national collections of art treasures."

And, further, let me add the quotation from the chairman of the Society of Arts:—

"Our artisans nearly all desire that museums, &c., &c., should be open on Sundays; not only to assimilate the English to the French Sunday in other respects. Nearly all feel that it is the familiarity with the beautiful in nature and art from childhood that has given to the French nation as a whole that knowledge of artistic skill and feeling for the beautiful which threaten to make them the most successful workmen in the world, to the serious injury of our country."

These words being identical with those put forth by us through so many years, it was, I contend, legitimate in us to use them in support.

What, however, are we to say of "Jack Plane" when,

having denounced the advocates of the Sunday opening of museums as "quacks and nostrum-mongers," he forthwith proposes, on a Monday evening, the evening opening of such institutions? We of the League are in favour of such openings for those who could visit them; but we maintain, from our practical knowledge, that the great bulk of the working class would not be able to do this with any profitable advantage if open.

The miserable plea of rest for the attendants is raised as a barrier to the people obtaining knowledge and elevating their minds, as though there were not sufficient persons partially employed to recruit a special staff for Sunday duty (as shown by the Report of the Parliamentary Committee, 1857), or as it is well understood by the British Museum trustees, there is a reserve of police on Sunday duty from whom the duty could be obtained without the additional employment of a single person; and until your correspondent can show that injury to the individual or to the society is produced by working on Sunday for the bringing out of the Monday morning newspapers, the printers and compositors taking the Saturday for holiday; and, in fact, can tell us how all society is to be at perfect rest on the one day; we cannot give such as "Jack Plane" credit for consistency. Besides,—what sort of a friend to the attendants is this who would add some four hours nightly to their duties as necessitated by the evening opening? or his nostrum, like ours, must be supplied by relays.

When it can be demonstrated that by a vast majority the working classes of London are in favour of the Sunday opening, and that it is not the executive for these are we not justified in issuing a bill calling attention to the necessity of organisation? I trust, sir, that "Jack Plane" will not be so ready to apply his pen as he does to apply such offensive epithets, and not call for so much of your valuable space in refutation.

R. M. MORRELL, Hon. Sec.

BILLS OF QUANTITIES IN LIVERPOOL.

A CORRESPONDENT writes,—

A really good bill of quantities is an exception in Liverpool (unless when London architects bring down London quantities), on account of certain irregularities which unfortunately exist. In London the architect never supplies the quantities; it is not the etiquette of the profession, the assumption being that he is more profitably employed. But the chief reason is that he finds himself in a more independent position by keeping clear of the quantities, placed as he is an umpire between two parties. If he receives pay from the contractor for them he is responsible for their accuracy, and this is not a desirable position for him to occupy. He will therefore have nothing to do with them. But in Liverpool, with one or two honourable exceptions, the architect invariably takes out the quantities either directly or indirectly. Perhaps in no case does he actually take them out with his own hands. He employs a confidential clerk, who is a draughtsman, and not a qualified surveyor. He may place his own name to the quantities, or leave his clerk to place his name to them really one. But if he attaches his own name he generally states, as bold as brass, the interesting fact that he has taken all possible pains with them, he is not prepared to say that they are correct, and that he will not be responsible for their accuracy. In short, he employs himself, without consulting either his client or the contractor, fixes his own rate of charge, pockets the money, and refuses to be responsible for his work. If the name of his clerk is attached, the responsibility is supposed to be shifted on to his shoulders, but it is a responsibility which is never recognised, and which the clerk, of course, not in a position to meet. Now, it is a notorious fact that these quantities so supplied are often grossly inaccurate and inefficient, and even when correct, as to their general character they do not give the detailed information nor represent anything like the time and patience a good London surveyor brings to the same work. For doing this 2 per cent. are commonly charged, and in some cases 2½ per cent. Duly qualified surveyors are discontinued in Liverpool, the work being given out, not to the most efficient, but, in the interest of the architect. How much goes to show that, as now matters stand, we have no means of knowing, but it is always surmised that the fees are divided. There is one consolation for the unfortunate client, out of whose pocket the extra rate of course comes. He pays through the architect, and he pays in blissful ignorance. Such a state of things is a blot upon the profession.

THE ROYAL ACADEMY AND THE ARCHITECTURAL EXHIBITIONS.

Sir,—A short time back a suggestion was made to me, that the time for receiving drawings for the Architectural Exhibition should be postponed until after the Royal Academy judges had decided as to the drawings to be hung there. Architects prefer their drawings to be hung at the Royal Academy, and I know that a great number of drawings are prepared by the best architectural artists for that exhibition. Only a few of these drawings are hung, simply because there is not wall-space; and thus, after the expenditure of much time and money upon their production, they return to the architect's office without the public ever having a peep at them. Could not the Architectural Exhibition be made a success, if it could be so arranged that these rejected drawings should be included in the Conduit-street show?

I hope that this suggestion will receive a corner in your journal, and, if practicable, be acted upon by the Exhibition committee. I cannot deny that it seems anything but right that the representation of modern architecture should be almost entirely left in the hands of the junior members of the profession. We have reason to expect that men who have been blessed with success, and who must have ample means, will do all in their power for the honour of the profession; but how is our expectation met?

I fear that if the present utter lifelessness,—except where gold glitters,—goes on much longer, architecture will be erased from the list of professions, and put down as a dead letter. Sir Edwin Lutyens will be pictures without sending them to the R.A. Does he? No; he is an artist. How is it architects have lost all enthusiasm?

ADALPHI.

* This is not strictly correct.—Ed.

THE EAST LONDON MUSEUM.

SIR,—Thanks to well-directed efforts, a Museum of Science and Industrial Art will very shortly be established for the teeming populations of the great East London suburbs. The obstacles which impeded the progress of the enterprise have now been removed, and the site has been finally ascertained in the House of Lords; and it remains, therefore, with the public to subscribe the cost of the ground, in order that the Government may, in pursuance of their undertaking, commence building. I learn with some regret that some hundreds of pounds are still wanting to complete the sum; yet I shall rejoice if this circumstance be the means of eliciting from the people themselves an unostentatious expression of practical goodwill. Much might be done through an appeal to the loyalty of the East-end artisans to rally them to the support of their museum. Surely they owe it to the Government, the trustees, and the wealthy donors of money, that they should exhibit their interest by sharing, according to their means, the comparatively small burden which is the only condition attached to the wise and liberal concession of those who govern us, for the instruction and recreation of the masses.

In the East-end are 100,000 persons who have no pounds to spare, but can give pence. Let, then, a general contribution be made,—in workshops and factories, in offices and on tradespeople's counters, from house to house, and by the post,—of pence and postage-stamps. I am sure that Mr. H. Mansard, as the Rectory, Bethnal-green, N.E.; and Mr. Antonio Brady, Maryland Point, Stratford, E.; and I am permitted to add, the Council of the Public Museums and Free Libraries Association, 150, Strand, W.G., will be very glad of the help of your working class readers; and the body just named will cordially avail themselves of any opportunities offered them of addressing briefly, or for an evening, the meetings of literary, trades, temperance, mental improvement, friendly, and any other societies, in furtherance of so enormous a benefit to the toiling million of the East.

J. T. DEXTER.

HERNE BAY.

SIR,—My attention has been drawn to a communication from "One of the Piles" of our pier, which found a place in your columns. In the Bay will heartily rejoice, and many will be willing to lend a helping hand, should there at last really be a prospect of doing something towards restoring the last prestige of Herne Bay! And what more likely to effect such an object as re-opening the pier, and making it not only a point of call for passing steamers, but also a promenade for visitors? To attempt anything short of this would certainly be absurd.

I cannot, however, allow that the Herne Bay inhabitants have been reticent in this matter. Alive to their own interests, they more than once subscribed money, and offered to repair the pier; but then, as now, "difficulties piled in their way" by the proprietors of the pier rendered all efforts null.

Let but the owners of the pier meet fairly those who are now attempting a like object, stating upon what terms they will either cede their rights entire, or otherwise permit the rebuilding of the pier, and all the rest will speedily be arranged.

It is, indeed, a thousand pities that Herne Bay, possessing as it does the combined advantages of pure, bracing atmosphere, excellent bathing, charming country walks, and proximity to the chief cathedral city, should be so neglected, when a little public spirit would, if properly directed, soon cause it to take rank as a favourite watering-place.

ONE OF THE RESIDENTS.

RIGHT TO PLACE FOOTINGS ON ADJOINING GROUND.

SIR,—Will any of your readers kindly give me a correct reply to the following question:—

Providing two men purchase or lease two adjoining plots of land of R. frontage each plot, the one intends building, the other does not, can the one who builds legally encroach on his neighbour's plot for the purpose of putting in his footings, or can any part of them be built on the part of the man (his neighbour) who does not intend to build, should such non-building party object?

Parties to whom I have spoken are divided in opinion.

A SUBSCRIBER.

THE ARTISANS' AND LABOURERS' DWELLINGS BILL.

A REPORT on this Bill, now passing through the House of Commons, has been presented to the General Purposes Committee of the Manchester City Council by the Town-clerk, and by the Committee to the Council. In the outset the report says:—

"The Artisans' and Labourers' Dwellings Bill (against which the Corporation presented a petition last Session) has, with considerable alteration, and as the Town-clerk is glad to say, with much improvement in its provisions, been again introduced and read the second time in the House of Commons."

After reciting and commenting on the various clauses of the Bill, the report thus continues:—

"For the main object sought to be attained by the Bill, viz., an improvement in the dwellings of the working classes, the Corporation have always expressed their sympathy and approval; and the Town-clerk ventures to express the opinion that, if to the reasonable objections urged by the Corporation to some of the provisions more consideration had been shown, greater willingness to accept the amendments proposed by Mr. Goldney and others had been manifested by those who had charge of the Bill, very different progress would have been made, and in all probability a Bill to accomplish an object of which every member in the House approved, would, during the last session have received the willing sanction of the Legislature. In the Bill now before the House the whole of the amend-

ments referred to in the report of the town-clerk have been embodied. . . . The responsibility of making the alterations required to improve the sanitary condition of dwelling houses is, as the council has always contended it ought to be, cast upon the owner of the property; and in all cases where such owner either declines or neglects to make the alterations required, the council may, at their option, either close the dwelling until rendered fit for habitation, or they may purchase the property at such price as shall be fixed by two independent valuers, who are to value the property 'at the true market value as unfit for human habitation,' and use 'to add nothing for compulsory purchase.' As now framed, and subject to unimportant alterations which will no doubt be made in committee in the House of Commons, the powers proposed to be given will, in the opinion of the town-clerk, be found most valuable to the local authorities, and enable them by their exercise largely to improve the sanitary condition of the dwellings of the working classes."

PROPOSED WORKHOUSE FOR ISLINGTON.

THE architect of the selected design, Mr. Bardon, writing with reference to a paragraph in our last, says,—

"The amount stated in the original instructions issued by the trustees was 35,000*l.*, which, with the 10 per cent. margin, may be taken in round numbers as 40,000*l.* The amount of the accepted Tender, on the other hand, is under 22,000*l.* Since the selection and adoption of my design, the compulsory requirements of the Poor-law Board have considerably increased the necessary cost. Instead of a cubical space of 500 ft., as originally asked, for each inmate of the infirmary (a large building, to accommodate 400), my amended plan (on the pavilion principle) provide just upon 800 cubic feet per inmate in the infirmary, and 1,300 cubic feet in the 'separation wards' with additional kitchen, scullery, and other internal arrangements. Fireplaces also in the centre of the wards have been preferred, instead of ordinary fireplaces in the side-walls, as planned in the first instance. The cubical space of the casual wards has also been increased. The Guardians, moreover, were pleased to adopt several improvements which study of workhouse arrangements induced me to suggest for their consideration, and which were not included in their original instructions."

PARISH CONTRACTS.

THE tenders accepted by the vestry of St. Pancras for the supply of granites, road materials, &c., for twelve months, are as under-mentioned, the prices at this time last year being those named second, from which it appears that prices are lower, and this reduction is attributed to the cessation of numerous large works in the metropolis, and the lessened demand for men and horses.—Granite, in quarry lumps, at per ton, Messrs. Mowlem, 11*s.* 6*d.* (15*s.*); Mount Sorrell, 10*s.* 6*d.* (12*s.*). Mr. Culverhouse, Groby, 10*s.* 4*d.* (10*s.* 8*d.*). Sewell & Son, Markfield and Bardol-hill, 10*s.* 8*d.* (10*s.* 10*d.*). Kentish rag, broken, Mr. Culverhouse, 8*s.* (8*s.* 5*d.*) per yard. Road materials, per cubic yard.—Smith & Son, hard core, 1*s.* 6*d.* (2*s.* 10*d.*); Mr. Studd, loamy gravel, 5*s.* 8*d.* (6*s.* 4*d.*), and clean rough gravel, 6*s.* (6*s.* 6*d.*); Mr. Anderson, surface hand-picked flints, 8*s.* (11*s.* 10*d.*), and pit flints, 7*s.* 6*d.* (8*s.* 4*d.*). Carriage-way pavings:—Messrs. Sewell & Son, Aberdeen laid-in gravel, per yard super, cubes 9 in. by 3 in., 15*s.* (17*s.* 7*d.*); half coverings, 7 in. by 3 in., 11*s.* 10*d.* (13*s.*); pitchings, 6 in. by 3 in., 10*s.* 10*d.* (11*s.* 10*d.*); Mount Sorrell squares, 3 in. by 3 in., 5*s.* 2*d.* (6*s.* 4*d.*); channelling on macadamized roads, 9*s.* 6*d.* (10*s.* 10*d.*). Footways:—York stone, 3 in., per 100 ft. super, 2*l.* 12*s.* 6*d.* (3*l.*); York, 3 in., laid, per yard super, 5*s.* 10*d.* (6*s.* 6*d.*); kerb, 12 in. by 8 in., per foot lineal, 1*s.* 9*d.* (2*s.* 1*d.*); York channelling, 4 in. by 12 in., per foot lineal, 6*d.* (8*d.*); spnr stones, 2*s.* 8*d.* (4*s.* 9*d.*).

MONUMENTAL.

Proposed Statue of Faraday.—A meeting has been held in the library of the Royal Society with a view of memorialising Government to erect a statue of Faraday, in Westminster Abbey, at the national expense.

The Lincoln Statue.—The model of the statue of President Lincoln, which is to form a portion of the "Lincoln Monument," to be erected by the United States War Fund Committee, has arrived in New York from the studio of Mr. H. K. Brown, and been inspected by the committee. The statue, which will be of bronze, will be 9 ft. in height, representing Mr. Lincoln in a standing position, holding in his left hand a copy of the Emancipation Proclamation, with the right hand pointing to the words, "Shall he for ever Free," engraved thereon. The statue will rest upon a pedestal 15 ft. in height, ornamented with appropriate devices. The total cost of the monument will be 15,000 dols., which amount has been fully subscribed in 1 dol. subscriptions. The

monument will be placed in the Park, near the great fountain.

Monument to the Poet Tannahill.—For nearly sixty years after the death of Robert Tannahill, the poet, no public memorial of him existed in Paisley, his native town. Some time ago, it was proposed that a committee should be appointed for the purpose of organising an subscription for the erection of a monumental tombstone over his grave. The proposal was gone into, and soon sufficient funds were obtained for the purpose. The memorial was not intended to be more than a neat erection to mark the spot where the poet's ashes reposed. Tannahill was buried in the West Relief Churchyard, and there the memorial has been built. It was designed and executed by Messrs. Gordon & Barclay, sculptors, Paisley. It is composed of grey granite, and the style is Roman. Its general character is a pedestal, about 4 ft. square at the base, and 10 ft. in height. On the shaft is a polished subscription-plate with the following words:—"Tannahill, Born 3d June, 1774; died 17th May, 1810. Erected over the remains of the poet, 1867." The work was completed a few months ago, and the committee have been celebrating its erection.

CHURCH-BUILDING NEWS.

Tamworth.—A meeting has been held in the town-hall to promote the restoration of the parish church by carrying out the plans for increased accommodation, at a cost of about 2,000*l.*, prepared, some time ago, by Mr. G. G. Scott. Subscriptions to the amount of 1,850*l.* were announced at the meeting, and there was no intention of raising any rate. The "Bishop of Lichfield and New Zealand" presided, and the meeting was disturbed throughout by such "discordant noises" as the bishop said reminded him of the South Sea Islands; and indeed it looked as if his lordship had imported some of his New Zealand fock into the diocese of Lichfield.

Lichfield.—A vestry meeting of the ratepayers of the parish of St. Mary has been held to receive the report of the committee appointed to select a design for rebuilding the body of the church, as a memorial to the late bishop, and to determine whether an application should be made for a faculty for such rebuilding. There was a very numerous attendance. It appeared from the minutes of the committee that having advertised for designs for rebuilding the church in unison with the present spire and tower, nine architects sent in plans, and the committee, after examination, selected those of Mr. Griffiths, of Stafford, the county surveyor, and Mr. Fowler, of Louth, Lincolnshire, a native of Lichfield. Both plans were sent to the family of the late bishop, and the result was the adoption of Mr. Fowler's. The new church, according to Mr. Fowler's designs, will seat 1,000 persons, and the cost will be about 6,000*l.*, towards which the family and friends of the late bishop promise subscriptions of 4,000*l.* The report of the committee stated that the designs of Mr. Fowler had been accepted subject to certain modifications, to which that gentleman had assented. Until a formal tender had been made by a competent builder it was not possible to state the exact cost, but it might be estimated that the sum of 6,300*l.* would be required, towards which 4,500*l.* had been promised by the vicar's family, they allowing 500*l.* for the old materials; and sums amounting to 545*l.* had also been promised by other persons. The report of the committee was all but unanimously adopted, and it was resolved that as soon as the funds necessary for the rebuilding of the church had been guaranteed the churchwardens be empowered to apply for a faculty for such rebuilding according to the plans of Mr. Fowler. A committee was appointed to provide funds for the rebuilding and generally to carry out the object in view.

Wednesbury.—The cemetery here has been consecrated by the Bishop of Lichfield. When the formation of the new cemetery was resolved upon, an eligible piece of land, situated on the Walsall-road, at a short distance from the town, and measuring upwards of 12 acres, was secured at a price of 5,400*l.*; and a loan of 10,000*l.*, repayable in thirty years, was obtained from the Public Loan Commissioners. Plans and designs, prepared by Messrs. W. & S. Horton, of Wednesbury and Walsall, were accepted; and contracts were entered into for the building of the chapels and lodge, the levelling, and laying out of the ground, and the erection of the boundary

walls and palisading. The former was given to Messrs. Trow & Son, of Wednesbury, at the contract price of 2,220*l.* The remaining part of the 10,000*l.* has been expended in the levelling of the ground (at a cost of 540*l.*), the laying-out of the cemetery (a work which has been done under the immediate supervision of the Board's surveyor, Mr. Fereday), and the erection of the entrance gates, boundary walls, and palisading. The design of the chapels is Early English, modified to suit the requirements of the case. The chapels are situated on each side of an enclosed entrance porch, above which rises a stone spire, furnished with a bell, and springing in octagonal shape from a square base, to the height of 56 ft. The chapel to the right, entering from the Walsall road, is for the use of Episcopalians, and that on the left for the use of Nonconformists. Each is 30 ft. by 16 ft., and to each is attached a receiving place, 18 ft. by 13 ft., and a small vestry at the extreme end of the building.

Strood.—The committee interested in the erection of a new church for the inhabitants of Strood have finally decided on the site for the proposed church, which will be near the Marsh, at the rear of North-street, in the parish of Frindsbury, on land belonging to the Dean and Chapter given by the Ecclesiastical Commissioners. The erection of the church will, we understand, be proceeded with forthwith.

Mistley.—The preliminary operations for the erection of the new church are now in progress. Mr. Capon and his assistants have been staking out the site, which is in a meadow of Mistley Park. It appears that the dimensions of the new edifice, including the spire, will be about 110 ft. by 60 ft. The committee have engaged the architectural services of Messrs. Wadmore & Baker, of London. The existing building, which is regarded as a curiosity in ecclesiastical architecture, has so many friends among the parishioners that its ultimate fate still remains undecided.

Books Received.

Our Schools and Colleges. By HERBERT FRY. London: Hardwicke, 1868.

INFORMATION is given in this useful volume as to nearly 2,000 schools of all sorts, preparing for various public examinations, and also as to the universities. The present issue is the second annual edition, in which the whole has been revised up to the end of 1867, after direct communication with the principals of each institution, and the author has added considerably to the information given in the first edition. The chief object in view is to provide information to parents in the selection of schools for their children. An account is given of our ancient endowed schools as they now exist. This is a very important subject, which in past years was considered worthy of Government investigation; and that renewed inquiry and adjustment are necessary seems evident. Mr. Fearon, one of her Majesty's inspectors of schools, speaks of a little English grammar school which he visited where the schoolmasters, according to the Parliamentary returns, had 100*l.* a year, and he found two masters teaching one scholar! One of the most comical things ever witnessed in the county, says Mr. Fearon, was the examination of that solitary scholar by the venerable and learned head-master, the usher, and assistant master! He was a sickly boy and very ignorant. Such a mockery of education ought not to be possible in England, nor should such means be wasted.

An Inquiry into the Difference of Style observable in Ancient Glass Painting, with Hints on Glass Painting. By the late CHAS. WINSTON. Second edition. Oxford and London: Jas. Parker & Co. 1867.

PENDING further notice we mention the publication, in two handsome volumes, of a new edition of the late Mr. Winston's valuable work. Some few additions have been made from an interleaved copy, in which he had occasionally made notes; but these are not very numerous. His opinions remained very much the same as first expressed.

Some of our readers may be glad to be reminded that Mr. Winston's drawings from ancient glass paintings—a large and valuable collection, exhibited in 1865 by the Archaeological Institute,—have been presented by his widow, in pursuance of a wish expressed by

himself, to the British Museum, where, we suppose, they may be consulted. These drawings would have been more appropriately deposited if sent to South Kensington.

Haddon Hall. Illustrated by Drawings from Sketches made on the spot, by GEORGE CATERMOLLE; with an Account of its History. Derby: Bemrose & Sons. 1867.

WE have here twenty views of Haddon Hall, beloved of artists and lovers of the picturesque; but they are for the most part so badly lithographed, that we can recommend the book only on the score of its being a remembrance. The well-known flight of steps to the upper garden is "conspicuous by its absence."

VARIORUM.

"ENGINEERING Facts and Figures for 1867: an Annual Register of Progress in Mechanical Engineering and Construction." Fullarton & Co., London and Edinburgh. 1868. This annual contains a good deal of useful matter, which seems to be chiefly compiled from various journals named only in the preface in a general way. It is illustrated by plates and woodcuts, and contains notes on the various departments of the Paris Exhibition of 1867.—"A Treatise on the Petroleum Zones of Italy." By E. St. John Fairman, F.G.S., &c. London: Spon. According to this author, and, indeed, on ancient authority as well, there are distinct indications of the existence of petroleum in various places throughout Italy, more especially in the provinces of Modena and Reggio. These indications were observed by the author in a geological tour through a large district of rich mineral country in Italy, and he says, they appeared to him to be identical with those of the American petroleum districts, and in some places even more favourable.—"On the Purification of the river Clyde." By Michael Scott, C.E., London. Maclehoose, Glasgow. Mr. Scott here publishes his views in the form of a letter addressed to the Lord Provost of Glasgow. He proposes, intercepting sewers being constructed, that the Glasgow sewage should be raised by pumping, carried along near the line of the Glasgow and South Western Railway as far as Dalry, then from Dalry to Fairlie Head, where it would be discharged into the sea. This, however, would be a very costly system. The line of conduit would only be about thirty miles long, but for seven miles or more it would pass through a hilly country. Mr. Scott himself admits that the lift would be great, and the annual expense of pumping very large. Nevertheless, should it be found that this is on the whole the best or most effectual way of disposing of sewage which has become as great a nuisance in the Clyde as was that of London in the Thames, cost ought to be a secondary consideration. An alternative system is also proposed, however, by Mr. Scott, which consists essentially in diluting the sewage by help of a canal and basin, so as to restore it to the comparatively innocuous state in which it passed into the river in years bygone; and then twice in twenty-four hours to allow it to pass out to sea through the Clyde so as not to return, or not to remain in the river.

The illustrations of the Paris Exhibition in the current *Art-Journal* include a view and details of the exquisite ebony and ivory cabinet by Alessandri now in the South Kensington Museum; also one of Durenne's elaborate cast-iron fountains.—In the *Broadway* Mr. Holingshead gives a frightful picture of Theatrical Management, which notice, however it may be overdone, is not without its value, and may lead to some useful inquiries.—*London Society* continues to provide interesting particulars of "King Theodore's country." The April number is, in other respects also, fully up to its mark.—The "Easter Annual" is distinguished by a strikingly original story called "The Soul-Trap," by Mr. James Greenwood.

Miscellaneous.

NEWSPAPER PRESS FUND ANNUAL DINNER.—The Duke of Cambridge has consented to preside at the annual dinner of the Newspaper Press Fund on Saturday, the 6th of June, at Willis's Rooms, St. James's.

ARCHITECTURAL LIBRARY.—The Library of the Institute of Architects has received an accession by the gift of Miss Leicester, of Bishop's-road, Baywater, of numerous works on architecture, &c., which formed part of the library of her late brother, Mr. G. O. Leicester, who, up to the time of his decease, was a Fellow of the Institute.

SOCIETY OF BRITISH ARTISTS.—The forty-fifth annual exhibition by this society, now open in the Suffolk-street Galleries, consists of 650 oil paintings, 427 pictures in water-colours, and 11 pieces of sculpture,—1,097 works in all. The number of exhibitors is 600. The collection includes a number of very interesting pictures, and is better as a whole than has been seen here lately.

TELEGRAPHY.—The value of the telegraphic wire and apparatus exported from the United Kingdom last year was 209,688*l.*, as compared with 312,288*l.* in 1866, and 143,679*l.* in 1865. In the ten years ending 1867 inclusive, the value of this branch of our exports will be seen to have been very considerable—viz., in 1858, 234,708*l.*; in 1859, 742,306*l.*; in 1860, 251,712*l.*; in 1861, 214,411*l.*; in 1862, 320,897*l.*; in 1863, 317,314*l.*; in 1864, 218,464*l.*; in 1865, 148,679*l.*; in 1866, 312,288*l.*; and in 1867, 209,688*l.*

DRINKING FOUNTAINS.—We regret to observe, from the *Sheffield Independent*, that the various local drinking-fountains have been almost entirely abandoned, and that several of them have disappeared. A committee of the Town Council, it is said, have ordered the fountain at the Town Hall to be removed. Has the experiment of drinking-fountains proved a failure at Sheffield? Our authority thinks the subject has not yet been fully considered, and trusts that a structure intended to be both useful and ornamental, and that was erected at a cost of 50*l.*, will not be destroyed without due deliberation.

THE MANUFACTURE OF STEEL FROM CLEVELAND IRON.—At a recent meeting of the Cleveland Society of Engineers, held in the draughting-loft of Head, Wrightson, & Co.'s Works, South Stockton, a paper was read by Mr. Hargreaves, of Darlington, on his new process of manufacturing steel from Cleveland iron. About forty gentlemen were present, and a large amount of interest was evinced in the subject, which has of late occupied much attention throughout the district. Mr. Hargreaves's process is said to produce first-rate steel, securing, according to the *Darlington and Stockton Times*, the maximum of results at the minimum of cost.

THE CONDITION OF AGRICULTURAL LABOURERS. A conference of noblemen and gentlemen has been held at Willis's Rooms, to consider the present condition of the agricultural labourers of England. Resolutions were passed to the effect that the subject demanded serious attention; that district protection unions should be encouraged and aided; that such unions should be strictly defensive, and limited to securing a fair day's wages for a fair day's work; that a committee be appointed to initiate the formation of such unions, and otherwise promote the physical and social improvement of the agricultural labourer; and that those interested in this be requested at once to provide a fund to enable this object to be carried out.

NEW SYNAGOGUE.—The consecration of a synagogue was performed on Sunday, with all the accustomed rites, at Thornhill-road, Barnsbury, where one of these places of worship has been erected for the North London districts. The building is in the modern Italian style. The niche where the "ark" stands is approached by a flight of marble steps, which were decorated with flowers, and the arches, which are formed of decorative figuring, are supported by columns of rare coloured marbles. Immediately over the niche of the sanctuary, in Hebrew characters, is the sentence, "Know before whom thou standest," and on the second arch, in like characters, the sentence, "Let the fear of the Lord be constantly before thee." Below are two windows with the initial words of each of the Ten Commandments, and the door of the ark (or sanctuary) itself is covered with a crimson velvet curtain, on which a wreathed crown and characters representing the words "The crown of the law" are embroidered in gold. There are galleries to the body of the synagogue. The architect of the building is Mr. H. H. Collins, and the builder Mr. Henshaw. It is intended to build schools adjoining the synagogue.

VENTILATION IN STOCK-SHEDS.—Mr. Mechi says on this subject:—"When farmers see my twenty blocks in one covered and enclosed shed, they frequently exclaim, 'Can they be healthy there?' That is a proper remark, for unless the ventilation were perfect, they could not be healthy, so closely packed in a limited space. As my system of ventilation appears to keep my animals (although closely packed) in perfect health, I will describe it: a portion of the centre of the roof is raised above the rest, with louvre boards on each side, but the wind is not allowed to blow through from one side to the other, but a board, a yard or more in depth, is dependent from the roof, so that the current of air coming through the louvre boards is deflected and passes downwards, driving out the foul air through the opposite side or louvre boards, or through the holes in the top of the walls under the wall plate, the circulation is thus constant and perfect." He was able, he says, by the medium of steam, to see the circulation which could otherwise have only been surmised. In one of his sheds, where the animals are on sparsed floors, and very closely packed, say two bullocks in a space 2 ft. by 8 ft., for twenty years there has not been the loss of an animal, although many lots have been fattened there, some remaining from calves until two years old.

THE SUZ CANAL.—A letter by the Duke of Devonshire in the *Times* takes a favourable view of the prospects of the Suez Canal. The Duke says, in reference to the great or salt water canal, to which the smaller or fresh-water canal is merely subsidiary,—"The first point of interest after leaving Suez is at Great Shalouf. This is the most important cutting next to El Cuair. It is four miles in length, through clay, stone, and sand, and is dry at present. Three thousand European and Arab workmen are kept here. It was more struck here than anywhere else on the canal works. The canal is cut to its extreme depth, and the water will stand 26 ft. deep at low water in the Red Sea. You look down into an enormous dry channel, with its busy hive of workmen scooping away the ground and filling the trucks which stationary engines draw up and replace by others; and while looking down on this magnificent work you almost persuade yourself to believe in large steamers passing to and fro here between the West and the East, in the coffers of the company being filled with their shares, and in delighted shareholders drawing large dividends. At the Serpinn, some distance further inland, you come on another piece of the canal finished, and it is here you meet the waters of the Mediterranean, which have been brought over half the whole distance of the Maritime Canal, and are kept back from the other portion of the works by an embankment of earth."

BUILDING UP THE PEOPLE.—A M. Jules Borie says he has received the sanction of the Emperor of the French to the building of what he calls "Aérodromes." These structures are to be not less than ten stories high, access to the upper parts being afforded by lifts, as is already the case in many hotels, both in England and France. Iron is to constitute the framework of these vast edifices, which are to rise to altitudes from 100 ft. to 120 ft. "Let us suppose," says *Galignani*, "the building to occupy a large rectangle; the fifth story will be partially supported by a terrace, say 10 ft. broad. Above this rises what may be called a second set of gables, narrower than the basement part just described, and constituting the aérodome proper, no five stories high, making ten in all. The basement flats would serve for shops, banking, &c. other offices, &c.; those above the terrace could be inhabited by the clerks and other people generally connected with the establishments below. Let us now imagine a series of these rectangular constructions, separated from each other by wide avenues; the inhabitants of the aérodomes may communicate with each other by means of bridges thrown across from terrace to terrace, and in this way we get in fact two towns, one above the other. A large amount of traffic will be carried on without descending into the streets at all, provisions, fuel, &c. being obtained by means of the lifts. Each aérodome will be inhabited by 1,000 people or more, all enjoying commodious apartments, a pure atmosphere, and abundance of light, while the streets now will be wide and airy." We are by no means sure that this pure atmosphere would be enjoyed, and are not at all disposed to aid in arguing about this enormous collocation of man beings on a given area.

"PLANING AND TRYING MACHINE."—Mr. Chas. Powis dozes that the machine said by Messrs. Worssam & Co. to be "the only machine which has ever been brought out that will set a piece of twisted timber true, and at the same time give it a planed face fit for gluing up without requiring to be touched by a hand-plane," is so. We must leave him to settle this matter with Messrs. Worssam.

FALL OF A WALL IN THE CITY.—An accident has occurred in Bucklersbury, by which a man has lost his life. The deceased was one of several workmen employed in removing houses on the site of the new street from the Thames Embankment to the Mansion House. While engaged in undermining a wall between the houses Nos. 13 and 14, Bucklersbury, he was told that if he continued where he was the wall would certainly fall upon him; but he disregarded this warning, and continued to dig under the brickwork. He was again cautioned, but without any effect. The wall fell in with a crash, and he was completely buried beneath it. When he was got out he was found to be quite dead.

THE RATING OF CHARITIES.—A very large deputation of gentlemen from the principal cities and towns in the kingdom, headed by the Duke of Cambridge and the Earl of Harrowby, has waited upon the Premier, who was accompanied by the Chancellor of the Exchequer, to lay before him the hardship inflicted upon all institutions of an eleemosynary character, such as hospitals and schools, by the departure from the ancient principle that all such places should be exempted from parochial taxation—a principle which has been upset by a recent judicial decision. The cities of Bristol, Birmingham, Derby, Gloucester, Liverpool, Leeds, Manchester, Northampton, Newcastle, Sheffield, Southampton, Wolverhampton, and Worcester were all largely represented. After hearing various members of the deputation, Mr. Disraeli said the statements which had been made would be considered in a spirit adequate to the occasion and to the importance of the deputation.

THE MONT CENIS TUNNEL.—This remarkable work makes steady progress. Of the total length, 12,220 metres, 5,049 metres are completed. The following is the advancement and expenditure for each year since the commencement of this undertaking to the end of 1867. The expenditure for 1867 has not yet been published:—

Length of Tunnel completed.

Date.	Total during year.		Amount.
	Mètres.	Mètres.	
1857	497-00	497-00	3,299,248
1858	369-10	866-70	1,639,753
1860	343-30	1,210-00	2,500,000
1861	363-00	1,573-00	3,000,000
1862	623-00	2,196-00	2,000,000
1863	822-00	2,998-00	3,500,000
1864	1,068-00	4,068-00	6,532,254
1865	1,223-70	5,309-70	5,327,338
1866	1,024-99	6,334-69	5,644,932
1867	1,511-96	7,846-65	—

The probable cost of the work was estimated at 70,000,000 francs (2,800,000*l.*); of this amount 33,699,973 francs were expended up to the end of 1866, justifying the estimate very remarkably.

WHAT WE HAVE AND WHAT WE PAY.—A return, moved for in the House of Commons, has lately been published, which includes particulars as to the annual value of property in England and Wales charged under the different schedules, the Property and Income Tax. From this it appears that the annual value of property and profits charged to income-tax in England and Wales, amounted to 273,404,918*l.* in the year 1863, to 276,520,647*l.* in 1864, and to 296,031,791*l.* in 1865. The rateable value of property in England and Wales subject to local taxation was 76,357,145*l.* in 1863, 87,618,867*l.* in 1864, and 90,137,365*l.* in 1865. The amount raised by poor-rates, highway-rates, church-rates, police and prisons, drainage, &c. and local boards, amounted to 14,462,442*l.* in 1863, to 14,543,307*l.* in 1864, and to 14,966,751*l.* in 1865. The sums given as annual grants from the public revenue in aid of local taxation in England and Wales, amounted to 1,316,073*l.* in 1863, to 1,384,952*l.* in 1864, and to 1,398,000*l.* in 1865. The largest items in these grants are for prison and convict establishments at home, for the maintenance of prisoners in county gaols, for the removal and transportation of convicts, and for law charges and criminal prosecutions.

"LIVERPOOL MUNICIPAL BUILDINGS."—For the "late Mr. Weightman," under the view in our last, read the late architect to the corporation, Mr. Weightman.

THE AMERICAN STEAM MAN.—We were inclined to regard the account of the steam man as a Yankee joke, but it is now said that he is exhibiting in New York, and preparing for a promenade, at the rate of 30 miles an hour, down Broadway. A citizen of New Jersey invented him, but a speculator in New York is said to be "bringing him out." The inventor, it is said, offers to manufacture him by the score for 60*l.* a head. This is not a great sum to pay for a man who is as strong as three or four horses, who can be fed at a cost of 6*s.* a week, and can earn a hundred-fold that amount. Yankee jokes, however, are sometimes rather elaborate affairs, and the human form seems absurd as a one for any attempt to make steam useful as a locomotive, that we are not even yet caught.

ART INSTITUTION FOR DUBLIN.—A numerously-attended deputation, consisting principally of Irish noblemen and Irish members of Parliament, recently waited on the Chancellor of the Exchequer, at his official residence, Downing-street, to ask the Government to establish in Dublin a department of science and art, similar to the institution at South Kensington. The Chancellor said that the matter had already received the consideration of his colleagues and himself, and that they were prepared to give effect to the views represented by the deputation. A scheme had already been under their consideration, but it was not as yet fully matured. He hoped when the estimates were being prepared next year to be in a position to know what the desired institution would cost, and to insert a vote for that purpose.

EQUALIZATION OF THE POOR-RATES.—The question of the equalization of the poor-rates is daily extending. The ratepayers of Holborn Union have held a meeting, to take the subject into consideration. There was a large attendance of ratepayers. The meeting resolved,—That the Poor-law Board be requested to introduce a Bill into Parliament for the purpose of effecting an equalization of the poor-rates in the metropolis, and thus put an end to the present unequal and admittedly unfair mode of taxation for the support of the poor." Mr. Bullen showed the great inequalities existing. Paddington was assessed at 646,256*l.*, and contributed 16,504*l.* for the relief of the poor; while St. George's, Southwark, which was assessed at only 139,706*l.*, contributed 22,907*l.* A general equalization of rates would reduce the rates of the Holborn Union by 8*d.* in the pound. It was also resolved that a petition should be signed by the chairman on behalf of the meeting, and be presented to Parliament by the borough members.

OPENING OF CLERKS' DINING-ROOMS.—The first establishment erected by the Clerks' Dining Company (Limited), for providing clerks with dinners at moderate prices, has been opened at 36, Wallbrook. It is the first of ten proposed to be established by a capital of 20,000*l.*, raised in 20,000 shares of 1*l.* each. The premises opened are entirely new, and replete with all modern and convenient arrangements. The building is fireproof, being composed of stone and iron girders, and the floors of rubble and concrete. There are two stories underground. In the lower one are cold, well-ventilated vaults for keeping the meat, wines, and ales. Over these are the usual cooking kitchens, fitted with first-class ranges, and so constructed that, by means of air-shafts, the varied smells of the savoury meats under process are carried to the outside, and thus are prevented from rising into the upper rooms of the establishment. On the basement floor is a luncheon-bar and large room, and on the first floor a room capable of dining about 150. Above are coffee, chess, reading, and smoking rooms, and also a private Board-room for the directors. The interior walls are done in a lavender colour distemper picked in with stone and chocolate. There are about 1,200 members, holding among them 2,000 shares. Two 5*s.* calls having been made, the company has started with a capital in hand of 1,000*l.* An extra advantage held by the members is that they may be supplied with meat at 5 per cent. over cost price. Mr. Finch Hill is the company's architect, and the adaptation and fittings were by Messrs. Hill & Son, builders. Messrs. Waller & Son supplied the ranges, and Messrs. Buckley & Beech the beer-machines.

FEMALE SURVEYOR OF HIGHWAYS.—The Aylesbury bench of magistrates, at their annual session for the appointment of parish officers for the several parishes in their division, appointed Mrs. Sarah Wooster to the offices of overseer of the poor and surveyor of highways for the parish of Ilmire, there being no other "person" resident there so well qualified to perform the duties. Last year the same magistrates appointed not fewer than four women to similar posts, in parishes within the Aylesbury petty sessional division.

ROYAL ITALIAN OPERA, COVENT GARDEN.—The season was opened on Tuesday night last with an admirable performance of "Norma," Madlle. Frizzi filling the grand part grandly. We are disposed to say this lady is now the best *Norma* on our stage. Madlle. Lemmens-Sherington was an excellent *Adalgisa*, and Signor Naudin an equally good *Pollio*. Mr. Gye's programme contains an account of the recent negotiation entered into with the view of bringing about the union of the two opera managements, and shows, as it seems to us, that Mr. Gye was played by a so-called Financial Company. Had he been a man of less experience and providence than he is, the success of his season might have been perilled. On Thursday night "Don Carlos" was successfully presented.

ENGLISH PORCELAIN AT BOW.—In reply to questions in the Commons, put by Mr. Schreiber, Lord R. Montagu (vice-president of the Committee of Council on Education) said that some fragments of porcelain, dug up at Stratford-le-Bow, were sent to the Museum of Practical Geology, and Mr. Trenham Reeks wrote concerning them as follows:—"I immediately identified in these fragments patterns which exist on some perfect specimens in our collections, but of hitherto unknown manufacture. I subsequently visited the locality, and found that many very interesting specimens had been collected by the engineer of Messrs. Bell & Black's new patent safety match manufactory. . . . On Monday I called on Mr. Bell, who most liberally offered to open out the 'diggings' again, if any good is likely to result to the history of British Art." Directions had been given to enter into communications with Messrs. Bell & Black.

COINCIDENCES.—A correspondent writes,—"Coincidences such as you pointed out in your last do occur more often than might be expected, but they are overlooked: people do not look with their minds. The English excursionists who have been visiting Jerusalem lately were led by Captain Gaze, not a had courier for people who came to look about them. Notice how oddly names and trades sometimes agree. In the Hampstead-road, Cowdary, cow-keeper and dairyman, used to live, and may still do so; Waterfall, umbrella-maker, lived at Newton-cum-cuseway; Bacchus, publican, might be seen in Brompton not long ago; Sugar, confectioner, at Mitcham; and Kilham, undertaker, at Kennington. I have notes of many others.—H. Hamper, basket-maker; J. Tippler, publican; T. Unite, rope-maker (Notting-hill); J. Saddler, harness-maker; J. Pets, bird-seller; Veal, cow-keeper and dairyman; Miller, corn dealer; Eg-ham, poultryer; and Birch, schoolmaster; but will not ask for more space.

PROPOSED NEW WORKS AT CHATHAM DOCKYARD.—In the naval estimates for 1868-9, just laid on the table of the House of Commons, the sum of 229,705*l.* is taken for the works, &c., proposed to be carried out at this dockyard during the ensuing year. The total estimate for the extension of the dockyard by the formation of new docks, three large basins, factories, and building slips is 1,250,000*l.*, of which amount 437,564*l.* had been expended to the 31st December last. The original estimate for the extension of the yard appears to have been dependent upon the number of convicts available for the work, but there is little doubt this will have to be increased, the number of convicts engaged on the extension works having hitherto fallen far short of that upon which the estimate was originally based. The sum required to be voted for 1868-9 is 195,000*l.*, being 150,000*l.* for contract work, and 45,000*l.* for convict work, the further estimate for completing the whole of the works being 570,000*l.* Among miscellaneous works proposed to be carried out during the year, are a new iron roof over No. 2 dock, and at the angle iron smithery, at an expense of 20,000*l.*, new iron caisson for No. 4 dock, 4,000*l.*; foundations for new machinery, 900*l.*; erection of a new master station, and other works.

MANUFACTURE OF STEEL.—We read in a French contemporary that M. Galy Casalat has invented an ingenious process for compressing molten steel, intended for guns, so effectually as to save all the labour of hammering. In the upper part of the mould into which the metal is run is an apparatus containing a small quantity of highly inflammable powder, which, in burning, generates gas in such quantity as to produce thereby in a very short time a pressure of ten atmospheres. This pressure expels the gases contained in the steel, and forces the metallic molecules into the closest union.

EARLY CRYPT, ANGERS.—In digging for the proposed new theatre in Angers, M. Armand Parrot, secretary to the Société Académique of the department of the Maine-et-Loire, and intrusted with the superintendence of the excavations, has had the good fortune to discover the Gallo-Roman chapel in which the first bishops of Anjou used to officiate and preach to the Pagans who had recently embraced the Christian religion. This little temple was, therefore, the cradle of Christianity in that province. Two other crypts of different periods have likewise been found, which present some curious architectural details. One of them, called after St. René, contains a large number of very fine sarcophagi of various shapes. Some of them belong to the Mérovingian period, and consist of magnificent monoliths, in the interior of which skeletons, in a perfect state of preservation, have been discovered.

TENDERS.

For the erection of four cottages, for Mrs. Mulliner. Messrs. H. Davies & Son, architects:—
Rogers.....£550 0 0
Gwen.....780 0 0
Davies.....850 0 0
Samuels (accepted).....600 0 0

For altering and enlarging Paddington Chapel. Messrs. E. Hatherston, Brock, & Webb, architects. Quantities supplied by Mr. H. T. Northcroft:—
Henson, Brothers.....£3,530 0 0
Simpson & Son.....3,493 0 0
Ehiss & Son.....3,443 0 0
Simpson.....3,447 0 0
Manley & Rogers.....2,028 0 0
Sriviever & White.....2,900 0 0

For alterations, additions, and decorative works to house and stables, Stratford-place, exclusive of gas or hot water work. Mr. H. H. Collins, architect:—
Gillow.....£9,700 0 0
Henshaw.....8,600 0 0
Foxley.....7,733 0 0

For villa residence, Horney-lane, for Mr. T. E. Blax-hall. Messrs. Lander & Bedells, architects:—
Axford.....£1,450 0 0
Batman & Potheringham.....1,458 0 0
Saunders.....1,455 0 0
Grover.....1,394 0 0
Manley & Rogers.....1,375 0 0
Mann.....1,345 0 0
Sale.....1,170 0 0

For house and stabling at Silechester, for Capt. Lloyd. Mr. Smith, architect:—
Woodward.....£5,280 0 0
Lovatt.....4,857 0 0
Lockyer.....4,611 0 0
Dover.....4,530 0 0
Grover.....4,415 0 0
Wilcox & Spurgeon.....3,913 0 0
Hallaway.....3,470 0 0
Pither.....3,201 0 0

For rebuilding market-house at Hemel Hempstead, Herts. Mr. George Low, architect. Quantities not supplied:—
Sear.....£3,300 0 0
Watkins.....3,250 0 0
Humphrey.....2,565 0 0
Webb.....2,534 0 0
Cook (accepted).....2,140 0 0

For a detached villa residence at Beckenham, Kent. Mr. George Low, architect. Quantities supplied by Mr. Frederick Johnstone:—
Horse. Stabling. Total.
Browne & Robinson.....318.....318.....636
Colls & Son.....1,654.....318.....2,000
Marland & Sons.....1,635.....355.....1,990
* Accepted, for house only.

For additions, &c. to Loxley House, Warwickshire, for Mr. James Cove Jones. Mr. Thomas T. Allen, architect. Quantities supplied:—
J. & E. Callaway.....£3,600 0 0
Clark.....3,590 0 0
Clark & Smallwood.....3,520 0 0
Kibler (accepted).....3,140 0 0
Green.....2,986 0 0

For alterations to Edmonthorpe Hall, near Oakham, for Mr. W. A. Pochin. Mr. R. W. Johnson, of Melton, architect:—
Halliday & Cave.....£1,510 0 0
Fast.....1,476 0 0
Hrale & Sons.....1,469 0 0

For converting two houses into warehouse, Monkwell-street, City. Mr. Wm. Smith, architect:—
Waters (accepted).....£587 0 0

For rebuilding 189, Camberwell-road. Mr. Janu Tolley, architect:—
Right.....£750 0 0
Baker.....670 0 0
Grover.....664 0 0
Stevens.....655 0 0
Ennor.....509 0 0

For building residence and stables at Teddington, M. H. H. Collins, architect:—
Horse. Stables.
Dawes (accepted).....£1,550.....580

For new lunatic asylum for the county of Berks, boroughs of Reading and Newbury. Mr. C. H. Howarth, architect. Quantities supplied by Mr. John Scott & Messrs. Winell & Trollope:—
Foster.....£47,250 0 0
Lacey.....46,975 0 0
Brace.....45,703 0 0
Browne & Robinson.....45,128 0 0
Webb.....45,500 0 0
Piper & Wheeler.....45,434 0 0
Trollope & Sons.....45,434 0 0
L'Anson.....45,280 0 0
Deunell & Co.....45,100 0 0
Lovatt.....45,050 0 0
Holland & Haugen.....45,070 0 0
Perry.....45,050 0 0
Higgs.....45,190 0 0
Barnley & Son.....45,093 0 0
Mansfield, Price, & Co.....41,618 0 0

For rebuilding infant school, Charlton, Kent. Mr. V. Wigginton, Corinthian architect:—
Ennor.....£592 0 0
Kully.....565 0 0
Axford & Whittier.....555 0 0
Abraham.....530 0 0
Walker.....502 0 0

For simonases, Charlton, Kent, for the trustees of Dutch Church, Austin-friars. Mr. W. Wigginton, architect:—
Abraham.....£3,174 0 0
Kully.....3,122 0 0
Ager.....3,117 0 0
Ashby & Sons.....3,038 0 0
Nissey.....2,961 0 0
Hill & Reddel.....2,960 0 0
Ennor.....2,865 0 0
Axford & Whittier (accepted).....2,833 0 0

For building additional floor, &c., at 107-9, Leaden-hall-street, for Mr. J. T. Morton. Mr. W. Ete, architect:—
King & Sons.....£658 0 0
Greenwood & Sons.....565 0 0
Hoiser.....610 0 0

For completing a tavern and three shops in Trafalgar-road, Camberwell. Mr. Wm. Smith, architect:—
W. Saunders.....£1,497 0 0
Garrud.....1,485 0 0
George.....1,475 0 0
Walker.....1,439 0 0
Pearce.....1,390 0 0
Watkins.....1,382 15 0
W. Saunders.....1,375 0 0
Smith & Simmonds.....1,338 0 0
Mundy.....1,281 0 0
Wood & Munn.....1,216 0 0
Crabb & Vaughan.....1,214 0 0
Sabey.....1,210 0 0
Pither.....1,162 10 0
Blackmore & Morley.....1,100 0 0

For erecting nine houses and shops in Trafalgar-road, Camberwell. Mr. Wm. Smith, architect:—
Walker.....£5,268 0 0
Pearce.....4,779 0 0
W. Saunders.....4,775 0 0
Mundy.....4,767 0 0
Hearle.....4,640 0 0
Garrud.....4,556 0 0
Smith & Simmonds.....4,535 0 0
Watkins.....4,513 0 0
Blackmore & Morley.....3,960 0 0
Crabb & Vaughan.....3,783 0 0
George.....4,365 0 0
Sabey.....4,357 0 0
Blackmore & Morley.....3,960 0 0
Scholfield.....3,783 0 0
Wood & Munn.....3,672 0 0
F. Saunders.....3,650 0 0
Pither.....2,979 0 0

TO CORRESPONDENTS.

A. L.—J. T. D.—T. W.—D.—F. O.—J. W.—F.—K. E. B.—F. H. Driver.—G. P.—J.—J.—Cul.—C.—J.—E.—T.—G.—E.—K.—R.—H.—T.—G.—J.—J. W. H.—H.—D.—H.—A.—J.—R.—S.—R.—F.—H.—R.—T.—T.—A.—R.—J. M.—W.—R.—D.—G. H.—H.—S.—J.—S.—O.—W.—W.—P. (let us see the model).—A. K. E. (already given)—A Country Gentleman (in type).

NOTICE.—Architects who are unwilling (as we are) that their name should not accompany lists of tenders with which they are concerned may prevent the omission by sending lists themselves. We cannot repeat lists on the ground of such omission.

We are compelled to decline printing out books and giving addresses. All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. **NOTE.**—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

GOOD FRIDAY.

NOTICE.—"THE BUILDER," for the week ending APRIL 11th, will be published at TW p.m. on THURSDAY, 9th inst. Advertisements for insertion in that Number must therefore reach the Office before THREE p.m., on WEDNESDAY, 8th.

The Builder.

VOL. XXVI.—No. 1314.

Curiosities of Art.

HO shall write the "Curiosities of Art?" We have "Curiosities of Literature," "Curiosities of Natural History," and Curiosities of this, that, and the other; but we are not aware of any work specially devoted to the "Curiosities of Art." Here, then, is a fresh field for some facile pen. The theme is a suggestive one, and a hook at once amusing and instructive might be written on it. Perhaps a few notes and reflections may prove useful as materials to the future D'Israeli of art. In the *Builder* of the 8th of June,



1867, there appeared a critical note on M. Gustave Doré's illustrations of Tennyson's poems of "Vivien" and "Guinevere," then announced as forthcoming. A hope was expressed that this clever and versatile artist would be allowed time to read what he was to illustrate before making his drawings. This, as was remarked, he could scarcely have done in the case of "Elaïne." We pointed out that in more than one of the illustrations the author's meaning is wholly misrepresented; as, for example, in the drawing supposed to illustrate that passage which says that Arthur, who, "labouring up the pass," had trodden on the crowned skeleton, and sent the skull rolling, plunged down the shingly scarp after the crown,

"And caught
And set it on his head,"—

Arthur is shown on horseback! The publisher took exception to this criticism, and replied to the effect that "while the critic was evidently a stranger to pigskin," M. Doré was a most accomplished and daring horseman, and perfectly understood what he was about when he designed this picture. He (the critic) was advised to consult "Greenwood's Horsemanship," and be taught how to pick any object from the ground at the walk, canter, or gallop. We simply reiterated our assertion that the engraving in question was not an illustration of the author's words. If it be thought that this criticism savoured of harshness, the reply is that it has been fully borne out by various writers who have since discussed Doré's merits as an illustrator. Indeed, certain critics, of no mean repute, have gone much further than the *Builder* in their strictures. A recent writer in the *Athenæum*, for instance, using almost the exact words of the *Builder*, says, "We suspect that M. Doré has never read Tennyson, and never thought of Tennyson while engaged upon this work." Whereupon an artist writes, "Does not this remark of yours involve points of im-

portance? Is not the great curse of our day *untruthfulness*, spreading over the nation that stapor from which no one as yet sees signs of escape? And should not every instance of it be frowned down? Is not the book-illustrator a translator? Why then should he be allowed to falsify his author without disgrace? In his 'Milton,'—the 'Inferno' portion of it,—does not M. Doré treat his great author contemptuously? It appears to me that herein his first characteristic is want of imagination, and his second untruthfulness. Fully enter into Milton's grandly laboured description of Sin and Death; then look at M. Doré's design; and will not a freezing chill seize one?—a feeling that such is a pitiable libel and a disgrace to any person? I hope that English artists will not be led away by the success of this very clever illustrator." Even still stronger language might be applied to Doré's Bible illustrations, many of which are simply worthless and an insult to the sacred text. A writer in the *North British Review* of September last quotes a number of examples of the artist's carelessness and want of sympathy with his subject. In the parable of the Prodigal Son, says this critic, the father is fainting, the whole family are in despair, more like the Jews weeping over Jerusalem. The son, whom the French style *l'enfant prodigue*, is represented as a boy of twelve or fourteen coming slyly round the corner, and down some steps, *pour faire une petite surprise à sa famille!* Again, in the story of the Pharisee and the Publican, it is expressly said the publican stood afar off, and smote upon his breast; but Doré places him close to the Pharisee, and prostrate, with his arms spread, in the attitude of one looking for a needle. The death of Ananias is depicted on a steep hill side; whereas, we are told that the "young man arose and carried him out," and that his wife Sapphira came in. Again, the burning fiery furnace mentioned in Daniel is represented by three logs of wood in a 10-foot ohammer, at the top of which, sure to be smothered with smoke, or suffocated for lack of hydrogen, is the king with his court, calmly looking on. Nothing could be more absurd, more ridiculous. Nay, when the king looked on there were four "walking in the midst of the flames," but Doré has only three. Other examples might be given, but they are unnecessary, for they would only prove more conclusively the charge of carelessness and ignorance, and consequently of untruthfulness.

Gustave Doré is a clever French artist, but he lacks imagination: he is essentially a caricaturist, and it is questionable whether he can draw the human figure correctly. Perhaps the worst compliment he ever received was when it was said of him that, "though not yet thirty-four years old, he has painted, yard for yard, more than any living artist." There is sometimes an evil in doing too much; we may mistake quantity for quality. An artist may paint too many pictures, just as an author may write too many hooks. Did Doré take more time over his work, and produce less, it would be better for his reputation. The French artist's treatment of the fiery furnace reminds one of Holbein's drawing of the same subject. The prophet's words are, "And these three men, Shadrach, Meshach, and Abed-nego, fell down bound into the midst of the burning fiery furnace." Holbein's furnace is a dome, or cupola, having a door like that of a common boiler in front. Looking from out this aperture are the heads of two men—much in the same position as a couple of female gossips might be at a street window; while another face is seen in the background, the door or look-out being too narrow to admit of the three individuals being equally represented. One cannot but be struck with the undisturbed, nay, comfortable expression and demeanour of the three men, all things considered. But we are bound to say the treatment here is not a whit funnier

than Doré's, while the same allowances cannot be made for the nineteenth-century artist as for his fifteenth-century predecessor. The assertion that our religious book illustrations least of all interpret or translate their subjects, seems hardly to require proof: no designs, as a rule, are so unsatisfactorily conceived. For the fault lies more in the conception than in the execution: the great subjects and events of Holy Writ unquestionably offer many difficulties to the artist. In truth, your man of small imagination and mediocre powers is not the man to make designs for the Bible, for Milton, or for Bunyan. Some of the old masters have given at least a grandeur to their notions of Biblical events. They have invariably represented them on a large scale. The figures are massive in design and drawing; they are painted in colours "gorgeous as the sun at midsummer," as if the masters had "dipped their pencils in the colours of the rainbow," and the noble extent of canvas which Raffaele, and Rubens, and Titian have given to their great works, gives them the dignity and splendid effect which they possess. It seems to us that such subjects as God appearing to Moses "in a flame of fire out of the midst of a bush," "Christ's Agony in the Garden of Gethsemane," and the "Ascension," are wholly incapable of being illustrated by the insignificant engravings which we see in pocket Bibles. A woodcut or steel engraving, a few inches square, cannot possibly represent subjects of so sacred an import. Can such a picture inspire any feeling of reverence or solemnity whatever? Does it impress one in any way? It may be questioned, indeed, whether the great I Am, who is a spirit, is—with reverence he it said—a fit or legitimate subject for a pencil. A pictorial illustration must utterly fail to assist us to realize that glorious Being whom eye hath not seen. The extent to which some of the great painters have treated sacred subjects is familiar to all students of art, and the liberties taken by a ruder school are amusing by their mingled absurdity and singularity. In some of his pictures Rembrandt made Abraham a hurgess of his time, and the Messiah a burgomaster of Saardam. In the old paintings representing Adam and Eve it is not uncommon to find the forbidden fruit varying with the country or province. In Normandy and Picardy it is the classic apple, one of the riches of the country; in Burgundy and Champagne, the bunch of grapes; in Provence and Portugal, the fig and orange; whilst in America it is the guava. In Greece it is generally the fig, which is adopted on account of the sweetness and abundance of the fruit. In Italy it is sometimes the fig, sometimes the orange, according to the province or caprice (*Edinburgh Review*). In the gallery of the Convent of Jomits at Lishon, there is said to be a fine picture of Adam in Paradise, dressed in blue breeches with silver buckles, and Eve with a striped petticoat. At either Paris or Versailles may be seen a painting of the twelve apostles represented in wig wigs and swords; and we have somewhere read of a tract printed in 1641 entitled "Nowes from Helle," which has a rude vignette representing the devil ill in bed and attended by several doctors in square caps, evidently meant for Jesuits. Lord Orford relates a curious anecdote of Antonio Verrio to the effect that when this artist was employed at Windsor he quarrelled with Mrs. Marriott, the housekeeper (whose portrait is now at Hampton Court), and horrified her ugly face for one of the furios, in order to gratify his personal pique. To flatter the Court he represented Lord Shaftesbury among the demons of faction, distributing libels. There is also at Hampton Court a study for a proposed ceiling by Verrio, in which he introduced Sir Godfrey Kneller, Mr. May, the surveyor of the works, and himself, in long periwigs, as spectators of our Saviour healing the sick. What is the reader's notion of the fate of King Pharaoh, of Red Sea celebrity? The popular idea is that

his majesty was drowned on the unhappy occasion in question. Nor is the notion of recent adoption; it has been in vogue for centuries, and may have been an article of faith with Solomon for all we know to the contrary. But there is no foundation in Old Testament history for the supposition; and yet, nothing is more common than Pharaoh in the middle of the Red Sea as a Scripture illustration. Thus, in Holbein's Scripture cuts we have the Egyptian king with "the waters closing over him." The host is in the very act of being swamped,—after the grotesque manner of Holbein,—the crowned head of the king occupying the foreground, while the Children of Israel are all comfortably landed on the other side, quietly enjoying Pharaoh's discomfiture. The text quoted is Exodus xiv. 28,—“And the waters returned, and covered the chariots, and the horsemen, and all the host of Pharaoh that came into the sea after them; there remained not so much as one of them.” A more recent instance of belief in this opinion may be found in the frontispiece of Maunders' "Treasury of History," where we have Pharaoh drowned, "done" by W. H. Brooke, A.R.H.A. Some of Holbein's other cuts are equally quaint, as "David killing Goliath." David and the giant are represented as in close combat; the former is in the act of striking Goliath in the face with the sling, while the giant's spear or club is almost touching his antagonist's leg. And, by the way, in the letters recently received from Abyssinia, we have some particulars with regard to Abyssinian notions of sacred art, curious enough in their way. The church of Ardegrath, we are told, is ornamented within by rude pictures of saints and incidents in Biblical history, executed without any idea of perspective. "Nor is the absence of art redeemed by antiquity, as they have been finished little more than half a century. Among other errors of the artist, critics have discovered a glaring anachronism in one design. The subject is 'The Passage of the Red Sea.' Moses, standing on the farther bank, is shaking his rod with mocking irony over Pharaoh, whose horse is rapidly being submerged, while the Egyptian infantry, already nearly engulfed, are holding their firelocks over their heads." How curiously amusing, too, the treatment art—not nature—has bestowed to give us an idea of Paradise. In speaking of the correctness which the last century praised so much, Macaulay, in his essay on Moore's "Life of Byron," says, it "resembles the correctness of those pictures of the Garden of Eden which we see in old Bibles. We have an exact square enclosed by the rivers Pison, Eidon, Hiddekel, and Euphrates, each with a convenient bridge in the centre, rectangular beds of flowers, a long canal, neatly brooked and railed in, the tree of knowledge, clipped like one of the limes behind the Tailor's, standing in the centre of the grand alley, the snake twisted round it, the man on the right hand, the woman on the left, and the beasts drawn up in an exact circle round them. In one sense the picture is correct enough. That is to say, the squares are correct; the circles are correct; the man and the woman are in a most correct line with the tree; and the snake forms a most correct spiral, &c." *Appropos* of this is a story told of old Lord Selkirk in the days when symmetrical arrangement was considered the *acme* of gardening. One day he found a boy shut up in a summer-house at the end of a terrace at St. Mary's Isle, and was informed by his gardener that it was for stealing apples. On reaching the other end of the terrace, where there was another summer-house, Selkirk held the gardener's son looking dolefully out of the window. "Eh! John, what is this? Has your boy been stealing too?" "Ns, na, my lord," was the answer, "I just put him in for sea-metry!" We look for something truer and more advanced now, though, as we have shown, modern art is occasionally singular and eccentric. Not long ago a respectable London publisher issued an "Illustrated" Bible, in one of the parts of which there is an engraving of Joshua before the walls of Jericho. The warrior is mounted on a bare-backed rampant steed; one hand grasps the hilt of his sword, while the other is pointed aloft in the attitude of direction. Supposing the law of gravitation to be in force in those days, which by the bye, is proved by the tumbling walls of the doomed city, the conclusion is irresistible that it is a physical impossibility that the rider could keep his seat. Another Bible, printed at Oxford in 1860, contains an illustration of Ruth gleaning, and represents Boaz wearing a pair of modern-

shaped shoes, such as our grandfathers wore. In regard to the treatment of secular subjects, again, innumerable examples of incongruous art might easily be given. In the present day, while we have plenty of clever artists,—and there is a good deal of original art,—there is at the same time a vast quantity of wishy-washy illustration,—illustration that does not illustrate,—served up to the public. At no other time, perhaps, was there half so much. We speak more particularly of that kind of artistic talent which finds its market in the illustrated weekly and monthly magazines of the hettersort. *Cornhill* and *Cassell's* may be instanced as representing the class of periodicals we mean. The fact is that art, like literature, in these latter days, is to a great extent done to order. It has become an article of manufacture,—the artist being merely a producer, and oftentimes no more than a reproducer. The demand for a certain kind of thing called illustration has reached such a pitch that this, like almost everything else nowadays, must be done on the spur or not at all. Mr. F. Palgrave, writing of London statues, in the *Munch* number of *Brooklyn*, says of Chantrey, that his success was his ruin as an artist. "Rapidly becoming fashionable, he seems to have lowered his standard to the level of his patrons, and henceforth rarely gave himself time to work on anything; substituting a few vague curves and planes in the features, and large empty folds in the drapery, for the thousand lovely subtleties and difficult truths of nature." The description is applicable to some able artists of the present day, who seem to forsake originality for "what 'takes,' and to sacrifice conscientious hard work to success. To judge from much that is to be met with in the way of book and periodical illustration, one would say that the artist had never had a chance of reading his author; at least, the text, if seen, has been very imperfectly read. In illustrating Mr. Trollope's story of "The Claverings," in the *Cornhill*, a clever and graceful artist represents the hero without whiskers and moustache for twelve months, but the month immediately following he appears with hirsute ornaments in the greatest abundance. Perhaps Miss Edwards had a notion that the hero was at perfect liberty to "grow a beard" if he liked. No doubt; but even a lady, not to say an artist, ought to know, that under the most favoured conditions, the thing cannot be done in a month. However, in the very next number of the magazine, we have a vignette of the hero with his moustache, but minus his whiskers; and then in a large plate, which is supposed to depict him as he appeared a few hours after, he has neither whiskers nor moustache. If this be not escapist art, what is? Again, while Mr. Thackeray jests about Clive's beautiful whiskers and handsome moustache, Mr. Doyle persists to the end in denying young Newcome the possession of those tokens of manhood. Once more, in vol. ii. of "Pendennis," there are two engravings to the text at p. 165. Just before Huxter comes up to Captain Costigan, who is drunk in the street, he (the captain) wears a hattered old hat, his well-known cloak, and a dress-coat underneath it. This is illustration number one. In ditto number two, the intoxicated Costigan is represented as having fallen, and Huxter is assisting to raise him. Now the cloak is gone, which is possible enough; but that the stocking, bad hat should have suddenly altered its shape, and assumed a respectable appearance, and the swallow-tail should have changed into a frock-coat, must be left to the explanation of the artist. If we descend the artistic scale, and glance at a lower class of publications, we shall find still greater curiosities of art. Some one said a few of Turner's landscapes, that they were pictures of nothing, and very like. But it might be said of the works of not a few modern illustrators, that they are pictures of something, and very unlike. How seldom, for example, does a picture of some public scene or event in any of our illustrated newspapers tally with one's own recollections of the scene. Instead of a "full, true, and correct account," pictorially, we get for the most part a bundle of caricatures, or a confused mass of impossibilities. We chanced recently to be present at a public meeting in Exeter Hall, where a well-known lord addressed the audience. A view of the weeklies on the following Saturday, with the noble lord in the attitude of speaking. We hope his lordship liked his portrait. He must have felt flattered with the eminently D'Orsay-like appearance which it pleased the imaginative artist

to give him. He was even generous enough to insist upon his lordship appearing in wonderfully fitting evening costume, in place of the ordinary morning suit, in which, as a matter of fact, he did appear, and unlike the thing meant as it was possible for picture to be. A short time since, there appeared in another popular periodical a narrative of the capture of an alligator on the coast of Malabar. The faithful historian, who was an eye-witness of the feat, tells us that "James, without a moment's hesitation, seized the mugger by the tail, and gallantly he stuck to it." The said mugger is described as having been 13 ft. 4 in. long, and a woodcut shows James (who, *mirabile dictu*, is clad in a suit of black, with an ordinary English hat) clinging in his arms the hinder part of the animal, while we may suppose the body to be struggling on the ground. The sketch is called "Catching an Alligator by a new Method." About the newness of the method there can be no doubt. The writer who told this astounding story, the artist who drew the picture, and the editor who printed it for the benefit of a generous public, are equally entitled to commiseration. But even this is nothing to some of the feats performed by the writers and—shall we say artists?—of certain pictorial prints. The advertisement of one of these journals, which has become quite notorious as a chronicle of blood and murder, and filth, and wickedness generally, recently stated that the forthcoming number would contain "a large engraving of the suspected murder of a boy by his father at Hoxton," with "three subjects in connexion with this fearful tragedy." The "dragging for the body," was to form an illustration which would "fill half the front page of the paper." (There was a temptation and inducement to buy!) Furthermore, there were to be engravings of "The Burning of a Ballet Girl"—"The Suicidal Leap of a Young Lady from Westminster Bridge"—"Murderous Revenge of a Negress"—"Inhuman Treatment to a Child"—"The Selling of a Wife at Blackburn"—with half a dozen other equally revolting topics, "all taken from sketches by artists expressly engaged." Of course, we are asked to suppose that in each case the proprietors knew that these events were to occur, and at once despatched special artists, who sketched the scenes on the spot. But it will be said, "You do not call this art?" It is not truth, but in one sense it is art,—the art which finds its patrons and its pupils among the lowest orders. The fact that the publication in question boasts of a circulation of 150,000 weekly,—whether this be so or not, the figure must be large,—the fact, also, that its office-doors are usually "besieged," are indications of its popularity, and the influence which it must exert on the minds of its credulous readers. What the nature of that influence is we need not inquire. The paper is supplying an art education of the very worst kind to the most dangerous and ignorant of the population—the very class which stands most in need of something higher and healthier. In truth, each successive number of this wretched print is an additional obstacle to the efforts of the true art teacher, as well as to moral and intellectual improvement of the masses. Leaving those publications which may be said to confine themselves exclusively to the horrible and revolting in human nature, and give exaggerated and unnatural representations even of that, what shall we say of another class of indolent rubbish of a pictorial kind that has sprung up with so much French effrontery in our midst of late? Portraits from the Mahille and Cremorne, colored sketches of abandoned women who haunt the most notorious streets of the metropolis, valentines of the filthiest description, and photographs of the grossest taste, are at present exhibited for sale to an extent and with a publicity which we hardly believe would have been tolerated a few years ago. As compared with the coarse pictures to which we formerly alluded, we regard this prostitution of art as ten times more harmful in its influence. The principal marts of this vile trash are in the vicinities of Wynd-street and the Seven Dials; but it is a matter of every-day observation that some respectable print-sellers no longer scruple to exhibit half-naked figures of "celebrated" French actresses in the same line with the portraits of English statesmen, poets, and church dignitaries. A paragraph is just now going the round of the newspapers informing the world that "a photograph may be seen in the shop windows of Mr. Swinburne, the poet, sneezing Adah Menken's hand, and looking into her eyes like a

"dying duck." This, it would appear, is the latest thing out in photographic fashions; and a piece of ingenious impertinence it is, to call it by no worse name. The idea is thoroughly Parisian. It may be remembered that the same rather remarkable lady, about whom the public has heard so much in one way or another, and a celebrated French novelist, appeared in a similar interesting situation not long since, and that the affair gave rise to an action at law in the French courts. Where is this sort of thing going to end? Is it not scandalous that the reputation of public men should be thus made traffic of in order to minister to a prurient taste? The gross and libidinous caricatures of Gilray are no longer popular; the taste for Rowlandson's glutinous sketches has died out; but it may be doubted whether we have not something quite as bad, if not worse, in their place. And how such infamous publications as *The Town*, and others of a like stamp, are allowed week after week to flout their indecencies in the face of Lord Campbell's Act is surely a thing to be wondered at and lamented.

THE DESIGNS FOR MANCHESTER TOWN HALL.

IN our last issue we quoted from the letter of Mr. Heron, the Town Clerk of Manchester, requesting further information on certain points from the referees as to the relative merits of the four principal designs in these respects, and the letter from the referees accompanying their second or detailed report sent by them in reply. We will now approach the designs at present on view in the large room of the Town-hall, Manchester. This remarkable competition has arrived at what, we presume, may be considered its last phase. On Monday, March 30th, the second report of the referees, which placed Mr. Waterhouse first in the order of merit, was brought up by the sub-committee, and the City Council confirmed the decision by formally accepting Mr. Waterhouse's design, and resolving that the exhibition of the designs should be opened to the public on Thursday, April 2nd, for fourteen days.

The citizens of Manchester can now judge for themselves as to whether or no the City Council have made the best use of the authority confided to them; and architects have an opportunity of criticizing the award of the judges, the efforts of the several architects, and the strength of their claims to represent the profession in such an important contest.

The beneficial effect of such an exhibition on the public mind must be considerable: it affords to the greater portion of the community the only opportunity within their reach of judging of the dignity of architecture as a profession, and the claims of its professors to the title of artists. To the competitor, occasion is afforded of showing to the world what is really in him, and of breaking a lance with his professional brethren in the arena of architecture, thereby raising or lowering his position amongst them. To the student of architecture a lesson is provided, set forth in its most attractive form, and, if not properly studied, the lost opportunity will be required at his hands.

The City Council have shown every desire to free themselves entirely from the trammels of favoritism and "jobbery" too frequently connected with transactions of this nature. In the first place, by asking for the smallest number of drawings capable of illustrating the intentions of the competitor; secondly, by the liberal remuneration offered to those who might engage in the second competition; and, thirdly, by calling in the aid of professional arbitrators to enable them to arrive at a sound decision.

This liberal and straightforward conduct on the part of the Corporation met with a ready response from the profession. Men of the highest standing from all parts of the kingdom applied for "instructions," to the number, we believe, of 500. Of these about one-quarter submitted designs, amongst whom we noticed the names of men "conspicuous by their absence" in many similar contests; owing, doubtless, to the prevailing distrust amongst architects towards that standing anomaly, a "building committee"—that unapproachable creature, that irresponsible party, possessing neither a soul to be saved, nor a person to be kicked.

The presence of these architects may surely be taken as a compliment to the council—a vote of confidence, in fact; and we have every reason

to believe that the result of this contest will show that the confidence of the architects in the good faith of the Corporation has not been misplaced. The costly and substantial manner in which the council propose to carry out the work is eminently characteristic of the native vigour for which Manchester men are celebrated, and which we are pleased to find is not limited to matters of commerce alone, but also displays itself in public buildings. The result of this competition must be highly gratifying to the citizens, proving, as it does, that one of their number is able to cope successfully with the best men of the profession.

The writer has seen all the drawings, and can confidently say, that either for architectural excellence, skill in planning, or artistic and delineative execution displayed in the drawings, no finer collection (not excepting even that for the London "Law Courts") has ever resulted from one single competition.

The general average of excellence is so high that the race appears to have resulted in a nearly dead heat amongst the first two or three competitors.

The "Instructions to Architects" are so voluminous and explicit that none who have not either worked on the plans, or made themselves thoroughly acquainted with the requirements by patient study, can adequately appreciate the difficulties with which the competitors had to contend. These instructions are the result of four or five years' consideration of the individual requirements of each department of the Corporation, and many plans have been prepared by the city surveyor, Mr. Lynde, from which the dimensions of rooms and other important particulars have been derived. The experience also gained from the first competition decided the council to alter and considerably augment their list of requirements.

For the benefit of those amongst our readers who may not remember the particulars of the different stages through which this competition has passed, the following *résumé* may prove of use in assisting them to understand thoroughly the present state of affairs.

In March, 1867, architects were invited by the Corporation of Manchester to submit designs for a "Proposed New Town-hall." A guarantee was given to those who might compete that "not fewer than six or more than twelve" of their number would be invited to engage in a second contest, to be conducted on a much larger scale than that laid down for the first trial. In this final struggle the prize would be the erection of the building, with the usual professional remuneration; and each of the unsuccessful architects was to receive 300*l.* as payment for his labour, provided that the required number of drawings had been submitted. The council also promised to call in professional assistance to enable them to arrive at a fair decision. The drawings asked for were plans of ground and first floor and elevations of Albert-square, Princess-street, and Cooper-street fronts, it being understood that the elevation towards Lloyd-street should be little inferior in finish to the other three.

The drawings composing a single design occupied a vertical compartment on the walls of the exhibition-room; and, to secure the different panels being filled in a uniform manner, a clause was inserted in the conditions requiring each pair of plans to be accompanied by a separate set of elevations. The dimensions of the mounts and scale of the drawings were also prescribed, in order to secure further regularity.

In reply to this liberal offer 123 architects in August last sent in 137 designs, some competitors having furnished three distinct sets of plans.

A sub-committee was appointed by the town-council for the purpose of examining and reporting upon this large number of drawings. The result of their deliberations, aided by the Conductor of this journal, who was called in by them for that purpose, was the selection of a certain number of designs, found to be by the following gentlemen:—Mr. Salomons, of Manchester, two sets of plans; Messrs. Speakman & Charlesworth, Manchester, two sets also; Mr. Thomas Worthington, Manchester; Mr. Alfred Waterhouse, Manchester and London; Mr. John O. Scott, London; Mr. T. H. Wyatt, London; Mr. Cuthbert Brodrick, of London and Leeds; and Mr. W. Lee, of London; the honours being thus equally divided amongst local and London architects.

An exhibition took place which lasted fourteen days; but the successful designs, the authors of

which were again to compete with each other, were, of course, not shown.

Shortly after the election of the eight architects a fresh set of instructions, supplementing and considerably altering those first prepared, were issued, and February 14th, 1868, named as the last day for receiving the second set of designs. On St. Valentine's Day the drawings arrived, and we venture to say no enamoured swain or blushing maid receiving that eventful morning a more valuable offering than did the worthy mayor of Manchester.

Upon their reception the town-council held several meetings for the purpose of deciding on the best mode of dealing most fairly by their authors. It was finally arranged that Professor Donaldson and Mr. Street should be invited to visit the collection and report on the respective merits of the different designs. These gentlemen accordingly drew up a report, which placed the competitors in the following order, with reference to the different subjects upon which the judges were required to report. The numbers attached to the several designs, and used instead of the mottoes by the judges, for convenience of reference, are as follow—

1. "Arnolfo di Lapo"—Mr. W. Lee.
2. "Faire sans dire"—Mr. T. H. Wyatt.
3. "Fides"—Mr. Cuthbert Brodrick.
4. "Sperandum"—Mr. John O. Scott.
5. "St. Valentine"—Mr. Alfred Waterhouse.
6. Interlacing triangles—Messrs. Speakman & Charlesworth.
7. "True to the line"—Mr. T. Worthington.
8. "Valentine"—Mr. Edward Salomons.

Summary of Judges' Report.

6, 4, 7, 5, for architectural excellence.
5, 6, 8, for arrangement of plan and construction.

5, 7, 8, for economy and likelihood of being executed for the stipulated sum.

5, the best for natural light and ventilation.
5, 6, 4, 7, were considered to be the best in point of general merit, according to the order in which they are placed.

This report pleased neither the council nor the competitors quite, and the judges were required to answer a list of questions, and to state more in detail their reasons for arriving at their decision. A second report was in consequence prepared, the judges re-asserting their previous decision as to the superior merits of Mr. Waterhouse's design, and giving detailed reasons for objecting to the other plans. They requested that the contents of this second communication might be considered as confidential by the council, and not be published or communicated to the competitors. Nearly the whole of its contents has transpired, as the council might have known would be the case. Some of the unsuccessful men are angry at the prospect of having the report only partially known, and have in consequence demanded to see the document, or such portions of it as referred to their own designs.

Up to the present time, however, this has been refused; but the weight of influence which will be brought to bear on the council must eventually compel them to rescind their resolution of secrecy. Considering that a portion has already been divulged, we think it desirable that the whole should be published.

Before proceeding to review the different designs in the order of the numbers used in the report, it would be well to describe the site on which it is proposed to erect the new edifice. The shape is that of a blunt wedge, or a triangle with the acute angle cut off. Along the street line the dimensions of the different sides of the plot are,—Princess-street, to the north, about 300 ft. long; Lloyd-street, to the south, about 345 ft. long; Albert-square, the principal front to the west, about 330 ft. long; and Cooper-street, to the east, about 95 ft. This latter end is about 2 ft. higher than the centre of the Albert-square front.

Up to the beginning of this month strenuous efforts were made by Alderman King, and a strong body in the council, to have the present site enlarged, and converted into a rectangular plot. The Oxford-road, one of the main arteries running south-west could, by that means, be continued into Albert-square, and the narrow and tortuous streets that at present connect them, be swept away.

Let us now look at the designs *seriatim*.
No. 1. "Arnolfo di Lapo." Mr. William Lee, London. This gentleman has dedicated his design to the great architect of the Cathedral of Florence, the pupil of Nicolo Pisano, but we

have grave doubts as to whether this defunct worthy, could he re-assume "this mortal coil" for the nonce, in order to view the result of his pupil's efforts, would feel flattered by the doubtful honour conferred on him. As nearly as we can describe it, the style adopted is intended for a perpendicular treatment of Venetian Gothic, but so crowded is the whole with the most elaborate and diminutive detail, that the effect usually produced by the Venetian, or predominating style, is lost. The clock-tower rises from the centre of the Albert-square façade; and after leaving the roof, ascends in a very plain and unimposing manner until it meets a heavy machicolated cornice, with parapet bounded at the corners by a somewhat squat slate saddle-hipped roof, having dormer windows on its four faces. Two bold flights of steps, isolated from the rest of the building, rise from the street, on either side of the entrance to the ground floor, and land on a terrace or platform over the same. From this access is gained to the great vestibule on the main floor, through which the great hall and state-rooms are approached. This staircase is not, however, shown in the perspective view.

The connexion of the circular angle turrets, with the pavilions flanking the Albert-square front, is not satisfactory. The upper part of their roofs should rise higher above the side gables to obviate the present smothered-up appearance from which they now suffer; and the whole of this group is not sufficiently grand for the importance of its position. The Cooper-street corner of the Princess-street elevation is not sufficiently accentuated, and the central feature in Princess-street is too great for the remainder of the elevation. Four perspective views, very beautifully drawn in line and etched, illustrate the design. The detail shown is, in part, very good, and some beautiful bits of grouping will be found in these views. The interior of the large room is fine, but rather tame. A curved wooden roof, of low pitch, rises from hammer-beams, supported by corbels springing from the wall shafts, the space between the corbels over the heads of windows being finished with a flat ceiling. The windows are too wide for the amount of wall space between. One bay of this hall, drawn to a large scale, and showing the coloured decorations, is given. Frescoes are shown below the windows, and canopies containing statues separate the different bays. Twenty-three drawings, including views, explain this design, and the cost of carrying it out is placed at 250,000L.—the limit assigned by the instructions.

No. 2, "Faire sans dire," by Mr. T. H. Wyatt, of London, the architect of the Liverpool Exchange, is an Italian design, with French treatment, exhibiting great dignity and repose. The main entrance, or grand portal in centre of Albert-square front, is massive and chaste. The clock-tower over it, however, is not equal to its position, being too insignificant for the angle towers flanking this elevation. In the main façade, the basement is quiet and massive, and above it a colonnade detached from the front wall supports a deep cornice, with statues over it. The attic story is so lofty that it detracts from the scale of the lower parts of the façade, and its windows are too like those of a dwelling-house to suit the other parts of the composition. No roof appears over this, although two Mansard roofs abut against the angle towers.

The circular angle towers rise from two bold projections with high slated roofs, between which the colonnade of the main front is continued, terminating above in well-proportioned domes. The interior of the public room is very grand, and shows a circular roof formed by ribs springing from red granite columns. The lower portion of these columns and their dados are attached to pilasters supporting the side galleries, and resembles strongly the treatment of the large room in St. George's Hall, Liverpool. The interior of the council chamber, and those of the dining-room and principal entrance, are very pleasing, and beautifully drawn and coloured; in fact, the manner in which the views of this design are finished is highly creditable to all concerned in them. The plan is simple, practical, and clever, but the internal areas are small. The main floor is gained from the street by three flights of wide steps, an ante leading to the end of the public hall. Passages on either side of the hall are connected with it by doors at the centre and ends of the same. Four small staircases occur at the angles of the hall leading to

the galleries. Committee-rooms and open areas are placed each side of the whole.

The council-chamber and main entrance adjoining come between the mayor's department and the state rooms. The mayor's entrance on the ground-floor is placed in the circular angle tower, 81 ft. in diameter, at the corner of Albert-square and Princess-street. From this hall stairs lead to his rooms above. In the basement a metal tramway laid along the main corridor serves for the circulation of heavy goods. The areas provided are too small, in a climate like that of Manchester, for a proper supply of light and fresh air. Including views, this clever design comprises twenty-one drawings. The estimated cost is placed at the required limit of 250,000L.

In No. 3, "Fides," Mr. Cuthbert Brodric, best known by the "Leeds Town-hall," has collected the largest possible number of small shafts, and, with the assistance of pointed arches, has raised a palace for the,—fairies. The group formed by the large towers is fine when considered merely in outline. All the towers are circular and very large. On the ground-floor the base of the clock-tower, which is of great diameter, is devoted to a large entrance-hall, which swallows up the best portions of the front part of his plan. Part of the colouring of the exterior view is very spirited, especially the foreground. The plan has merits.

No. 4, "Sperandum," Mr. John O. Scott (son of Professor G. G. Scott).—This design is illustrated by no less than twelve beautiful and highly-finished exterior and interior views; some of considerable size and merit as coloured drawings. This is, we believe, the first occasion on which Mr. J. Scott has come before the public. The question naturally presents itself, if his first essay be so successful, what manner of man will he be when he has attained to his father's age and experience? The "Main Entrance," in the centre of the Albert-square façade, has over it a porch of two stages; the upper one gained through the large ante-room on the main floor, provided for public speaking at elections and on similar occasions. In the front elevation it is composed of three arches with angle buttresses, finishing in very graceful pinnacles. The side arches are pointed, but the centre ones are elliptical, and produce an unpleasant effect. This might have been easily avoided by making the side arches slightly wider, and changing the ellipse into a stilted semicircle. Over this porch rises the clock-tower. After leaving the roof, it shoots up straight like a rocket. By an anxious journey heavenwards, the eye at length reaches the clock, and over it a parapet with the usual allowance of pinnacles. The whole is crowned with a lofty hipped roof (too) green slate. Taking the tower as a whole, it is really grand. The lines are plain, but dignified and refined. There is nothing novel about it, and still it is satisfactory. The ground-floor windows are good; and over them, on the main floor, come pointed windows with traceted heads. These two floors are divided into bays by buttresses terminated on level of main floor by canopies containing statues. The windows of the upper story are divided by pilasters, and over the wall behind pierced with an occasional lunette; over this a cornice, and a high-pitched roof. This elevation is terminated north and south by octagonal turret staircases, continued to such a height above the cornice as to give them a somewhat lanky appearance. As the only projections in the front are the porch and buttresses aforesaid, the general effect is flat, owing to the absence of strong shadows and contrasts.

The tower at the Cooper-street end of Princess-street is somewhat similar to the clock-tower, but a better composition on the whole. The main entrance on the ground-floor is under the covered porch. A vestibule leads to the grand staircase, with dome-light over it. The grand staircase lands the public on the state corridor of the main floor. Retraining along corridors right and left of the staircase, the public would enter the grand hall. This is cruciform on plan, the arms of the cross being cut off from the remainder by three arches, and occupied by galleries. Two beautifully finished interior views show different methods of finishing the roof of this hall; the one by a dome springing from roof slightly pointed, and the other by a simple arch springing from wall-shafts, somewhat similar in treatment to that of Mr. Lee's. The drawings showing the grand staircase and council-chamber are works of art of no mean pretensions. The grand stairs leave the ground-floor by a wide

central flight of steps, and after gaining the first landing separate into two flights terminating on the state corridor. Round the whole is a series of graceful arches on marble shafts supporting a glass roof. The estimated sum for carrying out this design, including the dome finish to the great hall, is 201,775L. Mr. John Scott has a career before him that can scarcely fail to be eminently successful.

No. 5, "Saint Valentine," by Mr. Alfred Waterhouse, the architect of the Manchester Assize Courts, and the successful architect in the present competition. The general grouping of the tower roofs and prominent features of this design is most effective, and must have been well studied. The individual parts, however, seem to have had less attention. The Albert-square elevation has a central feature,—a boldly-designed gable, with angle buttresses and pinnacles over, projecting forward from the main building to the street line. On the ground-floor this forms the porch to the vestibule, and is gained by a wide and low-pointed arched door, the whole enclosed by a hood gable, constituting an insufficient main entrance. In this gable over the porch are three windows, of two lights each, having traceted and pointed heads. In the stage above are windows similar in character to those below; and in the gable itself are smaller lights, suited to their position. Behind this gable, and from the main walls of the building, rises the clock-tower. Its outline is plain. The top stage is occupied by three pointed arched openings in each face, and over them a parapet with angle pinnacles. Over this story the tower changes into an octagon, containing four clock-dials. The sides facing the angle pinnacles appear somewhat unstudied and bare. A slated pyramidal roof terminates the whole. The perspective views are lined in brown ink, and coloured in sepia and Payne's grey. They are executed in a bold and artistic manner. The small view on the same mount as the Cooper-street elevation is a gem in its way. The interior view of one of the three winding staircases is also worthy of close examination. We have no doubt that when Mr. Waterhouse has more leisure for the study of the detail of his elevations, a perfectly successful design will be the result. The style adopted is a free treatment of Early French.

The ground-floor is approached from Albert-square by the porch before described. On each side of this porch are small chambers for the use of the porters. Next comes the vestibule, placed immediately under the clock-tower; but how this is to be lighted, except with the most "dim religious light," we cannot say. This vestibule leads into the staircase hall, and from it runs a passage in the direction of Cooper-street, giving access to all the rooms of the police department placed under the public room. In the entrance-hall the grand staircases rise to the right and left landing on the main floor, either side of the entrance to public room. At the extremes of the front corridor on main floor are public entrances into Princess and Lloyd streets respectively. At the junction of this with the side corridors occur winding staircases, and a similar one is placed immediately opposite the entrance from Cooper-street. The treasurer's department is on the left of the main entrance. Then, turning the corner into Princess-street, come the public entrance, the mayor's entrance and staircase, weights and measures offices, paving and highway, and water department. Going from Cooper-street down Lloyd-street we find first the Court of Record, warehouse keys, some distance from the police department, under whose protection it lies, workshops for weights and measures at the opposite corner of the building from the offices connected with it. Then come the gas and scavenging departments, and the inclined cartway leading to the basement. Stairs to porter's residence, and a public entrance complete this frontage.

On the main floor the front is occupied by the state departments in the following order.—At the Princess-street end, the dining-room, reception-room, ante-room to same, under clock-tower, and projecting over the porch, large committee-room, ante and council-chamber. On the Princess-street front, next to dining-room, come the mayor, town clerk, assistant town clerk, and city surveyor; and off the cross corridor, at end of public hall, connecting the Princess-street with the Lloyd-street blocks, is placed the committee clerk. The three committee-rooms are put over the centre of Lloyd-street front. The public hall is placed at right angles to the Albert-square front, and is entered

only at the ends,—an arrangement which would prove inconvenient were the hall portioned out into three different divisions in the event of its being hired for a public entertainment. The hall is finished above with a high-pitched roof, having, large hammer-beamed curved principals, much resembling the hall in the Assize Courts; but not to be highly commended for its acoustic properties.

This plan has been placed first for simplicity of arrangement; but to gain this simplicity, the "instructions" appear to have been a little overlooked. In Cooper-street and Princess-street, for instance, the central features encroach upon the space reserved for areas. The wall of angle pavilion, crossing the dining-room, will, we imagine, be supported by a strong iron girder, but the internal pier that would support this girder is gutted by a hoist, leaving only a shell of brickwork, about 9 in. or 14 in. in thickness.

It is considered by the architect that the whole could be executed for a sum less than 250,000. Out of nineteen drawings, seven are perspective views.

To No. 6, Interlacing Triangles, Messrs. Speakman & Charlesworth, the judges awarded the first place for architecture. The Albert-square front is by far the grandest and most original conception in the room. In this design the central group is formed by a stately porch of three pointed arches, through which a broad flight of steps leads to the main floor. The centre one is nearly double the width of side arches, and is enclosed by a crocketed hood-gable. The middle ones are more massive than the angle piers, imparting a weak look to the latter, where extra strength and abutment are to be expected. Over the porch the façade is carried up one stage higher than the rest of the building; on the centre is a crocketed gable with small canopy for finial. A sculptured circular medallion fills this gable. On either side are beautiful octagonal turrets, two stages in height, rising from a square flat, banded by pinnacles. The construction for supporting these turrets is not hinted at externally, and, as in Mr. Waterhouse's case, they do not grow naturally out of their square bases. Above all, and behind the central gable, rises the lofty clock-tower, too much resembling that of the Assize Courts to be erected within a mile of that building.

In this façade the ground-floor windows are square-headed, and divided into two lights by shafted mullions, having relieving arches over all. The division piers are massive, with alternating courses of different coloured stone. Above this is a rich string and balustrade. Over the piers rise coupled columns sufficiently detached from the main wall as to leave a shallow passage or balcony behind. From these shafts spring pointed arches supporting the front wall of the upper story, and having their soffits the full width of the passage below, thereby producing strong shadows without diminishing to any deleterious extent the light of the main floor windows. Coupled pointed lights, with a circle in the head, form the windows to the state-rooms. Over this bold arcade is a deep string, formed by square panels filled with shields having armorial bearings. Next above come the windows of the upper story, of two pointed lights, separated by coupled granite shafts. These are divided into six bays on each side, by statues resting on corbels, and protected by canopies. Above an open arched balustrade, resting on a rich cornice, and shutting against two dormer-windows; and the angle and central towers bring us to the roof, which is finished with a metal cresting and well-designed chimneys.

The angle-towers bounding this elevation on each side are octagonal, and fully equal to their position. They are more than semi-detached, consequently looking safe and capable of easy execution. The horizontal bands of the façade run round these towers, connecting them with the rest of the building. The balcony of the main floor is also returned: it is supported on short granite shafts, resting on the projecting weatherings of small, but wide, buttresses. These towers rise one story above the cornice of the façade, and are crowned with a boldly-corbelled cornice, having gargoyles at the angles. Above this is a pyramidal slated roof, having an open sort of bell-cote, of pleasing outlines, as a termination. Four dormer windows occur in the roofs, completing these charming pieces of composition. The Cooper-street elevation is not so satisfactory as the main front, the central tower being throttled on either side by tall slated roofs of an alarmingly high pitch.

The interior of the public hall is pleasing. The roof, which is of wood, curved at the sides and flat at the centre, has the look of being suited for concerts or debates. To increase the comfort of this hall, a large wooden ventilator, supported on strong iron trusses, rises from the centre of the ridge, marking the position of the hall from the outside. The council-chamber is octagonal in plan, lighted by a shallow glass dome, supported on pendentives springing from angle shafts. Two galleries are provided, that for the public being gained from the street, and the other, for the use of the press, from the main floor. A view is given of the mayor's hall, which forms a very beautiful composition. The design of the grand staircase is also successful, and, like all the rest, if not even more so, is very beautifully drawn and artistically coloured. The figures introduced are well studied.

In Albert-square the ground-floor is entered by two doors leading off the covered carriage-way under the steps in the grand portal. Near these start auxiliary staircases, which lead to the main floor on either side of the grand staircase. Rooms for the porter are placed between these entrances, one of which is devoted to the use of the mayor. The treasurer's department lies on the right and left of the main entrance in Princess-street, the paving and highways on the Albert-square, and the gas department on the Cooper-street side of the treasurer. The water department occupies the greater part of the Lloyd-street front. The police will be found in Albert-square and that end of Cooper-street. A cartway leads from Lloyd-street by an incline to the basement, for the convenient delivery of coals and heavy goods. The main floor is gained from the street by the external flight of steps under grand portal; the auxiliary staircases on either side leading from the ground-floor. The great hall is gained from the ante-room by three doors, and the corridors, leading to the state rooms, branch right and left of same. On the left will be found the reception, dining, and mayor's rooms; to the right the committee-rooms. The council-chamber is placed next the cross corridor, on the Lloyd-street side of the great hall,—a position which the author considers more convenient than any other, and free from the disturbing noise of passing traffic. The areas are large; all the rooms and corridors are well and directly lighted. The estimated cost of carrying out this design is put down at 253,285*l*.

No. 7, "True to the Line," is by Mr. Thomas Worthington, Manchester, author of the new Albert Memorial in the middle of the square facing the centre of the main front of the proposed new building. He also built the Memorial Hall in the same square.

This design was placed third in order of architectural merit; Mr. Charlesworth's and Mr. John Scott's preceding it. This order applies, we think, only to the Albert-square front, as neither of the above-named gentlemen have treated the Cooper and Princess-street elevations in so masterly and artistic a manner. Take, for instance, the splendid group in No. 16, a view of Mayor's Porch and angle of Princess-street and Albert-square; also No. 15, view of Cooper-street end and Princess-street, with the massive tower at the junction of these streets, rising bold and dignified from the roofs. The broad and powerful treatment of this drawing reminds one strongly of the style of the elder Prot. We may call the style adopted the best period of Feudal French architecture, considerably refined. In the front elevation, as described in Mr. Lee's design, bold flights of steps, separated from the building by the sunk areas, approach a landing or terrace formed by the roof of entrance-porch to grand floor, and placed on the level of main floor. Two square-headed doors are placed under a lofty and shallow-arched portal, the tympanum over the doors being filled by a rose window. An elaborate gable, flanked by angle-piers with pinnacles, completes this grand portal. Above it rises the clock-tower, in five stages, before the machicolated cornice, parapet, angle-pinnacles, dormer-windows, and hipped and slated roof are reached. The façade between the clock-tower and flanking pavilion is divided into six bays. On the ground-floor are square-headed windows, with shafted mullions; on the main floor, pointed windows of two lights and traceried heads; above them a very plain space of considerable height must be passed before the string-courses to the upper stage are reached. This top story has triple lanced windows, with connecting hood-mould over, the division of the bays marked by

statues on corbels and under canopies. Over the parapet come the dormers, having shafts rising from the foot-stones of the gable coping, and supporting figures or finials,—a piece of æsthetic construction that we highly object to. The flanking pavilions are very heavy in outline. An oriel window projects from the front face, and at the sides bay windows, terminated by a graceful pyramidal slated roof.

The plan is constructed on a totally different principle to that of the other competitors, the motive being a desire to finish the angles of the Albert-square front by a square treatment, and also to make the internal areas rectangular and architectural studies. To gain this he has sacrificed much space and light, at the same time taking great liberties with the external sunk areas. From the main front the ground-floor is gained by a porch under the raised terrace arch before described. This is connected by a wide arch with the vestibule under the clock-tower. This vestibule will fare little better than Mr. Waterhouse's in respect of light. On the other side of the main corridor rises the grand staircase; and right and left of it is a spacious vaulted ambulatory,—lighted by one of the arcaded areas before described. North and south of the main corridor are public entrances. On the left of the vestibule are placed the paving and highway, with the mayor's private entrance, and on the right the building and sanitary departments. In the centre, under the great hall, are placed the Court of Record, markets and weights and measures departments. Going from the mayor's entrance down Princess-street we find the treasurer's, and then the gas departments; two doors either side of the central block giving separate access to each. The large gas office has a separate entrance in Cooper-street; and a second door near it is provided for the large room of the waterworks. This latter entrance also leads to the interior corridors. A cart entrance is provided in Lloyd-street, communicating with the basement. On the main floor the arrangement of the state-rooms is very successful; and although this floor can be gained from the street by the external steps, the entrance vestibule can be thrown into the long suite of rooms. At the Albert-square corner is placed the dining-room, with its serving apartment; next the reception, ante-room, and vestibule, large committee-room, ante-room, and council-chamber. Opposite the dining-room is the mayor's room, with a hall between. Of this hall is the mayor's staircase. Town clerk, assistant town clerk, and city surveyor occupy the Princess-street front; the committee clerk is placed by the cross corridor, at back of great hall. In Lloyd-street, next to the council-chamber, are placed the three committee-rooms, clerk of prosecution, and water department. The public room lies at right angles to Albert-square. It is gained from the vestibule, through a large hall, lighted from the tambour of a dome.

The upper flights of the grand staircase land at the sides of this hall. Corridor, at either side, and at the end of the public rooms give access to the same by seven doors,—a good and safe arrangement. The room is provided with a wagon-headed roof, divided into eight bays by curved ribs, and subdivided into small panels by moulded ribs. This shaped roof is not so good as some other exhibitions for true sounding properties. The windows are nicely designed, and the space below devoted to frescoes.

Out of twenty drawings, eight are perspective views, some being amongst the finest pictures in the exhibition. Estimate, including towers, &c., 275,000*l*.

No. 8, "Valentine," by Mr. Edward Salomons, of Manchester, known best by the theatres and warehouses that he has erected. The style he has adopted is free Italian, from a modern French point of view. In the centre of the main front is a wide square door, flanked by caryatides supporting a segmental pediment, filled with carving. On each side of this are massive rusticated dados the full height of the ground-floor, and relieved by a sunk niche holding statues. From these dados rise coupled columns, supporting a frieze and segmental pediment, filled with sculpture, the whole enclosing a semi-circular arched recess, containing three windows with carved tympanum over. Slight projections flank this gable, and, with the clock-tower, which crowns the whole, completes the central feature of this design.

The clock-tower rises by eight angle pilasters from a square base, having seated figures on pedestals at the angles. Under a semicircular arch, springing from these pilasters, is the clock

and below it three windows. A bold cornice comes next, having corbelled circular angles, supporting dumpy pepper-boxes. At this level the tower diminishes in width, and becomes octagonal. In the cardinal faces are windows, and the remaining are occupied by canopies containing figures. A curved roof, with cupola over, completes this very beautiful tower. Wide windows, with segment heads, and divided into bays by massive rusticated piers, having pilasters supporting balcony corbels, compose the ground-floor elevation. Over this comes a balcony. The windows to state rooms have two lights, divided by a column, with semicircular head, and circle over, the whole being enclosed within a semi-circular arch. The next floor has very small windows, in shallow-face dormers, that spoil the whole façade. These windows being very narrow, leave the piers between about double the width of the piers below, a big-upon-little arrangement always to be carefully avoided. The roof dormer-windows are better. This elevation is honned by circular angle towers. These contain the staircases to mayor's rooms and gallery in the council-chamber. They are divided into three bays by four columns, so slightly detached that they appear to support nothing but the staves above their cornice. Three arched openings on the level of roof-dormers, with a cornice and low circular dome, give a very dumpy finish to these towers. The other elevations are inferior to the above, and do not require description.

The front elevation is a marvel of geometrical drawing. The delicacy and precision of the lines, and the softness of the tinting, remind one strongly of some of the French drawings in the late Paris Exhibition, or the *École des Beaux Arts*. The principal perspective view is also tastefully drawn, and the statuary introduced is well composed. In the view the cornice of the nearest angle-towers is, however, dreadfully out of perspective, and gives quite a tipy look to the tower, or that of a slouched hat with the broad brim pulled down over the ears.

The plans are worthy of careful study: they seem to adhere closely to the "instructions," giving, at the same time, the required accommodation in the most economical and convenient manner. On the ground-floor, the door of the vestibule under the clock-tower opens into a wide corridor, running right and left, and terminating in public entrances in Cooper and Princess streets respectively. Opposite the vestibule rises the first broad flight of the grand staircase, which, being covered by a glass dome, would amply light the corridor and vestibule. On the first landing of the grand staircase are placed two ticket-offices, forming a mezzanine under the corridor next the public room. From this landing, on each side of the central flight, and at right angle to the same rise staircases—finishing on cross-passages connecting the state with the business corridors. From the same landing, return flights give access to the state corridor. By this arrangement of parallel and cross passages, the state-rooms are isolated from the business portion of the building, but still having easy communication with the public hall. On the ground-floor, to the left of the grand staircase, are clock-rooms. Additional retiring-rooms are provided above on each side of this grand staircase. To the left, and next to the vestibule, come the porter's room, Record Office, collector's office for treasurer's department. The angle-tower is devoted to the mayor's private staircase.

Turning down Princess-street are the public entrances before alluded to; next the treasurer's department; another public entrance in the centre of Princess-street elevation; and then the water offices, with their large room and separate entrance in Cooper-street. Opposite this public entrance is a semicircular staircase; stretching thence down Lloyd-street are the gas offices. In a cross hall connecting the Princess-street with the Cooper-street block, are placed gas offices, a general staircase, and the paving and highway department. In the middle of the Lloyd-street front is the entrance for carts. On entering the internal area the cart would turn to the right, in order to reach the workshop for weights and measures on the high level, and by the inclined plane the smith's shop below. Adjoining past the smith's shop the cart would reach the level of basement, and by going through archways, especially provided, pass round the whole of the basement story. Next to the cart entrance come the scavenging offices, with a pay lobby for the men. Then the warehouse for a room entered directly from the street. Op-

posite to it the detectives' office and the rest of the police department. The angle-tower at the corner contains the stairs leading to the gallery on the council chamber. On the left of the grand staircase are the market offices; below the public room, the building and sanitary department. On the main floor the whole of the principal front is devoted to the state-rooms, forming a suite about 250 ft. long. Next to the mayor's staircase comes a serving-room, with stairs to kitchen, and rooms over; then the dining-room, reception-room, ante-room, and large committee-room, with serving-room, and stairs leading to basement.

The large hall is placed parallel to Albert-square having the business corridor which connects Princess-street with the Cooper-street corridors, running on one side, and giving access to it by three wide doors. An ante-room lies between the end of the hall and Princess-street in the public room. By placing the public room in this direction the platform is brought near to the size of its internal areas.

Starting from the mayor's staircase and going down Princess-street, we find a vestibule with stairs to mayor's living-rooms, and proceeds into the state corridor and mayor's rooms. Next come the town clerk, assistant town clerk, committee clerk, and city surveyor. In the cross block, contractor's room, general staircase, and water offices. Turning down Lloyd-street from Cooper-street are water offices, porter's staircase, weights and measures offices, with stairs leading to work-shop below; then two committee-rooms, ante, and council chamber. All the rooms are well lighted, their general depths from the windows being very small. Two alternative arrangements to the above are shown. There is, however, a general prejudice against alternatives, from the idea that if the author has produced one, he considers to be the best plan, it is difficult for him to arrange a better. Twenty-one drawings, including four perspectives, constitute this design; and the cost of carrying it out is estimated at 240,900l.

A NEW YORK UP-TOWN HOUSE.

A PAPER on "Domestic Architecture in America," by Mr. Gerrase Wheeler, Fellow, was read at the Institute of Architects, on the 30th ult. In the course of it the writer said, the subject to which I would call attention is an ordinary New York up-town house, such as may be counted by hundreds not only in that large and fashionable city, but in all other new towns of the Transatlantic continent, remarking by the way that it is not offered as an example of what would suit our own mode of living, but as a specimen of the domestic buildings of America. The plan is a type of the class of private residences known as the "big-stoop," or genuine New York house. It is built upon an ordinary lot of 25 ft. frontage, and its arrangements preclude all the peculiarities of an American city dwelling. The block plan of the house shows nearly the whole of the lot, and is recessed walk, as Americans call it, than our London houses generally are. This recess gives a better opportunity for the entrance steps and landing, which are wide and handsomely arranged, the upper level forming a porch or "stoop," which feature gives the name to this kind of house. The hall-door leads into a vestibule, in which are inner glazed doors opening into the entrance-hall. Upon this floor are the reception-rooms,—differing from our customary arrangement which disposes them upon the floor above,—and these rooms consist of one very long saloon, divided by columns into two equal divisions, and in the rear is a drawing-room occupying the whole width of the house. Beyond this room—the American name for which is an "extension-room"—is a wide piazza enclosed with glass, and having steps leading to the garden. For party purposes the whole suite is thus extended to a very considerable space, the reception-rooms being each about 24 ft. by 16 ft., and the extension 10 ft. or 12 ft. more. The drawing-room is shut into the saloon by sliding doors, which are filled with ornamental glass.

Between the staircase-hall and the extension-

room is an inner-hall, shut off by sliding doors, and containing a "lift" or dumb waiter from the service-room below, enclosed shelves and other conveniences for the use of serving refreshments. This is lighted by glass in the sliding doors in the daytime, and by gas in the evening, which is of course the time when principally used. The height of this story is 14 ft., and the staircase is carried up in one continuous flight without the break of intermediate landings.

The floor below is thus divided:—
In front is the dining-room, forming the general living-room of the family, and corresponding in size with the reception-room over—24 ft. by 16 ft. In rear of this is a large private store-closet, and also a serving-room, which communicates directly with the kitchen. The kitchen itself is of considerable length, the rear end being fitted with washing-troughs and other conveniences for laundry purposes. A glazed door leads from this into an open space beneath the piazza, and in the floor of this are apertures filled with sheets of rough heavy glass to assist in lighting the cellar below. By the side of the laundry are a servants' bath-room and a water-closet, and the space not occupied by the staircase is filled with a store-room and several closets, American housekeepers always preferring a large number of separate enclosures, in which their necessities may be kept distinct, to a general store-room. This story is 10 ft. high. Beneath this floor is the sub-cellar, which is always kept as little obstructed by cross walls as possible. The heating apparatus, whether furnace or boiler, is in the centre, with large coal-bunks in front; the rear being left open with larder, milk-room, and the like at the side. The heating apparatus I will presently speak of, merely calling attention to the large air-tough area in front, by which cold external air is conveyed into the heating-chamber, and thence distributed over the house.

The chamber floors are above the reception-rooms, and are arranged exactly alike in each story;—one large room in front, a similar chamber in the rear, and smaller ones at the side; that at the back containing a bath and water-closet, with a large linen-closet, the peculiarity of which is that it is lined with cedar to keep blankets and furs from ravages by moths. Between the two large rooms a considerable space in the middle of the house is devoted to dressing-closets, which are so arranged as to contain washing and bathing apparatus, hanging wardrobes, drawers, and all other fittings for toilette requirements. These are, moreover, lighted and ventilated by an air-shaft, which runs up from this floor through the building, with a cover of thick glass raised a few inches above the level of the main roof, having apertures at the side with closing slitters for admission of air at will.

There are three such chamber stories, of the respective heights of 11 ft., 10 ft., and 9 ft., and in the rear the peculiar construction of the long sloping roof gives an additional story over one half, and affords sleeping-rooms for servants. Although other forms of roofs may be seen, this mode of construction is that generally adopted. Its simplicity, and the ease with which snow or rain can be conducted to the one large overhanging gutter in front, give it advantages which the lightness of the covering need—in, enables American builders to avail themselves of. The beams are principally on the side walls by means of stout purlins, and the rafters overlap and are pinned together in breaking lengths, and tied at the foot to the ceiling and floor joists, forming in reality a series of individual trusses from one end of the building to the other.

The gutter is formed in tin, and is carried upon very hold brackets, the front being treated as a cornice. This part of the front of the house is generally of wood, and very stonily and strongly framed. I know this part of an expensive and often elaborately ornamented front taken an ordinary peep at American town houses will believe that it is; but recollections of actual fact compel me to say that the American workmen and sand woodwork very cunningly, and all must not be taken as mere orthodox material. But it must be conceded that for this particular purpose wood is a good and proper material; the error is in making it appear what it is not. Iron, which has been occasionally used in this situation, has not, I fancy, found general acceptance—at all events, it had not to

the date of my last personal experience in America.

The average cost of building such a house as the one described, with a stone or marble front, and a bandstand but not over-elaborately finished, would be, exclusive of the land, about three thousand guineas. The land, especially in some exclusively choice localities, would often be nearly as much again, and the rental of such a residence would not be less now than from six hundred to eight hundred guineas per annum,—in some situations very much more. The cost to purchase would be from six to ten thousand pounds. Houses built a few years back, and in the less fashionable parts of the town, may be bought for much less than these amounts; and in many very pleasant situations, not so exclusively "the rage," such can be obtained at more reasonable, though still very high, rentals.

A wish having been expressed for information as to the modes of artificial heating employed in the United States, I will endeavour to describe the various apparatus most commonly in use.

Stoves, fire-places, and the like, serving to heat only one apartment, I will pass over, and confine myself to such systems as provide warmth to the whole building.

The first of these is the hot-air furnace, by which air brought from without is warmed by contact with a large heated metal surface confined within a chamber of brickwork, and then distributed through tin pipes of large diameter to the floors of the several rooms above. This apparatus is placed in the cellar, and being comparatively inexpensive and very easy of arrangement, until a very few years back it was in almost universal use. Unfortunately many serious objections were found in the working of the system, which, however, I am inclined to attribute to defects in the apparatus and in the mode of its application, rather than to the principle itself. Hot-air furnaces there are of American make, both good and bad; and the bad being cheaper, and the people on the whole not understanding wherein the advantage of one piece of mechanism consists over another, the country has been overrun with cheaply made red-hot cast-iron appliances, that burn up and vitiate the air, discharging currents into the rooms highly charged with sulphurous and other irritating gases, justly bringing upon their use the condemnation of medical men. The pipes, too, are often contracted in their dimensions, and instead of the warm-air chamber gently giving out large volumes of moderately-heated fresh external air throughout the building, a thin scorching blast of air, almost red hot, is shot through the registers into the rooms, to the destruction of all health and comfort. So great a nuisance this became at last, that a general outcry was raised, and hot-air furnaces are now, I am told, not nearly as frequently used as they once were. But experience and a loving attention to a subject, always somewhat of a hobby, have satisfied me that the old Boston furnace of *Childen's* principle, or its improvements and modifications introduced by *Boynton*, the New York successors of the original house, may be used in such a manner as to answer all the requirements of modern modes of heating.

Recent testimony from New York leads me, however, to conclude that furnaces are less frequently in demand, and the more costly modes of hot water and steam heating are supplying their place; still, with many instances fresh in my recollection, and the disinterested accounts of their continuance in satisfactory working, I do not feel inclined to admit that the evils of this mode of warming are identified with the system, but rather result from bad workmanship and improper application.

The best furnace that can be used is one which gives the greatest possible amount of heating surface, and at the same time is of such simplicity of construction as to readily allow its internal parts and flues to be frequently got at and cleaned. Its parts should consist of a large fire-lined pot of very heavy casting, and above and surrounding that the flue subdivided into such forms as will best multiply the heating surface, and ultimately discharge the smoke into the chimney flue as cool as possible, so that all the heat may be transmitted by radiation. All these parts are enclosed in an air-chamber of brick, which must be of large size, and of double walls so as to allow no waste of heat into the cellar. The cold air is brought by a wide wooden trough from the exterior of the building into this air-chamber, and after passing over the several heating surfaces, is carried by means of tin pipes, varying in diameter from 8 in. to 14 in., or even

more, according to the size of the rooms to be warmed, to just below the floor of the apartment. There it opens into a box, the depth of the space between the floor joists, and set in soap-stone in the floor. The top consists of a metal ornamental grating, below which are flaps working on centres, and moved by a rack and wheel so as to perfectly close or open gradually the apertures for transmission of the heated air into the room. Considerable care and judgment are required in conducting the tin pipes to the several levels, and in carrying them in horizontal directions. Workmen generally contrive to have them as nearly as possible in the centre of the house, and the pipes perpendicular; although there is no difficulty in leading them nearly in a horizontal direction, provided this is done at first on leaving the air-chamber, and then continuing them up to the required point of discharge. It will no doubt suggest itself that the longest pipe will draw off the heated air from the chamber with greatest rapidity; and, aware of this, the mechanics construct these of smaller diameter; but, with all their care, it requires a little nicety in the management of the valves in the registers to secure its fair share of heat to each room. In practice, however, it is very rare that all the registers are required to be opened at one time, and my own experience of domestic life in America reminds me that we rarely had any difficulty on this score, and that the furnace once lighted in the beginning of the winter generally remained without going out until April. Servants soon get into the way of managing a machine that saves so much trouble—no coals to carry up, no fire-places to sweep up and keep tidy: all the furnace asks is a good raking out and removal of the ashes in the morning, a few shovelfuls of coals about twice a day and banking up with cinders, and partial closing of the damper at night, to ensure a constant fire and a regular heat. The coal used for these hot-air furnaces is anthracite; but I know that they can be made, and our own fuel, and that bituminous coal, such as our fuel is, no difficulty the accumulation of soot in the flues is no difficulty. Should our manufacturers be inclined to try the introduction of this system of circulating artificial heat through a building, the principal points to secure must be a large heating surface, an air-chamber of ample size, and pipes of such diameter as I have described.

Ventilation may easily be secured by adit flues or pipes from the rooms; in fact, the indraft of warm air will be too sluggish to raise the temperature of the apartment, unless means have been provided for its outflow; and this necessity compels an efficient ventilation.

Heating by means of circulating pipes filled with hot water or steam does not differ in its treatment in America much from our own modes; but a common practice now prevails of combining the principles of the hot-air furnace and the hot-water boiler. This is done by having the air-chamber heated by circulating pipes instead of by furnace flues, and the atmospheric air from without is introduced, warmed, and distributed throughout the building in the same manner. This system, however, has only been found to answer either on a small scale or as an auxiliary, unless great expense has been gone to in providing a very large boiler, which, moreover, requires an undue amount of room in the cellar. The temperature, too, generally proves insufficient for the severity of an American winter, although in the instances that I remember, in which it had been successfully applied, the quality of the warmed air thus generated was very soft and pleasant.

A new mode, I am credibly informed, now obtains very great patronage and favour. I am acquainted with its details, although it was only just commencing to attract attention when I last left New York. It consists of a boiler in the cellar, by which steam is generated and circulated at a low pressure throughout the building. The heating of the air is, however, effected not always or necessarily in a general air-chamber common to the whole house, but in special chambers attached to each room. This is done by admitting the steam into a radiator consisting of two thin plates of iron forming a case, stamped by machinery with curved indentations to increase the radiating surface, and of a size corresponding to the dimensions of the apartment to be warmed. One or more of these are used and are enclosed in a case which, in fact, forms the air-chamber, communicating with which is a tube carried along the floor-joists, and opening into the external air, through which is admitted the current of fresh air to pass over and around the radiators, and thence through

apertures into the room. The whole of this apparatus may either be below the floor, with a register at top, the same in make to what has been described before, or it may be in the side of the room with an ornamental front. The inventor of this mode of heating suggests it may occupy the opening of the fire-place, and manufactures many highly ornamental gratings for that purpose, but the objection that so doing would cut off a natural and commonly existing mode of ventilation seems to me fatal.

The best apparatus for applying this mode of heating is that known as *Gold's Patent*, as manufactured by the American Automatic Steam Company, and perhaps the best practical testimony that can be offered in its favour is the fact that the New York Board of Fire Insurance have agreed that all the companies of that city will make a reduction of 10 per cent. on all risks where this mode of heating has been adopted.

Professor Silliman—a name, I am sure, well known to all scientific readers—gives very careful and laudatory testimony to the satisfactory results of an introduction of this apparatus into his own residence, and I read the names of many of the leading men of the present day as recording their equally favourable opinions.

It is not likely that we in England will ever willingly, or at all events generally, give up our cheerful-looking open fires in favour of any concealed mode of heating, however economical, convenient, or healthful: with us, all such appliances must be only auxiliary, as, for instance, to warm halls, corridors, and large rooms; nor do I know that in America has the system been so exclusively carried out as to permit but the one smoke-flue required by the heating apparatus, and the omission of ordinary fire-place openings and flues to every room. I notice, however, that such an arrangement is strongly advocated there now, and builders are advised that no smoke-flues need be built but for the cooking range and heating apparatus, and that all rooms should have instead metal or glazed earthen tubes carried up in the walls for ventilating purposes only. It is an open question whether a building will gain or lose in an architectural point by omission of such well-known features as stacks of smoke-shafts above the roof, and meanwhile houses are built as heretofore, each with its own separate chimney opening to every room.

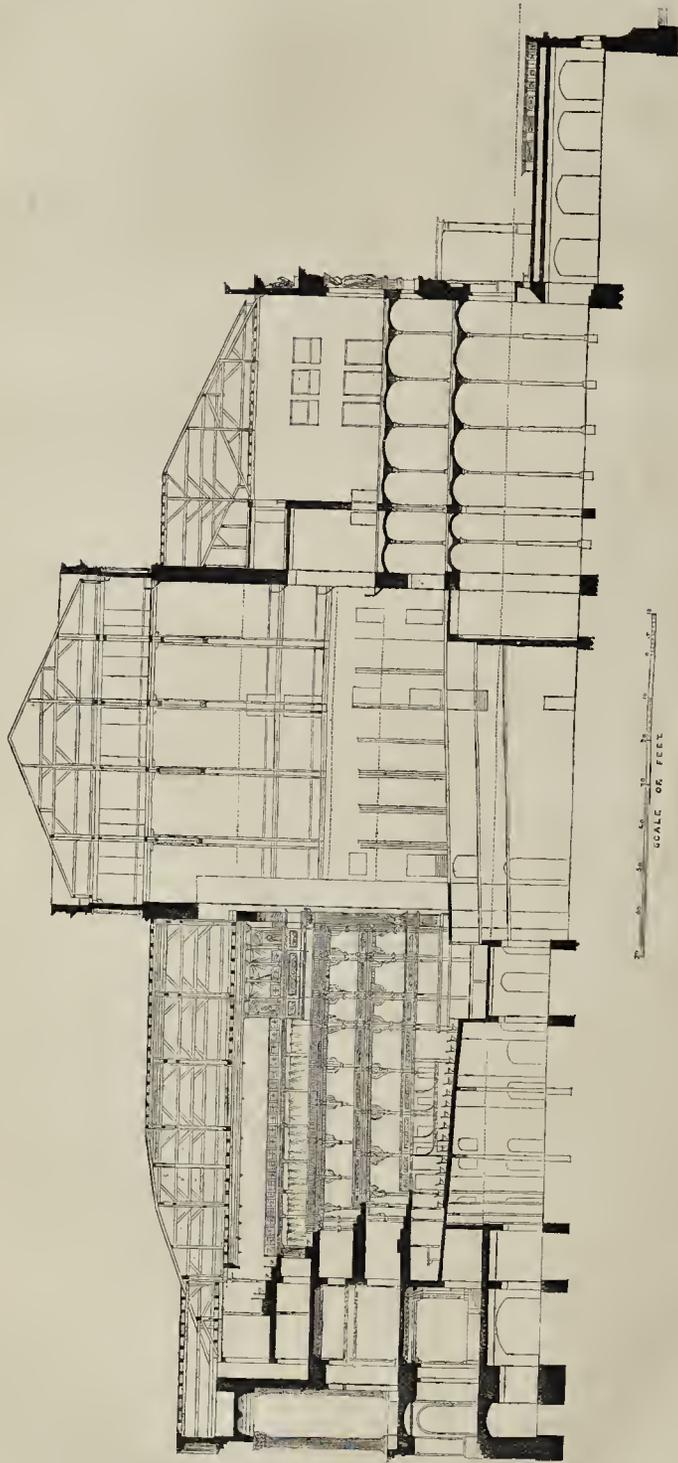
COMPETITIONS.

Hull Church.—In this competition the designs of Messrs. Adams & Kelly, of Leeds, have been selected.

SANITARY MATTERS.

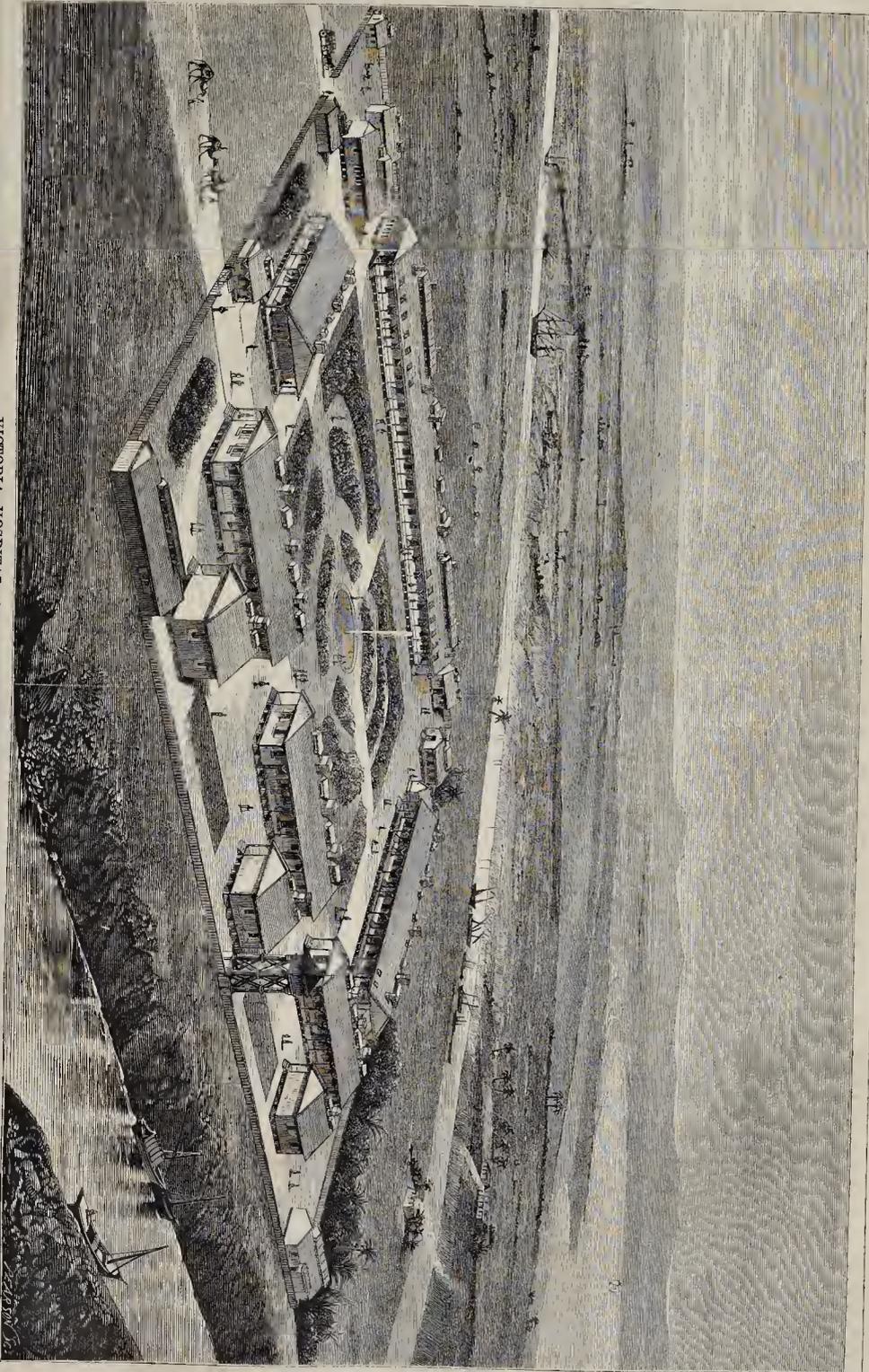
State of Sparkbrook, Birmingham.—A report presented to the Balsall Heath Local Board has confirmed the unhealthy condition of the district about Sparkbrook. It appears from this document that fever has been very prevalent in the locality, and that the cause is to be found partly in the deficiency of drainage and of water supply, and partly in the slovenly habits of the residents. The streets in question are inhabited chiefly by labouring men, whose natural disadvantages are aggravated by pig-keeping, drunkenness, the practice of throwing refuse about the doorways, and neglect as to the cleansing of ash-pits. The two great difficulties are water supply and drainage. As there is no water laid on from the company's works, the people derive their supply from shallow wells, which are corrupted by the infiltration of foul matter from the un drained surface. These two influences acting in combination are clearly producing poisonous effects, for, in a two years' visit, the committee of the Local Board heard of more than 100 cases of fever having occurred within the last few months. The Board cannot see a clear way towards removing the root of this infection, as they have no power to compel the use of other than well water, and have no access to an outlet for the drainage of this part of their district. Something, however, must be done. The Board, perhaps, require the aid of the Privy Council.

Whitehaven.—There must be something wrong with the water supply here; it was stopped altogether the other day in the higher parts of the town, and engines were stopped, locomotives deprived of their usual supply, and the inhabitants had to fall back upon the objectionable pumps, which are still scattered about the town.



SCALE OF FEET

THE NEW THEATRE, LEIPZIG.—*Longitudinal Section.*



VICTORIA HOSPITAL, SUEZ.—CORONEL COLLYER, R.M.E., ARCHITECT.

LEIPZIG THEATRE.

We add, according to promise, a longitudinal section of the newly-built theatre in Leipzig, to the illustrations given in our last.* It should be instructive to notice the monumental character given to the structure, its complete isolation, the facilities of access, and the amount of accommodation provided for the executive. Leipzig (Leipsic, English), though the largest commercial town of East Germany, has a smaller population than Brighton.

VICTORIA HOSPITAL, SUEZ.

This hospital, and the accompanying buildings, of which we give a view, have been erected for the Government of India by Mr. John Kirk, of Woolwich, Government contractor, from designs by Colonel Collyer, late of the Royal Madras Engineers.

They are of a temporary nature, but it is believed they will last for many years. They are of wood, weather-boarded outside, and match-boarded inside, the walls being about 6 in. thick. The roof is double, the rooms having a wooden ceiling, then a space of 7 in., then again a wooden roofing covered with patent felt, and upon that slates.† The hospital wards have verandahs 10 ft. wide, the windows are glazed, and where other verandahs are less than 10 ft. wide, the windows have Venetian blinds in addition. The floors are raised 5 ft. from the ground on cast-iron pillars. There are ridge ventilators, foul-air extractors, Galton's stoves, supplies of hot and cold water, and drainage throughout. There is accommodation for forty-four soldiers, four officers, and four women in the hospital, as also for a hospital sergeant, six orderlies, and two nurses. There is further accommodation for six married non-commissioned officers and their families. There are kitchens, store-rooms, wash-house, laundry, bakehouse, stabling, dead-house, guard-room, and in addition, quarters for six officers, their families and servants. The whole is surrounded with a railing.

A ward for twenty men is 75 ft. long, 22 ft. wide, and 16 ft. high, giving 1,320 cubic feet per man.

The area of the ground containing the above buildings and central garden, with fountain and walks, is eight acres. There is an additional piece of land of six acres immediately to the north of the hospital, which has been reserved for kitchen-garden purposes.

These works were sanctioned in July and August, 1867, and were all constructed in this country, and then sent out and erected at Suez. The work in this country was done under the direction of Mr. John Baker, the contractor's manager and agent; and the work at Suez under the superintendence of Messrs. Joshua Constable and Charles A. Baker, with four foremen sent out from this country. The large number of men that have been employed upon the works were all foreigners, principally Maltese, Greeks, and Arabs.

SMALL-POX IN SHEFFIELD.

Of the eleven large English towns furnishing monthly returns to the Registrar-general, Sheffield has, since the beginning of the year, enjoyed the lowest annual death-rate, which has not exceeded 23·3 per 1,000. The death-rates for the same period, in the other towns, have varied from 23·4 in London, to 25·7 in Newcastle-upon-Tyne, and to 30·2 in Liverpool, and 31·0 in Manchester. Notwithstanding this satisfactory condition of the health of Sheffield, the weekly returns vary from time to time given evidence of fatality from small-pox. This disease may, indeed, be said to have been more or less epidemic in this town for some months; and although it has not been fatal to the same extent as in Woolwich, Hertford, and a few other towns that have recently suffered from the same disease, a few deaths have been recorded in each week of the present year, amounting in all to forty deaths within the borough in the twelve weeks ending the 21st ult. When we consider that there are, in a population enjoying so

low a death-rate as Sheffield, at least five recoveries to one death among those attacked by this complaint, it is very evident that small-pox has recently been, and is still, very prevalent in Sheffield. A sufficiently large proportion of these deaths from small-pox is stated to have occurred among unvaccinated children and adults to prove the neglect of this precaution in the town; but the returns give very incomplete evidence upon this important point. Some of the deaths were of infants who had not reached the age at which they are generally vaccinated, and doubtless many of the adults who are reported to have died from the disease "after vaccination," had not been vaccinated since infancy, when, in too many instances, an assurance of the success of the operation is neglected. The prevalence of small-pox in Sheffield has led to a correspondence between the military authorities at the barracks and the health Committee of the Sheffield Local Board.

It appears that early in February small-pox was prevalent in the barracks, and the staff-surgeon in charge communicated with the local authorities as to its prevalence among the surrounding civilian population, assuming that the soldiers had therefrom been infected, and suggesting that all cases should be removed to a special hospital established for the purpose. The chief sanitary inspector of Sheffield lost no time in making a special inquiry into the prevalence of the disease, and has since reported that he could find no cases within the borough in the direction of the barracks, except in one house, King James-street, where four persons had been attacked, and were in a fairly way of recovery. This house, which was nearly half a mile from the barracks, is admitted to be one of several which are destitute of proper, or, indeed, any drainage. King James-street is a street only in name, says the report, not being formed, pitched, channelled, or drained, and is on the estate of the Sheffield Grammar School. Surely the borough surveyor or some other responsible officer of the corporation should certify that new dwellings are in a fit condition for human habitation before lives are risked by dwelling in them. It is somewhat strange that the chief inspector could only discover this one nest of small-pox cases out of the something like 200 that have occurred since the beginning of the year, but probably his inquiry only extended over that portion of the borough immediately around the barrack, although the soldiers were as likely to catch the infection from any part of the town to which they might resort. In the course of his investigations the chief inspector visited the barracks themselves, and reported to the health committee most unfavourably on their sanitary condition. The privies of the soldiers, in all parts of the barracks, were in a "disgusting and dangerous state;" some of them were structurally defective, and even those designed on a good principle had by neglect been allowed to get out of order. The staff-surgeon, who had in the first instance made the representation to the Local Board, accompanied the inspector during his investigations, and stated that he had only been in Sheffield two or three weeks; and although he believed there existed a "sanitary council" on the establishment, he was entirely ignorant of its organization. As this took place more than a month ago, it is to be hoped that this "sanitary council" has long ere this awoken to action; for in the face of the late liberal expenditure of public money for the sanitary improvement of the condition of the English soldier, it is somewhat disheartening to find such a condition of things existing in any of our barracks.

It really matters little whether small-pox first originated in Sheffield among its civilian or military population; but the inquiry has proved the existence of evils among both most favourable to the development of small-pox and other zymotic diseases. As to the neglect of vaccination, it is to be hoped that the military authorities insist upon all the soldiers availing themselves of vaccination, which is a comparatively easy task to the difficulties which lie in the way of enforcing that precaution upon the civil population. The sanitary committee of the town have appeared inclined to ignore the presence of the disease,—at any rate, the extent of its prevalence. This is surely unwise, and in the face of an average weekly return of three deaths since the beginning of the year, is no longer very possible. It is, doubtless, owing to the general satisfactory condition of the health of the borough that the deaths have been so few; and consideration for the 200 persons who have

been attacked, but recovered, should further stimulate the local authorities, civil and military, to use every endeavour to encourage vaccination, abate all nuisances liable to promote the prevalence of this or other epidemic diseases, and, moreover, to remove from themselves any stigma of supineness, with regard to the prevalence of small-pox in Sheffield.

PROPOSED SCULPTURE FOR THE UNIVERSITY OF LONDON.

The Committee on the new building, Burlington Gardens, presented to the Senate the following recommendations:—

"1. That the four seated figures over the four piers of the entrance-porico should typify the four faculties of the University, as represented by Englishmen illustrious in Arts, Science, Law, and Medicine respectively.

2. That the six standing figures on the roof-line of the central portion of the building should be in the Classical style, and should represent men of ancient times eminent in various departments of study included in the University course.

3. That the six standing figures in the niches of the ground floor of the wings should be portrait-statues of distinguished representatives of modern knowledge; those on the west wing Britons, and those on the east wing foreigners.

4. That the six standing figures on the roof-line of the wings should also be statues of distinguished representatives of modern knowledge; those on the west wing to be Britons, and those on the east wing to be foreigners,—the statues at the angles of the wings being grouped with such accessories as may give the required mass, instead of being double groups as proposed by Mr. Pennington."

The following names have been selected in accordance with those principles:—

Seated Figures over the Central Porico.

East—Bentham, Milton. West—Newton, Harvey.

Standing Figures on Roof-line of Centre.

East—Cicero, Galen, Aristotle.

West—Plato, Archimedes, Tribonian.

Portrait Statues in Niches of Ground Floor of Wings.

East—Cuvier, Leibnitz, Linnaeus.

West—Locke, Bacon, Adam Smith.

Standing Figures on Roof-line of Wings.

East—Galileo,* Laplace, Goethe.

West—Hume, Hunter, Dalton.

We shall hope to hear that the execution of the statues is entrusted to men of known ability.

In the first instance we believe Shakespeare formed one of the four "representatives of modern knowledge;" but Lord John Manners, as First Commissioner of H.M.'s Works, having suggested a doubt as to the propriety of this position, the name was removed, and that of Hume substituted. A place will probably have found inside the building for a statue of the all-wise poet.

THE RUINED CHURCHES OF ORKNEY AND SHETLAND.

At the last meeting of the Architectural Association, a paper was read by Sir Henry Druden, bart., on "The Ruined Churches of Orkney and Shetland." He observed that there were four ways of estimating churches. The first was the ecclesiastical view, which aimed principally to obtain a building fit for public worship, but which was generally in favour of replacing a plain window by a coloured one if the money was forthcoming to do so; the second was that of the artistic gentry, upholding the beautiful and picturesque, and who thought every church ought to be made as attractive as possible; the third was that of the antiquarian, who considered it sacrilege to make the slightest alteration, and who believed that to remove an ancient stone or window was to lose a chapter of history; and the fourth was the view of those who, like himself, were in favour of conservation of architecture as far as it was possible. He alluded to a remark made by Professor Keay on a former occasion, in which it was stated that when professionals made pots of amateurs, they latter generally became poets; and begged to differ from such an assertion, being fully persuaded that when wealthy people had to pay for the erection of edifices of any kind, however much confidence they might have in the architect, they generally liked to have something to say as to how their money should be spent. But he did not believe that there was any reason why there should be any enmity between the two.

With respect to the ruined churches of Orkney

* With astronomical accessories.

† With chemical accessories.

* See pp. 245, 246, and 247, ante.

† We confine ourselves at this moment to describing the building.

and Shetland, on which he was to address them, nearly all the buildings were of Norwegian origin; and as, since the time of the Reformation, the owners had allowed any one to desolate them, most of them were in a great state of ruin, and several had even come down in the last twenty years from the want of a little mortar being here and there judiciously employed. It was asserted that they were not worth preserving because they were not very beautiful, the same argument would apply with respect to the Coronation-stone in Westminster Abbey, and to many other cases. They were, in fact, the materials of history, and should be appreciated as long as history was of any value.

He would first of all touch upon the churches of Orkney, and bring before their notice the ruin of St. Olaf, at Kirkwall, dedicated to the great warrior saint of the country, who, he believed, was said to have killed something like a thousand men in a day. The original entrance was evidently in the south; and the building was in the form of a parallelogram. It was probably built by Bishop Reed some time between 1540 and the Reformation. At the church of Orpha there were the remains of what was evidently a circular nave, and it consequently must have been one of the six round churches in Great Britain. Most likely it was built between the years 1090 and 1160. There was a small chapel in the Brough, immediately in the centre; and it was old to notice how general was the practice of a olden time of erecting sacred buildings on prominent and isolated points. This little chapel was also in the form of a parallelogram, being 20 ft. long by 17 ft. wide. Only 4 ft. in height now remained. There was one door and one window, the latter in the east end. Spread on the top of the ruin were ten huts, evidently for the benefit of pilgrims. The church on the Brough of Bursas was 57 ft. in length and 21 ft. in width; of the west end of it only 3 ft. in height remained. The sole access was on the west of the building, where there was one doorway. Now the question was,—Were there doors in this doorway? And if so, how were they hung? In some cottages skins were hung over doorways; and the Shetland gates were for the most part hung with staples. In his opinion, it was questionable whether there were any doors. He found some three-quarter angle recesses in the eastern part of the nave. Another singular thing was that the entrance to the chancel was only 4 ft. 2 in. wide, and there had evidently been a stair in this entrance. The chancel was 9 ft. 9 in. from east to west. One window only remained. The floor was level to the end of the aisle; but in later times a recess had been built, which had completely blocked out the whole of the apse. Steps had been also put to the altar. There need be no hesitation in assigning the date of this chapel, which was very like St. Margaret's chapel in Edinburgh, to the year 1100 or thereabouts. The Church of Wyre was built of stones; it was 35 ft. 10 in. in length and 11 ft. 10 in. in width. The nave was 19 ft. 2 in. by 10 ft. 10 in. There were two windows in the south side, but only one of them was original. The top of the nave reached up 11 ft. 5 in. above the floor. The chancel arch was 2 ft. 6 in. wide, and the chancel like that of Lipstone Church, Caithness, was nearly square. Enghallow Church had not been known for many years, as it had been converted into a cottage. Its length was 52 ft. and width 22 ft. on the west of it was a building which, in his opinion, must have been a sacristy. The chancel was 12 ft. by 8 ft. on the inside. There was another building close by, 8 ft. by 7 ft. 9 in. on the south side of the church. He did not know what it could have been, but perhaps it was a reb. Some part of the church might have been built in the eleventh or twelfth century, but a new chancel had apparently been added in the fourteenth century. There were the remains of a chancel at Linterna, with an entrance to the south wall. On the Island of Egilsay, 3 miles by 1 mile, there was a church with round tower. The Norsemen had probably built this church, and then named the island after it. A chancel, nave, and the tower remained; indeed, they were in use up to fifty years ago. The size of the stones employed was very large. The nave was 20 ft. 9 in. by 15 ft. The doors had round arched heads. There was a window in the north, which had probably been filled up by a form of parchment instead of glass. On the west was a tower, which appeared to have been built at the same time as the nave, which had apparently contained four chambers. Another odd thing was a vaulted cham-

ber in the chancel, with an arch leading into it. It might possibly have been a munition room, or a priest's room, for there was only one small window in it, facing the north. The church had probably been an important one, and might have been erected about the twelfth century. The tower was the only part which justified the assumption that the building was of ancient date, although in many respects it resembled the early Irish churches. It was, in fact, built after the traditional Irish form with some modifications, and was raised, he should think, after the Irish people were converted to Christianity in 998.

So much for the churches of Orkney. He would now introduce to their notice those of Shetland. The church of Culhishrough consisted of a nave, a north and south transept, and a chancel. It was the only cross church in Orkney and Shetland, except the cathedral of St. Magnus. There was an east window in it. In the churchyard had been found a grave-stone which had excited great interest, and which had given rise to a considerable amount of discussion. On one side there was the representation of a cross, and on it two nondescript beasts, who appeared to be devouring a man. On either side were two bishops with their mitres and man riding. On the other side there was a very well-executed interlaced cross, and also the two bishops again. There was also an inscription, but some doubt existed as to what it really meant.

The Ness was the only complete one of all the churches in Shetland, but in consequence of not being looked to, the whole of the chancel arch was gone. The nave was 20 ft. 5 in. by 14 ft. 10 in. It was used a hundred years ago. There had been two windows and two doorways on the south and west, both of which were original. The chancel was larger than any of the others. There was a sedile on one side, the only one discovered, and on the other side was an arch. To sum up, then, the various facts connected with these ruins; the doorways were nearly all in the west end; Orpha and Egilsay churches had windows with circular heads; four of them had no east windows; and, as far as could be ascertained, no platform to the altar—a state of things which would not be approved of by the Ritualists at the present day. No piscina remained, and the windows were very low. The grave-stones were of four kinds; flat slabs, upright stones with crosses engraved on them, stones without any ornamentation, and upright stones cut into the shape of crosses. The coffins were formed of six smooth slabs of stone. The proportion of these buildings was, in his opinion, geometrical, and not arithmetical; this system extended to the elevation, at all events. The proportion was founded on three figures, a circle, square, and equilateral triangle.

Mr. White, in moving a vote of thanks to Sir Henry Dryden, observed that there was rather a singular fact connected with Egilsay. When he visited it some years ago, he was told that some ten years had been taken from the top; and even then there was nearly 50 ft. of it left. Until Medieval times, he remembered no case of a compartment that had been mentioned being it might have been used to receive people who had no residence in the neighbourhood of the church. Sir Henry Dryden had alluded to the ritual of the earlier churches was exercised to a much greater extent in olden times than it was in these days. And this fact might in some way explain the meaning of the two towers to which Sir Henry Dryden had alluded, and for which he had been unable to assign any use. He thought it by no means improbable that they might have been used, one to read the Epistle, the other the Gospel from. With respect to the blocking up of the apse in the same church, it seemed to him that the general prejudice of the twelfth century was against the Norman apses. In England they seemed determined to get rid of it entirely. Although he had promised not to allude to the question of proportion, he would say just one word about it. There seemed to have been two squares in many cases; but, of course, it could not have been executed so accurately as in later days.

In answer to a question, Sir Henry Dryden said that in the Ness Church there were bar-holes in both the doors, and it was a puzzle to him how, if any one harred them up, he could get out; for the windows were not large enough to enable him to do so.

Mr. White suggested, that perhaps they were intended to har people out, so as to afford a refuge in those lawless days.

Sir Henry Dryden accepted the proposition, believing that the principal occupation of the men of that time was to protect their own throats and cut other people's.

The president observed, that it was always difficult to express an opinion in the face of any one like Sir Henry Dryden, who had so carefully studied the subject. With respect, however, to the hanging of the doors, he did not see that there was any necessity for them to have been hung on the inside; they might have been suspended in the middle, like the swing-doors of the present day.

THE CITY TERMINUS OF THE CHARING CROSS RAILWAY.

At the Institution of Civil Engineers on March 31st, the paper read was on "The City Terminus Extension of the Charing-cross Railway," by Mr. John Wolfe Barry.

This line was authorized by Act of Parliament, dated June 28th, 1861, and the works comprised (1) a bridge over the river Thames, (2) the Cannon-street Station, and (3) viaducts south of the river, for connecting the bridge over the Thames with the main line of the Charing-cross Railway.

The bridge over the Thames, the writer said, had been constructed to carry five lines of way from the south abutment to the pier next to the Middlesex shore, at which point the five lines branched out, and were connected with nine lines of way in the station. There were two footpaths, one on each side of the bridge, intended for the use of the public on payment of a small toll; but they had not yet been opened for traffic. The extreme length of the bridge between the abutments was 706 ft. This length was divided into five spans, the two side openings being each 125 ft., and the three centre openings being each 136 ft. in the clear on the centre line. The width of the straight portion of the bridge outside the railway parapets was 80 ft., and the width of the railway portion between the inside parapets was 61 ft. 8 in. The span, which extended over the Middlesex opening, was widened out to 202 ft. at the abutment, and accommodated, in addition to the lines of way, portions of two passenger platforms, engine sidings, foreman's offices, &c. The height of the soffit of the bridge above Trinity high-water level varied from 24 ft. 8 in. at the abutments to 25 ft. 4 in. in the centre span. The object of this arrangement was to prevent the bridge appearing depressed at the centre. The height of the rails above the soffit of the bridge was 9 ft. 10 in.

The southern abutment was built on cast-iron caissons, sunk side by side, partly by means of divers working in helmets, and partly by dredging inside the caissons with a hag-and-spoon dredger. In the case of the north abutment, neither caissons nor cofferdams were used. Short lengths of ground were excavated at low water, a small "stank" dam of clay was employed, and the water being pumped out as the tide ebb, the excavation was continued and the footings were got in. The piers were each formed of four cast-iron cylinders, placed in a line at right angles to the longitudinal axis of the bridge, and connected by two wrought-iron transverse girders at the top. The outside diameter of the cylinders was 18 ft. below and 12 ft. above the bed of the river; a conical reducing ring being introduced to effect the junction between the two diameters. The cylinder plates were fluted from 5 ft. below Trinity high-water mark up to the level of the ornamental cap mouldings. In sinking the cylinders the bed of the river was first smoothed by dredging; then the two bottom rings, together 13½ ft. in height, which was equivalent to the greatest depth of water at low tide, were put together on timbers, between strong timber guides, exactly over their destined position. This portion of the cylinder was next raised by a travelling crane so as to permit the removal of the supporting timbers, and was afterwards lowered into position. A third ring of plates was then added, and a hag-and-spoon dredger was employed inside the cylinder, to take out the mud and gravel. As the cylinder descended additional rings were bolted on until the London clay was reached, when the sinking was continued by ordinary excavation until the final depth was attained, which was from 59 ft.

to 6½ ft. below Trinity high-water mark. The cylinders were filled with Portland cement concrete up to the level of the bottom of the reducing ring, and on this brickwork, also in Portland cement, was carefully built for the full height of each column, being capped with large bed-stones 2 ft. thick. Each of the cylinders was weighted at the testing-line with 850 tons of iron. This weight was calculated to represent the dead weight of the structure above that line, a rolling load of 1 ton per lineal foot for each line of way supported by the cylinder, and a moving load on the footpaths. The order to remove the load was not given until it was ascertained that no subsidence had taken place for seven days. The greatest subsidence under the full test load was 2½ in., and the least ¼ in. The heaviest weight on the London clay at the bottom of any of the cylinders was 5¾ tons per superficial foot, with a rolling load as stated; and the heaviest weight on the brickwork in the cylinders was about 9 tons per superficial foot.

The particulars were next given in detail of the bed-plate girders, of the outside main girders, and of the intermediate main girders. The girders for the two side openings were independent of the other spans, but those for the three centre spans were continuous over the three openings. The flooring of the bridge was composed of flat plates of wrought-iron ½ in. thick, which were riveted to the top flanges of the main girders, and were further strengthened by angle or T irons; for as the floor of the bridge formed the station-yard, and was occupied by cross roads, as well as by the through lines, it was necessary that it should be capable of carrying the rolling load in any direction. Upon the flooring plates asphalt was laid, which was covered with an average thickness of 5 in. of ashes, as ballast, and on this the ordinary permanent way was placed.

The piers of the bridge, from the bottom of the cylinders to the bed-plate girder, contained in all about 2,500 tons of cast and wrought iron. The superstructure contained about 4,200 tons of wrought-iron in girders, floor-plates, &c., and about 1,100 tons of ornamental castings. The cost of the Cannon-street bridge, including the abutments, signal bridge, and all things connected with the work, with the exception of the permanent way, signals and signal apparatus, gas and water mains, amounted to 193,000*l.* This sum gave 2*l.* 15*s.* as the cost per superficial foot, and 250*l.* per lineal foot, or 50*l.* per lineal foot for each line of way, including the fan and footpaths.

The length of ground occupied by the Cannon-street Station, between the river Thames and Cannon-street, was 855 ft., distributed as follows:—The forecourt was 90 ft. wide, the booking-offices were 85 ft. wide, and the length of the covered portion of the station south of the booking-offices was 680 ft. The width of the station outside the walls was 202 ft., and inside the walls, at the platform level, it was 187 ft. The whole of the station was built on a sub-structure of brick piers and arches, excepting the booking-offices and the part which was over Upper Thames-street. At the crossing of this street, which passed underneath the station at about midway of its length, wrought-iron girders were used. Openings were left in all the piers to allow tramways to be worked throughout the basement if necessary; and provision had been made in the arches for an hydraulic lift to raise and lower the wagons. The cross openings north of Upper Thames-street were mostly carried up through the springing of the large arch, and were groined into it. The groining, which was 27 in. thick, was built in Portland cement, and the keystone was of Bramley Fall. It was adopted in consequence of the height of the ground not allowing communication between the different main archways, by transverse arches below the springing of the large arch. Without intercommunication the value of the vaults would have been commercially much diminished, and they would not have been available, as they were now, for parcels offices, stores, and railway purposes. The station walls were almost entirely of brickwork in mortar,—the only exception being the arch over Upper Thames-street, and a few courses at the top of the walls, which were laid in cement.

The main trusses of the roof consisted of segmental ribs with a tie-bar looped up. The clear span of the trusses was 190 ft. 4 in. The rise of the rib at the centre was 60 ft., and the rise of the tie-bar was 30 ft. The truss was, therefore, 30 ft. deep at the centre. The particulars of the different members were then

given in detail. The ordinary distance from centre to centre of the trusses was 33 ft. 6 in., being the same as the distance between the centres of the piers of the substructure. In crossing Upper Thames-street, however, the distance apart was increased to 35 ft. 1½ in., in order to suit the abutments of the bridge over that street. The weight of a single truss was 47½ tons. The parts of the roof not glazed were covered partly with zinc and partly with slating. A lantern, 22 ft. wide, extending nearly the whole length of the roof, was glazed on the top, and had the sides fitted with louvres, which afforded means of ventilation. Two movable timber stages, designed by Mr. J. Phillips, were used in the erection of the roof. One was as high as the top of the segmental ribs, and was employed in the erection of the trusses; the other was smaller, being low enough to pass under the tie-bar, and was used for painting, glazing, and finishing. The cost of the roof of the Cannon-street Station had amounted to 491,10*s.* per square of 100 superficial feet of area covered, measured between the walls. The cost of the roof of the Charing-cross Station was 39*l.* per square. In both instances the price of iron was high, the contract price for wrought iron in place in the roof being 24*l.* 5*s.* per ton.

The cost of the works of the City Terminus Extension was 505,336*l.*, and of the whole Charing-cross Railway, including the extension, 1,160,118*l.*; or, including land, somewhat more than three millions sterling. In this sum, it was to be remembered, were included about 4½ miles of railway for a double line, two large bridges over the River Thames, a considerable number of expensive street bridges, and two of the most extensive metropolitan termini. The importance of the traffic, which was not at present fully developed, might be gathered from the fact that, during the year ending the 1st of January, 1868, being the first year since the City Terminus Extension Railway was opened, about eight million passengers used the Cannon-street Station, of which number about three millions and a half were local passengers between Cannon-street and Charing-cross. At the present time about twenty-six thousand passengers used the Cannon-street Station daily, and the South-Eastern Railway now conveyed about fifteen million passengers annually.

THE TRADES MOVEMENT ABROAD.

The Strike in Geneva.—It appears that the strike of the Genevese working builders has been met with a lock-out on the part of the masters. In a letter addressed to the workmen by the committee of masters, dated March 28, they say the firms in the building trade will be under the painful necessity of closing their establishments to-morrow. The working masons, stone-cutters, and plasterers have completely left their workshops. But few of the working mechanics, founders, and locksmiths are at work, intimidated by those who have organized the strike. Under these circumstances there is a general stoppage in the building trade.

The chairman and hon. gen. secretary of the International Working Men's Association in London say, in respect to this strike and lock-out:—

"As the promoters of the International Working Men's Association never entertained the idea of establishing an international medium for the settlement of wages disputes, the general council has never yet been appealed to for advice, and has, consequently, no opportunity of investigating or provoking strikes. According to rule 11, every society joining prescribes its existing organization. Hence it follows that every affiliated society manages its own special affairs without any reference whatever to the International Working Men's Association. Strikes were condemned on principle by the Geneva Congress; co-operative production was declared to be the only means to a permanent solution of the labour question. At Lausanne, the discussion of the question of the course of arbitration was recommended, with a view of putting a stop to strikes. The association, as such, never interferes in trade matters; but it uses its influence, when appealed to, in cases of strikes and lock-outs, to prevent the workmen of one country being used as industrial mercenaries against the workmen of another, and, in cases of need, it solicits pecuniary aid. So far from the general council having had a hand in the getting up of the Geneva dispute, it was not even aware that the building trades were trying for a rise until, on the 3rd of March, a notice to that effect, published in the *Voix de l'ouvrier*, was announced in the regular weekly meeting."

They also state that, in January last, the men appealed to their employers for an interview to discuss their grievances. The employers never answered their application, but set to work to form an association for their own purposes. In the mean time the men of each trade made out a "log," demanding a rise of about 10 per cent.

upon their wages, and a reduction of the hours of labour from twelve to ten per day. After the condemnation of the Paris committee, the masters broke their silence, and told the men that they would not employ them on any terms unless they renounced their connexion with the International Working Men's Association.

The Belgian Disturbances.—In the Charleroi district the colliers are idle, and have come into collision with the military. For an extent of several leagues the coal-mines, factories, and furnaces are almost abandoned. The workmen complain that, while the masters wish to reduce wages, they will not lower the price of coal, immense quantities of which are lying at the pits' mouth. Hopes are entertained that nothing serious is likely to recur, but the miners are exasperated against certain individuals; and a cavalry major, who was obliged to order his men to fire on the mob, is in particular threatened.

ST. THOMAS AND THE MAURITIUS.

I ENCLOSE you a paragraph cut from the *Liverpool Mercury*, relative to the dangerous and unhealthy state of St. Thomas, in the West Indies. The Government and the Royal Mail Company have incurred a fearful amount of responsibility and odium in consequence of allowing that island to have been used so many years as the central packet station, and which has been attended with so serious a loss of human life amongst that peculiarly valuable class of men, "our true British tars," who can be so ill spared from our mercantile fleets.

I have known this island ten years, and it would be interesting and instructive to know how many of "our hearts of oak" have been sacrificed in that hotbed of disease during that time. If any patriotic and humane M.P. would move in the House of Commons for a return upon the subject, he would render a benefit to his country, and I think there would be no difficulty in ascertaining the number of men lost in the steamers and vessels employed in the mail service. Its amount I am sure would rather astonish the country.

I have heard of as many as thirty men having been sacrificed in one vessel from yellow fever, while lying there a fortnight for the return of intercolonial mails, and of serious loss from other vessels; and if our marines is to be decimated in this way at unhealthy stations, we may well complain of the scarcity of able seamen. Most opportune and useful questions have been asked in the House of Commons relative to the fever which prevails at the Mauritius, and the answers given have been neither assuring nor satisfactory.

From a seven years' residence in tropical countries, I can unhesitatingly say that, with ordinary care, precaution, and forbearance, an Englishman will enjoy as good health there as in this country, even without the use of the nostrum "quinine;" as, during the time I was there I scarcely tasted it, and did not feel the need of it.

Of course, residents there must conform to the customs of the country and the necessities of the climate, which are somewhat opposed to those of this country; and if they are free livers, they cannot with safety give full scope to their favourite propensities.

In our tropical colonies generally efficient sanitary improvements are little thought of; sewerage is not approved, as drainage on the surface is preferred, with a few exceptions: at the houses cesspool abominations extensively prevail; and one cannot wonder when these objectionable and noxious practices exist in hot climates, that yellow and other fevers, cholera, &c., ride rampant over almost every one, particularly those not thoroughly acclimated.

If disease be rife, they appoint additional medical officers, it is true, and plant the yellow flag at the doors of the houses to warn the unwary; when if it were not for the colour of the flag, the streets would often look like being

* *A Fever-stricken Ship.*—Information has reached the Type of a sad calamity which has overtaken a Newcastle vessel, the *William Miles*, at St. Thomas, West Indies. Within the last two years an alarming number of Tyne shipmasters and seamen, whose vessels have taken course out to the mail-packet station at St. Thomas, have died of yellow fever, and the intelligence which has reached the owners is that Mr. William Folland, a Shields man, the master, and six of the crew of the *William Miles*, have been carried off by yellow fever, while nine more of the crew were at the time the letter was sent off lying ill of the disease in hospital.

checked out for a festival; but they do not strike at the root of the evil, the cause of this disease, which I firmly believe is of as easy remedy as in this or any other country.

I have no doubt if a competent sanitary engineer and medical officer were sent out to the febricitans, they would find almost a total disregard of even the commonest rules and regulations for the preservation of the public health; and the time has arrived when I think active steps should be taken to improve the sanitary state of the cities and towns of our colonies, in a broad and comprehensive scale, similar to the one so advantageously carried out in this country.

It must not be left to the colonists themselves; they, like many of our town magistrates here, are reluctant to introduce any change or improvement, particularly if it be likely to touch the pocket; the ruling authority, to make things less, does not like to place itself antagonistic to them, and the consequence is, when disease visits their towns are almost exterminated or depopulated.

I have visited many of the most unhealthy of the cities and towns of the tropics in the western world, and, after a careful inspection of them, I have not seen one but in which the laws of sanitary science are abused or fearfully neglected, and there is not one of them, I confidently believe, but is capable of being made as clear and healthy as any place in this country; in fact, I would venture to undertake and guarantee to make them so at a very moderate expenditure. If the remedy be so easy and close at hand for those "ills that flesh is heir to," as the poet says, let us at least endeavour to modify and relieve the sufferings of poor humanity.

B. B.

A NUT FOR THE PROFESSION TO CRACK.

Your journal, I am aware, is addressed to the architect, engineer, operative, and artist, though I have not the honour of belonging to any of those classes, I take sufficient interest in it to be a "constant reader" of it. I do not know whether you will allow me to offer a remark that may be of some importance to at least one of the favoured professions.

I can quite confirm the remarkable discovery made by "J. P. S.," that non-professional men are frequently irreverent enough to speak of architects in the way that he quotes,—"Oh, one fellow runs us into such expenses!" But think I can relieve his fear that "the cause is deep in the English mind, in the utter ignorance of art from the affairs of practical life." Were this the real cause the case would indeed be lamentable; for, as English architects are presumed to have English minds, our only chance of securing an architect who united artistic taste with practical knowledge would be ways to employ a foreigner.

The cause, I believe, lies simply in the extraordinary and unreasonable way in which the remuneration of architects is calculated,—that by a charge of 5 per cent. on the amount that they induce their clients to spend in building. For instance, I may be prepared to spend 3000l. in building a house. I may be quite willing to pay my architect 3000l., and I by no means think this would be too much, if he really gave a constant superintendence to the work; but I may not be at all willing to be drawn out an expenditure of 6000l., in order that my architect's fee may amount to 3000l. I doubt it may be said that all architects are not only honourable, but disinterested, and, invariably prefer their clients' interest their own. Be it so; but why expose them to constant temptation, and to the inevitable suspicion of acting in a contrary manner? No similar practice exists in other professions. I do not pay my doctor by a percentage on my baggage's bill, nor my solicitor by a percentage on the amount he can spend in retaining counsel. We may look at the humbler ranks of life, we do not pay our housekeepers by a percentage on the butcher's bill, nor our butlers by a percentage on the wine-merchant's. Yet all these employments would be just as reasonable as the system of paying architects by a percentage on the builder's bill. So long as that system continues, long will people avoid employing an architect, they can possibly help it.

The reason that there is no public movement against this system is that most men have nothing to do with architects, and few employ

them more than once or twice in a lifetime, when their natural tendency is to get over the disagreeable necessity, and to have done with it, as in dealing with an undertaker. But there can be no doubt that the practice of building without an architect is increasing, and that the Greek is being supplanted by the English synonym, the "architect" by the "master-builder." A neighbour of mine is building a house of the value of 17,000l. without an architect. And I have heard that Oshorne was built without an architect, the cause of which, no doubt, was "the utter severance of art from the affairs of practical life in the English mind" of the late Prince Consort.

I have no doubt that such considerations as I have submitted have occurred to many architects. But the system is too strong for individuals to break through: convention heats them down. However, I believe it will be well for the Institute to take into consideration the subject of professional charges, lest, while strictly upholding the etiquette of the profession, they may find that they have little work for the etiquette to operate upon.

A COUNTRY GENTLEMAN.

THE BED OF BUILDING STONE.

In the letter from Mr. A. J. Hiscocks on this subject in your last number reference is made to a recent communication made by me to the Institute of British Architects, in which I considered among other matters building materials and their use. I did not then enter into detail, and little was said either in the paper or in the subsequent discussion on the special point now in question. I fear the space that could be spared in the *Builder* would not be sufficient to discuss it thoroughly, but I will take an early opportunity of putting before the profession such suggestions and explanations as I am able. It is a subject of some difficulty and of vital importance.

Meanwhile, assuming that every architect and builder understands in some measure the law and method of stratification by deposit from water, and the history of the passage of stratified layers of mud into stratified layers of stone, I think it will be perceived that enormous mechanical pressures must have been brought to bear at some time or other on all stones; and, I believe, that in determining the direction of pressure will be found the practical solution of the problem.

The natural bed of a stone originally, and before it has been upheaved and brought to the earth's surface, is clearly the plane of stratification. The original zenith of the stone must then be the zenith of the place where it was first deposited. But after upheaval the case is different. In fissile roofing slate, where the squeezing has entirely masked the original stratification, the bed of the stone is the cleavage plane, and the zenith a point vertically above the plane of cleavage.

In intermediate stones the problem is mixed. No doubt the microscope properly applied would afford a very useful key, but the application for practical purposes would not be easy. Whether also a stone turned inside out would answer its purpose in building, as well as a skin in resisting water, is a different matter altogether.

D. T. ANSTED.

MACHINERY FOR JOINER'S WORK AND THE REDCLIFFE ESTATE.

Sir,—The leading article in the *Builder* of the 21st ult., showing the great saving in labour effected by the employment of a few of the most modern machines for joiner's work, has caused a great many builders to visit our works, as well as those of Messrs. Corbett & M'Clymont, in order to verify by personal observation the statements contained in the article in question.

As, however, many builders have taken exception to the statements in the article, on the ground that the time occupied in finishing the joiner's work, after leaving the machines, is put down at 6d. per hour, we beg to offer a few words of explanation on this point.

It is of course well known that the ordinary wages of skilled joiners in London is 8d. an hour, which is the rate paid by Messrs. Corbett & M'Clymont to their joiners; and, as a matter of fact, the rate quoted in your article is considerably in excess of what is paid for putting together and cleaning off the work after leaving the machines; for as all the operations requiring the greatest amount of skill are done at the machines, the putting together and cleaning off is done by apprentices and improvers, whose wages certainly do not average more than 20s. a week. The work turned out by the machines being all of an uniform width and thickness, and the various parts being planned up perfectly true and square in the trying-up machine, the time and skill required to finish it are infinitely less than where

the stuff is all prepared by hand; and those who doubt whether the joinery prepared at the cost given in your article is equal in quality to hand-work prepared entirely by skilled joiners, at the full wages of 8d. an hour, can easily satisfy themselves on this point by availing themselves of the kind permission of Messrs. Corbett & M'Clymont to visit their workshops, and inspect the joiner's work upon the Redcliffe estate.

SAMUEL WORSSAET & CO.

"THE ROYAL ACADEMY AND THE ARCHITECTURAL EXHIBITIONS."

Sir,—In answer to the letter in last week's *Builder*, on this subject, signed "Adelphi," I beg to state that for some years past, through the courtesy of the secretary of the Royal Academy, some of the hanging committee of the Architectural Exhibition have annually been allowed to inspect the rejected architectural addresses, and have obtained from them some few. I regret to say very few, good drawings for their exhibition, which, from want of space or other reasons, the Royal Academy committee have been unable to hang on their walls. Your correspondent is in error in supposing that the hanging the works of the rejected Academy drawings would contribute to the success of the Architectural Exhibition; and also when he hints that the representation of modern architecture has been almost entirely left in the hands of the junior members of the profession, as he will see by reference to some of the earlier and later catalogues.

The time required for selecting, hanging, and cataloguing the drawings, necessitates their being sent in early in April, in order that the Exhibition may be opened early in May, the time found to be most advantageous for the opening thereof.

If the profession generally would recognize the Architectural Exhibition in the way that they ought to do, seeing that the space allowed for architecture is at the present so limited at the Royal Academy, and would send drawings of their works, we doubt a much better exhibition might be made; and with such, the interest of the public, a very important element in the success of any exhibition, be secured. If "Adelphi" will visit the opening Exhibition, I can venture to assure him that he will find considerable progress made.

ROBERT W. EDIS.

WORKED STONE AND THE MASONS' UNION.

A BUILDER writes:—

"Sir,—At the interview that representatives of the trade unions, including the masons' society, had with Mr. Gladstone in London, Mr. Gladstone asked the question, if a sale, only worthy of savings, was in existence, prohibiting worked stone from being sent from the quarries into the towns. This they most emphatically denied.

Perhaps Mr. Potter, or the secretary of the masons' society, will please explain the discrepancy between the treatment I have just received and their answer to Mr. Gladstone's question.

We have a rule in Manchester, that worked landings shall be introduced. As the only difference between steps and landings is the width, and I wanted about 3,000 feet, and had only a very short time allowed for the work to be done, I thought I should be quite within the rule to order these steps worked on one side at the quarry, time being more an object than a saving in the cost. The masons' delegate pays me a visit, and informs me that it is against the law, and that I must at once promise to desist from bringing any more, or the men would be drawn from the work. However this may surprise the public, it will not surprise your readers that I had to submit to this tyrannical interference with the management of my business.

I have a large contract on hand at the present time that is precisely similar to one that is going on in London, and the stone comes for both jobs out of the same quarry. The proprietor of that quarry sends all the stone for the London contract worked, and he applied to me to do the same. As the London contract was six months in advance of my contract, he was very well acquainted with all that was wanted, and would have executed the order in the most satisfactory manner. The price at which he proposed to do the work, compared with what it is costing me, would make a difference of 5000l., and I must say that, as a free-trader, I feel it a very great hardship that I cannot go to the same market as a London builder to buy either my material or labour.

E. J."

STAINS ON WHITE BRICKS.

Sir,—Will one of your readers inform me of a receipt for removing the stains off white Suffolk bricks, caused by the rain running off the window-sill? A. E.

METROPOLITAN BOARD OF WORKS.

At the usual weekly meeting of this Board a report was brought up from the Works and General Purposes Committee, which stated that three inhabitants of Streatham secured Tooting-common as a place of public recreation for the inhabitants of the metropolis, at a cost of 10,000l. At a public meeting of the inhabitants it was resolved that the Metropolitan Board should be requested to purchase all the rights in and to the common as soon as the parties owning the manor could at their own cost obtain the approval of the Court of Chancery for the sale of their interest in it. These parties sought no advantage for themselves, and were content simply to be reimbursed the outlay of 10,000l. and any further costs and charges they might necessarily be put to. The report recommended the Board to complete the purchase. The motion was unanimously agreed to. The chief engineer (Mr. Bazalgette) presented his monthly report on the progress of the Thames Embankment works. It was similar to the report presented at the last meeting, and reiterated the promise that the main and approach footways on the northern side will be opened to the public during the approaching summer.

SCHOOLS OF ART.

The Wolverhampton School.—A meeting, to which the leading manufacturers of the town and some of the friends of art had been invited, has been held in the committee-room of the Town Hall, "to consider the best way of furthering the interests of the school, and to carry out the suggestions of the Government in reference to technical education." The Mayor presided, but, despite the attention which the subject of technical instruction is receiving at the present time in other places, the invitation was by no means numerously responded to. Captain Lovelidge (who has for the last few years been the chief supporter of the school) said the committee had resolved to call the meeting to consider whether it was not possible in some way to rescindate the school and put it in something like a prosperous state. It was remarkable that in a district like this, with such a superior building, there should be only about 50 pupils, while the schools of Dudley, Stonbridge, Kidderminster, smaller towns than Wolverhampton, were in a state of prosperity, and while Birmingham school had 1,000 pupils, with others who were clamouring for admission, but for whom there was no accommodation. A resolution was passed to the effect that the meeting was of opinion that further exertion is necessary for the purpose of making the school more generally known among the artisan population of the town and neighbourhood, and that the heads of trades and manufacturers and schools, as well as the professional classes, be requested to use their influence so as to increase the number of pupils for instruction in various branches of practical art. The committee of the school were requested to adopt such measures as to them might seem necessary for carrying out the resolution.

The Wakefield School.—Mr. Walter Smith, head-master of this new school, which has been opened in connexion with the local Fine-art and Industrial Institution, recently delivered an address on art education to those interested in the subject. The classes of the school have commenced, and the address was intended to open out the subject of art education, its history, present condition, and objects, to the people of Wakefield. There was a large audience. Around the walls were hung specimens of the art examples which have been obtained for the use of the classes. The chair was occupied by the mayor, Mr. W. H. Lee, who on rising said it was a great satisfaction to the promoters of the local exhibition that the encouragement given to it by the public left them a handsome surplus—no less a sum, indeed, than 3,000*l.*, or a little over.

The committee were anxious that this sum should be devoted to something that should perpetuate the objects for which the exhibition was first promoted; and it was ultimately determined that a school of art and a museum should be founded in the town, and he was now happy to say that that school had been established in eligible premises, that had been purchased and fitted up for it. They had placed the institution in connexion with South Kensington Science and Art Department, and had secured the services of Mr. Smith, who had long been connected with art education, and who had shown a special interest in the promotion and encouragement of schools of art in different parts of the kingdom. Mr. Smith's name was well known, and his talent in this direction was acknowledged. The mayor added that he need not point out that it would be difficult to keep our position among the nations unless we amend our system of primary education, and also give to those who have gone through it opportunities for further improvement. It was for this object that they had determined to establish this school of art, and they should be glad if their efforts were appreciated by the town generally. Mr. Smith, in his lecture, explained what it was intended should be done in that new School of Art. The mayor had referred to the cause of the recent cry that had been heard for technical education. Now, what was meant by this phrase? In the first place he might say that, contrasting it with general education, it is the process by which a human being acquires the power of learning a trade or a profession by the acquisition of knowledge—the formation of the habit of thinking correctly, and reasoning with accuracy. Technical education is the direction in a particular channel of this acquired power. General education is a training of the mental faculties, as gymnastic exercises prepare the body physically, while technical education proceeds on the basis of general knowledge to develop the senses, to sensitize the natural powers, and

to open out the special abilities of the individual in the particular direction in which they are required. Technical education stands as a connecting link between learning and labour, and, by uniting the two, confers what is necessary to all success—theory and practice in their true relations of learning saving labour, and practice rectifying, correcting, and testing theories. Thus, then, technical education ought to be directed to qualifying the student for the particular trade or profession it was intended he should pursue; and, looked at in that light, it embraced the studies pursued in a school of art as well as in science classes. The lecturer then glanced at the progress of art education in England; the importance of the knowledge of drawing to working men; and spoke of the Wakefield Industrial and Fine Art Institution, and the new school in connexion with it. Other towns, he remarked, had preceded Wakefield in establishing Schools of Art or Science Classes, but no other town—not even London, had deliberately set to work to bring both art and science, picture-gallery and museum—the active and present influence of direct teaching and the passive influence of galleries and scientific collections—under one roof and under local management.

CHURCH SERVICE STOPPED BY MOTHS.

A REMARKABLE plague of moths fell upon Sydney and St. Leonard's, Australia, last autumn. The Rev. W. B. Clarke, writing from the latter place under date of October 10th, 1867, says the moths first appeared in the church on the 14th of September, and for a month from that time had gone on increasing in numbers; and, although several bushels had been destroyed, the army was undiminished. On Sunday, the 6th of October, the state of the church was such, from the accumulated dust from the moths' wings, and the incessant swarms that were continually flying through the building, that divine service could not be held therein. More than seven days' hard labour had been spent in vain endeavours to subdue them; and applications of the strongest ammonia, sulphur-smoke, and other contrivances, used for hours, failed to drive them away; for as fast as one swarm was partly destroyed another succeeded. The neighbouring ground and trees were full of them; and when driven away, they mustered again and again. On the 10th of October, Mr. Clarke counted 80,000 on the windows alone; and in the tower and below the floor he calculated there were many millions.

A similar plague visited Australia in 1851, and again in 1855. From specimens forwarded to this country, the creature is ascertained to be the "Boogong" or "Cnariogon" moth (*Agrotis syntina*). It is eaten by the aborigines, either baked in the ground or pounded into a paste for cakes.

STATE OF THE BIRMINGHAM WORKHOUSE.

THE local guardians, by a majority of twenty-two to thirteen—there were only thirty-five guardians present out of a total of 108—have resolved to build a boys' school only, at an estimated cost of 7,500*l.*; whereas last year complete schools for boys, girls, and infants were to have been built for 23,000*l.* The majority of twenty-two rescinded the previous resolution in favour of complete schools. The Poor Law Board, however, has yet to be consulted as to the new plans, and being decidedly in favour of the former arrangement, as our authority the local *Journal* remarks, the Board will not readily allow the guardians to recede from it, especially as the vote just come to was carried by only one-fifth of the whole number of guardians. Besides, the Poor Law Board may possibly find in the discussion as to the schools another reason for interfering—namely, the state of the workhouse. Dr. Barratt, a guardian and medical man, gave the following account of the workhouse:—

"It was overcrowded all through. There was not a single classification that would meet the requirements of the Poor Law Board. The inmates were sleeping on the floor, two and three in a bed. The infants' department was a disgrace to a civilized community. The girls' department was the only one in which there was any approach to comfort, and a new bedroom was required there at once. The infirmary was overcrowded; the surgeon did not know what to do with the cases. It was the same with regard to the imbeciles and epileptics."

Mr. Jones, the late chairman of the Board,

added something to this statement. He said that "the dining-room was occupied by what were called the 'sore-leg cases.' This was a most improper arrangement, and must be altered. The epileptics were wandering about the house instead of being confined to wards of their own."

Mr. Clay, a medical man, and one of the visitors to the workhouse during the last month, corroborated and even strengthened the remarks of previous speakers:—

"He must say that many portions of the house were in a most disgraceful state. In the lying-in ward the cubic space for each patient were 450 ft. less than it ought to be. In the epileptic ward there was not half the cubic space there ought to be for the number of inmates. In the bad-leg wards and the infirmary the beds were too numerous. The House could not be sufficiently relieved without adopting the old plans [for the schools]. This would render further building unnecessary for many years. He saw two and three children sleeping in a bed the last time he was at the workhouse."

Some of the so-called economists having denied certain of these statements, Dr. Barratt replied, "What I state is true, and, if driven to it, I may go considerably further."

The Poor Law Board will do well to institute an immediate and public inquiry into the state of the workhouse.

Books Received.

The Year-Book of Facts in Science and Art. By JOHN TIMBS, F.S.A. London: Lockwood & Co. 1868.

THE new volume of this serial contains a portrait of Sir Samuel W. Baker, accompanied with a pithy and interesting memoir of this distinguished traveller. Mr. Timbs has, with his usual discrimination and zeal, gathered and pressed in between his green covers a large number of facts exhibiting the most important discoveries and improvements of the past year.

Works in Terra-Cotta manufactured by John Marriott Blashfield, Stamford, Lincolnshire. Parts 1, 2, 3.

As a trade book Mr. Blashfield is issuing illustrations of numerous architectural details of which he has moulds,—chimney-shafts, chimney-pots, balustrades, parapets, and so forth. Part 3, just now published, is particularly interesting, including numerous doorways, windows, balconies, copings, plinths, terminals, consoles, and panels. Mr. Blashfield claims that his terra-cotta is made from the finest pottery clays, carefully ground and amalgamated with calcined flint, felspar, glass, and other substances, and brought into a stiff paste. After the terra-cotta articles have been modelled and moulded with this body they are dried in a warm building and then placed in a pottery kiln and burnt. The degree of heat required to thoroughly burn or partially vitrify the ware is equal to that obtained in the firing of porcelain. For all large thick pieces of terra-cotta the heat should be prolonged several days, so that the masses of material may be thoroughly fired to their centres. Many of the imitations of ancient terra-cotta work now offered to the public are little better than kiln-fired common clays, and will soon moulder and crumble to dust. So many works have been produced by this maker during the past twenty years,—including balustrades, Stafford House; frieze and capitals, Duchy of Cornwall Office; large vases and terminals, Buckingham Palace; statues and fountains, Sydenham; terminals for the Royal Italian Opera House; cornice, capitals, panels, &c., London and North Western Station, Broad-street, London; and the architectural dressings and details, Sun Fire Office, Charing Cross;—that it cannot be difficult to test the goodness of his ware.

Rating of Railways. By EDWARD RYDE, Surveyor. London: Cassell, Petter, & Galpin. 1868.

THE little pamphlet before us is, it seems, to form part of "A Handy-Book, in a Series of Letters," wherein Mr. Ryde intends treating of various professional subjects, such as land measuring, levelling, compensation cases, parol assessments, rating of water companies, light and air questions, and so on; and as each letter will be complete in itself, and there is some uncertainty as to the time within which the whole of them may be finished, those which possess special interest will be published in pamphlet form from time to time.

In the letter before us the accepted mode of

ing railways is set forth clearly and com-
pensively, cases which establish the various
points being quoted. Mr. Hyde has had plenty
experience personally, and speaks with
authority.

VARIORUM.

“BOARD of Works for the Limehouse District: Report of Medical Officer of Health for the Year ending Lady-Day, 1867.” This is virtually a re-
cense on the causes of cholera, one chief ob-
ject of the author, Dr. Orton, being to disprove
the truth of the conclusion that foul water pro-
cesses cholera. — “Board of Works, White-
chapel District. Report on the Sanitary Con-
dition of the Whitechapel District for the
year ending 28th December, 1867. By John
Fiddle, Medical Officer of Health.” The rate of
mortality in the Whitechapel district for the last
year was 24 per 1,000, or 1 in 41 of the total
population; and indeed, including the London
hospital, it was 29 per 1,000, or 1 in 34 of the
population. — We find a trade pamphlet,
amongst those before us, descriptive of Herring
Son’s self-acting apparatus for warming build-
ings, manufactories, &c. The apparatus is
worked in connexion with a high-pressure steam-
engine, and it is self-acting; and, apart from
the cost of working the engine, which is not
supposed to be erected for that purpose, there is
no cost connected with the working of the
warming apparatus; the hot water being sup-
plied from the waste water of the engine-boiler
and returned to it again, so that the water sup-
plied to the engine becomes pure distilled water,
avoiding all encrustation of the boiler, and
saving fuel by the supply of water already
heated. — “Report on Health of Liverpool.”
The report of Dr. Trench, the Liverpool medical
officer of health, has been issued in a printed
form. The death-rate of the borough for the
last year was 23·4 per 1,000, or 3 per 1,000 less
than the average during the previous ten years.
The following particulars refer to the overcrowd-
ing of houses during 1867:—

No. of rooms found overcrowded at night.....	1,261
Total cubical area of the above rooms.....	974,758 ft.
No. of adults found sleeping in the said rooms.....	4,595
No. of children below fifteen years.....	2,430
Average cubical area for each individual.....	157 ft.
Average cubical area for each adult (in- cluding therein two children under fifteen years as one adult).....	230 ft.

As our readers know, this is an evil which the
corporation and its able medical officer are
actively engaged in mitigating, as also is the
hidden and privy system. In 1867, the local
health Committee ordered the conversion of
3,371 privies into water-closets.

Miscellaneous.

TECHNICAL INSTRUCTION: MR. WHITWORTH’S
MANIFEST OFFER.—Mr. Whitworth has offered
to found thirty scholarships of 100l. each for the
promotion of education in engineering and
mechanical science open to competition amongst
all natives of the United Kingdom; and his
splendid offer has been accepted by the Depart-
ment of Science and Art. Mr. Whitworth will
manage the proposed trust during his lifetime,
and the President of the Council of Education
hereafter. This must be equivalent to a gift to
the nation and to science of no less than
300,000l. The Lords of Council on Education
suggest that technical instruction will be
rendered easy if the magnificent example set by
Mr. Whitworth shall be extensively followed by
others.

MR. HENRY LESLIE’S CONCERTS. — The last
two have been particularly successful. At the
concert on the 2nd there was a medical certifi-
cate instead of Mr. Sims Reeves, and an ap-
ology for Miss Angelo; but Mr. Hallé was so
perfect, and the choir sang so charmingly, that
every one was satisfied. Mr. Cummings took
the place of Mr. Reeves, and sang with so much taste
and excellence, that all forgot to be disappointed.
Mr. Cummings is deservedly rising high in
public estimation. On the 6th the concert con-
sisted of sacred music. Mr. Sims Reeves was in
admirable voice, and never rendered with deeper
pathos and more perfect expression the recitative
from *Uphthah*, “Deeper and deeper still;” and
the exquisite air “Wafe her, ye angels;” and
Leslie’s fine trio, “Love, gentle, holy, pure,” by
Fiddle, Carola, Madame Gardloni, and Madame
Lately-Whytack, was beautifully sung. These
concerts will be resumed on the 29th inst.

CIVIL SERVICE ESTIMATES.—The sum required
to be voted on account of the civil services for
the year 1868-9 is 15,230,479l. the votes for the
previous year being 14,190,353l. There is a con-
siderable increase in the department of public
works and buildings, the vote on account of
embassy houses showing an advance on the pre-
vious vote of nearly 26,000l.; and on account of
harbours of refuge there is an excess of 16,274l.
The Commissioners of Works in England will
require an advance on last year’s vote of 14,110l.,
for the maintenance and repair of Royal palaces.
The other principal items of increase are for
public buildings, 6,352l.; Royal parks and plea-
sure gardens, 12,198l.; public record repository,
20,580l.; enlargement of the National Gallery,
15,000l.; Burlington House, 40,000l. The Govern-
ment also requires a new vote of 10,000l. for a
natural history museum; 10,000l. for the new
Home and Colonial Offices; and 20,000l. for the
Glasgow University. There is also an increase
of 32,962l. in the estimated cost for the year of
public buildings in Ireland.

THE THAMES EMBANKMENT AND RAIL.—Some
further information respecting the Embankment
and the railway is contained in a letter which
Mr. Bazalgette has sent to the *Times*. From
Westminster Bridge to the east end of the Temple
Gardens, a length of 5,807 ft., the Embankment
is practically completed. It now only remains
for the railway contractors to cut their trench
through it from end to end, and build their rail-
way within that trench. It will then be arched
over, and the roadway formed on the top. From
the east end of Temple Gardens to Blackfriars
Bridge, a length of 853 ft., it is not proposed to
form a solid embankment; but the road will for
this length be continued upon arches up to
Blackfriars Bridge. The river will flow through
and barges will pass under those arches up to
the wharfs as heretofore, and the water space
between the viaducts and the wharfs will vary
from 100 ft. to 125 ft. in width. There will be
no connexion whatever between the works of
the railway and this viaduct. At the east end
of the Temple Gardens the railway will leave
the Embankment, and be carried close in front
of the wharfs to Blackfriars Bridge. The rail-
way and the viaduct will for this length be two
perfectly distinct works, with a wide water space
flowing between them.

THE NEW BRIDGE AT BLACKFRIARS.—The struc-
ture, it may be remembered, is to consist of five
arches, namely, two of 135 ft. span each, two of
175 ft. span, and one of 185 ft. The width of
the roadway on the bridge, including the foot-
paths on either side, will be about 75 ft., and
the average gradient will be 1 in 40. Some of
the foundations have been sunk 52 ft. below
high-water mark—in other words, a long way
into the London clay; and with respect to two
of the piers which are to occupy the sites of the
old ones the work has been necessarily tedious
and protracted, involving, as it did, the unroof-
ing of the old foundations before those of the
new piers could be laid. On the Survey side of
the river, at which the erection of the structure
commenced, the works are in a very forward
stage, much of the granite masonry being
finished, as also the ribs and ironwork of the
arches. The fourth pier, or the one next to the
Middlesex side of the river, has been raised
nearly to the half-tide level; and with respect to
the third pier the caissons have been sunk to
the extreme depth and filled in with concrete,
except the two end caissons, which are being
gradually lowered to the proper depth. Four
of the piers will be ornamented by two columns
each of polished granite, about 11 ft. or 12 ft.
high, and some of them 23 ft. in circumference.
The granite is being quarried in the Isle of Mull,
and conveyed by sea to Glasgow, where it is
adapted and polished by machinery, and re-
moved thence to London by railway. Each
column consists of three blocks of granite,
weighing from 11 tons to 12 tons each block,
and each column costing upwards of 500l. The
drawback to the structure will be the railway
viaduct on the eastern side, which will greatly
mar the appearance, running parallel with it, as
it does, at a distance of 50 ft. If all goes well
the new bridge will probably be opened to public
use about the spring of next year. On Monday
last, the chairman of the Bridge-house Com-
mittee, in the presence of his colleagues; of Mr.
Brand, the controller; and of Mr. Joseph Cubitt,
the engineer; Messrs. Thorne, the contractors;
and Mr. Bryant, the engineer of the contractors;
publicly laid the foundation-stone of one of the
remaining piers, with the accustomed ceremony.

PROJECTED IRONWORKS AT MARYPORT.—Messrs.
Gilmour, Brothers, & Co., of Glasgow, have made
arrangements for erecting smelting furnaces at
Maryport. The site they have selected consists
of about twenty acres, on the Bent Hill, west of
Norman-terrace. The plans exhibit four blast
furnaces, and it is estimated that one furnace
will require nearly 1,000 tons of material per
week, and employ perhaps 100 hands.

REPORT OF ST. PANCRAS GUARDIANS.—A report
by the chairman, Mr. W. H. Wyatt, to the Board
upon the proceedings of the guardians for the
last nine months has been printed for circula-
tion, from which it appears that some sweeping
amendments have been made in the management
and treatment of the poor. A lax system had
prevailed, and new officers were appointed to
carry out the new system resolved upon by the
guardians; and it would appear, with decided
advantage both to the really deserving poor and
to the ratepayers. They have since, however,
announced the necessity for a heavy rate, which
is exciting some commotion; but the rise of
rates is not limited to St. Pancras.

BRICK BURNING.—In the case of *Roberts v.*
Clark, before Sir W. P. Wood, as Vice-Chancellor,
it was held that where a nuisance had been of
more than twenty years’ standing, but with tem-
porary interruptions, the party asserting the
right to continue it was bound to show that it
had been exercised at least in the first and last
year of the period of twenty years, in order to
preserve it from being lost. The Vice-Chancellor
said it was not necessary to prove that any
special sickness had resulted to plaintiff or his
family from the effluvia arising from the brick-
burning, nor that the vapour was more than
usually injurious or offensive. It had been held
at law that brick-burning carried on in the
ordinary way was a nuisance to the persons
living within the limit affected by it; and it was
such a nuisance as the Court of Chancery would
restrain by injunction.

DESTRUCTIVE FIRES.—The Gilnow Cotton
Spinning Mills, Bolton, have been totally
destroyed by fire. The flames broke out while
the mills were in full operation, and in half an
hour the entire structure was brought to the
ground. All the workpeople got out in safety.
The damage is estimated at 70,000l. The
premises are largely insured.—A fire has
occurred at Eastwell Park, near Ashford, the
seat of Earl Winchelsea, producing damage to
the extent of 10,000l. or 12,000l. It broke out
in the north side of the main entrance and above
the dining-room, schoolroom, and governess’s
apartments. The roof gave way, and almost
simultaneously the expansive glass dome, and the
grand staircase fell in; the former burying the
contents of the school room and governess’s ap-
artment, and the latter a number of valuable books
and other costly property. The result of this
was that the flames were communicated to the
dining-room beneath, and valuable pictures,
some family portraits, and many articles of
vertu, together with costly furniture, were
destroyed. Great fears were entertained that
the entire mansion would be sacrificed; but
luckily the fire was confined to the dining-room
and apartments above.

RATS AND MICE.—If the police are wanting in
expertness when most needed, they make up for
it by being very expert where least needed.
They lately brought before Alderman Hale a
ratcatcher named Samuel Humm for poaching
in the sewers without leave asked or given.
He had just come up through a manhole with
thirty rats, in a bag. Alderman Hale fortunately
did not take the policy view of the matter,
and not only discharged the prisoner, as one who
was doing good by extirpating rats from the
sewers and houses of London, but also promised
to use his influence in obtaining for him a rat-
license to sport in the sewers for the future as
often and as long as he liked. We only hope
that Humm will not have a monopoly of the busi-
ness.—Certain hungry mice having gnawed
a piece of gas-piping in a house at Warrington
till the gas escaped, a disastrous explosion took
place; two persons were badly burnt, and serious
damage was done to windows, ceilings, walls,
and flooring. Gas-plumbers have a bad practice
of rubbing gas-pipes over with grease, or strap-
ping them with greasy rags, where they leak
slightly. This must induce mice and rats to
chew the lead. The gas-men’s practice is one
they ought to eschew, for it clearly leads the
rats and mice into temptation, and their betters
into danger.

NATIONAL PORTRAIT EXHIBITION, SOUTH KENSINGTON.—The collection of portraits will be opened to the public on Monday next.

DISCHARGE OF GOVERNMENT WORKMEN.—About 200 workmen of various grades were on Saturday discharged from Woolwich Dockyard, and 800 mechanics and labourers will leave the establishment at weekly intervals.

TWISTED WROUGHT-IRON BARS.—We observe that wrought-iron bars, generally of + section, but twisted as it runs along, are being made by Messrs. Macanight, Robertson, & Co., of Bankside, and recommended by them as particularly applicable for balustrades, balconies, balconets, verandahs, railings, columns for shop-fronts, stanchions, circular stair-posts, and ornamental iron-work generally. Although light, they are said to have considerable strength.

PROPOSED COLLEGE FOR WOMEN.—A conference was held on Saturday at the Architectural Gallery, London, to consider the proposed establishment of a college for the education of advanced female students. The Dean of Canterbury occupied the chair, and a large number of ladies and gentlemen attended. It is intended to place the college in a healthy locality between London and Cambridge, thus putting it within reach of the best teaching in all the subjects of the college course. It has been roughly calculated that a building with accommodation for 100 students may be erected at a cost of 30,000l.

CORPORATION MODEL LODGING-HOUSES FOR NEWCASTLE-UPON-TYNE.—At a recent meeting of the Town Council a report was adopted in favour of the Corporation erecting model lodging-houses for the poorer classes. The mover of the resolution said, after detailing the history of the movement, that the estimated cost of the lodging-house would be 4,433l.—3,500l. for the cost of the building, and 933l. for the cost of the ground. He believed it would pay 5l per cent. They could obtain the necessary money from the Loan Commissioners for 4 per cent, and in this way the council would make 1½ per cent. Another of the council said it was a great experiment, and strongly advised the council to follow as far as they could the example of Mr. Peabody in London. He believed they would, by carrying out the scheme, provide better houses for poor people.

TELEGRAPHIC PROGRESS.—The adoption of the telegraph by the Government will be a decided step in telegraphic progress. The Bill to enable the Postmaster-General to acquire, work, and maintain electric telegraphs is not binding on the telegraphic companies so as to compel one and all of them to hand over their telegraphs to the Government, but it is compulsory in certain circumstances on the Postmaster-General to purchase telegraphs that may be offered. He is also authorised to negotiate with companies for the purchase of their lines of telegraph with money to be given by Parliament from time to time for the purpose. The charges for messages are not to exceed one shilling within the United Kingdom for twenty words or less, exclusive of names and addresses, and sixpence for each additional ten words or less. There are arrangements and restrictions also as to portage and transmission by post, &c.

THE BIRMINGHAM STATUE OF SIR ROWLAND HILL.—Some three years ago a public subscription was set on foot at Birmingham, to provide for the execution of a statue of Sir Rowland Hill, as the promoter of penny postage. A commission was given to Mr. Peter Hollins to execute a marble statue at the price of 950 guineas. The statue has just been completed, and is now about to be sent to the approaching exhibition of the Royal Academy. It has been cut out of a block (three tons weight) of Carrara marble, and the sculptor has been fortunate in securing some of the finest grain, and without flaw. In the right hand Sir Rowland holds a roll of penny postage stamps. The figure is 6 ft. 8 in. in height. The statue, from the fine quality of the marble, is too delicate to stand exposed to the weather, and will be placed indoors. The late recorder of Birmingham, Mr. M. D. Hill (brother to Sir Rowland), and other members of the Hill family, who have seen Mr. Hollins's work, pronounce it a characteristic likeness, whether as regards feature, expression, or attitude. It has just been determined by the Government to go on with the erection of a new General Post-office at Birmingham, and it is not improbable that this may be the ultimate destination of the statue.

TENDERS.

Table of tenders for Kingston-on-Thames Workhouse Infirmary. Messrs. T. H. Rushton & C. L. Luck, architects. Quantities supplied by Mr. Northcott. Includes items like Collings, Little, Myers & Sons, Foster, Hart, Saunders, Nightingale, Gibson, Higgs, Simpson, Howard, McLachlan, Wells, Gammon, Hatten, Lacy & Flexman, Manley & Rogers.

Table of tenders for a pair of semi-detached cottages, to plans and specification, and quantities supplied by Mr. J. T. Matthews, architect. Includes items like Peters, Scrags, Holdworth (accepted), Winkworth.

Table of tenders for the erection of villa residence, at Epson, Surrey, for Mr. John Barnard. Mr. A. F. Williams, architect. Includes items like Hooker, Cooper, Chuter, Brothers, Andrews.

Table of tenders for warehouse, 34, Gutter-lane, Messrs. John Young & Son, architects. Includes items like Lawrence & Sons, Mansfield & Price, Hart, Patman, Myers & Sons, Brass, Webb & Sons, Newman & Mann, Ashby & Horner, Heushaw.

Table of tenders for Abingdon Grammar-school. Mr. E. Dolby, architect. Includes items like Nightingale, Dover, Gawland, Thomas & Dicks, King, Troy & Son, Selby, Bull & Sons, Claridge.

Table of tenders for building chapel, at Bexley. Messrs. Habershon & Pile, architects. Includes items like Butler, Patman & Co., Nightingale, Longson, Falkner, Yeagb, Dabs, Wata, Pearce & Booth.

Table of tenders for completing erection of villa, for Mr. W. Hall, Mr. Danby, architect. Includes items like Willes, Parks, King & Sons, Nightingale, Regis, Garrod, Rogers & Richards.

Table of tenders for a villa, Grove Park, Camberwell, for Mr. Benj. Hooper. Mr. R. Nixon, architect. Quantities supplied by Messrs. Mann & Saunders. Includes items like Thompson, Cooper & Cullum, Heushaw, Nixon & Son, Colls & Co., Higgs, Gammon & Sons.

Table of tenders for a printing warehouse, in Hatton-garden, for Mr. J. Hazell. Messrs. Lander & Bedells, architects. Includes items like Grover, Bamford, Patman & Co., Dove, Brothers, Manley & Rogers, Browne & Robinson, Mann, Axford.

Table of tenders for alterations, No. 14, Hyde Park Gate, for Mr. J. R. Haig. Includes items like Mansfield & Price, Patman & Fotheringham, Nixon, Liberal, Saunders (accepted).

Table of tenders for road-making and drainage, on the Woodbridge-road Estate, Guildford. Mr. Henry Peak, architect and surveyor. Quantities not supplied. Includes items like Walkins, Garnett, Ayers (accepted).

Table of tenders for alterations to the Norfolk Arms, Hart's-Jane, Bethnal-green, for Messrs. Truman, Harbury, Buxton, & Co., brewers. Includes items like Gray, Marr, Kelley, Brothers, Lengshead & Way (accepted).

Table of tenders for new buildings, Great Tower-street. Messrs. John Young & Son, architects. Includes items like Jackson & Shaw, Ashby & Sons, Mansfield & Price, Browne & Robinson, Heushaw, Ashby & Horner, Conder.

Table of tenders for rebuilding No. 29, Mark-lane, Messrs. John Young & Son, architects. Includes items like Lawrence & Sons, Ashby & Horner, Hart & Brier, Ashby & Sons, Webb & Sons, Brass, Heushaw, Condar, Newman & Mann.

For erecting a warehouse, at Batley, near Leeds, for Mr. John Blackburn. Mr. Walter Hazstock, architect. Quantities supplied:—

Table of tenders for Mason and Bricklayer's Work. Includes items like Atkinson, Hepworth & Son, Brier, Mortimer & Sons, Hart & Brier, Booth, Chappell, Robinson & Hirst, Goldthorpe, Preston & Webster, Winstadales.

Table of tenders for Carpenter and Joiner's Work. Includes items like Jackson, Tyles, Ibberson, Petty & North, Williams, Hodgson.

Table of tenders for Plumber and Glazier's Work. Includes items like Brumitt, Firth, Heushaw, Sanior, Lobley.

Table of tenders for Slater's Work. Includes items like Rawthorne, Thompson & Son, Thornton.

Table of tenders for Ironfounder's Work. Includes items like Shillito, Messrs. Horsfield, Bagshaw.

For paving footways, and for facias, of the Thames Embankment, from Westminster Bridge to the Temple Gardens:—

Table of tenders for paving footways and facias. Includes items like Hitton, Furness, Turner, Nowell & Robson, Goech, Bentball, Thirkn, Booth, Hill & Reddie, Mowlem & Co., Knight & Son (accepted).

For rebuilding premises, High-street, Stoke Newington, for Mr. S. Brampton. Mr. F. G. Widdows, architect. The quantities were supplied by the architect:—

Table of tenders for rebuilding premises. Includes items like Patrick & Son, Birt, Conder, Brass, Ashby & Son, Newman & Mann, Heushaw, Hill & Kaddell, Ennor (accepted).

For erecting two cottages, in the Sydenham-road, Snarebrook, for Mr. Rowbotham. Mr. F. G. Widdows, architect:—

Table of tenders for erecting cottages. Includes item like Innt & Elkington (accepted).

For painting the inside of the Agricultural Hall, Islington, for the Agricultural Hall Company:—

Table of tenders for painting the inside of the Agricultural Hall. Includes items like Patten, Grant, Cbild, Sharnam, Davis, Kellaway, Brown & Sons, Barnes, Harding, Gray, Markham (accepted), Allard.

Table of tenders for new building, and raising additional story, Featherstone-street, City-road. Mr. H. J. Haman, architect:— Includes items like King & Sons, Eston & Chapman, Heushaw, Perry & Co., Macey, Praddy & Son.

For villa residence, at Acton, for Mr. T. L. Edwards. Messrs. Lander & Bedells, architects:—

Table of tenders for villa residence. Includes items like Bywater, Harding, Adamson & Son, Palmair, Sale, Perry & Co., Bick, Bray, Cowland, Mann.

The Builder.

VOL. XXVI.—No. 1315.

Exhibition of National Portraits.



OR one who has mixed actively in the world during the past twenty or thirty years, to walk through the third collection of National Portraits now on view at South Kensington, is to go amongst old friends and acquaintances. Whatever may have been his particular path,—politics, war, the stage, art, literature, or science,—he sees around him the men with whom he has worked or quarrelled, whom he admired or envied. The departed, with one great exception, reign here alone. Dead! dead! is the echo everywhere. And yet not dead, for their works and doings are still operating. As Milton says,—

"Where all life dies, death lives."

What hosts of memories arise as we pass before the well-remembered faces; what pegs to hang stories on start out in all directions! Without making great pretence to largeness of connexions we would undertake to fill a volume right off with personal recollections and anecdotes of the men whose portraits are to be found here. And, if we, so most. This collection, therefore, although it contains a considerable amount of poor art, will probably interest the multitude more than the last did. It commences with the present century, and includes the last twenty years of the reign of George III., the ten years comprising the reign of George IV., and the seven comprising that of William IV.; with the first thirty years of the reign of Queen Victoria. As supplementary to the exhibitions of the two previous years, the present collection also includes the portraits of many persons who were then either omitted or inadequately represented, with the works of some painters to whose art due justice may not have been hitherto done; and this part of the collection is not by any means the least interesting. Containing works of the chief portrait-painters whose names and art have been known in the country from the earliest times, it serves to show the influence they had on the works of their successors, and the sources of many later excellencies. It contains a series of paintings in which portrait art may be traced from the time of Holbein to the present day, including the works of Antonio More, Vansomer, Jansen, Vandycck, as well as those of our own countrymen, Reynolds, Gainsborough, Romney, Lawrence, Raehurn, and Knapton. Of course there are many omissions, and there are many circumstances to account for them. The series proper consists of 624 works, the supplementary collection brings up the number to 946, making the whole that have been shown in the three exhibitions that have taken place 2,842, many of them, of course, containing more portraits than one. The catalogue has been written by Mr. R. H. Soden Smith, a member of the committee, and

Dr. Althaus, and contains a large amount of information concisely given. The general direction of the exhibition was entrusted as before to Mr. S. Redgrave, who has prefixed some introductory observations, in the course of which he says, truly,—

"The series of exhibitions may surely claim one great merit, if it prove the means of awakening the owners of pictures, many of which are of national interest, to the true value of their possessions, and lead to greater care that the identity of family portraits is not lost by consignment to the housekeeper's room, or even to the attic; if it saves portraits themselves from destruction by cruel exposure to the sun till all traces of colour and the finer qualities of the art are hopelessly dried out; or by exposure to damp or changes of temperature, so particularly injurious to early portraits on panel; or, worst of all, subjection to greater danger in the hands of incompetent repairers, who, in the attempt to restore what is irretrievable, destroy the only remains of original art which may have been spared."

A peculiar example of the mischief following the latter practice is afforded by the remarkable portrait of Richard II., which will be found in the supplementary collection (653). This portrait—large life-size, throned, the most important contemporary representation that we possess of any English sovereign—used to hang in Westminster Abbey, above the Lord Chancellor's pew, on the south side of the choir, next to the pulpit; it was removed in 1775 to the Jerusalem Chamber, where it has hung ever since. It is believed to represent the king enthroned on the Feast of the Translation of King Edward the Confessor, and was exhibited in the first National Portrait Exhibition, 1866, in the state in which it had been left after many attempts at restoration or repainting. It has since been cleaned with care, as we have before mentioned, under the superintendence of Mr. George Richmond, R.A.; the comparatively modern painting that concealed almost every part of the original portrait, has been removed, and there now remains the genuine contemporary work of the fourteenth century. What connexion is there between the painter of this remarkable work and the artist of the angels remaining in the Westminster Chapter-house?

Near the Richard II. hangs an elaborate picture, attributed to Hans Holbein, "Lady Guildford" (659), a wonderful piece of realistic work. In this part of the collection, "Edmund Waller" (690), and "George Gordon, Marquis of Huntly" (717), both by Vandycck; "Lord Keeper Coventry" (697), by Cornelius Jansen; the Cromwell group; "Mrs. Margaret Woffington" (754), one of Hogarth's best portraits; the poet Cowper (777), by George Romney; "Mrs. 'Perdita' Robinson" (828), by Gainsborough (the most delicious female head in the whole collection); the head of Wesley; Mr. Townley (913), with guests, amongst his marbles; and several others, will be looked at with interest. In the Townley picture, the exquisite bust of Clytie, now in the British Museum, and made common property by the Art-Union of London, is on the table. Townley's affection for this bust was remarkable. The story runs that when it was feared that his house would be sacked by Lord George Gordon's rioters, he took his Clytie with him into a coach, and said, "Now let them do their worst."

In this portion of the Exhibition, although we do not quite see why, is a portrait of James Wyatt, architect (788), who died in 1813. Also up-stairs; but in the last bay of the Exhibition proper, hang, of architects, Pugin (588), Cockereil (617), and Sir Charles Barry (618). A series of portraits of members of the Dilettanti Club, painted by George Knapton, Sir J. Reynolds, and others, have a room to themselves up-stairs; and being all glazed, and for the most part of a highly-finished kind, make a distinct feature. This society, it will be remembered, was established in 1734, by several noblemen and others (Viscount Harcourt, Lord Middlesex, Duke of Dorset, &c.), who were desirous of advancing the fine arts in

Great Britain. The society consists of fifty members; and by its aid or encouragement there have been published from time to time several important art works. In 1764 they sent an expedition to Asia Minor, and recorded the results in the "Ionian Antiquities;" they aided in publishing Stuart's "Athens," and Chandler's "Travels;" in 1814 they sent an expedition to the Levant. Quite recently they published "Principles of Athenian Architecture, with reference to the Optical Refinements of the Ancient Buildings at Athens." In 1740 it was ordered, "That every member of the society do make a present of his picture, in oil colours, done by Mr. George Knapton, a member, to be hung up in the room where the society meets." Judged by our present standard of portrait-art Mr. Knapton was no mean painter.

Below stairs we have, amongst architects, Sir John Soane (107), G. Dance (135), Sir R. Smirke (137), Sir Jeffrey Wyattville (220); but we may not here begin to signalise special works on this floor. Suffice it just now to add that all our readers will find pleasure and much matter for musing on in the gallery of National Portraits now open.

UNIFORMITY OF ACTION WANTED.

LARGE works are being carried out on every available site through the vigorously expanding metropolis. Many of these works are individually calculated to reflect credit on their designers, but the want of harmony which they evince between the different originating bodies is most painfully apparent. The instance most prominent at the moment is the "difficulty" between the Board of Works and the Metropolitan Railway Company. The engineer of each of these powerful bodies has rushed into the columns of the daily press, intent to throw on his opposite neighbour the blame of the public inconvenience. The river-wall, that has replaced the pestilent mud-banks of the Thames between the Temple Gardens and Westminster, has been for some time in such a state that a small amount of exertion would have given the public an outlet for overcrowded traffic, and an open and welcome promenade. But the same principle which seems to regulate the operations of all concurring interests in England, or at least of all interests that ought so to combine their operations as to reduce the outlay of each, while at the same time all unnecessary disturbance of the public traffic is avoided, exerts its ordinary influence. How often have we groaned under the shameful bivalence to metropolitan intercommunication caused by the independent action of the various gas and water companies, each of which seems only to watch for the occasion of a road being thoroughly repaired in order to rush furiously to tear it up again for some tinkering of the vast and complicated system of pipes or of sewers. There are at present but two instances in London in which due provision has been made beforehand to avoid this characteristic and intolerable nuisance—Garrick-street and Southwark-street; and these are not fully taken advantage of. In the case of the Holborn Viaduct, we believe, sewage, water supply, gas supply, will all be provided for; and if a pipe leak, or a drain become foul, the workmen in charge will be able at once to proceed to the spot without turning a single carriage aside from the "crown" of the causeway, or going to the expense of a gang of men furnished with pick and shovel. It is to be hoped that the arrangements of the new riverain parapet will be equally perfect; but in the mean time we are sufferers by the conflict between open air and subterranean travelling. It is intended that a branch of the Metropolitan Railway shall occupy the lower story of the new terrace, the traffic being carried on in two stages alongside of the river highway, as in the case of the New-road. But the road-makers and the railway-makers are not in accord. The Embankment people, in the first instance, state their own case and that of the railway in a breath. "It is no use for us to make our road," has been their plea, "for you to come upon us as soon as it is finished and tear it all up again, in order to build your gallery underneath. And, as you have no money, you are only making excuses

for delay." The railway people reply that this is by no means the cause of the hindrance. They are ready and willing to make the line from which they anticipate,—and that not without good reason,—an ample and remunerative traffic. Only the line must go *somewhere*. It is not to be stopped short at the present termination of the embankment, and carried on a joint at a time, as people fix the rungs in a ladder. Now, the mode in which the Board of Works will carry on their own open day traffic eastwards of the Temple is yet undetermined. The Board appear to have alternative powers, and may either construct a continuation of river wall and roadway, or a narrower terrace upon arches. The Metropolitan Railway people require that this question should be decided before they commence a large outlay.

It is not creditable that we have two bodies, which between them are carrying on public works of the first magnitude and the greatest importance, at a cost of many millions, thus hampering each other. The object of one of them is the convenience and the practical welfare of the public, and the provision for an improved mode of conducting the self-strangling traffic of one of the most crowded thoroughfares in the world. The other company has a financial *raison d'être*. It lays out capital for a return. But this return is entirely dependent on the mode in which the wants of the public are provided for. The aim and object, then, of the two bodies, and the principle on which their works should be carried out, are, or ought to be, identical. And yet there is such an entire absence of that practical common sense for which Englishmen are wont to take credit that, instead of having arranged, long since, a common plan of operations, the Boards are glinting at one another with angry eyes from behind their respective board-fences, and their engineers are explaining matters, not to one another, but to the neglected public.

New secretaries of State are regarded by some politicians as a panacea for old and intolerable grievances. By others they are regarded as a remedy worse than the malady. Into such a question as the advisability of the appointment of a *bona-fide* minister of public works, or of a machinery that shall tend to save the large amount of time and of money that is annually consumed by the cross-purposes of independent improvers of London, we do not now enter. But that some means of knocking the riotous and over-grown principle of irresponsible independence on the head must be adopted, we hold to be indispensable. The hitch between the Board of Works and the Metropolitan directors is not an exception to the general harmony of our constructors. It is the rule. The state of hitch is the normal state from which the public suffer. Every one for himself, cry the Brighton board, the South Eastern board, the London, Chatham, and Dover board; but they do not add the time-honoured conclusion of the adage, "and God for us all." They seem incompetent to understand the moral of the faggot which could not be broken when united, but which was readily snapped stick by stick. Each kicks out its passengers at the first possible outlet from the terminus, heedless of what becomes of them,—utterly careless of that decent attention to the comfort and the need of the customers on whom they live that would so well repay the cost.

Enormous sums have been expended within the last few years on very large terminal stations. Without saying that these are in every case such as to impress us with the highest sense of the taste or the constructive ability of their designers, they are still ample and imposing erections, capable of the comfortable discharge of an immense amount of business. We cannot forget how they arose rather from the interecine and frantic rivalry of the companies than from the desire to serve the public. But we are told that in this respect we have entered on a new *régime*. Why should not this peace and amity be inaugurated by the new and grateful feature of attention to public convenience? The companies would find it pay. A consultation of the several engineers as to the best method of combining the operations of the London lines might readily, and at no great expense, lead to such improvements as would effect an incalculable economy in the time, fatigue, and even outlay of that vast stream of population which is ever pouring to and from the great centres of business. Why should the passenger who arrives at Paddington from the west have to climb into the attic to gain the

long and inconvenient gallery through which, if he lights on any one to show him the way, he may finally reach the Bishop's-road platform, and thence, after a proper divergence to the ticket-window, set off for the City? Why should the passenger who arrives at the lofty and spacious terminal station erected at London Bridge by the Brighton Company have to dive through those insufferable dog-holes, and to wait on that ill-shaped and wind-swept platform for the next train, which, if it please Providence, may take him to Charing-Cross? Why is the threefold set of lines that couple the inconvenient platforms at London Bridge with the great wagon-roofed stations at Cannon-street and at Charing-Cross laid out with such perverse imprudence, such unnecessary bungling, that every train must cross the line of some other train, and that safety is made to depend, not on the proper arrangement of up and down and "shuttle" lines of way, but on the untiring and vigilant watch that is kept on the very complex system of signals? All these things would be so easy to amend. The public would be such great gainers by a little arrangement. And statistics so clearly show that every facility to traffic increases the amount of that traffic, that it is a false economy to neglect not only the convenience but the comfort, not only the convenience but the safety, of the metropolitan passengers.

We are not a people incapable of combined effort. In those cases where difficulty has been fairly met, and where competent men have set their wits to work to meet new necessities by adequate machinery, we are very apt to succeed. Look at the railway clearing-house, for instance. Does it not seem, on the first blush, that it would be a much easier thing to send a certain number of passengers, at fixed and definite hours and dates of arrival, from Sydenham to Charing-cross, or from Windsor to the Great Northern Station at King's-cross, than to ascertain where, on the previous night, wagon No. 2,000,672, or tarpaulin No. 5,000,099, had been left. Yet the latter can be done with ease; the former is yet an impossibility. It was, if we remember, Sydney Smith who, speaking, of course, of a foreign resting-place, said that if the fleas had been unanimous they would have pushed him out of bed. If all those constructors whose name is "the Board" were but unanimous, what would be the result to London? Suppose the engineers of the southern lines were to spare a little leisure (most of the profession have but too much of the commodity just now) to the attempt to remove the last vestiges of the old destructive and obstructive rivalry, and to the endeavour to carry, with the least delay, each other's passengers to their several destinations when these were on each other's lines. Why should not all the arrangements for transit and traffic be carried on in central and accessible positions, so that the man who, arriving from Dover, wishes to send a parcel to Oxford, a telegram to Southampton, and a letter to Birmingham, might be enabled to do so without stepping from beneath the roof of the terminus where he leaves his carriage? The junction of the metropolitan line with the Shoreditch and the Fenchurch-street Stations; of that system with Cannon-street, of Waterloo and Charing-cross, of Euston-square with the latter great point of departure,—all these things are matters of much more moment to the public than they are to the several companies. But they are none the less the duty of those who have assumed, for the sake of its financial return, the control of the whole traffic of the country. The want of this unity of arrangement is a national scandal. Not only so, but it is a personal loss and inconvenience to four passengers out of five. The full benefit of our great outlay is very far from having been reaped. The time lost by the suburban resident, in his daily transit, is frequently more than the time actually occupied in travelling. The damage is repaired at the cost either of business or of health. Either the daily traveller has to rise so much earlier, and to reach home so much later than necessary, thus incurring, say four hours' more fatigue, and fatigue of a wearing and unhealthy description, every week of his life, or he has to take that wasted time from his hours of business. With prompt and punctual arrangement his daily trip may be almost a pleasure; with liability to constant interruption and disturbance, it is a daily cross and anxiety. Let any man of business compare the time which is devoted to the actual transaction of his affairs with that which is wasted, partly unavoidably, but in great measure from want of system, and multiply the individual

result by the factors indicated by the hankers' clearing-house, and he may form some conception of the injury caused to the commerce of the country by the independent and uncombined action of those on whom he depends to convey him from place to place, to pave his streets, to light his ways, to purify his dwelling, and to run his errands.

If anything he needed to enforce this important lesson on the mind it is a comparison of our own liability to censure in these respects with that of some of our neighbours. England is the cradle of steam locomotion. But that is not a good reason for the fact that steam locomotion should linger longer in the cradle in England than it does in other countries that were once only too happy to follow humbly in the wake of the English engineer. It is in the absolute neglect of small but essential links that we are so much behindhand. Portage with us bears an undue proportion to carriage. We see coal quoted one day at 18s. 6d. per ton; a week later it is quoted at 17s. 6d. per ton. In either case we find it has cost us 26s. per ton by the time it has reached our cellars, and something for civility into the bargain. It is by attention to such details, among others, that our German neighbours are now neutralizing the disadvantage of distance from the markets from which they are driving our manufacturers. Their railways are organized, not for conveying passengers and goods to the verge of their estate, wherever that limit may be, and then for turning them out to shift for themselves, but for the most convenient and economical method of conducting traffic. The traffic of the country must be conducted in the most efficient manner. That is the common law. It is not such a circumstance as that one company stops short at Shoreditch and another at Paddington,—so that if you wish to go from Chesham to Slough, the intermediate passage is your affair, and not that of either company,—that will inconvenience you abroad. All parties interested in the matter are aware that it is only by a thoughtful and prudent harmony, by forethought and good arrangement, both of structure and of system, that ironwork from the North of Germany can be delivered in London at a less cost of carriage than ironwork from Manchester. The North German manufacturers wished to obtain that advantage; therefore they took the proper steps to obtain it. In that effort they have succeeded: such, at least, is the testimony of those respectable firms, long known to the Post-office Directory, who live by selling German goods to English consumers. By closing the intermediate links, in the absence of which the main chains end "in the air," our neighbours and rivals secure a unity and economy of action, the want of which amongst ourselves may be estimated by such tests as that of the price of coal.

WHAT IS AN ARCHITECT?*

An opinion which was formerly almost universal, and which still lingers amongst us, is that an architect is a man who draws plans of houses suited to the wants and purse of his client, looks after the interest of said client, keeps an eye on the doings of the joiners and plumbers, goes through the accounts and cuts down the extra bills, and, in short, acts generally as a sort of bridge over the great gulf which is fixed between the refined and aristocratic client and the gross building element, and for these good services pockets 5 per cent., besides pickings. It is matter for congratulation that this specimen is likely soon to vanish, like the dodo, into the limbo of forgotten things; indeed, it is known that even in the instances in which it is still to be found, it has generally been thought necessary to import a little fine art into the outer office, in the shape of a draughtsman, who may be cunning to devise ornaments and elevations, while his employer, in the *sanctum sanctorum*, improves the shining hour in the more congenial occupation of letter-writing and arbitration, or administering soft soap to his clients. But although this type is passing away, "the evil that men do lives after them," and it is probably mainly owing to the long prevalence of the above-named view of the profession that the architect who takes a higher view thereof is so constantly exposed to the attacks of respectable people, who wish him to look at their orders, to poke his nose into their drains, and to tell them why the

* From a paper by Mr. H. H. Statham, jun., read at a meeting of the Liverpool Architectural Society.

shower-bath does not act properly, in all confidence that this is his proper duty and calling. What that calling really is I have to consider presently, but, at least, it has not necessarily to do with such things as these; for does it not stand to reason that the manufacturers of grates and cisterns and shower-baths, who are constantly engaged practically about them, must know more of them than a man who lives outside of trade and manufacturing operations, and only knows partially by theory what they are practising every day of their lives? The fact is, that this notion of an architect's business proceeds from the idea that tradesmen will always deal unfairly unless there is an architect to check and oversee them. Now, the fact is that the architect cannot check them efficiently, for the simple reason that, in nineteen cases out of twenty, they know much more about the matter than he does; and if there be a foundation for the idea that such a check is necessary, I believe it arises from the fact that as long as you will not trust men they are not likely to be worth trusting, and that contractors and workmen who find a man pretending to overlook and find fault with them about things with which they are much more conversant than he is, are likely to be tempted out of a mere spirit of reticence, to "chisel" the architect in some way or other. And I really cannot see why such a strong line should be drawn between the honesty of the professional man and the tradesman or labourer; or why it should be supposed that a good workman, if treated honourably, would be any more likely to shuffie over his work or to make a job for himself than the architect. Are "jobs" entirely unknown in our own profession?

To go to another extreme, there is a class of architects and art-critics, including some of our cleverest men, who very constantly affirm that the only business worthy of an architect is to design sculpture; and that the building is only a frame to contain sculpture, and is without it perfectly lifeless and expressionless, and unworthy to be classed as a work of art. At first sight it would appear that this amounted merely to a reduction of the number of artistic professions by one, that of architecture being simply merged in sculpture, and disappearing gracefully from the scene, as a superannuated myth. But those who have taken stock at all of the sculptured works from the designs of architects will see that there generally is a difference between these and what passes for sculpture with the leading professors of that art; and that architects' sculpture generally shows remarkably stiff figures and expressionless faces, with very large heads, and legs and arms "of the period" before *biceps* and *gastrocnemius* muscles were invented. The simple fact is that to be a good sculptor or designer of the figure on a large scale is of itself an aim which will demand all a man's time, energy, and study, unless he be one of those exceptional geniuses who appear once in three or four centuries; and as some one must contrive and draw the buildings that must be erected to receive the statuary, it is clear that the architect cannot successfully combine the ordinary business of his profession with the acquirements of a really high power of design in sculpture or painting. He who would succeed in this path must give himself entirely to it. Then there is another theory, tending in quite a different direction, but which is gaining ground a good deal in certain quarters, that an architect is, in fact, only a constructor; or, in other words, that an engineer and an architect are very much the same thing—especially an engineer. That the professions of architect and engineer might be much more closely assimilated than they generally are is probable enough, but what is required is rather that the engineers should know more of architecture than that the architects should be better engineers. The structures erected under the superintendence of architects are generally stable enough; at least failures are not more common in them than in engineering works, though it may be admitted that the engineers have tougher constructional problems to grapple with. But what are we to say of the engineering structures of the day, considered from an artistic point of view? With regard to most if not all of them I must, I fear, he said, that they show either an utter disregard to anything like beauty of appearance or decoration, or else the decoration is attempted in such a manner that it had better have been let alone altogether. The usual engineer's notion of bringing a work under the denomination of "architecture" consists

not in emphasizing and ornamenting the various parts of the construction, so as to render the aspect of the work pleasing while not concealing its strength, but rather in masking the whole construction behind a screen of what is supposed to be architectural design; that is to say, an imitation of some features which have belonged to some period of architecture, and are readily laid hold of and copied. Thus an ordinary brick or stone bridge for carrying a railway over a road or brook, which, if simply built in the strongest possible manner, with a pointed arch and deeper ribs of masonry where the principal lines of pressure act upon it, would be a really pleasing object, is turned into a kind of quasi-architectural sham, with pilasters affixed, and a weak and purposeless-looking blocking and cornice on the top. There is, indeed, a kind of engineer's style, unlike anything that was ever seen in architecture, which is most commonly developed in buildings devoted to the purposes of waterworks; it is not easily describable, but once seen can never be forgotten. Then there is again another theory to the effect that all architectural beauty consists in polychromatic decoration, about which some very fine things have been and frequently are written concerning walls "glowing with colour," "suffused with all the tints of the rainbow" ("throbbing with colour" is an expression I have seen used), and the advocates of this theory would have us believe, on the evidence of some nearly obliterated appearances of colour on the stones of some of the Greek temples, that the Greeks, after selecting the whitest marble from the quarries of Pentelicus, were at the pains to daub it all over with colour, an opinion which, I think, with Mr. Garbett, is against all common sense, and not to be believed on any amount of circumstantial evidence; indeed, if the most indubitable evidence were produced, it would seem far more probable that the buildings were painted over at a later period of debased taste, just as our own Gothic cathedrals were daubed with whitewash; a circumstance which Macanlay's New Zealander, in writing his history of the architecture of ancient England, might adduce to prove that the Medieval architects abhorred colour and invariably whitewashed their buildings to bring them to a uniform tint.

The first time that my attention was drawn to what I venture to think the exaggerated importance attached to coloured decoration by some of its adherents was on the occasion of the reading of a long and valuable paper on the subject by Mr. Audsley in 1860. In the course of that paper, after remarking on the singular absence of coloured decoration in the interior of our buildings, and the bad taste which ordinary house decorators generally showed in such things, when they were attempted, he continued, "Wily, may I ask, are the architects employed upon what is often the mere shell or foundation for artistic display, and the work taken from their hands when (if they are worthy of their profession) their real office begins? An architect is not a constructionist alone, and more, an architect need not trouble his head about it at all, beyond the dictates of common sense."

I have always borne Mr. Audsley a grudge for that sentence, and determined to have it out with him some time or other; for I think that if the building itself is left to be the mere shell for artistic display, then in that case the architect certainly has not been "worthy of his profession," and this brings me to the real point, what after all is his profession? If we deny that it is a mere house-builder and inspector of workmen; if we will not allow him to be merely a decorator; if he is not, as Mr. Audsley truly said, a constructionist alone, and if we cannot admit him to be a designer of sculpture, what ground is there left for him? Simply this—he is a *building artist*. It is his office to use stone, brick, and timber as the painter uses colour and the musician uses sounds; though the analogy with music is the truer one, because both the arts are alike in having no definite expression, or, as it is the fashion to call it, no *phonetic* power—they can appeal to the imagination or feeling, but not to the reason. And if this view of architecture seems at first sight a dry and uninteresting one, after so many writers in the present day have been endeavouring to impress upon us that we are (or ought to be) painters, sculptors, and what not that is grand and exciting to our imaginations, I think a little consideration will show that architecture, pure, as the art simply of building well, has high claims enough upon our interest. For it is the

special privilege of the architect to turn that which would be a mere utilitarian necessity into a source of pleasure, by, in the first place, arranging the plan of his building so as not merely to afford convenience and economy of space, but to be effective in its disposal and arrangement, and in the second place, by the arrangement and grouping of the windows, and of the various masses of building; and by the effects of shadow carefully studied and considered, to see that the building gives some positive pleasure and interest to those who behold it, in recompense for the amount of light and air that it shuts out; so that, instead of being a mere nuisance and excrescence, it should be an object conveying a definite meaning and expression; and, finally, by the judicious application of well-studied ornamental detail where it may help to emphasize and bring out the expression of the building without being too obtrusively prominent, to give the last touch of refinement and point to the design. And I cannot but think that this treatment of a building in the mass is as much entitled to be called a separate art as that of painting, sculpture, or music, though under somewhat different conditions; I believe it is a source of beauty quite complete in itself, and whose place cannot be filled or supplied by anything else, and that we are therefore fully justified in thinking that the architectesque employment (to use Professor Kerr's new word) of the ordinary durable building materials of stone and timber is the real duty of the architect, and is to be regarded as of more importance than the designing of coloured detail in more fleeting and perishable material for the decoration of the interior. If the architect tries to be a sculptor, the sculptor can beat him; if he would shine as a constructor, the engineers can commonly beat him; but, in his own line, as indicated above, he is doing what no artist of any other profession can do for us, and furnishing an important link in the chain of art. And it is certainly desirable at present that we should insist upon this view of the building art as a thing existing distinct from and in addition to the other generally recognised branches of art, for it is only thus that we can rebut the theory which has been of late years so noisily propounded in certain quarters, that there is really no defined profession or art of architecture, and that any one who knows how to construct a building has a right to call himself an architect. Certainly one or two structures which were erected by the upholders of this theory went far to give it the lie, by showing practically that something was wanted to make a building satisfactory, besides what the mere constructor, however talented, could give to it; and it is probable that this theory of the mythical character of the architect would never have been broached, had not we ourselves been untrue to our colours, in neglecting comparatively that which should be really the object of our studies, to run off and try to lay hold of the skirts of the other arts, which have resented the insult by showing plainly enough that they will not be half-worshipped, and that with regard to each branch of art it may be said,—

"Oh, trust me not at all, or all in all."

At the same time, as there can be no doubt that the designing of a building, with its accessories, does call for some acquaintance, on the part of its designer, with certain branches of art and science which are auxiliary to it, it may be well to consider for a moment how far such accessory studies must be carried, in order to render the architect's power of treating his work more complete, while not distracting him too much from his main and principal study—that of building effect. It is unquestionable that a knowledge of construction and of the strength of materials, and the most effective way of employing that strength, must be part of the architect's education; because, in the first place, one of the chief desiderata in his art is durability, both in appearance and reality, and therefore it may be fairly urged that we may go a little further in our constructional studies than merely the "common sense" rather vaguely demanded by Mr. Audsley would take us. I should say that what is wanted is an acquaintance with the leading and broad principles of mechanical statics and dynamics, coupled with as much practical experience as the architect can acquire by a frequent attendance on buildings in progress, and personally inspecting the results of his own constructive design. I think there is scarcely enough of this in the profession, and that the architect, as a rule, remains too much

in his office working over a drawing-board and designing details on paper, when often a personal visit to the building and the sketch of a few details on the spot, with the position in which they are to be placed actually before his eyes, would result in a greater life and expression being given to the building, though the sketches might be rough enough compared with those which can be elaborated in the retirement of the office. But here, I think, the demands of construction stop. It is not to be required of the architect that he go into all the mathematical studies requisite for the engineer. This would be to rob him of much precious time which is wanted for other studies; and his aim is not the same as that of the engineer; he is not required to economise material and accurately calculate how to make the least amount of material do the most possible work; on the contrary, no architectural work can have a satisfactory effect in which the strength of the material is not evidently and palpably greater than the occasion absolutely requires, since it is only thus that the expression of stability and repose, so invaluable in architectural design, can be secured. In short, with regard to practical and constructive knowledge, I should say, if I may be permitted an illustration from another art, that the architect is in the same position with regard to the materials he uses and the workman he employs as the composer of a piece of orchestral music is with regard to the instruments and players in his orchestra. It is not necessary that he should be able to play upon all the instruments himself, or direct all the players how to use them, but merely that he should have a general knowledge of their capabilities and peculiarities, and by constant attendance at performances familiarize himself with all their various effects.

And so with regard to the power of designing sculpture, which has been so much insisted on lately. Perhaps no other study can so much promote the training of the hand and the eye in the use of the pencil, and contribute so much to the attainment of artistic power of design, as the drawing of the figure, either from casts, prints, or life. But with the architect this should be a means, not an end. He should aim at improving his hand and eye, in the first place; and in the second place, when sculpture is to be introduced into a building, it is desirable that he should be able to give a sketch showing the style of design and the grouping which, in his opinion, will harmonize best with the lines of the architecture, and be in keeping with its spirit and purpose. But to aim at the power of making detailed cartoon drawings for the whole design is, I believe, to attempt the impossible, when the number of an architect's other occupations and claims on his time are taken into account. The late Benjamin Haydon had one day been sketching rapidly some figures on a stray sheet of paper, indicating with his usual precision every leading feature of their anatomy. "Oh, Mr. Haydon," said some delighted bystanders, "could you not teach us to sketch figures in that way?" "Certainly," was his reply, "if you will give it eight hours a day for four or five years;" an answer which pretty clearly indicates a painter's estimate as to the possibility of succeeding in figure-drawing as a mere accessory branch of study.

The real art of an architect then resolves itself, as I think, into what may be called artistic building, which consists of three main branches—first, the arrangement of plan, so as to produce an interior combining convenience with effect, while it furnishes the groundwork for a picturesque or architectresque grouping of the various parts of the design; secondly, the main design itself, shown in the grouping, the sky-line, the arrangement of the window-openings, and the contrast of light and shadow; and thirdly, the heightening of the effect by the introduction of ornamental detail; and these three branches must, I believe, always receive consideration in the order above-named. If the elevation or perspective effect of the building is conceived and sketched out before the plan is properly considered, the inevitable result will be that the latter will be sacrificed to the former, and the building will be more or less untruthful. The general design should grow and expand naturally from the plan, combined with the constructive principle employed, whether it be the arch, the lintel, or the tie; and this general design finally determined on, the parts of the building which seem to require or offer opportunity for it may then be brought out, and the rest of the building relieved, by appropriate and

judiciously applied ornament, which, I think, should be more sparingly used than it often is in the present day, and which should, and on the principle just indicated probably would, have the appearance, not so much of an extraneous natural outgrowth inborn in it and necessary for its complete expression. And whoever will consider all that is involved in worthily and adequately carrying out these three requisites of a purely architectural design must surely admit that it affords matter enough of itself to employ a man's time and talents, and that no slight education must be required fully to develop the power of successful architectural design as just defined, and that it is even matter of importance that the time and exertion of the architect, both while he is a pupil and after he has entered into practice, should not be unnecessarily diverted to studies or work which will not directly promote this object. And, considered in this point of view, the subject of an architect's education assumes an aspect of serious importance, and the more so as it must be admitted that the system of architectural education in this country at least is very defective, or it might be more correct to say that there is no system at all. A young man is articled to an architect for five years, without the slightest understanding or stipulation as to what he is to be taught, or how he is to be taught it, only with a general understanding that he is to learn the profession. In some cases it is to be feared that the matter, so far as the architect who takes (or "takes in") the pupil is concerned, ends here, and that perhaps no attempt at all is made to give any special instruction, but that the pupil has just the run of the office and picks up what he can or will, which is often little enough. And even in cases—let us hope not infrequent—where the master accepts his responsibility and conscientiously endeavours to do all he can for his pupil, what can this amount to, amidst the daily duties and routine of an office, but a series of desultory bits of instruction, given at odd times, not bound together or arranged into any definite system which could give a clue to the real importance and value of each scrap of information communicated, and its relation to the whole scope of the profession of architects?

What is it that a pupil learns by this process? Not certainly the art of architecture, but rather the peculiar practices of his master. The whole thing appears to me to be a commencing at the wrong end; isolated facts and lessons being given to the student before he has had any general education which would enable him to take a broad view of the meaning and object of the profession, and refer the information which he picks up in the office to its proper place in the scheme, and give it its proper value. The first thing surely that an architectural student should be taught is the general history and principles of the art which he intends to practise; the practical details and more minute instruction should come afterwards, when he has gained sufficient knowledge of the real object and tendency of his profession to be able to understand how the practical lessons and instruction which he receives tend to aid that object, and what their real value is. To act otherwise is about as reasonable and philosophical as if we were to attempt to teach a new language by explaining the meaning of a word here and there, without giving any analysis first of the grammar, construction, and idiom. I believe such a thing as an architectural college or academy might be very valuable in remedying this defect, by giving a general education on the subject previously to the student coming to the office to learn the practical details and working of the profession; but there are great difficulties in the way of establishing such an institution, and the history of some other art-academies of a similar nature in this country proves that such things are not always successful in accomplishing what they profess. Failing this, I think something might be done by private tuition with this special object; and the efforts of any competent and thoroughly educated architect, who might be able and willing to establish a class for preparatory tuition in the history and principles of architectural design would deserve the highest encouragement; and if our profession could once be put on the same kind of footing as those of Law and Medicine, and a diploma, given after a sufficient examination, could be made the condition of any one practising as an architect, it would probably very much aid architectural education, by marking out a definite path of study and affording a

definite standard to work up to. Not that I would advocate a competitive examination, but merely one which would afford evidence that the candidate had learnt the history of his art, knew in what it consisted, and was sufficiently instructed in the practical part of it. The rage for competitive examination I consider to be one of the evils of the present day, and in matters like architectural design success in such an examination is no test of real power, because one man may be a much readier and more rapid draughtsman than another, and may dash off, with little thought or consideration, a kind of *bravura* drawing, which will look very well, while another, with less of this ready facility of execution, might in a rather longer time furnish a design exceeding in thought and originality anything that the more rapid draughtsman could produce under any circumstances. And this leads me to mention what I have often thought a very serious evil in the practice of the profession among us, namely, the time frequently spent over work which can have no effect upon the actual success of a design when executed, and more particularly I refer to the absurd and disproportionate time and trouble constantly spent in "getting up" drawings and perspectives.

It cannot be too often repeated and urged that the real value of an architectural design is exactly in proportion to the amount of thought bestowed upon it; and I cannot but regard the time frequently spent in elaborating elevations and perspective views as the waste of so many precious hours which might have been so employed as to ensure the design being a greater success when executed than it can be expected to turn out when so much of the architect's energies have been employed in making it look pretty on paper. With regard to the rage for perspective views especially, we might take a lesson from our French neighbours, many of the best critics among whom expressed their astonishment at finding scarcely any plans or elevations among the English contributions to the recent Paris Exhibition, one of them plainly saying that the English architects seemed to think of nothing but making beautiful pictures. Yet, I believe, the annual Architectural Exhibition invariably consists almost entirely of perspective views, often unaccompanied by any plan; and, if the exhibition is intended as a pleasing and attractive resort for young ladies and their admirers, who may please themselves by fancying they are studying architecture, this is all very well; but no exhibition on such a principle could really afford matter for valuable study to an architect, who, if he is to learn anything from drawings, must have such as will show him the progress and construction of the design, not merely the final result, and that too in a form which may be, and often is, cooked up to look much better than the reality. Paradoxical as it may seem, I believe that the architect might often be more profitably employed in general study not specially connected with architecture than in producing drawings; for the last and not the least important answer which I shall hazard to the question "What is an architect?" is that he should be emphatically and truly an *educated* man. There are special reasons for this in architecture beyond what exist in sculpture or painting; for in these arts a good deal of the effect of a work depends upon its reproduction of forms and effects already existing in nature, and the mere evidence of power on the part of the artist thoroughly to understand and reproduce nature will frequently of itself raise a work into the class of high art; nor have there been wanting instances of men whose paintings will always take a high rank, who were themselves in private life both vicious and vulgar, but whose works were redeemed from these qualities simply because they were so faithful a transcript of nature and gave such unmistakable evidence of power of hand and correctness of eye. But the architect has no such guide; he does not anywhere directly copy nature, but rather has to lay bold of her principles and adapt them to his use in grouping buildings and designing ornament; he has to look beyond the natural, the *τὰ φυσικά* of the Greeks, to the *μετὰ τὰ φυσικά*, the metaphysical principles and motives which underlie the separate forms which appear to the eye; and similarly in availing himself of the works of his predecessors he should study not the actual forms employed by them, but endeavour to catch their spirit and principle, and apply it to his own purposes. But to do this, to make this kind of analysis of the principles of beauty which alone will save us from dropping

into pure copyism, either of nature or of our predecessors, requires no small mental training, and presupposes a generally high cultivation of the intellect. I cannot do better than quote here the admirable words of Mill, in his address delivered at the university of Glasgow, which apply as fully to our own profession as to those to which he alludes.

"What professional men should carry away with them from a university is not professional knowledge, but that which should direct the use of their professional knowledge, and bring the light of general culture to illuminate the technicalities of a special pursuit. Men may be competent lawyers without general education, but it depends on general education to make them philosophic lawyers, who demand, and are capable of apprehending, principles, instead of merely cramming their memory with details. And so of all other useful pursuits, mechanical included. Education makes a man a more intelligent shoemaker, if that be his occupation, but not by teaching him how to make shoes; it does so by the mental exercise it gives and the habits it impresses."

And with reference to our own profession it may be observed also, that, in consequence of its forms and development being much more under the control of the designer and dependent upon him, than in the case of sculpture or painting, it follows that much more of the tone of the designer's mind, and the refinement or otherwise of his taste, is often apparent in his works than in those of the sculptor or painter; and indeed it may be said that there is no profession, save that of a literary man, in which vulgarity of mind and want of general education on the part of the worker more surely show themselves in the work, than in that of architecture. And though a man who is content to take this view of his profession, and to give less attention than is usual to the acquirement of the facility in drawing and throwing together a design which is considered nowadays so valuable an attainment, but which, in fact, deserves little higher name than mere "sleight of hand," will find that for the present at least he will probably be distanced in the race by the rapid draughtsman who falls in with the fashions of the day; he will at least have the satisfaction of feeling that what he does execute is based upon some fixed principles, and that he may be quietly laying the foundation for the power of producing, at some later period, work which will not only satisfy himself and please his contemporaries, but may continue to give pleasure to people of cultivated taste in future generations, when the productions of the mere draughtsman will be counted things of a worn-out fashion. And even if he never have the opportunity of doing this, he will still be repaid by the broader view of his art, and the consequently greater enjoyment of what is best in it, which his superior education will afford to him; and amidst the vexations and littlenesses which will jar upon him in the daily pursuit of his calling, he will be able, to quote again the words of Mill, "to keep up the tone of his mind by frequent visits to those higher regions of thought and feeling, where every work seems dignified in proportion to the ends for which, and the spirit in which, it is done."

I cannot but feel that in vindicating the existence of architecture as a separate and independent art, and consequently the profession of the architect as a real and important one, I have not said half as much as might be claimed in its favour, nor have I even attempted to do so, as, not wishing to rhapsodise, I have confined myself to merely defining it as the art whereby that which would otherwise be an exorcism and eyesore on the face of the earth is converted into a source of pleasure. But of architecture, in its highest forms, much more might be said than this; for there have undoubtedly been structures, even the ruins of some of which still tell us, which may claim a place among the finest and most inspiring forms in which the spirit of art has ever been manifested on this planet. And, in opposition to those who on the one hand would reduce architecture to mere mechanical contrivance, and those who on the other would represent it as merely the vehicle for the display of elegant ornament, irrespective of its total effect, let it be remembered that many of our greatest poets have drawn their finest similes from pure architecture, considered as the display of vast proportions and contrasted masses of building; and when Milton would describe to us the fame that of his fallen angels enjoyed in brighter regions, as the archi-

tect of the celestial palaces, he does not refer to his proficiency either in sculpture or colour, or in the minute details of ornament; it was with greater objects than those that his name had been connected:—

"His hand was known
In Heaven, by many a tower'd structure high."

TASTE.*

THE subject before us has for its object beauty, concerning which much has been written, but, to us it seems, in a much too metaphysical manner, and our endeavour will be to put it before you in as plain and practical a way as possible.

To convey the exact meaning of the expression good taste is almost impossible, and in attempting a definition we seem in danger of circumscribing nature within the bounds of our own notions, formed, perhaps, from a limited and personal consideration; but, for convenience sake, we shall consider good taste (applying more particularly to nature and art) to be the perception of intellectual pleasure, and that beauty, the object of this taste and the source of this pleasure, is appreciated by the understanding, exercised either upon the works of nature or the productions of art.

There are some who have written on the theory of beauty, who maintain that the perception of it arises solely from the association of ideas which crowd upon our imagination as we gaze upon the objects of our contemplation. Now, we think otherwise, and will attempt to show that it is not so, but that the association of ideas only enhances that beauty which is appreciated by the understanding.

If our perception of the beautiful were only in proportion to the association of ideas, we could not well understand how such a taste could be cultivated to any degree of perfection, or well brought under the dictates of reason and reflection; whereas, if we consider it subject to reason and reflection, as appreciated by the understanding (in conjunction with association), we can more easily perceive how good taste, or, what is the same, a just appreciation of the true and beautiful, can be improved or acquired in any useful degree, and that only by persevering and well-directed study, reflection, and cultivation.

From the opinions opposed to this have resulted the worst effects, not only among those who practise art, but in many of its patrons. How often do we find those whose attainments by no means qualify them for judges, condemning, or eulogising, with a degree of peevish confidence and impunity, works of art from what they are pleased to designate as a natural taste. Now this, if it means anything at all, simply signifies an untutored and consequently imperfect taste. It seems the grossest illusion, with an odd admixture of ignorance, in any one to imagine that he should be capable of judging or criticising an art of the very elementary principles of which he is utterly ignorant.

Goldsmith, in describing Sir Joshua Reynolds's conduct towards those somewhat of this class, says,—

"To excoarce averse, yet most civilly steering,
When they judged without skill, he was still hard of hearing."
When they talked of their Raffaels, Correggios, and stuff,
He shifted his trumpet, and only took snuff."

It is such as those now described whose maxim is, that taste is not to be disputed, which proverb has arisen, no doubt, rather from the acknowledged prejudices than from the deductions of sound reason.

We do not wish to be understood as maintaining that individuals do not possess a certain amount of natural taste; on the contrary, they generally do; but we firmly maintain that unless this taste be assiduously cultivated, it is of very little value, if any, to its possessor; and this same principle applies to the other arts.

Those who boast this natural taste are attracted most by compositions, such as interiors we often see by Dutch painters, in whose efforts pots, clear glistening pans, and garden-vegetables abound; in fact, scenes from ordinary life have greater attractions for them than those which represent a more cultivating and refining feeling. Nor is this to be wondered at: such subjects are exceedingly easy of comprehension.

* By Mr. Alexander Fraser. Read at a meeting of the Edinburgh Architectural Association.

and require almost no effort of the mind to feel their merit; but to appreciate the ideal beauty, the cultivated and ennobling sentiment in the compositions of those worthy the name of painters, is a vastly different acquirement, and only, as we have said before, to be gained by patient and properly-directed study, even as the improvement or perfection in the knowledge of any art can possibly be attained; and again, the artist who succeeds in gratifying this so-called natural taste, is, in relation to refined taste, one of the lowest order of true artists, being endowed with that poorest and lowest aim—mere imitation.

We will now explain the expression, ideal beauty,—the beauty of which we speak: it consists in bringing perfections existing in various individuals or natural objects into one grand harmonious whole, making an aggregation of beauties which are constantly to be found in nature, but never altogether in the most favoured individual or natural object.

We will not attempt here to state the necessary acquirements to perceive the true and beautiful, especially in works of art, and will content ourselves in saying that correctness of eye is absolutely necessary in judging of form, grace, and proportion; and we are compelled to admit that this correctness is only acquired, in any useful degree, at all events, by well-directed study and practice. If we be wanting in this qualification, it is absurd to suppose we can be imbued with the true feeling of good taste.

But to return to the association theory of beauty. Mr. Alison in his work describes the emotion of a spectator on his first prospect of Remo. He says, "It is not the scene of destruction which is laid before him," &c., "but it is the country of Cæsar, of Cicero, and of Virgil," and concludes by saying, "Take from him these associations, and how different would be his emotion." But let this spectator be one whose object is the acquirement of knowledge and the study of beauty, to him this distant view is not sufficient;—no, he approaches nearer to those magnificent remains, from which, through association, he has derived so much pleasurable emotion, and there beholds the perfection of that beauty which is perceived only by the cultivated mind, capable of appreciating the delicacy, grace, and proportion presented there in such glorious and wonderful profusion. Now, if the beauty of these remains arose solely from association, piles of meaningless, unsculptured stones, massed rudely together, would suffice, instead of that which bears the stamp of true genius and the unmistakable evidences of the works of minds of the highest state of cultivation and refinement; and, we would ask, for what reason is it that artists of the first standing visit these and similar scenes? Is it to feed their imagination and to overcome by dreamy influences? Surely not; their mission bears a higher and more practical issue, as may be discovered from their respective works, when again among us, their minds elevated and refined by the study and contemplation of the works of the older and more perfect masters. And again, what to the man influenced solely by association of ideas is the effect of the play of delicate light and shade, thrown charmingly on these venerable piles by the mellow rays of a golden sunset? To him all these beauties are speechless; but to the man who gazes with a critical eye, these, and more than these, are not displayed in vain or unperceived, but only lend enchantment to that which is the source of so much intellectual gratification.

It would seem that what is considered true beauty is often applied to objects, the admiration of which arises solely from mere selfish sentiment. An individual may be in possession of really ugly objects, but which (from the interesting associations of ideas they recall to his memory, on which he loves to dwell) may be interesting, but surely not beautiful, as some would uphold.

It would be needless, we think, to adduce more instances of the difference between that beauty which is perceived through association, and that through reason, study, and reflection, or what is the same relative and abstract beauty, or that beauty which exists in the object or objects themselves.

Indeed, it seems to us that this associated beauty (if we may be allowed to call it so) is not altogether the beauty which is the object of the taste we here speak of. To illustrate what we mean, the law of gravitation possesses a first principle of the beautiful,—simplicity; so the refined mind must receive gratification from

of the study of this theory; but this beauty and gratification are perfected by associating with this simple law the fact that worlds are thereby governed in their course through space.

And again, the bolier and lovelier sensibilities awakened by moral beauty, being distinct in their principle, are not, we think, to be classed under that beauty of which the taste we speak of is the object.

To us it seems that combining the influences of these distinct beauties, as affecting good taste, has occasioned a considerable amount of unprofitable dissonance; and that while the one applies almost solely to the heart and feeling without any direct reference to cultivation, the other applies almost entirely to that cultivation which is governed by, and subject to, certain rules,—rules by which we appreciate a beauty, an excellence, the offspring of truth and reason, and like these ever consistent and imperishable.

As we have shown how beauty, the object of taste, is not solely derived from association of ideas, but is governed by rules, we will now attempt to show that there is a standard of this beauty.

If there were no stable and unerring principles of judgment, there would be neither merit nor dignity in the works of the most gifted mind.

Good taste is not only progressive, but inductive, being the result of a series of experiments, the object of which is beauty; and as in all experimental sciences these researches, most carefully conducted and in their inferences most consistent, are accepted as the canons of scientific truth; so in the liberal arts, those productions which for the longest period have afforded most delight to those capable of appreciating their true merit, are rightly considered standards of taste, by which succeeding works must be tested.

Such standards in the science of taste we possess in literary compositions, sculpture, painting, and the architecture of antiquity, and of modern masters, adept pupils of their ancient masters.

It has been adduced as proof of there being no standard of taste, that mankind do not agree in their estimate of beauty; but this objection can be removed by the principle we have attempted to establish, namely, that taste is the result of intellectual cultivation; and this principle accounts for the diversity, the consequence of the varied extent of knowledge enjoyed.

We will now cite one or two objections to the existence of a standard of taste. We are told that the savage Indian considers his squaw to be the most perfect type of beauty in woman-kind. This is right enough; so would the refined European, judging from the benighted Indian's standard. This savage acknowledges a standard, but which, of course, is formed and modified by his moral and physical condition, and the amount of enlightenment enjoyed.

And, again, we are referred to the various and contradictory objects of beauty existing in the lower animal species,—that this one is admired for the length of his neck, the other for its shortness; this one for its length, the other for its breadth, and so on; but this does not prove the non-existence of a standard, but the very essence of our principle, and shows that each separate species will have its own standard, which excellence is only learned and appreciated by properly-directed study.

Taks man himself, the most perfect animal created. Now, because he possesses two legs, are we to consider every four-legged animal ugly? The absurdity of this is at once apparent. Voltaire even says that a toad will consider the perfection of beauty as resting among toads: this is further proof of our principle; if the toad had had the least amount of brains (which he has not), he would have had more sense, and considered nothing of the sort.

What we have attempted to show is, that the possession of good taste, or a true perception of beauty, is, as Dr. Samuel Johnson has defined it, "skill."

Nothing has tended more to retard improvement than placing taste and genius in opposition to reason and application, and investing the two former with some intangible, undefined excellence, incapable of being properly tried by any test, or regulated by any standard, and superior to the drudgery of study. How does this accord with fact? The greatest geniuses who have bestowed on mankind the most perfect productions have applied themselves as much to the study of rules and principles as to the production of new works. If there were no standard

of taste, of what advantage to succeeding knowledge could the works of the greatest masters prove? Nothing, save a passing pleasure, degrading excellence in the most refined minds to a mere knack, an unaccustomed aptitude, rendering the very progression of knowledge or improvement among men uncertain.

We would urge, in conclusion, the advantages to be gained by the cultivation of taste: it is one of the most ennobling and refining pursuits of the human mind, and possesses peculiar incentives of its own; for the more we cultivate this faculty, the greater will be the inducements to continue our researches.

"To love the beautiful in all things," Sir E. Bulwer Lytton observes, "to surround ourselves, as far as our means permit, with all its evidences, not only elevates the thoughts and harmonizes the mind, but is a sort of homage we owe to the gifts of God and the labours of man."

DIGGINGS IN ROME.

The Government of Pins IX. has been, and continues to be, active in carrying on public works to a degree which, if short of what is desirable, is yet somewhat beyond what might be expected from a habitually slow-moving system under present embarrassments. One of the undertakings now in progress has the object of displaying more fully to view than hitherto the beautiful ruins of the Octavian portico, sunk in and in part hidden by the buildings of an insignificant church and of obscure streets, near the *Ghetto*, or Jews' quarter. The earliest mention of this portico is found in Suetonius, where he recounts the public improvements of Augustus, and the edifices raised by him in the name of other persons, his relatives. And Dion tells us that in the great fire under Titus, A.D. 70, a library, which the widowed Octavia had dedicated to the memory of her lost son, Marcellus, probably in the vicinity of the building, which suffered from the same disaster, was destroyed with all the books contained in it. "The building and the books were at the same time burnt." Majestic in ruin, notwithstanding unsightly incumbrances, is that portico, dedicated by Augustus to his virtuous sister, who, by her second marriage, became the neglected wife of the Triumvir Antony. On the ancient plan of the city (now in the Capitoline Museum) we see a portion of it preserved sufficiently to explain its character: a parallelogram surrounded by a double colonnade, about 750 Roman feet in length, 500 in breadth, and with a propyleum, or porch, projecting from the narrower front, with four columns and two ante, from which to right and left extended the front colonnade, eight shafts in double file on each side; the lateral colonnades having each more than twenty-five in double file at the least, since twenty-five is the number of columns in the fragment of the heap, presenting to us a portion only of this building. In the centre stood the temples of Jupiter Stator and Juno Regina, also a Curia, and a *schola*, called after Octavius; the former of those temples, founded by Metellus, named (from his victories) Macedonicus, about the year of Rome 606; the latter by the Censor M. Emilius Lepidus, who had made a vow to build it during the war against the Ligurians, A.U.C. 575,—both temples having been rebuilt by Augustus in the year 721, with the architecturæ of the two Creeks, Sarcos and Batrachos, of whom Pliny relates the contrivance to transmit their names to posterity by sculpturing a lizard and a frog on the torus of the bases to certain columns in this same portico, where they were not permitted to chisel their names in letters. The portico itself is known to have been not a completely new structure, but an amplification, with increased magnificence, of another, founded, on this site, by the above-named Metellus after his Macedonian campaign. What we now behold is nothing more than the ruins of the propyleum; all the rest, the colonnades, enclosed parallelogram, the two temples, and curia, having totally disappeared, except a few fluted shafts and capitals to be seen walled up in the houses of the narrow streets adjacent; and this remnant of classic architecture, as it stands before us, is not the original building of Augustus in every detail, but the restoration by Septimius Severus and Caracalla, as conveyed in the last words of an inscription on the frieze with the two emperors' names, "*incendio consumptum restituerunt.*" Within its quadrangular area was built, so early (it is supposed) as A.D. 755, a

small church, *S. Angelo in Piscaria*, modernised in the poorest Italian style, first in 1611, and again in 1700. The intercolumniation, behind which stands that church's front, was walled up; a great part of the colonnade and triangular pediments on the inner side concealed by the modern building; but still were left, in graceful antiquity, the Corinthian capitals, the fluted marble shafts (though but in part visible), and the mutilated reliefs of eagles holding thunderbolts (allusive to the worship of Jove in the temple adjacent) on the abacuses; a lateral cornice, under which remains of the pediment on one side still retaining its ornamentation of sculptured antefixes. The arch of this ruin is flanked on one side by the church; on two others, by brick arches, the work of Severus, resting on architraves of white marble adorned with rosettes in relief, and we may conclude that the same marble originally encrusted those arches now left in the naked brickwork. The outer side, or front, originally formed of four Corinthian columns and two ante, now presents but two columns, the place of the others which are wanting filled by a brick arch, added (as inferrible) either in the restorations by Severus, or (as perhaps more probable) in later and inferior restorations, perhaps A.D. 442, after injury done to this, as to many other Roman buildings by earthquake (c. *Mnatori, Rev. Ital. Script.*, t. i., p. 1). The works now in progress have already effected the uncovering of three columns and of the entire pediment on the inner side, also of the basement and threshold beneath, down to which we can now see in an excavated area opened before the church, and crossed by a bridge of masonry; that church's front having been taken down and rebuilt on a line thrown farther back, so as to leave the columns almost isolated, instead of concealing them within its walls, as formerly. This is a great improvement; and the graceful ruin now stands amidst the gloomy buildings of the fish-market, whence that dedication, *S. Angelo in Piscaria*, presenting a very different aspect from that seen in past years, and familiar in engraved or coloured views of Roman monuments. We read of the profusion of Classic sculptures that adorned the Octavian portico, the temples, and the spaces intervening. Celebrated paintings were seen in the *schola*. The seventy-five equestrian statues in bronze, by Tisippos, of the officers of Alexander the Great, who perished in the crossing of the Granicus, were placed before the two temples by Metellus, who had brought these bronzes from a city of Macedonia; and the most precious earnest of the artistic wealth lost, destroyed,—who knows how much may still lie buried under the ground near the extant ruins?—was obtained in the seventeenth century, by the discovery of the *Venus de' Medici*,—if indeed the report be true, first given by Santa Bartoli, that the celebrated statue was found beneath a spot occupied by some of those Augustan buildings.

But the works that have lately excited most attention, and attracted throngs of visitors to the spot, are those also carried on by Government, and directed by the well-known secretary of the Roman Archaeologic Academy, Signor Visconti, on the site of the ancient Emporium, upon the steep bank of the river between the Aventine and the Porta S. Paolo. The extent of level ground in this region, within the Honorian walls, though far from the inhabited streets of Rome, is well known as the ground once occupied by the various buildings of that Emporium and the *Navalia*, to which are referred several vague and formless but picturesque brick ruins among the gardens, on the western slope of the Aventine, besides others more conspicuous, in gardens near the river, as well as the arch of brickwork, crossing the high road between that hill and the Ostian (or S. Paul's) gate, called from a little chapel and hermitage close by, *Arco di S. Lazzaro*. The Emporium, a harbour and market for foreign goods here unshipped, was founded by the *Ædiles M. Emilius Lepidus and L. Demetrius Panlus*, in the year 193 B.C., between the Aventine and the Tiber; and farther off, southwards, were constructed the *Navalia* (dock-yards), with magazines on the level nearer to the city walls. The excavations on the bank of the river, reached by a narrow path that strikes off from a platform, still used for the deposit of sculptors' marble brought hither up the stream, and therefore called the "*marmorata*"—these works that have won such praise for Visconti,—have laid open, on a steep slope immediately above the water, a considerable extent of business wall, in firm *opus reticulatum* mixed, in the usual ancient style, with layers of interstitial

masonry; and at the foot of this a ledge paved with tiles, from which is an ascent by a zig-zag path, similarly paved, to the summit of those walls, where we must find the place of deposit of goods here unshipped. The wharf, with its pathway for trucks, is here recognizable, and this purpose of the whole is made still more evident by the accumulation of hewn marble blocks, that lie strewn around, in the greater number of green-veined Carylitan called *cipollino*, with some specimens of African *breccia*. Forty-eight such blocks were left buried for ages, having (as the official gazette informs us) been found before the 14th of February. Several smaller fragments, more finely wrought, in porphyry, rosso antico, and other coloured marbles, as well as pieces of glass vessels and terra-cotta lamps, are spread out on sale, under care of some superintending workman. The Pope, who has inspected these discoveries, has rewarded Signor Visconti with a gold snuff-box, set with diamonds. More imposing ruins of the Navalia are seen in an extensive garden of Prince Torlonia, between the road under the Aventine and the river-bank; but at some distance from the site of those excavations. Here, too remote to be seen from any highway, and therefore very little known or visited, we find considerable remains of a lofty structure, in brickwork, forming three sides of a quadrangle, the fourth side having, as apparent, been left open to the river, with whose banks it corresponds, to be approached by steps from the water-level. On one side the ancient walls are opened by a row of wide arches; on another they are pierced by round-headed windows in the upper part, which, as they do not seem to belong to the original plan, we may suppose to have been formed at some Medieval period, and to have served for habitations, thrown up against the antique building. It is assumed that the date of these structures may be about the same as that of the Emporium; their masonry is of concrete, faced with brick; not of the better Roman style. The Aventine, with its contents, Monte Testaccio, the Trastevere quarter of the lower banks of the Tyber, are seen in a picturesque grouping of objects from these spacious garden-grounds, a pleasant sunny spot, which, with its solitude and ruins, forms one of the interesting byways, little known, or named, so many of which may delight the explorer in Rome.

THE TECHNICAL INSTRUCTION MOVEMENT.

A PUBLIC meeting has been held in Hulme Town-hall, under the auspices of the Amalgamated Society of Carpenters and Joiners, in support of a movement by the members of the Society in the Manchester and Salford district, for the promotion of technical instruction among the artisans employed in these trades. The numerous lectures on the subject given in the principal centres of industry in England, and the comments of the press in reference to foreign competition, have had the effect of stimulating some members of the Society to take the matter practically in hand. Their efforts have been directed to the formation of a school for technical instruction in mensuration, drawing, practical geometry, mechanics, and other matters relating to their daily work; and they have resolved that all the classes in connexion with the school shall be open to those who desire to attend, whether they be members of the Society or not. The executive council of the Society, located in London, has warmly recommended the project, and its promoters state that they have received during the past month from several gentlemen of prominence conversant with the subject, assurances of the high estimation in which they hold a movement which, as they remark in the prospectus of the new institution, "stands amongst the first instances, in the industrial history of our country, of a trades' union undertaking to promote a plan for the education of its members." The use of St. John's Schools, Gartside-street, has been obtained for the accommodation of the classes, the services of efficient and practical men as teachers have been secured, and the classes meet every Tuesday and Thursday evening. The aim of the promoters is not confined to mere class-work, though that of course forms the most important feature of their plan; but the members of the institution are to be invited to engage in a series of competitive prize essays on subjects connected with their practical

studies; and it is also proposed to have lectures and papers from gentlemen of scientific eminence, and to establish orders of merit and honourable degrees in connexion with the subjects of study. The meeting was numerously attended by artisans of both crafts. The chair was occupied by the Mayor of Manchester (Mr. R. Neill), himself a practical builder, and a large employer of skilled workmen in the trades for whose benefit this institution is intended.

Mr. Scott Russell, in moving the chief resolution, said he was one of the—he would say fortunate—men who had enjoyed the two things rarely combined—the blessing of a university education and the blessing of a workshop education. If he were asked which of those two privileges he valued most, and which had been the greatest pleasure and comfort to him, he was sure he could not answer the question; but he said for himself, his children, and his friends, if it could be given to the rising generation, let them have both. He strongly deprecated the practice of introducing hard names for things which could be easily rendered intelligible in plain English, and strongly advised that the promoters of this school should procure the services of a master who possessed that qualification. He was glad to see they proposed to teach geometry—although that was a hard name, and the use of it was bad—which simply meant, in plain English, the knowledge of shape. He dwelt upon the importance of elementary geometry, and the far higher geometry which we know nothing about, the knowledge of curved shapes. He instanced the wonderful aptitude of the Greeks for this description of work, and contrasted the inferior knowledge which the English workman possessed in this respect as compared with the foreigner. He did not know an English joiner who knew how to make an oval, but those of them who had visited the Paris Exhibition must have had their attention directed to the fact that the French could make ovals, and if they studied a French oval, they would find it one of the most exquisite specimens of carving they ever saw. Therefore, he was glad that they were going to learn the principles of shape. The next set of principles he observed they were going to learn was that of mechanics, and he need hardly tell them that if they were well-taught mechanics, a knowledge of those principles would give them a thorough mastery of their tools. With regard to the methods of learning, he would say this: begin first by learning the profound and essential principles. And they should not understand that because a principle was profound it was difficult to learn. If they procured a clever master, he would put the profoundest knowledge in the simplest possible language; and he knew nothing that was intelligible and worthy of knowing that could not be conveyed in plain English. He was not one of those who said they were afraid of the foreigner running away with the laurels of the English workmen. He was not afraid of the English workmen being beaten, because he knew, first, that from youth upwards they took a pride in doing a good job; and, in the second place, that they could put energy and heart into the work. Mr. Russell concluded by moving the resolution,—

"That this movement for the promotion of technical education amongst the carpenters and joiners is deserving of all support, not only on account of its value to the trade, but for the interest it will give to the workmen in their work; and that, as intelligent artisans, their work will be done better, and they will feel a greater pleasure in doing it."

Dr. Parkhurst, Mr. Jacob Bright, M.P., and the Rev. J. P. Hopps having addressed the meeting, the resolution was unanimously agreed to, as was another, moved by Dr. John Watts,—

"That as this movement will have the tendency of removing that prejudice existing against all trades' unions because of the deeds of darkness perpetrated by a few, this meeting calls upon all artisans, builders, &c., connected with the trade to assist in its successful adoption."

STEALING A STATUE.—At one time "stealing a statue" appeared about as likely a feat as that of stealing a railway arch, but the former feat has lately been accomplished in France. The men in the employment of M. Hoyaux, founder, at Meux, were astonished, on going to their work a few days back, to find that a bronze equestrian statue of the Emperor Baudoin, of Constantinople, placed for safety under a shed, had disappeared. Notwithstanding its great weight, a robbery was possible from the fact of the casting being in four pieces. The watchman of a neighbouring factory heard during the night one or more heavily-laden vehicles pass.

THE PROPOSED MEMORIAL OF THE LATE LORD FEVERSHAM, HELMSLEY, YORKSHIRE.

WE mentioned some little time ago that it was proposed to erect in the Market-place of Helmsley, a Memorial of the late Lord Feversham, from voluntary subscriptions by friends and tenants; and that a design, obtained from Mr. Charles Barry, architect, had been approved of by a public meeting, and was to be carried into execution forthwith. This being settled, an illustration of the design was prepared, and is published in our present issue. It appears, however, that a change has been brought about by some means, and it may be useful to report briefly the proceedings.

At starting it was proposed that the Memorial in question should be wholly independent of any memorial or monument which the family might erect either in the parish church, now in course of restoration, or elsewhere. This course was taken with the full approval of the present lord, as evidencing a more emphatic and unflinching desire to do his father honour on the part of those among whom he had lived so many years.

A market-cross was finally decided on (after a good many suggestions) as the shape the memorial should take. An influential committee was appointed, and they requested Mr. Barry (who had been identified with the estate and the late lord as his architect for twenty years) to advise and act for them.

A design was accordingly sent down, and at a meeting held directly after, it was adopted "by an overwhelming majority," with such additions as an expected increase of the funds should admit of. To meet this resolve a more elaborate design, to cost about 800*l.*, was sent down, was submitted to Lord Feversham, and approved. Another meeting was then held, when the improved design was adopted, and some additional subscriptions were announced.

The material of the memorial was to be a fine-grained warm sandstone from Bilsdale (to be given by the present lord); the emblematical figures of Justice, Mercy, and Truth were to be in red Mansfield, giving relief of colour and individual importance to them as works of art. The pedestal was to have a portrait bust, in alto-relief, of the late lord on one of its faces; on the opposite one a dedicatory inscription; and the other two panels were to have bas-reliefs illustrative of some of the tastes and pursuits of the late lord. A contract was arranged with a local mason, and an eminent London sculptor had agreed to execute the figures and panels.

At the final meeting, however, 7th of March, called to receive the report of the committee appointed to collect subscriptions and to proceed with the work, a design by Professor Scott was handed in by a member of the family, and its acceptance urged on the subscribers by an undertaking (as its cost far exceeded the design which had been made by Mr. Barry, to meet the means at command of the committee) that the amount of its extra cost would be found by some of the members of the family. This design was made by Mr. Scott in ignorance of previous proceedings, and he naturally hesitates, as we are told, under such circumstances, to proceed.

We have here another instance to be added to the long list of those where a committee seems utterly to forget, or trifle with, the honourable obligations they enter into with professional men.

OFFICES OF THE SCOTTISH PROVINCIAL ASSURANCE COMPANY, DUBLIN.

THE offices for this company, in Sackville-street, Dublin, have been erected from the designs of Mr. T. N. Deane, architect. They stand at the corner of a street, so as to show two sides, and the style adopted may be spoken of as a free treatment of Scottish Gothic. Elliptical and straight-headed windows are made use of. A turret at the angle, corbelled out over the ground-floor and terminating with a conical roof, gives importance to the structure. On the ground-floor are the offices of the company, including public office, waiting-room, board-room, and secretary's room. The upper floors are arranged for letting as offices, and the basement will be let for wine stores. The total cost was about 4,000*l.* The materials used are granite, Scotch stone, and lime-stone from Skerries, near Dublin. The builder was Mr. G. Carolin, of Dublin.



THE FIRST ACCEPTED DESIGN FOR THE FEVERSHAM MEMORIAL, HELMSLEY, YORKSHIRE.
By MR. CHARLES BARRY.



THE SCOTTISH PROVINCIAL ASSURANCE OFFICES, SACKVILLE-STREET, DUBLIN.
MR. T. N. DEANE, ARCHITECT.

THE TRADE MOVEMENT.

The Potteries.—A dispute between the builders of the Potteries district and the carpenters and joiners, as to the hours of labour, was lately referred to Mr. J. E. Davis, the stipendiary magistrate of the Potteries. The masters proposed that the carpenters and joiners, who go to work at six and leave off at 5-30, should begin later in the winter time, and leave off at six all the year round. The men resisted this proposal, and Mr. Davis has decided in their favour.

Bradford.—The unionist journeymen painters of this town have struck for an advance of wages. In 1864 the wages of the men were 22s. to 24s. per week of fifty-eight hours; but in the following year the mode of payment was altered to the hour system, and was fixed at 54d. per hour. In the two succeeding years it was raised 4d. per hour; and when they left their work they were receiving 54d., and now demand 6d. an hour. The employers say they are determined to make a stand against these annual exactions, and, as business is not very brisk, they have resolved not to accede to the demands of the men. On the other hand, the men say they asked for 6d. per hour in 1866, and were told it was a reasonable demand, but that the masters were not prepared to give it all at once. They did not strike, but agreed to take 4d. advance for that year, and the same last year; but now the masters refuse the men's request to settle their portion of the agreement, and refuse to meet them, and decline arbitration.

Oltham.—The Springhead Spinning Company have got an *ex parte* injunction in Chancery against John Riley and John Butterworth, as chairman and secretary of a trade-union called "The Operative Cotton Spinners' Association," to prevent them from printing and publishing placards injurious to the business of the complainants, by hindering persons from working for them or otherwise.

Glasgow.—The dispute between the ship-builders on the Clyde and the operative joiners is assuming a somewhat formidable magnitude. Messrs. Napier & Son posted a placard in their works, warning the joiners in their employment that, if they supported the workmen on strike in Greenock, they must leave their situations. In consequence of this intimation, the men convened a meeting, at which they resolved to cease work at once. As matters now stand, the following yards are said to be all but clear of joiners, viz., Messrs. Randolph & Elder, J. & C. Thomson, Barclay & Curie, Wingate & Son, Laurie, C. Connell & Co., Aitken & Mansell, and also Messrs. Simons' and Henderson's, Renfrew.

Scotland generally.—The strike in the moulding trade in Scotland is now at an end, the men having accepted the written conditions under which the men are to be allowed to resume work, the restrictions hitherto enforced by the union are all to be abandoned. In point of fact, the whole policy of the society is to be given up, although the men are not required formally to renounce their union. The strike or lock-out lasted for nine weeks. Upwards of 1,800 men were thrown out of employment at the commencement of the struggle; and although many of them obtained work in other places, there still remained a large number dependent upon such assistance as could be afforded from the society's funds. It is estimated that the cost to the union has been about 4,500*l.*, or an average payment of 500*l.* per week.

Geneva.—The strike here has terminated. The walls were lately placarded with the following notice:—"Department of Justice and Police.—The delegates of the masters have communicated to the Department of Justice and Police, in a document signed by them, the conditions on which it would be possible for them to open their workshops. These conditions, having been communicated to the workmen, have been accepted by them. It is, therefore, decided that the work will be resumed on Monday, April 13th. The friendly relations which always existed between masters and workmen will be consolidated by the crisis just past,—a crisis which, thanks to the liberty we enjoy, has ended peacefully and happily. Long live the Confederation. Long live the Republic of Geneva. P. B. CAMPERIO, Councillor of State." The result of the strike has been that the masters in the mason, plaster, polishing, marble, whitemith, glazier, joinery, and carpentry trades have consented to diminish the day's labour by one hour,—that is to say, from twelve

to eleven hours, and to increase the wages of the men by 10 per cent. The masters of the locksmith, mechanic, and founding trades have consented to the reduction of one hour's labour, and to an increase of 5 per cent. in wages.

Italy.—Many thousand persons, mostly workmen, paraded the streets of Turin a few days back, shouting, "Down with the Ministry!" "Down with the grist tax!" Much difficulty was experienced in restoring tranquillity and preventing serious disorder. This demonstration arose out of the strike of the men employed at the arsenal, in the tobacco manufactory, and on the railways of Upper Italy. The authorities had deducted 5 per cent. from the wages of these persons as payment of the tax on personal property, the act being illegal, since wages of small amounts are declared exempt from the impost. Other strikes, more peaceful in their character, have taken place at Bologna, Naples, and Milan, especially a strike of the owners of public carriages, on which was placed so onerous a duty, that if it had been persisted in, it would have led to the ruin of many undertakings. The tax has been suspended.

ST. SEPULCHRE'S, SKINNER-STREET.

FOR the purpose of the enormous work now being carried out by the Corporation of London in forming the Holborn Viaduct, part of the churchyard of St. Sepulchre's is required. A new street is designed to branch north-westward into Farringdon-road, very near to the ancient tower of the church. The parish are very anxious that the opportunity should be taken to isolate the church, and put the tower, the outline of which is very bold and striking, prominently in view in passing over the viaduct. The opportunity is so favourable that we cannot resist expressing a hope that it will be taken advantage of. Mr. W. Haywood, the architect of the Corporation in this work, is so fully alive to the value of aesthetic improvements, and knows so well the interesting character of the church and its neighbourhood, that we feel tolerably sure of his willingness to assist in bringing about what is desired, if circumstances can be made to allow of it.

CHURCH OF ST. HELEN, BISHOPSGATE.

THE reopening of St. Helen's, Bishopsgate, took place on the 31st ult. The unsightly partition and organ-gallery, which obstructed the proportions of this ancient church, have been removed, and the organ re-erected in the south chantry. The floor of the church has been lowered in many places to its original level, and the chancel paved with tiles made by Messrs. Minton, after the pattern of some ancient remnants discovered *in situ*, embedded in the walled-up opening leading from the nuns' choir into the cloisters of the convent, at a depth of 3 ft. 6 in. below the present floor. This opening, together with a staircase in the thickness of the wall, and several hagioscopes from the cloisters, are now visible, as is also the base of the fine monument of Sir John Croshy.

The ancient brasses are relaid under the east window in the chantry. The flat plaster ceiling over the east end of the nuns' choir has been replaced with one more in keeping with the rest of the church; and a new roof, with additional lights, constructed over the chantry. The old pewing has been removed and other seats provided; the old carved stalls from the nuns' choir are re-used in forming the present choir-seats.

Several windows filled with stained glass have been added to the church by various generous donors, amongst which most conspicuous is that erected by Messrs. Hodgson, at the east end of the church, to the memory of their father, for fifty years a parishioner and resident merchant in the parish. Messrs. Heaton, Butler, & Bayne were the artists. The centre light has the Ascension, and the other portions are filled with various scenes of the life of our Lord.

The window at the east end of the nuns' choir has been put up to the memory of Sir Thomas Gresham, Knight, by the Joint Grand Gresham Committee; the glass is by Messrs. Powell & Sons, and represents St. Helen and the four evangelists, with the arms of Sir Thomas Gresham and the Corporation of London and Mercers' Company. A small window in the chantry has been restored and filled with por-

tions of old glass, by Messrs. Heaton, at the cost of the present churchwardens, Messrs. Rolfe and Richardson. On the south side is a stained-glass window, by Gibbs, presented by Mr. Williams, an old parishioner, representing the legend of finding the cross by St. Helen, the patron saint of the church. Another window, by Gibbs, was presented by Alderman Wilson. A small ancient light has been also filled at the cost of one of the architects, in memory of his ancestor, Bishop Robinson; it adjoins the tablet to John Robinson, merchant of the staple, A.D. 1599.

The collection of monuments is one of the finest in the City of London; that to the memory of Sir John Spencer has been moved to allow the opening of an arch which it formerly obstructed, and has been restored in colours by Messrs. Poole, at the cost of the Marquis of Northampton.

The cenotaph containing the embalmed body of Bancroft has been removed by the Drapers' Company.

The work has been carried out under the superintendence of Messrs. Wadmore & Baker, architects.

A MASONIC HALL, IRELAND.

THE *D Belfast Newsletter* announces the opening of Leamne Masonic Hall. The hall is situated in St. John's-place, at the north end of the town, and is approached by a spacious avenue. The style of the building is Tudor Gothic. It is built of black stone from quarries in the neighbourhood, the dressings being of Scarab freestone. The gables are capped by ornamental cast-iron finials, and over the porch is placed a globe. The grounds about the building are enclosed by iron railing, and are planted with shrubs and flowers. The hall in which the lodge meeting will be held is 35 ft. long by 20 ft. wide, and is so adapted that in it all the higher degrees of Masonry can be practised with great facility. There are two ante-rooms, one of which will be used as a cloak-room, the other as a sitting-room. In the east is situated a throne on a raised dais, over which is a draped canopy of crimson merino, surmounted by a gilt crown, and in the centre of the room is placed an altar, on which are the Doric, Ionic, and Corinthian orders of architecture; also three candlesticks in a triangular form, the implements of the craft, and other Masonic symbols. In the east is the seat of the senior warden, and in the south the seat of the junior warden, opposite each of which are benches of the form of a double cube. The hall is illuminated by means of a large sunlight, 3 ft. in diameter, which is placed in the centre of the ceiling. The architect of the building was Mr. William E. Kelly; the contractors were Messrs. Dixon & Son, of Larne.

RAILWAY INTELLIGENCE.

THE extension of the Underground Metropolitan Railway to St. John's Wood, has been inspected. It extends from the Baker-street station to the Swiss Cottage station. The length of the line as now open is one mile, seven furlongs, and six chains. Leaving Baker-street new station, the next come to a St. John's Wood-road Station, near Lord's Cricket Ground. The next is Marlborough-road Station, close to the Byre Arms, Portland-town. The next station is the Swiss Cottage. The railway is constructed as far as Finchley-road, and only requires a station to be opened to place it in full working order. The entire journey from Baker-street to Swiss Cottage Station is travelled underground, with the exception of the approaches to the stations and the stations themselves, which are all lighted from the top by glass roofs. Both in the stations and in the tunnels ventilation is secured. It is intended that trains shall run to the City from the Swiss Cottage and intermediate stations every twenty minutes; but during the business hours of the day there will be local trains run between Swiss Cottage Station and Baker-street every ten minutes.

In the course of the trial of an engine-driver for manslaughter, of which he was acquitted, at the Gloucester Assizes, counsel for the defence incidentally gave an easy rule for remembering the railway signals,—

"White for right, red for wrong,
And green for 'gently go along.'"

The traffic receipts of railways in the United

Kingdom amounted, for the week ending March 28th, on 13,146 miles, to 691,059l., and for the corresponding week of last year, on 12,810 miles, to 677,105l., showing an increase of 267 miles and of 13,954l.

Mr. Thomas Payne, conductor of the Detroit and Milwaukee Railway, has lately invented an ingenious contrivance to indicate to railway passengers the station which they are approaching, its distance from the one last passed, and from that point to each terminus of the road. It is placed in the centre of the car, and has two arms projecting about 2 ft. from each side of the car, which, coming in contact with posts placed for the purpose, turn the indicator immediately after passing each station.

The railroad bridge at Burlington, Iowa, now nearly completed, has required over 3,000 piles and 1,000,000 ft. of pine lumber. The bridge is 2,237 ft. long; and 7,500 cubic yards of stone have been laid.

OVERLAND ROUTE TO INDIA *via* THE BLACK SEA.

Sir,—In a few years Russia will have extended railway communication to the frontier of India. The line between Balta and Odessa has been opened some time, and the section from Balta to the Austrian territory is commenced, as also the line from the Black Sea to the Caspian is being pushed with vigour. The entire journey from Charing Cross to Bayreuth, on the southern shore of the Caspian Sea, will not exceed six days, including the passage of the Black Sea. It is in contemplation to continue the line through Persia to the frontier of India. Upon this scheme some of the chief thinkers, chief workers, and chief engineers of Russia have been engaged for some years. The journey by this route from London to the Indian frontier will not exceed eight days.

Is it not an insult to the genius and enterprise of Englishmen that Russia will be the first to drive a railway through this solitude, and leave it no longer a huge void on the earth's surface? The line will traverse many a gwañ, and cross many a dried-up nllāgh, that has played its part in the world's history. The benefits which it will confer on the native population are incalculable; there the people will multiply, and religion and civilisation and commerce will be promoted. Beds of clay, granite, sandstone, schist, white kaskin, yellow, red, and other coloured ochres, are to be found in abundance in many sections of the line; as also *kunkar*, or lime and gravel.

Had our Government adopted a positive instead of a negative attitude towards the projectors of the Enphrates railway, Russia would never have contemplated a great rival and shorter line.

PIERRE ARTHUR, India.

ST. BARTHOLOMEW'S, SMITHFIELD.

Sir,—We are not surprised at the disappointment experienced at seeing the ugly girders thrown across the east end of St. Bartholomew's Church in place of the apse itself; but, in justice to the committee, we should be delighted by your allowing us to state that they have need every exertion to rebuild the apse in its entirety. The upper part (as is well known) is occupied as a factory. This place a zealous member of the committee endeavoured ineffectually to purchase. The opinion of two eminent counsel was then taken as to the course to be adopted, and after their report we consulted with the architectural committee of the Incorporated Society, whose unanimous feeling, we believe, was, that the best plan would be to show the complete form of the apse on the ground-floor at least, leaving the upper to be added whenever circumstances would allow.

There are a few other points connected with the restoration which we should also be glad to have noticed if your space will permit. The whole church was, as you are aware, filled up with rubbish about 3 ft. 6 in. deep, the paving of the floor being made up to a great extent with tombstones. In order to lower the ground these had of course to be temporarily removed, and though the committee undertook to have each one restored to its precise position on the lower level, the necessary facility was at first refused. When the difficulty was, with some trouble and expense, got over, and the earth dug out, it was found that some of the grave-vaults had, in comparatively recent times, been dug in a most dangerous way under the piers. In two cases

the excavations were so completely under them as to render it a matter of surprise to every one that the piers had been able to stand at all. There seemed to be literally nothing for them to rest upon. On trying the ground still further, we found that a number of the piers had been built on a layer of very soft material (almost peat), and this had so far given way as to cause very serious settlements in the work over; so much so, indeed, that two of the piers had to be shored up with extreme care, and entirely rebuilt. The south clearstory wall had been seriously injured by the fire which occurred some twenty years since, and had to be taken out and replaced pier by pier. A curious circumstance we have noticed during this work which we do not remember in other cases, that, in the drying of the church after the removal of the earth inside and the formation of the area externally, the joints of the stonework shrank perceptibly, as was shown by an iron bar cut to the exact length between some of the mouldings.

Of the above work there is of course little now apparent; and there is, perhaps, less to be seen than in many other cases, as it has been our greatest care throughout to leave every portion of the old work so far as possible untouched.

THE ARCHITECTS.

A NUT FOR THE PROFESSION TO CRACK.

Sir,—The remarks by "A Country Gentleman" were well meant, and deserve the careful consideration of the profession, but quite fail to answer the problem put by me. The payment by per-centage was so far from being the point objected to, that the engineer engaged in lieu of an architect is to be paid as an architect would be, by per-centage. I maintain, therefore, that the cause does lie "in the utter severance of art from the affairs of practical life," and that the reason of this strange selection was that it was thought an engineer would have no temptation to run up expenses for ornament.

As regards the point raised by "A Country Gentleman" I am not disposed to give much weight to it. Fortunately, few amateurs are so foolish as to expend 17,000l. without professional advice; and those that do (unless they are Heaveu-born architects, and then they are perfectly wise and justified in acting for themselves), will be mulcted to a far greater amount than 5 per cent. by their unchecked employes. They do no damage to any but themselves, and, perhaps, their successor, who will, doubtless, if he has any taste at all, pull down and rebuild all such amateur work.

Country gentlemen are quite at liberty to act as their own architects, just as they would be to act as their own doctors; and nice pills would be the result of their own concocting in either capacity.

Cannot "A Country Gentleman" see that honesty is the best policy for architects to follow, and that they would be killing the golden goose for the sake of a paltry single egg or two, if they were to act as he thinks them so tempted to do? At any rate, I believe the world does give them credit for more worldly wisdom than that, and, perchance, for a trifle of proper principle besides. If the mode of their payment be open to criticism, the Institute has declared, after due consideration, that it seems to be the best that can be devised under the circumstances; still, if "A Country Gentleman" can suggest a better, the thanks of the profession, as well as of the class he represents, will be most ungrudgingly accorded to him.

J. P. S.

THE "EGYPTIAN HALL" IN THE CITY.

Sir,—Your correspondent under the above head, whose letter appears in your number for March 21st ult., page 214, would be in error if he considered his communication the first that has occurred with reference to that appellation.* The subject was taken up by me in August, 1826, now upwards of forty years ago; and as the letter I then wrote contains the whole in as concise a way as I could otherwise explain it, together with the circumstance that then induced me to notice it, I beg to hand you a copy. I received a friendly letter from Mr. Britton in answer to it, in which he says,—"I have to

thank you for your polite and judicious letter respecting the Mansion House, which appears written by myself," &c.

Your correspondent says there are three-quarter columns in the upper tier. They are, however, shown as only half columns. The reason is obvious, since, however more correct a three-quarter column would be *per se*, it could not have been placed over the lower column in addition to the surrounding wall without one or other overhanging on a false bearing.

H. G.

Copy of Letter to Messrs. Britton & Pugin, Editors of the "Illustrations of Public Buildings of London."

August, 1826.
Gentlemen,—In No. 15 of your "Illustrations of the Public Buildings of London," under the head of 'The Mansion House,' and in pages 123 and 124, I observe the following:—"To the south of the saloon is the Egyptian Hall, for the appellation of which see an engraving, as it is, as it displays no vestige of Egyptian architecture or following observations, which may, perhaps, prove as satisfactory to you as they are to me."

It will be requisite first to consider the hall not as it now exists springing from the entrance with its support, but as it existed before the 'attic' was taken down, a representation of which you will find in plates 33 and 34, vol. ii. of 'Vitruvius Britannicus,' by Woolfe and Gandon, where you will observe an upper range of half columns placed against a wall, in which is a tier of windows, the whole resting on the lower range of columns.

Referring now to 'Vitruvius,' book vi., cap. 5, where he treats of the Egyptian 'Zeus,' which precisely corresponds to the Egyptian Hall at the Mansion House as it was originally executed, I may not be amiss in saying, therefore, denominated given from its resemblance to the double 'Zeus' denominated Egyptian, and from which, no doubt, the idea was taken. The authority of Vitruvius, of course, suffices; but he is also followed by Palladio, who in his book iii., cap. 10, treats of the hall in an 'Egyptian manner,' which is further explained by a plan and section exactly corresponding with that of the Mansion House as first built; and these matters are followed by Ware, who, in his book iii., cap. 30, and in two plates, each numbered 37, gives the same description of the Egyptian Hall. It may not be here to notice that this hall at the Mansion House, as now altered, corresponds exactly with the hall which Vitruvius in the very same book and chapter denominates 'Corinthian,' where he states that the difference between the Corinthian and Egyptian orders is that the latter (the Egyptian) has two tiers of columns disposed in the way he there mentions, and with the upper range surrounded by the unsheltered floor (the lead flat of the Mansion House), and that the former (the Corinthian) has only one tier of columns, from at the Mansion House now is, I would therefore suggest that, as since the alteration the name Egyptian Hall no longer applies, and (as the circumstance which has occasioned this letter proves), it is the cause of some perplexity, since the name has been altered to 'Corinthian Hall,' an appellation which at once accords with the Corinthian Hall of Vitruvius, and with the order of architecture used in its embellishments. It is also the name by which, if originally constructed as at present, it would, no doubt, have been then called. It has the advantage also of conveying to our ideas a juster conception of its character and style, and it would be also less liable to censure from critics.

SIDMOUTH, DEVON.

Sir,—I have read the interesting article on Sidmouth, Devon, contained in your number for April 3; and, with reference to the origin of the improvement to the sea wall, I beg to inform you that the scheme for an improved outfall, which appears from your article to be at present being carried out at Sidmouth, was originally proposed by me in a report made last April by request of the Local Board of Health, upon one or two other schemes submitted to them by Mr. Phillips and another gentleman.

WALTER BRADLEY.

THE EDUCATION OF THE WORKING CLASSES.

Sir,—I feel sorry that I should intrude on your valuable space, but, being had a number for the sensible letter of "Jack Plane" on the 27th ult., and the reply of H. Morell, secretary of the Sunday League, to what "Jack Plane" calls "nostrum-mongers on technical education," I fully agree with "Jack Plane." Mr. Morell writes a quotation from the Society of Arts on the artists' reports, being one of those reports, and one of those whom H. Morell had up in *Daily News* as having great discernment, and quoted a remark from my report to support his purpose, totally reversing the meaning of the sentence. Therefore cannot give him credit for his discerning faculties, and endeavoring to conceive idea of technical education, and endeavoring to have no, as he opened on Sundays, as in Paris; which at once convinces me that he knows nothing of the means which enable the Parisians to acquire a knowledge of the fine arts, nor the reason that engineers and architects are now stipulating when they let contracts that the work shall not be carried on on Sundays. It is not on Sunday that the Frenchman studies the fine arts, but the evening. It is the easy manner of transit that enables him to do so, as he can ride in any part of Paris and back to his home again for 3d. (30 centimes). If we had the same easy and convenient means of transit in London, there are hundreds of London artisans who would visit there three hours of an evening for the purpose of study. When I go there it costs me 1s. for omnibus fare. If I could ride for 3d., as in Paris, I feel certain I would go four times,—

* There was no supposition to that effect.—Ed.

times, for once that I had now. The grand evil in it is too much talking and too much management, by far at a number living by their orations out of subsidies obtained from working men and other sources...

ARTISTIC CURIOSITIES.

—Apropos of the article on Curiosities of Art, appeared in last week's Builder, I think I can point out a slight instance of inattention to the text in a note by J. E. Soden, in the Exhibition of the Society of English Artists, in Suffolk-street. "Talking Treason," is the name of the picture, and the artist's name is not given in the catalogue...

AN OBSERVER.

PROPOSED WORKHOUSE FOR ISLINGTON.

—In reference to this competition, will you allow me to state that the positive instructions of the Guardians that the buildings committee should not exceed the cost of £1,500. On these instructions I prepared and submitted designs, including central ward and ventilation, and the infirmary arranged on the principle, and so on to which was awarded the second prize...

J. ELIUS.

ARCHITECTS OF THE CEMETERIES.

—Will some of your numerous readers give me information as to the names of the architects who made the plan of the cemeteries at Kensal Green, Highgate, and New-road Cemeteries, and the best monuments found in each of the distinguished persons? W. G.

ARTESIAN WELLS.

—I would be obliged if any of your readers could inform whether the machine invented by Dr. Potts, and used some years ago in your pages, has been applied to artesian wells; because, in my opinion, it is applied with advantage, having been used several times with great success in sinking iron pipes of bridges. J. D. J.

THREEPENNY RAILWAY SYSTEM.

—A rather startling proposal has been made by Mr. Raphael Brandon, the architect, in a paper which he has read at the Society of Arts, and is printed, showing "how to make railways profitable to the shareholders, beneficial to the public, and profitable to the State." Mr. Brandon proposes that the railways shall, by legislative enactments and Government authority, be placed under one management, and the fares be at a uniform rate for all distances, somewhat on the principle of the postage system, which he alludes as an analogy, though not by way of example or argument. In making an estimate he says:— "I suppose that the numbers at present travelling would be increased sixfold if they could travel one journey of distance in one direction for the sum of threepence, is the minimum sum I have based my calculations on. Existing fares under the proposed minimum prices would be as successful; they are comparatively few, could not affect the calculations. In the general summary, I find that during the year 1866, passenger trains to the number of 3,448,660 produced 1,208,918,350 passengers; and during the year 1867, produced 1,472,802; this gives an average of nearly 1,340,860 passengers for each train, that is about 34 passengers for each mile, the average fare paid by each passenger is 1/6d. I suppose that the number of passengers could be carried for 1/6d. small (if any) additional expense; and if a uniform rate of threepence was charged for any distance for each person, at a very moderate computation six times

the present number would travel, and would produce 18,866,984, being 4,172,187, in excess of the present receipts.

The above calculation is made supposing that each person pays only a threepenny fare; but as it will be necessary to divide the passengers into different classes, a much larger receipt may be reckoned upon. For this purpose I would divide the traffic first into half, supposing that half the passengers would travel by single fares (that is to say, would pay for each journey at the time), and these I would sub-divide into three classes as follows: at one shilling for first-class, sixpence for second-class, threepence for third-class."

There will, no doubt, be many readers of this paper who will at once say that the idea of carrying a passenger from London to Edinburgh for 3d. is preposterous, but we must remember that it was not until Sir Rowland Hill had shown its feasibility that any one thought it reasonable to take a letter from London to Edinburgh for the same charge as from London to Richmond. It may be said that the analogy does not exist, that the half ounce of a letter is nothing, but that a passenger is really heavy and makes some difference in the cost of running a train. In reply, I say that the delivery of a letter is the most expensive part of its cost to the Post-office, whereas a passenger takes himself away; that the average of trains run could each carry six times as many passengers as are now conveyed by them, and though the expense might be slightly increased, the increase could be but extremely small, while the receipts, as I show, would be enormously augmented. The increase of expense would also be further much more than met by doing away with a large number of ticket-clerks and others, who would not be required under the new system. The foregoing calculations have been based upon the returns of 1867. Those for 1868 show more favourably for the correctness of my views; and I have no doubt those of 1867 will yet more fully justify my calculations, and the soundness of my plan and arguments.

Without writing, under one management, all the railways in the kingdom, no considerable saving can be made, and the system cannot be developed as it ought to be, and no board representing different, and, in many cases conflicting, interests, can ever be made to work for the public benefit. The interests are national, and the management, to be effective, must be national also. At the present moment the Government can safely guarantee 4 1/2 per cent. to the proprietors of railway stock, and this guarantee would at once raise the value, and, consequently, leave a large profit to the Government; therefore all railway proprietors would be benefited by the Government taking up their lines. The public would speedily reap the advantages of a complete and harmonious system of management, with regular and continuous trains running in all directions, and a general diminution of expense; trade would be benefited enormously by the increased facilities of traffic; while the effect upon the money market at once occurring 433,000,000, of sunk capital into readily convertible securities, would be a stimulus of enormous value to the country."

In the discussion which followed, Mr. Hawes and others naturally opposed some strong objections to the scheme.

BUILDERS' ACTIONS.

WITTER F. WILLIAMS.

THIS was an action, tried at Liverpool, before Mr. Justice Mellor, to recover the balance due upon a contract for the alteration of certain building premises in Liverpool.

Mr. Charles Russell was for the plaintiff; and Mr. Pickering, G.C., and Dr. Cummings were for the defendant.

The plaintiff is a builder and the defendant is an attorney, both living in Liverpool. The latter also carries on the business of a clothier, and the contract in question had reference to certain alterations in the defendant's business premises. The contract, which was made in February, 1865, contained some very stringent provisions binding the plaintiff to finish by a particular day, and imposing heavy penalties for non-compliance. It also contained a provision making the defendant's architect the final arbitrator in case of difference between the parties. The defendant sought to deduct from the plaintiff's bill, which in all amounted to a sum of 298l. only, no less than 136l. for delay. He also sought to charge the plaintiff with a further 100l. for failing to observe an award which his (the defendant's) architect was alleged to have made. The plaintiff denied that any award had been made, and also denied that the delay in the completion of the work was attributable to him. When the case had proceeded some way the learned Judge suggested a compromise, and it was ultimately agreed that a further sum of 50l. should be paid by the defendant to the plaintiff.

CASES UNDER METROPOLITAN BUILDING ACT.

Necessary Repair.—Mr. Brist, of Henley-street, Battersea, was summoned by Mr. Jennings, jun., district surveyor, before Mr. Dayman, at the Wandsworth Police Court, for doing work without notice.

The district surveyor contended that the whole of the shop-front and stall-board at the corner of Henley-street and Lower Wandsworth-road having been removed and replaced by a new one, in which the position of the door was altered from the corner to the front towards the Lower Wandsworth-road, the work required notice, under sec. 38, and was a work subject to the Act under sec. 3, 2. The defendant argued that the shop-front having been blown in, what was done was merely necessary repair.

The magistrate held that, in sec. 3, the words "done for any purpose, except that of necessary repair, not affecting the construction of any external party wall, or referred to as any alteration or addition," as well as to "any other work," and that, if the work in the first instance came under the head of necessary repair, the fact that it was not retaken exactly the same as before would not render it subject to the Act unless such alterations prejudicially affected the construction; and that the words "any work," Act, in sec. 38, were limited in their signification by the latter part of sec. 3.

INVENTORS' INSTITUTE.

THE Hon. Auberton Herbert, B.C.L., has presided at a second conference on the reform of the patent laws, at the Inventors' Institute, 4, St. Martin's-place, Trafalgar-square. The secretary of the Institute, Mr. R. Marsden Latham (barrister-at-law), read the report of the proceedings of the committee nominated a month since, and composed of members of council, together with representatives of various public bodies. From this document it appeared that arrangements were in progress for an effective agitation in the interests of inventors, and that already Mr. A. H. Layard, D.C.L., M.P., had kindly consented to preside at a large public meeting in London. The report was adopted, and it was unanimously resolved to adopt a petition to Parliament, which the committee had prepared; and to appoint a deputation to her Majesty's Government. It was also unanimously resolved that technical instruction would be valueless if the results to which it must lead were not secured by improved laws on the subject of inventions. The petition was ordered to be signed by the chairman in the name of the meeting. An American gentleman gave an interesting description of the working of the patent laws of the United States, showing their immense superiority over those of our own country. It was announced that at the next meeting Mr. J. T. Dexter would read a paper "On the value of industrial exhibitions in their relation to skilled work and inventions."

CONSULTING ARCHITECT TO INDIAN GOVERNMENT.

THE Calcutta Engineers' Journal says,—"We understand that Mr. W. S. Granville, Consulting Architect to the Government of India, has obtained two months' privilege leave of absence prior to resigning his appointment on the 31st March, upon which date his present agreement expires. Mr. Granville's position in the D. P. W. is that of Superintending Engineer, first class, first grade, and we have not heard whether the appointment is to be done away with, or another architect to be brought out from England. The works at present in process of construction in Calcutta from Mr. Granville's designs are the new High Court, the new Post-office, and the Calcutta University, the Indian Museum, and the Dalhousie Institute.

The works at the High Court are at a standstill; the University building is in the same state; the dome of the new Post-office is progressing slowly; and the Indian Museum and Dalhousie Institute are both being proceeded with.

We hope that it is not intended to abolish the office of Architect to the Government of India; we would rather see a move in the other direction, and see a number of architects employed in the Public Works Department, because amongst engineers few have the taste, and fewer still have had the special education, which is necessary to success as an architect."

PROVINCIAL NEWS.

Hastings.—At the usual meeting of the Board of Guardians, the report of the committee appointed to endeavour to find a site for a new workhouse was read. They suggested that probably the best site for a new house was the site occupied by the present building with additions. They also reported that Battle workhouse, for 440 inmates, cost about 12,000l.; the new house at Lewes, to hold 123 adults, exclusive of casuals, is to cost 10,651l., with a detached infirmary; the building at Brighton, capable of accommodating 861 inmates, cost 34,193l. 17s. 6d.; the workhouse at Cuckfield, for 363 inmates, cost 7,500l., including the purchase of 14 acres of land. The committee thought these figures might be of service in guiding the Board to a rough estimate of the probable cost. The consideration of the report was deferred.

Saltburn.—The new pier and sea-wall have been commenced at Saltburn, the former to extend 1,500 ft. into the sea, so that passengers may be landed at the lowest tide. There is also a hoist being constructed, for the purpose of lifting passengers from the beach up to the level of the town. An extensive sea-wall, fitted for a promenade, is also being carried along the foot

of the cliff, under the personal superintendence of Mr. Barry, one of the contractors for the stone work. Mr. John Anderson is the contractor for the new pier, which is to be composed of wood and cast iron.

Norwich.—A drinking-fountain has been presented to St. James's parish by Mrs. Peter Wells, from the design of Mr. J. H. Hakewill, London, architect. It is erected at the corner of St. James's churchyard, Cowgate-street. In character it is Gothic: the material, Portland stone; the bowl for receiving the water being rose granite, polished. The bowl is surmounted by a triangular canopy (with foliage carved in the hood moulding) supported by three grey granite shafts, polished. Above the canopy there rises an hexagonal shaft, surmounted by a cross. The entire height of the structure from the ground is 17 ft. The work was executed by Mr. R. A. Margeson, of Norwich; and Mr. A. W. Morant, surveyor to the Board of Health, has given assistance in superintending the work and procuring the material.

COMPETITIONS.

St. Matthew's Church, Anlaby-road, Hull.—In reply to advertisement, fifty-three competitors forwarded designs. After consideration, the sub-committee finally chose four: those of Messrs. Adams & Kelly, of Leeds; Mr. Blesley, London and Eastbourne; Mr. T. C. Sutton, Nottingham; and Messrs. Clarke & Son, Nottingham, as those to be submitted to a full meeting of the general committee. From these, ultimately, the design of Messrs. Adams & Kelly was selected. About 3,000l. are still required, and it is hoped that the churchmen of the town will come forward and help.

CHURCH-BUILDING NEWS.

Folkstone.—A meeting has been held in the District Schools, Sir C. Maclean in the chair, having for its object the enlargement of Christ Church. Plans had been prepared by Mr. J. Gardner, providing for an increased length of 35 ft. to be added to the west end; the organ-gallery to be widened, and the organ removed to the north-east of the chancel; a new porch on the south side of the church; and the present south porch removed to the north side; while access to the gallery would be gained by an entrance at the base of a tower at the south-east angle. The increased accommodation would be 450 sittings, and the cost nearly 2,000l. Resolutions declaring the necessity of enlargement were carried, and a general committee for the work and for procuring subscriptions was appointed.

Burley.—The church here has been re-opened. It is in the internal arrangements that the principal improvements have been made. The chancel was formerly filled with high pews, and the nave with comfortable seats, some with low backs and others mere forms. These have all been cleared away, and new stained benches take their places. By this, which is the chief improvement, accommodation for more than sixty additional hearers is provided, and there are now sittings for about 275. The roof, which is wagon-shaped, used to be a plain, celled affair; the plaster was taken down, but, as the roof was found to be rough unfinished oak, it was recelled, and stained wooden beams placed at short intervals. The chancel is raised two steps above the nave, but there is no chancel arch, and the division is marked in the roof simply by some amount of ornamentation to the beam, and the ancient caken screen separating the two portions of the church has been retained. An improvement has been made at the east end; the communion rail formerly just enclosed the east window, but the new rail extends across the chancel and is of oak, supported by bronze standards. The floor of the chancel is paved with Maw's encaustic tiles and the passage of the nave is paved with red and black tiles. A new pulpit, with panels ornamented with carving, stained so as to be in unison with the benches, has been erected on the north side of the passage, and a reading-desk on the south side. The walls are whitewashed. Accommodation is provided for the school children in the west gallery, and the lower part of the tower is screened off by a curtain to serve as a vestry. In the course of the restoration several discoveries have been made. When the flooring of the chancel was taken up a large vault was found, which ex-

tended quite across the chancel, but it contained only one coffin, and this so far decayed, that no indication exists to show whose remains it contained. At the north-east-corner another smaller vault was found. In the splay of the easternmost window openings, in both north and south walls of the nave, a niche was found, in one of which were the remains of an image, and it is supposed that these niches were small shrines, dedicated, the one to St. John, the patron saint of the church, and the other to the Virgin Mary. The old oak door to the southern porch remains, and when the paint with which it had been covered was removed it was found that some three centuries ago one "Augustine Brore" had roughly carved his name just below the lock. The date, 1571, is the only date in the church. The restoration of the font has been carried out by Mr. Walter Allen, of Rendlesham. The church is warmed by hot-water pipes carried down the centre passage, the apparatus being supplied by Messrs. Page & Girling, of Melton. The alterations were carried out by Mr. Beeden, of Marlesford. The total cost is about 300l.

Birkenhead.—The new church of St. Peter, which has been erected in Cathcart-street, Birkenhead, on the principle of all its seats being free and unappropriated, has been consecrated by the Bishop of Chester. The edifice is surrounded by a dense population, for whose special behoof and benefit a free church is most required, and being built entirely of brick, with very little stonework and no plaster in its details, is dependent rather upon symmetry of outline and depth of its reveals for light and shade and general effect. The church, when completed, will consist of a nave and aisles, of five bays, chancel aisles, and large chancel, with lofty tower on the south-east front. Of this portion, however, simply the nave and aisles, with western narthex, have as yet been erected. The nave being unusually lofty and spacious, whilst the peculiar form of roof, prepared for polychromy, and the somewhat unusual height of the clerestory, which is supported upon well-proportioned arches and white limestone columns, add to the effect of the whole. Provision has been made, when funds permit, for decorating the arcade walls by a series of pictures in Venetian mosaic, illustrating passages in the life of St. Peter; and a mode of gas-lighting has been introduced by the architect in anticipation of the mosaic being used. The benches are simple in construction, and are open throughout. The present pulpit and other fittings are merely of a temporary nature. Two of the south aisle windows adjacent to the font have been filled in with painted glass, as a memorial of children of the incumbent, and have been executed by Messrs. Pilkington, of St. Helen's. The west front towards Cathcart-street is flanked by buttresses, within which is the triple entrance to the narthex, and immediately over are large two-lighted windows, filled in with tracery of an early French type, which are again surmounted by a circular window of plate tracery, with deep reveals and labels of moulded brick. The side windows are varied in outline. The roofs are covered with Bangor slate of two colours, the ridge tiles being of red fire-clay. The church will accommodate about 700. The cost of erection and furnishing has been about 2,500l.

Trowbridge.—The foundation-stone of St. Thomas's Church has been laid. The total cost will be 5,000l. It is intended for the poor people of the district, and will seat 500 persons.

Louth.—North Reston Church has been re-opened, after having been restored by Mr. C. Clark, of Louth, under the supervision of Mr. Wither, architect, London. It is a small building of rough stone, and slated, and consists of chancel, vestry, and nave, with small octagonal bell-turret. Internally the great feature of the old church, the Saxon (?) chancel arch, remains unchanged. The thick walls of the nave also remain; the chancel is altogether new. The window tracery is filled with two shades of cathedral glass, with transparent borders, in quarrels and diamonds.

Llangathen.—The church here has lately undergone a restoration, which was effected by a rate passed unanimously by the parish, the Earl of Cawdor undertaking a portion of the building pertaining to the estate of Berllandywyll. The total cost incurred is about 700l, including the extension of the churchyard, the land for which had been given for that purpose by the Earl of Cawdor. The pews are all of Memel fir, stained and varnished, and are of middle height.

The pulpit and reading-desk are made of pine. The entire flooring is composed of red and black Staffordshire tiles, laid diagonally, and the warmth of the congregation is provided by hot-air apparatus laid underneath the chancel. The walls of the edifice, as well as the tower, are raked and pointed. The roof is composed of Carnarvon slates, and the ceiling is formed into panels with moulded ribs. The architect was Mr. T. W. A. Tompson, of Carnarvon, and Mr. D. W. Williams, was the contractor. It is in contemplation to build a vicarage, a plan for which has been already given.

Durham.—Cockfield church (date 1210) re-opened on the 2nd inst., after having undergone restoration. The works have been carried out by Messrs. Robert Robson & Son, under the superintendence of Mr. C. Hodgson Fox, architect.

Brede.—The parish church has been re-opened. The old hoarding has been removed from the roof of the chancel, and timbers, cornices, &c. fixed, the whole of which are now left open and stained and oiled. A new open timbered roof with moulded tiles, king post Gothic ribs, &c., extends the whole length of nave and north aisle. The south aisle roof restored with the best of the old timbers, and the roofs are plastered between the rafters and coloured grey. The walls are now covered with stucco, and the stonework of all the arches has been cleaned and jointed with grey mortar. The gallery has been removed, and the long-obsolete tower arch is now a prominent object. A pulpit of Caen stone, with emblematic tiles, a reredos, also of Caen stone, with panels of encaustic tiles, and several other works in the rector's chancel are among those done. Messrs. O'Connor, of London, have executed three new windows of stained glass; one in the tower, and two in the rector's chancel. The stonework of the tower window is new, and the tracery is like the old window, which was rebuilt up in part with brickwork. The stained glass of this window is a geometrical pattern well marked out in various colours, yet so as to admit much light. Of the windows in the chancel, one is a memorial of the late Mr. Aylward in two compartments; one represents Mary sitting in rapt attention at the feet of Jesus, while Martha is serving; the other is raising of Jairus's daughter. The other chancel window is the east one, in four compartments filled with the four Evangelists. Texts of Scripture have been placed over the windows and arches of the chancel, and brass plates with inscriptions in several places, both in the chancel and chancel. The private chapel of Mr. Thomas Frewen has also been restored to correspond with the church. The whole of the works have been carried out under the direction of Mr. Hand Price, architect, Weston-super-Mare; and contractors were Messrs. Crisford & Sons, Brede. It should be added that the unfashioned high pews still remain.

STAINED GLASS.

St. Stephen's Church, Ipswich.—The west tower window of St. Stephen's Church has just been filled with stained glass, in memory of the late Mr. Henry Miller. The window is inserted by the window and the sons of the deceased, and the Rev. John Miller, and consists of three lights, all filled with designs of stained glass, and in the centre compartment the "Stoning of St. Stephen," the protomartyr, is represented. The window is by Messrs. Powell & Sons, Whitefriars. The work of putting the window in its place was done by Mr. John King, Ipswich.

St. Mary's (R.C.) Church, Warwick.—Another stained-glass window has been placed in the western portion of this building, representing Jesus in the house at Nazareth, between his parents, assisting Joseph at his handiwork. Mary, standing behind, appears to be absorbed in the contemplation of her divine son. The window has been erected by the Rev. T. Louman (founder of the church) in memory of his mother; and the subject forms one of a series of chronological order, illustrating the mystery of the infancy of our Saviour. The work was executed by Mr. T. Dury, of Warwick.

St. Michael's, Basingstoke.—The new east window of this church has been put up. The stained glass has been executed by Messrs. Lavers, Barrand, & Westlake, of Bloomsbury. The general design has reference to the ministry

angels, associated in the five principal scenes with the Annunciation, the Nativity, the Ascension, the Resurrection, and the Assumption. Beneath these are five minor subjects, the Angels at the test-door of Abraham; Michael contending with Satan; the sacrifice of Isaac; Daniel in the lions' den; and the raising of Elijah. The head of the window contains our Saviour enthroned; the emblems of the four Evangelists, and the Angels hearing the words, &c., as described in the Book of Revelation.

Books Received.

Cutting and Perforated Carving, with practical Instructions. By W. BEMROSE, Junr. Messrs. G. and S. Paternoster-row, London; and W. Derby.

The author of the "Mannal of Wood Carving" has published this volume on the sister art of cutting and perforated carving for the pleasure of a large class of amateurs whose inclination does not permit them to attempt the more elaborate art comprised in the woodwork. Much pleasure and amusement in spare hours may be derived from the practice of these easy yet graceful and useful art, which does not require any special workshop, and may be carried on at a table in an ordinary parlor-room. The volume is illustrated by a number of engraved examples of brackets, ornaments, picture and other frames, book-ends, &c., some of them more tasteful than others, but all useful in learning the art.

Lathe and its Uses. With an Appendix. London: The "English Mechanic" Office.

Mr. Holtzapffel advertised a forthcoming series of seven volumes on tools, which had been prevented from being completed; and although his successors have since repeatedly promised the completion of the work, of which three volumes have ever appeared, the others are still without any complete work on the subject. No doubt the prospect of a work by so competent an authority as the late Mr. Holtzapffel has hitherto prevented any other work of the kind being prepared. But one has at length appeared which enters pretty fully into the subject of the elaborate branches of the subject. The series under notice is based upon a series of papers published in the *English Mechanic*, the whole has been revised and improved, and the volume contains an appendix, in which are described an entirely novel form of lathe for turning and rose engine-turning; a lathe and egg machine combined, and other valuable improvements relating to the art. The work gives instruction in the art of turning both in wood and iron, and includes a description of the most improved appliances for the ornamentation of straight and curved surfaces: it is copiously illustrated.

Miscellaneous.

THE JOAN OF ARC TOWER AT COMPIEGNE.—The Joan of Arc Tower at Compiègne has been blown down lately, and the crash caused great alarm. There was no loss of life; but when the tower fell the bed which a child had been lying in was smashed into atoms.

THE NEW RIVERS COMMISSION.—The Queen has appointed Sir William Thomas Denison, Bart., colonel in the corps of Royal Engineers, and Edward Frankland, and Mr. John Chalmers, Esq., to be her Majesty's Commissioners for the purpose of continuing the inquiry as to how the present use of rivers or running waters in England for the purpose of carrying off the sewage of towns and populous places, and the nuisances arising from industrial processes and manufactures, can be prevented without risk to public health or serious injury to such processes and manufactures; and how far such sewage and refuse can be utilized or got rid of in any other way than by discharge into rivers or running waters, or rendered harmless before being thrown into them; and also for the purpose of ascertaining into the effect on the drainage of towns and inhabited places, of obstructions to the natural flow of rivers or streams caused by weirs, locks, and other navigation works, and into the best means of remedying any evils arising.

A CALENDAR FOR FORTY YEARS.—On a small card, a simple calendar for forty years has been published by Foss, printer, Coleman-street, with instructions for its use printed on the card, which has a sliding slip of the days in the week for adjustment in connexion with the days of the month, and with alphabetical letters for the years. The idea is not new, but the card is useful.

PRESENTATION TO A BUILDER'S LATE MANAGER AT UXBRIDGE.—About twenty-four artisans in the employ of Mr. G. E. Kearley, of Uxbridge, builder, &c., met recently at the Railway Hotel, Uxbridge, and presented Mr. Robert Henson, late manager of the firm, with a handsome box of mathematical instruments, of the value of 8l. 8s., previously to his leaving the town. The event was celebrated by a supper, of which about thirty persons partook.

THE PROMENADES OF PENZANCE.—The *Cornish Telegraph*, after quoting some observations made recently in our columns as to the desirability of planting trees on the Thames Embankment, adds,—"Our excellent contemporary, the *Builder*, is always making some useful suggestion such as this, for which all should be obliged. That paper also sends out special commissioners, to note the sanitary or unsanitary, improved or unimproved, condition of towns. If one should travel westward, what would he say to the neglected planting of the Alexandra-road, Penzance, and the failure to make it one of the prettiest promenades in the west? When will the managing Boards of our country towns appreciate rightly the value and importance of artistic adornment?"

ARCHITECTURAL AND ARCHAEOLOGICAL SOCIETY OF DURHAM AND NORTHUMBERLAND.—The annual meeting of this society has been held in Bishop Cosin's Library, Palace-green, Durham. The Rev. W. Greenwell, president of the society, occupied the chair. The chairman alluded to the search that had been made for the remains of St. Cuthbert. The search, he said, had been productive of no results as to the finding of any body; and it was the opinion of many members of the Roman Catholic Church that St. Cuthbert's remains were interred behind the altar of the cathedral at Durham, as had always hitherto been represented. He next referred to excavations which had been made at the west part of the cathedral, where an ancient staircase and some chambers had been discovered, but these investigations had been brought to a close without any result having been arrived at.

CRYSTAL PALACE.—The sale of vouchers securing tickets for the great Handel Festival in June next, has, during the past few weeks, very considerably exceeded the amount it was anticipated it would have reached thus early. As in 1857, and subsequent years, the clergy from various parts of the country are still among the best supporters of the festivals. At the Clearing-house of the superintendents of the various railways, it has been decided to afford the greatest facilities for attending the festival. Three days' excursions from long distances, and single-day excursions for distances not exceeding 100 miles, will run for the great rehearsal day. For the three days of the festival excursion rates will be given. For the great rehearsal and the "Messiah" excursions will run from the northern and midland districts, for a distance exceeding 200 miles, returning the same evening. Such facilities are among the wonders of the age. The Crystal Palace season-ticket holders will enjoy the right of entry, for the first time, during all the four days of the festival. Our readers, generally are aware, no doubt, that an annual or season ticket can now be had, for the usual charge of a guinea, beginning and ending any month in the year, as from April to April, May to May, &c. The issue of tickets for the Handel Festival commences at Exeter Hall and at the Crystal Palace, on Monday, April 20th; and everything gives good promise of a most successful issue to this great undertaking. We had occasion to make a run out to the Palace the other day, and were delighted with the spring progress in the beautiful gardens. The tropical end of the palace is restored to a certain extent, and is as favourite a resort as ever. The Alhambra decorations were in progress. There is an interesting exhibition of photographs in one of the galleries, from the Holy Land, belonging to the Exploration Fund. We had a glance at a group of our Hindu fellow-subjects, female as well as male: the sight was an interesting one, although they were only jugglers and acrobats.

EMBASSY AND CONSULAR HOUSES.—The estimates before the House of Commons propose votes of 6,000l. towards 10,000l. required for the erection of an embassy house at Therapia; 8,000l. towards 20,000l., the amount of the estimate for a new house for her Majesty's mission at Teheran; a second sum of 40,000l. towards 175,382l. for consular buildings in China; and 15,000l. for consular buildings in Japan.

NUISANCES.—The Lords Justices have affirmed the decision of Vice-Chancellor Stuart, in the case of *Viscountess Gort v. Clark*; holding that the plaintiff was entitled to an inquiry as to damages for a nuisance occasioned by the noise and vibration caused by a steam-engine and circular saw, which were at work in the defendant's factory from morning to night, and by the smell of paint used in painting the "self-coiling revolving shutters" of which the defendant was maker and patentee.

FATAL SCAFFOLD ACCIDENT.—On Monday evening, Frederick K. Hame, a bricklayer, working at a new house in Crown-street, Wyndham-road, Camberwell, was descending from a scaffold, by one of the expeditions but dangerous methods of sliding down one of the poles, when his hand slipped, and he fell with great violence to the ground, striking his face so severely as to shatter both jaws and heat in his forehead and eyes. He was conveyed to St. Thomas's Hospital, but life was found to be extinct.

THE HOWARD ASSOCIATION.—An important address has been printed by this Association on the treatment and prevention of crime, with special reference to reformatory and economic labour in prisons, the Irish test system, capital punishment, the double license system, and prostitution and mendicancy. The Howard Association was instituted under the patronage of Lord Brougham, and others. It is a society for the promotion of the best methods of penal treatment and crime prevention. The committee invite information from home and foreign sources, especially from magistrates and prison-governors; also subscriptions in aid of expenses, to be forwarded to the secretary, 5, Bishopsgate-street Without, London, E.C.

IRON STOVES.—Some of the French doctors have started a [fresh] crusade against iron stoves. Dr. Carret, at Chambery, noticed a great deal of unaccountable disease in schools and institutions; and thought he could trace the mischief to the introduction of cast-iron stoves. Dr. Deville, in a paper read before the Academy in Paris, says that he proved by a mechanical contrivance that such stoves do give off noxious vapours. He had two bells so connected with electrical apparatus that they should ring when hydrogen or carbonic oxide was given off. Not long after the stove had got thoroughly heated both the bells began to ring. If it is proved that iron heated beyond a certain point gives off unwholesome gases, we had far better adopt the German stove—so much more capable, by the way, of being made a graceful piece of furniture, than our cast-iron abominations. Such a reform would naturally lead to the disuse of the wretched frontage of painfully black-leaded iron round our fireplaces, and a return to the good old Dutch tiles.—*Imperial Review.*

COVERED MARKET FOR BURY.—It was determined in the summer of last year to cover the whole of the market area, Bury, with a roof of iron, having a large proportion of the same glazed to give ample light to the area. The plan of the work was intrusted to Mr. Green, architect, Portsmouth, near Todmorden (who was also architect for the Earl of Derby's estate workshops at Redvales, near Bury). The roof is constructed chiefly of wrought iron on the tie and tension principle, and has a central roof of 60 ft. span with two side roofs of 50 ft. span each, with hipped sides at the angles. The form of the market, being an irregular triangle, presented difficulties in covering over the area without disturbing the existing shops. It affords accommodation for 146 stalls. The entire market, with shops round the three sides, occupies an area of about 6,300 square yards, or rather more than 1½ statute acre. The contract for iron roofs, pillars, and gutters, was taken by Mead, Wrightson, & Co., of the Teesdale Iron Works, Stockton-on-Tees. The rest of the works have been executed at Lord Derby's works, under the direction of Mr. Lofthouse, and the whole under the superintendence of the architect. The cost of the ironwork alone has been about 1,450l., and the total cost between 4,000l. and 5,000l.

COTTAGE ACCOMMODATION: FRAMLINGHAM FARMERS' CLUB.—At a recent discussion meeting of this club, held at Framlingham, Mr. S. G. Stearn, of Brandon, introduced the subject of "The Cottage Accommodation for the Agricultural Poor." The president, Mr. F. S. Corrance, M.P., presided, and there was a numerous attendance. Mr. Stearn stated that in the proposed new double cottages, a model of which he produced, the living-room was 12 ft. by 11 ft. 6 in.; back-house or scullery, 11 ft. 6 in. by 10 ft. 6 in.; store-room, 6 ft. 5 in. by 6 ft.; bedrooms, 12 ft. by 8 ft. 3 in., and 10 ft. 6 in. by 9 ft., 11 ft. 6 in. by 11 ft. His model cottages, as before them, excepting the pigstyes, could be built for 200l. each, the double dwelling. He had a man who would sign an agreement to build 100 at 200l. each, exactly like the models. A builder who was present said he could build the cottages for that sum; but there was some incredulity manifested during the discussion. Mr. Stearn said the rent would be 4l. 10s. In his estimate he included copper and ovens, convenient closets, and everything anybody could desire. Cottages built like this would be scrambled for. The cottages would require but little repairing, unless from accident, for 100 years. It would be ample to allow half a crown a year for repairs. He insisted that if private individuals could not take the movement in hand Government should. The President reviewed the discussion, and quoted from the *Builder* as to dimensions, minimum percentage, &c.: they wanted certain specifications, he remarked, into which Mr. Stearn had not entered.

TENDERS.

For building villa, St. Thomas's-road, South Hackney, for Mr. Robert Entwistle. Mr. Gathercole, Crown surveyor:—
Brett £1,280 0 0 Extra for building £38 0 0

For erection of warehouse at Narrow-street, Ratcliff, for Mr. H. Vane. Mr. C. Bunch, architect:—
Stuttle £875 0 0
Hearle 653 0 0
Johnstone 650 0 0
Rivet (accepted) 693 0 0

For sundry alterations and additions at the Prince Albert public-houses, Union-street, Bishopsgate, for Mr. Riches. Mr. W. Lambert, architect:—
Richardson £540 0 0
Ockley 388 0 0
Lark & Son 249 0 0
Bostel 212 0 0

For villa residences, Grove Park, Camberwell. Mr. W. T. Nixon, architect:—
Thompson £2,024 0 0
Cooper & Cullum 1,970 0 0
Hemman 1,878 0 0
Nixon 1,877 0 0
Collis & Son 1,874 0 0
Higgs 1,813 0 0
Gammon & Son 1,777 0 0

For additions and alterations to the residence of Mr. Frederick Archdale, at Biggleswade, Beds. Mr. Watson, architect:—
Twelvevrees £968 0 0
Harvey 875 0 0
Woodford 825 0 0
Daulty 814 9 8
Harris 805 0 0
Dunham 730 0 0

For new grammar-school, head-master's house, and offices, at Abingdon, Berks. Mr. Edwin Dolby, architect. Quantities by Mr. J. Crawley:—
Nightingale £5,363 0 0
Dover 5,280 0 0
Cowland 5,150 0 0
Thomas & Dicks 5,115 0 0
King 5,032 13 6
Trow & Sons* 5,000 0 0
Selby 4,998 0 0
Bell & Sons 4,983 0 0
Claridge 4,910 0 0

* Not received in time to be opened with the other tenders.

For residence for Mr. Frank Campion, Derby. Messrs. Thompson & Young, architects. Quantities supplied by Messrs. Waile & Jones:—
Bridgart £2,400 0 0
Fryer 2,379 0 0
Gadaby (accepted) 2,174 0 0

For residence at Toddington. Mr. Charles Aldridge, architect. Quantities supplied by Mr. L. C. Kiddett:—
Warr £2,090 0 0
L'Anson 1,884 0 0
Gammon 1,661 0 0
J. & W. Sanders 1,648 0 0
Capps & Ritso 1,568 0 0

For finishing a villa residence (the carcass being already erected) on the Mountlands Estate, Taunton, for Mr. H. D. King. Mr. J. Houghton Spencer, architect:—
Durham & Hawkins £820 0 0
Giles & Manning 620 0 0
Aplin & Woolfrey 649 0 0
Shewbrooks 654 0 0
Smith (accepted) 492 0 0

For raising warehouse, 107, Leadenhall-street. Mr. William Eve, architect:—
King & Son £685 0 0
Greenwood & Son 665 0 0
Heiser (accepted) 610 0 0

For enlarging house at Theydon. Mr. William Eve, architect:—
Turner £285 0 0
Cuthbert, Bros. (accepted) 275 0 0

For new schools and class-rooms in Drummond-street, Euston-square. Mr. John Farring, architect. Quantities supplied:—
Sherman £2,294 0 0
Shepherd 2,120 0 0
Richards 2,068 0 0
Saunders 1,883 0 0
Mann 1,973 0 0
Hill & South 1,985 0 0

For alterations and additions to Croft Lodge, Highgate-road, for Mr. Henry Gotto. Mr. S. C. Cipes, architect. Quantities not supplied:—
Serviner & White £1,085 0 0
Till 1,048 0 0
Brown 899 0 0
Mann 879 0 0

For new warehouse, St. Ann's-lane, E.C., for Mr. Geo. Hartley. Mr. Herbert Ford, architect. Quantities supplied by Mr. J. W. Dennison:—

	Brick Front.	Stone Front.
Brass	£1,775 0 0	£222 0 0
Piper & Wheeler	1,750 0 0	230 0 0
Brown & Robinson	1,698 0 0	228 0 0
Henshaw	1,688 0 0	330 0 0
Pritchard	1,672 0 0	248 0 0
Turner & Sons	1,669 0 0	250 0 0
Webb & Son	1,688 0 0	248 0 0
Mann	1,612 0 0	390 0 0
Crahh & Yanghan	1,468 0 0	178 0 0

For the erection of warehouses, Pudding-lane, City, for Mr. J. Sheppard Scott. Messrs. Meeson & Boys, architects:—
King & Sons (accepted) £5,120 0 0

For villa residence, with stable, &c., at Southend, Essex, for the Rev. A. S. Richardson. Mr. W. A. Dixon, architect. Quantities supplied:—
Manley & Rogers £1,953 0 0
Mann 1,938 0 0
Staines & Son 949 0 0
Garon 938 0 0
Thorn 917 0 0
Garrod 855 0 0

For villa residence at Southend, Essex, for Mr. S. Davila. Mr. W. A. Dixon, architect. Quantities supplied:—
Manley & Rogers £880 0 0
Mann 869 0 0
Staines & Son 783 0 0
Thorn 747 0 0
Garon 728 0 0
Garrod 698 0 0

For new hotel, Sherborne. Messrs. Slater & Carpenter, architects. Quantities by Messrs. Pain & Clark:—
Gala £16,890 0 0
Revel 16,063 0 0
Simpson 15,988 0 0
Dover 15,910 0 0
Rogers & Booth 15,769 0 0
Pollard 15,369 0 0
Mills 15,086 0 0
Fletcher 14,967 0 0
Brown & Sons 14,934 0 0
Palmer 14,832 0 0
Wellspring & Sons 14,831 0 0
Chapman & Trank 14,541 0 0
Manley & Rogers 14,317 0 0
Bartlett & Sons 14,199 0 0
Eastcott 13,800 0 0
Ball & Sons 13,236 0 0

No tender accepted: the drawings to be reduced.

For additions to the Christian Union Almshouses, John-street, Edgware-road. Mr. E. Roberts, architect. Quantities not supplied:—
G. Bird £588 5 5
S. G. Bird 497 0 0
Welham 385 0 0
Jagers (accepted) 332 0 0

For building a detached house, with stables and coach-house, at Green-street, near Sittingbourne, for Captain Lake. Mr. Benj. Adkins, architect:—
Sollitt £1,470 0 0
Gatham 1,400 10 6
George 1,329 15 0
Shrubsole 1,268 0 0
Epps (accepted) 1,163 10 0

For a villa residence at Mountlands, Taunton, for Mr. Peter Taylor. Mr. S. Shewbrooks, architect:—
Spüler £1,075 0 0
Smith 789 0 0
Kest 785 0 0
Aplin 745 0 0
Shewbrooks 730 0 0

For the enlargement and partial rebuilding of Trinity Free Church, Nottingham. Messrs. Thos. C. Hine & Son, architects:—
Barker £1,280 0 0
Wright 1,244 0 0
Rushworth 1,234 0 0
Stevenson & Weston 1,202 0 0
Simpson & Lyman 1,179 0 0
Marratt, Wartyaby, & Scott 1,174 0 0
Bell & Wood 1,148 0 0
Vickers 1,143 0 0
Booker 1,140 0 0
Dennett & Co. 1,095 0 0
Wood & Slight 1,075 0 0
Blundell 1,064 0 0
Moore 1,060 0 0
White (accepted) 978 0 0

For five detached residences, near Epping. Mr. Eve, architect:—
Shurmer £3,488 0 0
Sawyer 2,387 0 0
Cuthbert, Bros. 2,388 16 0
Mundy & Hutchinson 2,370 0 0
Nichols 2,294 0 0
Bell & Sons 2,189 15 0
White 2,198 18 4
Bates 2,190 0 0
Harrison & Edwards 2,189 0 0
Neale 2,127 0 0
Clarke 2,120 0 0
Capps & Ritso 2,093 0 0
Turner (accepted) 1,899 15 0
Cullen & Co. (too late) 1,825 0 0
Tece (withdrawn) 1,744 18 7

For completing three houses at Godstone. Mr. W. Eve, architect:—
Heiser £260 0 0
Sawyer (accepted) 625 0 0

For three houses and shops, Old-street, St. Lu. Middlesex, for Mr. Fred. Ingoldby. Mr. Wm. M. Soul, architect. Quantities supplied by Mr. J. Forge:—
Turrell, Bros. £2,367 0 0
Hobson 2,367 0 0
Porter 2,082 0 0

For alterations and additions to the Old Congregational Chapel, Guildford. Mr. Henry Park, architect. Alterations. Additions.
Garrett £275 0 0 £257 0 0
Sweeney & Sons 206 2 8 206 2 8
Smith 238 0 0 238 0 0
W. & E. Beagley 214 3 6 216 5 0
Mason 239 14 0 240 6 0
Footner 244 0 0 172 0 0

For the erection of public-house at Brentford, for Gomm. Mr. Windred, architect:—
Dodge & Son £1,130 0 0
Adamson 1,087 0 0
Nias 1,080 0 0
Nye 1,070 0 0
Gibson, Bros. (accepted) 983 0 0

For the enlargement of the parish church, Litchfield. Mr. Joseph Neale, architect:—
Lamb £1,650 0 0
Edwards 1,587 0 0
Marshall 1,550 0 0
Garside 1,527 0 0

For new District Church, Upper Easton, Bristol. Mr. Joseph Neale, architect:—
Sanders £2,395 0 0
Jones 2,384 0 0
Jos. Stephens 2,355 0 0
Humphries 2,328 0 0
Beaven & Son 2,320 0 0
Summerville 2,254 0 0
Challenger 2,150 0 0
Webley 2,140 0 0
J. P. Stephens (accepted) 2,127 0 0

For restoration of Holkham Church, Norfolk. Mr. J. E. Coling, architect:—
Myers & Son £6,550 0 0
Spaur 4,171 0 0
Stupper 4,090 0 0
Brown 4,083 0 0
Cornish 4,076 0 0

For two houses, Spa-road, Gloucester, for Mr. Wate. Mr. H. Jones, architect:—
Cullis £2,118 0 0
Fram 1,690 0 0
Meredith 1,690 0 0
Cutterback (accepted) 1,690 0 0

For restoration of church, new tower, and spire, Steeple Morien, Cambridgeshire. Messrs. Elmslie & Fran. architects:—
Brown £3,665 0 0
Whitehead 2,980 0 0
Mason & Green 2,860 0 0
Lacey 2,750 0 0

For enlarging Sydenham House, Sydenham, environs of shop-fronts and fittings. Mr. J. W. Dennison, architect:—
Tully £1,230 0 0
Woodward (accepted) 1,090 0 0

For the erection of schools and class-rooms, Drummond-street, Hampstead-road. Mr. John Farring, architect:—
Shurmer £2,204 0 0
Shepherd 2,130 0 0
Richards 2,008 0 0
Saunders 1,983 0 0
Mann 1,973 0 0
Hill and Sons 1,625 0 0

For erecting nine houses and shops, Trafalgar-road, Camberwell. Mr. James Smith, architect:—
Saunders (accepted) 3,530 0 0

For erecting two warehouses, Trinity-court, Aldersgate-street, City. Mr. John Collar, architect:—
Fosie (accepted) not finished, as previously stated £4,033 0 0

For building Fishery-chamber, Luke-street, Fishbury, for Mr. F. S. Foster. Mr. H. J. Hammon, architect:—
Bishop £30,165 0 0
Thorn & Co. 29,000 0 0
Marsland & Burton 28,500 0 0
Myers 28,565 0 0
Brass 27,760 0 0
Brown & Robinson 27,720 0 0
Easton & Chapman 26,500 0 0
Macey 26,500 0 0
Hodgson & Porter 24,779 0 0
Henshaw 24,491 0 0
Webb & Sons 24,480 0 0

The Builder.

VOL. XXVI.—No. 1316.

A Proper Welcome to Mr. Whitworth's Donation.

HE patriotic munificence of a man of whom all those in any way interested in the arts of construction may well be proud, whether they regard him as a mechanician or as an artilleryist, has a special claim to commendation in our columns. It will be in the recollection of our readers that we have on more than one occasion brought before their notice some of the most important features of Mr. Whitworth's projectile system. To give an absolute and authoritative decision on a matter of military engineering is somewhat beyond the scope of the *Builder*. The great beauty and utility of some of Sir W. Armstrong's inventions we very heartily recognise.

Yet we lean to the opinion that Mr. Whitworth has been rather hardly dealt by as regards the recognition of his claims as an artilleryist. Foreign Governments would seem to have been more prompt to recognise them than has our own. In reading the evidence printed in the several Blue Books, moreover, there sometimes appears to have been scant courtesy shown to the distinguished mechanic. He was at times sharply cross-questioned by men whose interest in rival schemes should have prevented them from coming into collision with him except in the character of avowed rivals or retained advocates. Nor does Mr. Whitworth seem to possess that rare, that almost unique, genius, which is equally at home in doing and in talking, in designing and in describing, in free command of the hand and of the tongue.

It is in accordance with the usual principles of human action that Mr. Whitworth may have himself felt the force of some such reflections as our own. The man who, having laboured long at a difficult subject, has acquired a large amount of positive knowledge, is apt to feel a natural impatience at the criticisms of those who have not yet mastered, and do not seem to care to master, even the A, B, C, of his science. If called upon to explain and to dilate he is apt to refer you to the "two-foot rule." A true mechanic is always happy when explaining his inventions to a pupil or an attentive listener. He is apt to shunt up closely if attacked by a critic, or pumped by a rival. While then in the European celebrity, and in the substantial wealth, which he has attained, Mr. Whitworth is one of the last people who should be called a disappointed man, it is more than probable that he has read the text that a prophet is not without honour save in

his own country with a certain soreness of self-application.

If so, he has taken one of the noblest revenges recorded in history. With the sole exception of what the munificence of commerce has done for the intended relief of poverty, in the instance of Mr. Peabody, the Whitworth donation of 3,000*l.* a year for ever to the nation is unrivalled as an act of noble patriotism. It is liable to no distortion by criticism. It is not a legacy, which often means a gift at the expense of others, perhaps at the expense of the rightful owners, of that for which we have no further use. It is not the lightly-handed-over gift of lightly-won money; the godsend of an unexpected bequest; the lucky result of a risky bet; nor even the fruit of a commercial venture. It is not the consecration to self-glorification of a sum earned by trade, strictly so called—that is, the mere profit between wholesale and retail price,—which knows no limit but that of the amount of custom. It is the fair, hard, honourable earnings, won by the head that can plan, the hand that can execute, and the will that can persevere unto success, that Mr. Whitworth has laid upon the altar of his country.

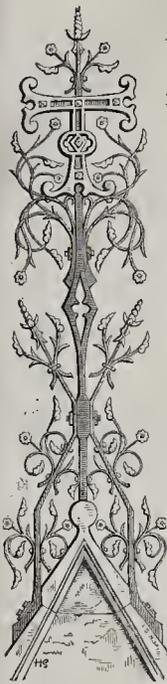
The gift is no less wise and appropriate than noble. It is, above all things, timely; and it indicates a new issue from a perplexed and most important controversy. In the absence of the information which the result of the *Realschulen* of Germany, and of the non-classical and secondary instruction now organizing in Italy and in France, may supply in a few years for our guidance, the most ardent admirer of the time-honoured method of classical education must regard with approval the foundation of mechanical scholarships. The details will be matter for future discussion, but an endowment of this kind is enough to form the nucleus of an Industrial University. For boys who in early youth show mechanical talent, no definite, well-adapted means of tuition are now open. The course of education given to the articled pupil of an architect or of a civil engineer depends on the talent, the occupation, and the conscience of the master. If all these be of the best, and if, into the bargain, the pupil be industrious, there is not only a good preparation for, but generally a fair introduction to, his future life. Still the risk is often great; the premium is usually heavy. We knew an instance recently of the acceptance of several pupils, and their premiums, by a professional man who had plenty of business going on in his office. It all, however, related to a single large public work, which came to a natural conclusion—an honourable conclusion, for the undertaking was completed, and, though not beyond the reach of criticism, was a success. But with this event came also the conclusion of the labours of office. The master had nothing more to do. There was nothing for the pupils to do either. Education and professional introduction vanished in smoke, and if the lads wanted practice they had to find it for themselves.

In the case of mechanical engineers some also take pupils. The same remarks apply in this as in the other instance. A practical knowledge of the interior of a workshop is in itself an advantage, but that scientific training which is needed to raise a man from the rank of a mechanic to that of an engineer is more rarely to be met with in the manufacturing than in the civil branch. For military engineers we have an admirable education in the Royal Military Academy, but we have no special secondary education to fit young men for the examination at Chelsea Hospital. A general education, however excellent, would enable but few to pass this severe ordeal, and the services of special tutors, men who prepare merely for passing the examination, are in most cases requisite to success. Apart from these unsystematic means of professional tuition one or two chairs have been erected in connexion with the London and the Scotch Uni-

versities. That the whole educational power now in existence might be organized and combined, and secondary schools for the preparation of students of engineering, of architecture, and of mechanics, might be invested with the sanction of professional recognition, and of examinations that resembled rather those of the Prussian system than those of our own inadequate competitive method, and that a faculty should be organized for the superior education of those pupils who are intended for the higher stations of the profession, is a hope to which the donation of Mr. Whitworth seems to give a practical prospect of fulfilment.

Disinterested as this noble benefaction is, it cannot fail of ensuring a more ample recompense to its author than could have been bargained for by any political combination or obscure intrigue. First element of this imperishable recompense must be the satisfaction of the conscience, and the reflection, which we trust will for many years be present to the benefactor, of what his own labour has enabled him to do for his country. Next will be the undying memorial to his name which generation after generation will welcome in the persons of those Telfords, and Stephensons, and Watts, and Whitworths of the future, who shall have been trained at the cost of the donation. We cannot for a moment doubt that the thoughtful and gracious Lady who has omitted, even in her deepest affliction, no proper occasion of proving that a constitutional sovereign is not a mere blank form, has already considered when and how the highest expression of the gratitude of the nation can be most fitly awarded to the founder of a systematic technical education for England. While ever leaving political action to the charge of those who are responsible to Parliament for the conduct of the affairs of the State, the Queen has shown that she is herself the true minister of that function of the Crown which is regarded when we speak of the Sovereign as the fountain of honour. The miners and mechanics of England can never forget that on every occasion when the perils which they so constantly dare have overborne their vigilance, and overwhelmed their efforts, the first services of the telegraph, to condole with and to inquire after the sufferers and those bereaved by their loss, have been employed by the first Lady in the land; the readiest contribution in alleviation of sudden distress has come from the privy purse of her Majesty. Where institutions different from our own have disabled the citizens of another country from accepting any of those marks of recognition of which Englishmen are justly proud, the Queen has known how to originate special and peculiar badges of honour proper to the occasion, as in the gift of her Majesty's portrait to Mr. Peabody. We have no wish to anticipate any condescending proof of the Royal recognition of what Mr. Whitworth has so opportunely done to forward the solution of the great English difficulty of the day; but we are sure that, whether the public ever learn it or not, all that good feeling, good taste, and good sense would consider most appropriate will freely flow from the *motu proprio* of Queen Victoria.

There is yet another response which we sincerely trust it will need little more than so humble a voice as our own to elicit. For the sake, not of himself but of ourselves, Mr. Whitworth's gift must not fall flat, and without an echo from the great centres of commercial and manufacturing industry. Hardly one great employer of labour can have read the few words that announced the donation to the House of Peers and to the House of Commons, without feeling a tingle in his veins. Hardly a corporate meeting can have been held at Manchester, Liverpool, Leeds, Birmingham, or any of the local capitals of industry, without reference to, or at least without thought of, the example



given of the heat method of employing the fruit of successful enterprise. It is our custom to greet less important exertions on behalf of our country with municipal marks of honour, which are gratifying to their recipient, but barren in themselves. Freedom of towns and cities, enclosed in gold-plate boxes, are the usual signs of corporate gratitude.

We trust that the thanks of the industrial leaders of English enterprise will, in this instance, take a more practical form. In whatever manner the Whitworth donation be carried out,—whether it form the nucleus of a technical university, whether it lead in the first instance to the preliminary step of the creation of a Faculty of Constructive Science, or whether only the organization of the thirty scholarships occupy the sole immediate attention of the trustees of the fund,—it is highly desirable that there should be a Seat and a Home for the administration. To provide this is a necessary complement to the donation itself. A noble and worthy building should at once be constructed for the purpose, and a very moderate contribution from each of the great towns, the prosperity of which depends so intimately on the maintenance and advance of constructive science among us, would suffice for the establishment of such a collegiate edifice. The Whitworth College should be the echo given by the industry of the nation to the Whitworth donation.

The site of such a building should be in a position central, as far as possible, amid the industrial districts of England, and yet removed from the actual unhealthy vicinity of any great mass of human habitations. Some spot like Crews or Norwood, some great railway centre of communication which is not itself a city, would seem to be the best locally. Thus, too, any local rivalry would be avoided. The great Lancashire towns might hesitate to aid in founding the college at Birmingham, in itself a very natural site. Staffordshire and Monmouthshire might feel less anxiety to support a Liverpool or a Manchester college than one chosen so as to be as far as possible central to manufacturing England. The determination of the site is, of course, only a detail; but the determination of the principle on which the site should be selected is a matter essential to the fair starting of the subscription.

We suggest, therefore, to the lord mayors and corporations of London and York, to the mayors and other municipal authorities of all great cities and towns dependent on mechanical and manufacturing industry for their welfare, and to all those great employers of labour who desire to see the industry of Great Britain resume that pre-eminence which is now slipping from our grasp, that a subscription should be at once opened for the purpose of acknowledging Mr. Whitworth's gift to the country by providing him a foundation with a Home. A very modest echo to a very loud call for gratitude will do this. How far the heart of the country is stirred by so noble an example, will soon become apparent. It is our hope and belief that all which is requisite is that a prompt example should be set by some leading city in the matter. Considering that vast amount of private beneficence which, while perhaps often misdirected in its course, enriches England with voluntary good will, we cannot doubt that it is only necessary to make a proper appeal to the country to receive a proper response. It would cost England little to double or to triple the donation. Great as that gift is, it ought to be most precious as a nest egg. Around the thirty scholarships will group—if we are not anxious to show that Mr. Whitworth is Quixotically in advance of the public spirit of his countrymen—college, and chairs, and lectureships, and full machinery for affording to the youth of the country a sound technical education which shall not be inferior to that now obtainable in the first institutions of the Continent. A centre of aggregation is now provided. It is, to a certain extent, independent of further contributions. But, to make the most practical use of that central benefit, we must hasten to surround it with subsidiary advantages. Primary schools, in connexion with each great industrial establishment, should receive an impulse from the constructive centre. Secondary schools, in each great seat of industry, should be in direct communication with the college. Education in the higher parts of constructive science should then be provided for those who are able and willing to pay for it, as well as for those who, by a fair and wise selection, not by the mere chance of a single examination, prove their claim to the enjoyment of the thirty exhibitions. A few

months' activity might make the present donation the prolific source of that which the reports of the Royal Commissioners admit to be so great a desideratum for England, a sound technical education, one in which practice and science may combine to do for the English engineer all that human skill and human wisdom can do to perfect his accomplishment.

For any communications on this subject the columns of the *Builder* will be open. While we wish the movement to be locally spontaneous, we shall be glad to afford the means of ready and public correspondence between the different movers in the matter. We shall be happy to give any aid to the formation of a central committee, each subscribing town to nominate a member, or to charge a member already nominated with the representation of its own voice. The occasion is most apt. The attention of the public is called in the very nick of time. Great questions, after the solution of which some are groping in the dark, some are seeking for information from other countries, and as dogged fight, will receive unexpected and most welcome solution from an organised, centralised, voluntary effort to supply at once and adequately one of our most miserable deficiencies. We call upon all who rank in the yard of the builder, upon all who live by the trowel and the pick, the hammer, the adze, and the chisel, the drawing-board and the pen, the foundry, the forge, and the loom, to echo our proposal, that the gratitude of industrial England for the Whitworth donation be shown by providing a Home for its reception.

ON THE UTILIZATION OF SEWAGE BY IRRIGATION.*

In the cases of large towns upon small rivers, and those rivers impeded by numberless bars or weirs,—both of which conditions are exemplified by the river Melkook at Manchester, and the Sheepscar Beck at Leeds,—the injury is not the effect of sewage hourly delivered as it is produced, but that of a putrid mass of organic matter, which, floating for days upon the surface, develops into a filthy scum, revolting to the senses. At Carlisle, where there are no weirs to retard the rapid flow of the sewage after mingling with the volume of the Eden, a complete system of main drainage conveys every particle of the sewage from beneath the city within a few hours of its production; so that, not having time for putrefaction, the river is less than usually contaminated, and salmon and trout abound in it.†

At Norwood, where the irrigation works are in the immediate vicinity of the town, this fact is so far from proving the source of a larger death-rate than the average in that district, that a comparison of the bills of mortality for the six years between 1860 and 1865 shows that during the period of irrigation the mortality was the lowest—a conclusive answer to those who insist upon its deteriorating effects on the atmosphere.‡ Mr. Albert Latham has also recently stated that while the mortality of the town districts for the year 1867 was 2.38 per cent, the country districts being 1.95, the mortality of the town of Norwood was only 1.47 per cent. At Edinburgh, where sewage has been utilized for centuries, no injury to health has arisen from the proximity of the irrigation works, although the applications have been in enormous quantities.§

Though opposition has tended to retard the progress of irrigation in its first stages, and thus, in the opinion of many, injured the cause of sanitary reform, yet it is impossible to doubt that it has done negative good. The tendency of speculation is to lay hold of and carry to a disastrous degree discoveries which are of fair promise, without consideration as to their limit of practicable application, or indeed as to their full development for commercial purposes. Consequently, that which raises up doubt and

caution in the mind, and conducts us by a searching process of argument, analysis, and experiment, to a comprehensive knowledge of every side of a question, must not be viewed as altogether valueless, since it is by this means alone that we can hope to acquire perfection without the costly teachings of experience. The attempts, therefore, to prove the unwholesomeness of sewage irrigation have had the result of producing in evidence a record of facts showing the groundless nature of such a fear, and establishing on sanitary principles the expediency of its adoption.

Quantity of Sewage to be put into the Land.

The expediency of sewage irrigation having been shown, we have endeavoured to explain some of its advantages, and also to answer the chief objections which its opponents have urged against it. To complete the present analysis of the subject, it now remains to inquire in what quantity it is necessary to bestow sewage upon the land, in order to ensure the greatest possible benefit. Notwithstanding all that has been hitherto accomplished in this country, it can scarcely be said that the experience so gained has been sufficiently extensive to justify our forming exact conclusions upon this important point; and, indeed, it is highly probable that in the end it will be found that no two soils are alike in their capacity for profitably absorbing sewage. At present nothing can be more diverse than the opinions of the various authorities upon this subject. Some of these incline to light and infrequent dressings—amount to from 100 tons to 500 tons per acre per annum; others substitute thousands for hundreds, and go as far as 9,000 tons; while there is a small minority who consider that there is actually no limit to the quantity to which sewage may be beneficially supplied. These latter, however, ignoring the fixed laws of economy, qualify their statement with the proviso that the sewage is to be had for nothing, not seeing that what is waste in a price-bearing commodity must be equally waste in a commodity which is of free cost, but of which the supply is limited.

The following is evidence given before the Select Committee in 1864 in this regard:—

Mr. J. J. Moore did not think it would require more than 5,000 tons per year to the acre.*

Mr. E. Smith considers that 800 tons would be more than sufficient, but that grass lands would absorb more.†

Mr. Ellis says that it is a mistake to suppose that the returns are in proportion to the sewage applied; and, in making his calculations for the area over which he proposed to distribute the sewage of the metropolis, he allowed 500 tons per annum to the acre; this to be applied in several dressings, amounting in the aggregate to a depth of 4.9 inches.‡

Mr. Chubbert Johnson stated that at Croydon, of whose local Board he was chairman, 1,000,000 gallons per day were being put on 250 acres, which gives 6,500 tons per acre per annum.§

Mr. Whitehead considers the sewage of even to ten persons sufficient for an acre; while Alderman Mechi would apply four or five dressings of 100 tons each to grass lands.¶

Mr. Walker, of Rugby, recommends from 500 to 1,000 tons per annum to the acre, in five or six dressings.‡

Mr. Lawes, employed by Government to investigate the value of sewage applied to land, found by experiment that with 3,000 tons per acre, 22 tons of grass, producing 5 tons 1 cwt. of hay, were obtained; with 6,000 tons, 30 tons of grass and 5 tons 15 cwt. of hay; and with 9,000 tons, 32 tons of grass and 6 tons 9 cwt. of hay per acre; whilst without sewage 9½ tons of grass and 3 tons of hay were the result. He considers 6,000 tons to be the most profitable quantity; but if the sewage cost nothing, would put on 30,000 or 40,000 tons.**

Professor Way recommends 3,000 to 6,000 tons per acre.††

The amount consumed on the Craigentinny meadows was stated to be 6,400 tons per acre.‡‡

At Barbing the quantity varies between 2,400 and 4,000 tons per acre.§§

* See pp. 146, 168, 202, 222, and 238, ante.

† Rep. Met. Sewage, 1864, § 598. Experimental works on a large scale now (1867) being carried on at Carlisle, with a view to the utilization of the sewage.

‡ Mr. Latham's paper, read before Soc. Eng. April, 1865.

§ Leam. Congress Papers, p. 177. The Rivers Pollution Commissioners' report contains this statement:—"In the neighbourhood of Edinburgh, 70,000 and even 120,000 tons of sewage are said to have been used over each Scotch acre (6,000 yards) of the sea-sand without creating a swamp."—Vol. i. p. 16.

* Rep. Met. Sewage, 1864: 1134.

† Rep. Met. Sewage, 1864: 1572.

‡ Rep. Met. Sewage, 1864: 1799.

§ Rep. Met. Sewage, 1864: 2331.

¶ Rep. Met. Sewage, 1864: 2892, 3343.

** Rep. Met. Sewage, 1864: 302.

†† Report. Met. Sewage, 1864: 4351, 4567. Mr. Lawes also stated that he had experimented with no less a quantity than 3,000 tons per acre.

‡‡ Rep. Met. Sewage, 1864: 4949-50.

§§ Rep. Met. Sewage, 1864: 4373.

§§ Agricultural Gazette, July, 1867.

The Earl of Essex applies the sewage of Watford to hay meadows at the rate of 225 tons per acre, in two dressings, and to Italian rye-grass 270 acres after each cutting.*

In the report of the Rivers Pollution Commission we find it stated that on poor land 5,000 to 20,000 tons of sewage per acre per annum may be filtered; whereas on good land, where paying crops and perfect purification are looked for, 6,000 tons are as many as can be profitably applied.†

Baron Liebig says that to produce four tons of hay on a pure sandy soil, 2,430 tons of sewage are required; but that the necessary quantity is ruled entirely by the nature and condition of the soil. If the soil contains more of the constituents of the plant, less sewage will be needed; if it contains less, then more sewage will be needed. Thus, on a soil which will supply one-half the necessary food in the growth of hay, not more than 1,215 tons need be applied to produce the four tons of hay.

But inasmuch as it is not the object of agriculturalists to exhaust the fertilizing properties of the soil, and throw the whole burthen of reproduction upon the action of sewage, this manner of calculation is subject to modification. If, therefore, four tons of hay represent twenty tons of sewage-grown grass, and it is considered that, according to Mr. Lawes's experiments, more than twenty-two tons cannot be obtained without a disproportionate sacrifice of the fertilizing medium, it would appear that 2,430 tons of sewage are as many as can economically be supplied. In bringing, however, Mr. Lawes's experiments to bear upon this point, it must not be forgotten that many doubts have arisen as to their integrity, and that by many authorities of weight they have been condemned as utterly worthless. The very fact that he never experimented with a smaller quantity than 3,000 tons, which we have from his own lips, would of itself appear to justify these doubts. Mr. Walker, upon whose land the experiments were conducted, states point-blank that they are calculated to mislead the public as to the true value of sewage manure, in so far that the applications of sewage were made at certain fixed intervals, which were rigidly adhered to, without consideration as to the condition of the soil, and its adaptation for the favourable reception of the liquid.‡ The position also of Mr. Lawes as a manufacturer of a rival manure, in which it was stated before the committee that he was interested to the amount of 40,000, or 50,000, annually, together with his reckless assertion of the enormous quantities, 40,000 tons,§ with which he would deluge the land, are further evidence upon which to found grave doubts as to the worth of these experiments. The weight of 40,000 tons per acre represents an annual depth of no less than 33 ft.¶ and yet we are told that even this quantity may be exceeded. Such is the authority into whose hands the charge of these important experiments has been entrusted by a confiding Government.

We have not, in fact, sufficiently decisive evidence as yet to determine this question with precision. Its importance is rendered greater by the influence it will have on the mode of administration. If the sooty dressings applied on the one side be finally determined upon, there can be little doubt that the hose and jet system can be found more advantageous in many cases than the special preparation required by the open carrier system, especially for grain crops. There is also another point to be considered. If—as doubtless has hitherto been the case—sewage is a drug in the agricultural market, of which its holders desire to rid themselves as speedily as possible, or if it can be bestowed but on a limited area, then the use of enormous quantities may be the better policy, taking care that too much is not passed through the soil to ensure proper purification. But if, on the other hand, as sooner or later will be the case, the demand for this commodity comes to exceed the supply, then excessive applications signify a waste of national resources.

In default, therefore, of convincing practical demonstration, we are as yet in the dark as to when the limit of the economic use of sewage on various soils is reached. When corporations take the land into their own hands for purposes of irrigation, a small area doubtless admits of easier management than a large one; and in the discus-

sion of the sewage question this will form an item of consideration, as such bodies are justly cautious in meddling with undertakings in which the ownership or lessorship of land is involved, although by existing Acts, local Boards are empowered to assume these relations. The existence of so much doubt and uncertainty as to the proportionate application of sewage may, perhaps, be a difficulty in the way of adopting irrigation, because, it may be argued, the extent of the proposed area of utilization is dependent thereupon; and whereas, on the one hand, too extended an area would leave the controlling Board in a position nowise different from that of ordinary farmers,—on the other hand, a too limited area would defeat its own purpose. This timid policy should not prevail. In projecting works of this kind, a Board should act with caution and judgment, confining their first tentative operations to a safe area—taking care, however, that the site is so selected as to afford ample provision for future extensions. A trader who, having a perishable commodity on his hands, allows his donkey as to its exact value, or its best possible market, to prevent his turning it to account, would be justly ridiculed; yet his position may be held analogous to that of a corporate body whose impulses towards the utilization of sewage are checked by uncertainty as to the exact distributing area.

Actual Results of Sewage Irrigation.

The following is a list of the chief of these towns which, in a greater or less degree, have dealt experimentally with sewage for irrigation purposes. Aldershot, Alwrick, Bingley, Birmingham, Bury St. Edmund's, Carlisle, Cheltenham, Coventry, Croydon, Edinburgh, Leeds, Mansfield, Melton Mowbray, Milverton, Mold, Norwood, Nottingham, Oswestry, Rugby, St. Thomas Exeter; Swaffham, Tavistock, Uckfield, Warwick, Watford, Worthing; and, as has already been said, the sewage of the northern portion of the metropolis is being at present experimented upon at Barking. For the present purpose, it will be sufficient to select from these, Aldershot, Croydon, Norwood, Edinburgh, and Rugby, as practical and successful illustrations of the principles of sewage irrigation, wherein the most approved forms of application may be said to be fairly exemplified.

Aldershot.—After, as has been stated heretofore, the Government filtration works erected at these camps were condemned by an injunction from the Vice-Chancellor, the sewage of Aldershot, comprising a population of from 12,000 to 15,000 people, was leased to Mr. Blackburn, of Aherdeenshire, for the purpose of being utilized on the waste land of the adjoining Aldershot Heath,—a barren common consisting of loose white sand, drifted here and there into irregular heaps, and covered with heather. This experiment has now (1867) been in hand for two years, and gives every appearance of ultimate success. At the southern outfall, a 12-horse engine has been laid down, which drives a centrifugal pump for the purpose of lifting the sewage on to the higher portions of land not accessible by gravitation, upon which it is distributed by means of the hose and jet system. At the northern outfall, the sewage discharged by which flows on to the land by gravitation upon the open conduit system, a very simple and well-devised arrangement exists, by which the grosser obstructions contained in the liquid are retained. This consists of a small wooden tank, provided with a strong close grating at the lower end, slightly inclined from the horizontal, through which the sewage is passed into the main conduit. This grating is in the form of a lid, and is moveable upon hinges; any overflow being prevented by a bar placed transversely across the tank, dipping below the level of the grate. About forty acres of land have been reclaimed,* and during the year 1866 six crops of Italian rye-grass were cut, averaging from ten to twelve tons per acre, and of excellent quality. When complete, the irrigated area is intended to comprise a farm of 140 or 150 acres in extent, reclaimed from the barren wilderness of Aldershot Heath. The scheme is exceedingly simple and effective, and is capable of economical management.

Croydon.—This town, perhaps the most complete modern exponent of the principles of sewage irrigation, certainly occupies a distinguished position in all matters pertaining to town-drainage. Forced by unavoidable necessity to have recourse to this method of dealing

with the sewage of a large town upon a small river, it has been truly described as the theatre of conflict, in which the most eminent improvements in modern town drainage have been fiercely and repeatedly discussed. Injunction after injunction was discharged against the local board by the proprietary of the river; and that body, driven to extremity by lawsuits on every hand, cast about for and grasped at every conceivable expedient for extricating themselves; and at last, having exhausted them all at an enormous expense, besides creating a debt of 10,000, for law costs, irrigation was tried, and ultimately proved perfectly successful. This success was not, however, of immediate growth. Croydon being, after Edinburgh—whose experiences was then viewed as something not in the nature of ordinary things,—the pioneer in this movement, the Board were compelled, from lack of precedent, to grope their way. In 1857, the quantity of land upon which the sewage of 20,000 people was disposed was but 15 acres, and, in consequence, this area became covered with muddy silt, which turned putrid and stank foully. In 1860 the area was enlarged, and the sewage was applied to 56 acres, which also, in its turn, proved by infallible signs inadequate. In 1862, the Vice-chancellor, Sir William Page Wood, granted an injunction to Mr. Bidder, the engineer, who is interested in the conservancy of the river, restraining the flow of the water after irrigation thereon, on the ground that, it having been proved decisively that sewage could be rendered pure by irrigation, the impure results of the Croydon process must be owing to some defect in application. It was then put on an area of 250 acres, after which the water went off in a pure state, and an end was put to all litigation.* Since that time sundry additions have been periodically made to this quantity, so that the total extent now exceeds 340 acres.

The cultivation of this area has been attended by complete success, the pecuniary fruits of which, however, had not been reaped by the ratepayers, but by the tenants,—Mr. Marriage, lessee of the Beddington Farm, and Mr. Cousins, lessee of the Norwood Farm,—who take the land under them. The Board, acting under an injunction, were forced to lay hold of the first land which presented itself, at the exorbitant price which is always exacted by necessity, and also to obtain a tenant, upon very disadvantageous terms, to whom they allowed 3l. or 4l. per acre towards preparing the land, upon which, although otherwise excellently adapted for irrigation purposes, many woods and shrubs had to be grubbed up. The rental paid by the Board for a lease of the land was 4l. per acre; that paid by their tenant, 5l.; whilst, as was stated by Mr. Cathbert Johnson before the Commission, four crops per annum were being taken off the land, each sold at 8l. per acre uncut; from which it would seem that the farmer, with no outlay save his rent and the wages of two or three attendant labourers, is in receipt of 32l. per acre.† It has already been stated, on the authority of Mr. Baldwin Latham, that the actual profit realised from the sewage of Croydon is 6s. per head of the population contributing to the sewers.‡ Despite these facts, however, we see that the Board are only profiting by their dearly-bought experiment to the extent of 300l. or 400l. per annum, an insignificant result due to the enforced nature of the enterprise. Yet, when we consider that at one time Croydon was expending at the rate of nearly 3,000l. per annum in attempts at filtration and deodorization, it cannot be viewed otherwise than one of the most successful of modern enterprises. So satisfied are the authorities, that they have recently (1867) expressed their determination to pump their sewage to an altitude of 200 ft., if necessary, for utilization. Had the policy of the Croydon Board been the result of their own deliberate conviction, unquickered by the formidable penalties of the law, a revenue of possibly not less than 8,000l. or 10,000l. would at this moment have been relieving their district of a material portion of its rates. Even under the circumstances in which they acted, the experimental conduct of the works might have been better placed in the hands of a hind or manager until a proper assessment of the value of the sewage could have been arrived at.

* Rep. Met. Sewage, 1864. Evidence of the Chairman of the Croydon Local Board, 2225 to 2235.

† 1867.

‡ Rep. Met. Sewage, 1864: Mr. C. W. Johnson's evidence.

§ The population of Croydon was 42,000 in 1866, but of these about 5,000 contributed to the metropolitan sewers.

* Rep. Met. Sewage, 1864. App. p. 345.

† Third Rep. (Aire & Calder, 1867), vol. i. p. 15.

‡ Rep. Met. Sewage, 1864: 3622.

§ Rep. Met. Sewage, 1864: 4676.

¶ Nearly twelve times the average rainfall throughout England.

The whole of the irrigation at Croydon being conducted on the principle of gravitation only, the works at the outfall are of no great extent. One feature, which might perhaps be remedied, is the large area of the settling tanks, which admits of the stagnation of the lighter solids floating upon the surface of the liquid. This in dry weather, is apt to cause a stench, which might easily be avoided by providing a much smaller receptacle, in which the impulse of the outfall discharge would prevent putrefaction. The refuse which is retained in this tank is sold to agriculturists in the neighbourhood, by which the expenses of overlooking the outfall works are nearly paid.*

M. P.

DOMESTIC ARCHITECTURE OF MEXICO.†

In treating of the domestic architecture of a country, and the selection of places for laying out cities and towns, there are many important matters to be taken into consideration, as to their geographical position, and the nature of the site, the geological substrata on which they stand, and their general aspect as to admitting light and air, particularly in a tropical country, and other important matters bearing on their physical and sanitary condition.

The records of ancient history attest that many of the cities of Mexico were laid out by its ancient conquerors, the Tonilics and Aztecs, wandering, nomadic, barbaric tribes, whose sole end and aim appeared to be to overrun and subdue the primitive inhabitants, and to subsist by partially cultivating the land, hunting, and fishing where water existed; and although they have left some very extraordinary monuments of their industrious habits, and constructive skill in the early ages of the world, still an attentive observer will discover, from the mode adopted, and the manner the Mexican cities are laid out, that they bear upon them the impress of well-studied design, skill, and science, the fruits of an advanced civilization, the workings of master-minds; and therefore their present state could not be the productions of those wild barbaric tribes, but of the subsequent conquerors of that country, the Spaniards, at a period when they had attained considerable eminence and skill in the constructive art and sciences, and had established a system of architecture, possessing many points of beauty and attraction, in its decorated arcades, horse-shoe arches, and fretted vaults.

Like the ancient Romans, the Spaniards evidently devoted considerable attention to the selection of a site for their cities: the geographical position, as well as their general aspect, were carefully studied, and its applicability for sanitary purposes, such as an effectual system of surface drainage and good water supply.

In giving a description of a large and ancient city, in which we resided some time, we shall be rendering a general and faithful representation of the great majority of the large and populous cities of that country, as the constructors appear to have been governed by one general design and plan, and which was adhered to as closely as local circumstances would permit.

The general direction of the streets was evidently regulated by magnetic bearings, running principally north and south, and crossed at right angles by others running east and west; and this mode of construction was rendered necessary so as to enable the prevailing cool and refreshing trade winds which blew from the east to circulate through the streets and also through the houses, thus promoting the health and comfort of the inhabitants.

The whole streets were laid out 40 ft. wide, the centre part allotted to the carriage-way, and footpaths on each side; and the physical position was such that slightly inclined ground, or easy gradients, were secured for the contour of the streets. Their cities are laid out in a series of blocks or plots of land, about 280 ft. long and 225 ft. wide; and in the particular instance of the city alluded to there were twenty such blocks from east to west, each divided by a street, and ten from north to south, also intersected with streets; and nearly in the centre of the city some blocks were omitted in order to afford space for the "Plaza des Armes," where all the military displays and public games and entertainments take place, and some extensive blocks of this city were laid out but were not built upon.

These plots are generally divided into four building lots, each 140 ft. by 112½ ft., and upon that site are erected four substantial houses, in the peculiar system and plan of the architecture of the country; and each house, therefore, faces a street, and they are built back to back.

Around the outer area of each lot, the buildings are erected with thick substantial walls of small rubble masonry, and roofed in and covered with bright red horse-shoe tiles, and with broad overhanging eaves, some 5 ft. wide or more, on the outer side, completely covering the side path of the street; and with broad overhanging eaves on the inner side, usually supported on pillars, and forming a covered passage or corridor around the inner part.

On each side the Plaza are erected the principal public and other buildings; on one side the cathedral, a large and imposing structure, a rough adaptation of the Mosque or Saracenic architecture,—the interior elaborately decorated and highly embellished in all the gorgeous splendour of Roman Catholic countries, and adorned with a large dome, covered with bright porcelain of many colours and patterns; and its open space in front fenced off with ornamental railing, and the ground laid out and tastefully planted with the brilliant and ever-blooming flowers of this warm and glowing clime. On the opposite side of the cathedral in the plaza is the prefecture, a one-floor arcaded building; and conveniently situated at the back of that building is the gaol. At the former, the prefect and alcaide preside daily,—the former of these functionaries to carry out the local government of the state over which he presides, and the latter to administer the laws; and that is usually conducted in such an arbitrary and cruel manner, so peculiar to the race of people whence many of them have sprung, as to savour very strongly of the dread and horrid inquisition.

The prisoners, who are generally employed on the public works, are bound and shackled with heavy chains, and in this barbarous manner they are compelled to labour, watched by the eagle eyes of the warder, armed with the stern authority of the rife.

On the side of the Plaza are the hospital, the post-office, quarters for the officers of the garrison, and some of the principal stores or "tiendas;" in fact, the Plaza is a place of the first importance, the centre of great attraction to the inhabitants as well as the traveller, and the general rendezvous, on all occasions, of public entertainments, military spectacles, and national fêtes.

The Plaza is not only used for the purposes just mentioned, but also is a public market-place, and the market is generally held on a Sunday, which is usually the case in Roman Catholic countries, the Sunday being made a day of recreation and enjoyment, rather than one of rest and religious observance, as with us, and the whole place is occupied with stands or movable stalls, for the display of the articles and produce to be sold. The Indians attend the market for many miles round, the city forming the centre of a large district, the produce of which is brought to this market; and they frequently arrive the previous evening, and take up their abode for the night under the arcades that are erected in front of the stores and public buildings.

It is no uncommon thing, if one is out after dark, to find numbers of men, women, and children stretched across the side-path,—in fact, pedestrians frequently stumble over them,—and their couch is the hard paving covered with Mexican matting (which is nicely and skilfully made) and their "serapes;" and by early dawn they are up and stirring, selecting their standing in the market, and preparing to display their wares and produce.

The whole of the area of the Plaza is occupied for the market, except a thoroughfare on each side, which is used for the traffic of the country, diligences, mule-trains, &c., and the stands and stalls are fixed in rows, with avenues between them, running up the square, for the public to obtain access to them; and they frequently make a fine display of fruit and vegetables, both tropical and of the European species, that would gratify the most fastidious taste, dried meats, and crockery, and, though last, not least, the national stall of tortillas and frijoles, around which you may see crowds of Indians gathered, devouring the favourite diet with much gusto—indeed, as fast as the female vendor can prepare them. To protect themselves from the weather, either the rains or the tropical sun, they frequently erect covers of matting on a

light framework, or on a pole with cross-piece attached to the end, upon which they stretch a piece of matting, something like a large umbrella, and this they move about on the other end of the pole as its axis as the sun changes its position or the rainfall drives, so as to shelter themselves effectually; and the different shapes and original forms of these coverings are striking and sometimes ludicrous, and with the moving figures of the people and the bustle of the throng, the scene is highly animated and interesting, particularly when we add the variety of costumes to the groups, amongst them not the least interesting the Indian women with their brown faces and jet black hair in tresses hanging down their backs, and dressed in white ornamented robes, broad "sombrosos," and gay-coloured serapes, the men also attired in white shirts or slops, short-legged trousers or drawers, the broad Mexican hat, sandals, and serapes, the whole combined forming a very picturesque, stirring, and strange scene to English eyes in the glowing climes of the tropics, with clear unclouded skies, and a brilliant sun, setting everything off to the brightest and best advantage.

The bustle of the market takes place in the early morning; as noon approaches the throng sensibly diminishes, and towards three o'clock there is a general clearance as the time for "evening vespers" approaches, which they attend in great numbers, depositing in the offertory as they enter the cathedral their mite to support the splendour and gorgeousness of their religious establishment, and to satisfy the wants of a grasping, overbearing, and dominant priesthood.

After the market and vespers are over they make what purchases they require at the stores, and return to their homes, sometimes on mules, horses, or on foot, and it is very rarely you see any of them intoxicated, although "aguadente and pulky" are plentiful. Occasionally such scenes may be witnessed; but whatever their other faults, it cannot be said they are greatly addicted to drunkenness.

Having briefly described the Plaza, we may further observe that the streets of the city are well and regularly laid out and built upon, and at frequent intervals you meet with large and imposing buildings,—the town mansions of some of the many-acred Dons of Mexico,—at others the stores or "tiendas" for the sale of goods and merchandise, and each merchant sells a motley variety of articles, almost everything you require, a sort of jack-of-all-trades or general merchant on a small scale.

The "tiendas" are sometimes made out of some of the apartments of the town mansion, generally a corner room, so as not to interfere much with the occupation of the other part of the house, and some of them appropriate rooms open to the street for billiards, so that the passing stranger may soon be made acquainted with the Mexicans' evil habit and desperate passion for gambling; and these rooms are frequently kept open all night, gaily decorated and lighted up to make it attractive, and you might hear the stroke of the cue, and the click of the balls, and the shout of triumph or the groan of despair, and sometimes the deadly strife in the dead hour of night, when one was hoping to obtain repose from the fatigues of the past day, and to gather strength for the trials of the morrow.

At the corners of some of the streets you would meet with large buildings, formerly churches or chapels, at others nunneries; and these are mostly in ruins, brought about by their perpetual intestinal wars, as they have been used as places of military defence, and have been broken down and destroyed when carried by assault.

Most of the buildings, both public and private, of this city, exhibit numerous marks of being struck by cannon shot and bullets upon the stone and wood work from the frequent battles that have occurred in the streets, spreading death and desolation around, and have left these enduring mementoes of their bellicose propensities, and their love of the gay guerilla's life.

This city was originally laid out on a bold and magnificent scale, and intended to be one of considerable extent and importance, as from its geographical and physical position it was well and admirably adapted; but the original conception was not fully and properly carried out, as a considerable extent of the part laid out is still unbuild upon, and this space is devoted to gardens or plantations, and generally cultivated, and on which grows the valuable produce of the tropics: thus the orange, lemon, lime, banana,

* To be continued.

† See also p. 7, ante.

and mango, and other fine fruits luxuriate; also coffee, sugar-cane, cocoa, and tobacco, and, at the season of the year when they are in full blossom, the beauty of the bloom delights the eye, and their refreshing fragrance scents the very air around with delicious perfume.

In addition to the beauty of the fruit and vegetable productions of these gardens, we must not omit to mention the splendid tropical flowers that adorn the fences, that separate them from the roadways, jessamines, Virginia creepers, purple wreaths, roses, &c., flourish in all their wild magnificence and beauty, enlivening the dark-green foliage with their brilliant and many-coloured blossoms, and shedding their sweetness on the desert air.

These suburban roads are much used as pleasant walks by the inhabitants towards the cool shades of evening, to breathe the pure and calm air of heaven and admire the glowing beauties of the gorgeous setting sun, and the bright and sparkling flowers, and indulge in the fragrant cigarro or cigarette.

The carriageways of the streets of the city are laid out on a different principle to that adopted in our towns, the channels are formed down the middle of the carriageway, which carries away the surface drainage, and the flood-water in times of heavy tropical rains, without incommencing the houses or the side-paths; there is a gradual declivity in the cross section from the sides towards the centre, and the side-paths are flagged, with a curb-stone; at other parts it is formed of small broken stones grouted and plastered over (a sort of concrete), which makes a hard and enduring surface.

The streets are usually well paved with regularly sorted boulder-stones, well arranged and set, which system might be profitably copied by many of our towns authorities who are not proverbial for well-paved streets of this kind.

The drainage is principally on the surface, and to cesspools situated at the rear of the premises, which filter away through the crevices of the rocky foundation on which the city is built.

The water supply is obtained by means of pipes laid from the stream that flows from the adjacent mountains, brought in pipes and delivered into tanks situated in the Plaza; but recently a lofty obelisk has been erected in the centre of the Plaza about 30 ft. high, the base of which is 4 ft. square and 10 ft. high, and the shaft 2 ft. square, tapering to nearly a point at the top, surmounted with a gilded star. Around the obelisk is constructed a circular tank to receive the water that falls from four fountains fixed at each angle of the base of the obelisk. The whole is elaborately ornamented with the egg and tongue and other mouldings, and a gilded wreath on each of the sides.

The obelisk was erected entirely of small rubble stone to the top, and smoothly plastered over, the mouldings, and the ornaments are also made of plaster, which appears to be well and substantially executed,—a remarkable and striking instance of what may be accomplished in small rubble masonry when well and properly put together.

The obelisk was commenced and completed while the writer resided there, and the day of inauguration selected was the anniversary of the one on which the Mexicans achieved their independence! Poor benighted creatures! to fall into a worse species of despotism—the despotism of mob law, or the strong arm of unprincipled chiefs.

Besides the cathedral, there are several other ecclesiastical buildings in other parts of the city, but one only except the cathedral is now used for religious worship. The system of architecture generally adopted is the Spanish, adapted from the Moresque or Saracenic styles, rather roughly executed on the exterior, and very sparingly ornamented; and where it exists it is executed in plaster. The domes are generally covered with coloured porcelain, of diverse pattern, which produces a light and bright effect when viewed from a distance, and under the bright rays of a dazzling tropical sun.

There are also some nunneries executed in the same style, covering a considerable extent of ground, and doubtless affording accommodation at one time to a great number of nuns and their attendants; but these are all scattered by revolution or civil war, and confiscation. The premises are deserted, and nothing but bare walls and roof remain. The churches that are in ruins and these monasteries were taken possession of by the French troops, and used for barracks for the soldiers and stables for their horses; and

during the time the writer was there, these interesting buildings were destroyed piecemeal by the troops for the wood for camp-fires, or in a wanton spirit of mischief.

It too often happens, instead of being the means of spreading civilization, and disseminating abroad a spirit of subordination and good order, it produces an opposite effect, desolating the country, destroying important and interesting buildings, and instilling into the inhabitants a spirit of vengeance, retribution, and anarchy. In the instance alluded to I have no hesitation in saying that the high-handed conduct of the French troops annoyed and exasperated the Mexicans, making them reckless to the consequences, and resolved to destroy everything that afforded a stronghold or a convenience to the French; and that accounts for the very ruinous and dilapidated state many of the Mexican cities now present since the evacuation of the French troops. The writer has seen them pull down and destroy interesting buildings, and has cried shame upon them; but the spirit of war and plunder was abroad: as the poet says,—

“Cry havoc, and let slip the dogs of war.”

The lighter part of the religious paraphernalia of these structures, we suppose, had been carried off, but much of the interior gorgeous decoration still remained, broken up, scattered about the building in glorious confusion, and inducing one to moralize on the sad spectacle, and to deplore the necessity and misery of war, that produces so much needless wreck and desolation.*

NAMES ENDING IN “ON.”

We have recently, on more than one occasion, drawn attention to some striking coincidences;—coincidences in names and trades, coincidences in averages, and so on: the fact that the same number of thousands will, each week, for many weeks together, visit some public museum, or go night after night with few to spare to some particular dramatic entertainment. Boxed up alone in a railway carriage a few nights ago, the observation, belonging to the same class of facts, occurred to us that a large proportion of our most eminent men in their various paths bear a name ending in “on.” Thus we have,—

Bacon, our greatest philosopher; Byron and Thomson, our greatest descriptive poets; Clarkson, Buxton, and Colston, some of our greatest philanthropists; Gibbon, our most eminent historian; Clarendon, not far short; Gibson, one of our best sculptors; Hilton and Haydon, amongst our best historical painters; Incedon, our greatest ballad-singer; Jameson, our greatest female writer on art; Johnson and Addison, our most distinguished essayists; Lytton, our greatest living novel-writer; Milton, our greatest epic poet; Marchison, our most distinguished geologist; Newton, our greatest astronomer; Palmerston, the most English of statesmen; Stephenson, our greatest railway engineer; Tennyson, our greatest living poet; Wellington, our greatest military commander (with Napoleon for adversary); and Nelson, our greatest sea-captain.

As amongst men of lesser rank, Den Jonson, Chatterton, Hinton, Wharton, Emerson, Simpson, John Britton, Alison, Paxton, Rawlinson, Bonnington, Watson Gordon, Noel Paton, Hepworth Dixon, Mark Lemon, Gardner Wilkinson, James Fergusson, Donaldson, Sir Thomas Watson (our first physician), and many others will recur to the memory. Surely this is very remarkable, and, so far as we know, the observation has never been made before. All these names speak of progress: they cry, “Excelsior!” Echo herself says, as each name is repeated, “ON!”

The circumstances that London may be given as the scene of their labours, and that these lines were penned in Brompton, may serve curiously to carry on the terminal coincidence, though they do not bear on the original observation.

TRAMWAYS IN LONDON.—The vestry of St. George's, Southwark, contemplate laying down a tramway in the centre of the London-road, for the use of all kinds of vehicles, according to the *South London Press*. If successful, similar trams will be adopted on other roads in the parish.

* To be continued.

CONCRETE SEWERS.

Sir,—The article which appeared in the *Builder* on the 4th instant relative to the concrete sewers constructed by me at Sidmouth, Devon, has induced many gentlemen to write to me, asking for information as to the best shape for concrete sewers, the proper materials to be used in their construction, and the best method of executing the work.* As this question is of great public importance, I should be obliged if you would kindly permit me to reply thereto in the pages of the *Builder*.

In the drainage of towns two classes of sewers are put down, namely, main or outfall sewers, and branch-sewers. As the latter collect the drainings from the houses and deliver it into the former, the streams running in the latter are usually small, becoming at times mere driplets, while those running in the former are usually large, becoming, in times of heavy rain, considerable torrents. As the sewers are also laid at various depths in the ground, for properly draining the houses, they are subject to great strains from the weight of the surrounding earth. It is necessary, therefore, that both classes of sewers should be made of proportional capacity for receiving the sewage and rainfall from the houses, streets, and districts which they are to drain; and also of suitable form, not only for imparting velocity to the currents, and so aiding the discharge of the sewage, but for sustaining the lateral and vertical pressure of the ground.

For main or outfall sewers, the best form is undoubtedly that of a circle, for three reasons,—1st, because the circle offers the greatest resistance at all points to the pressure of the surrounding earth; 2nd, because the circle affords the largest transverse area or capacity for receiving the sewage from the branch sewers, with the smallest quantity of materials and labour in construction; and 3rd, because the circle offers the least periphery, or frictional surface, to the flow of the sewage, with the same amount of inclination.

For branch sewers the best shape is unquestionably that of an egg, with the narrow end downwards, for three reasons:—1st, because the egg-shape, like the circle, while it possesses the property of resisting the pressure of the earth around it, distributes the weight thereof throughout the thickness of the arch without collapsing; second, because the egg-shape, like the circle, while it affords the largest capacity for receiving the sewage and rainfall from the houses, requires the least consumption of materials and labour in constructing it; and, third, because the egg-shape, with the narrow end downwards, forms a deeply-curved channel, which, by concentrating the drainage and heaping it up on a small frictional surface, imparts the utmost scouring power to the stream, and enables it to hold in suspension and carry away the heavier matters discharged into the sewers by the house-drains, without deposit or accumulation.

Hence the circle for main or outfall sewers, and the egg-shape for branch sewers, are not only the strongest and cheapest, but the most efficient forms that can be adopted.

The above principles, the result of much observation, practical experience, and study of the subject, were advocated by me first in the *Builder*, and before the Westminster Commissioners of Sewers in 1845; and subsequently before the Metropolitan Sanitary Commission in 1847. They were afterwards adopted by the Metropolitan Commission of Sewers, and also by the present Metropolitan Board of Works when it came into power. In fact, the plans, sections, specifications, and schedules for sewers, gullies, and house-drains, now in use by the Metropolitan Board of Works, by the Metropolitan District Boards and Vestries, and by Local Boards of Health throughout the country, are either those which were drawn by me between eighteen and twenty years ago, or modifications of them. This can be verified by reference to my original reports, drawings, specifications, and schedules at the office of the Metropolitan Board of Works. I may also observe that glazed stoneware pipes, which have been so extensively used in the drainage of towns, and in the drainage of houses, and by means of which brick-drains have been

* With reference to a letter in our last signed “Walter Bradbury,” Mr. Phillips writes denying the correctness of the statement it contains, and describing the circumstances which have led to the writer's misconception. We have also received letters from the Chairman of the Local Board, and the Editor of the *Sidmouth Journal* to the same effect. It is unnecessary to insert them, and we must decline any controversy on the subject.—Ed.

entirely superseded, were first practically used by me for house-draining and sewerage purposes in the metropolis in 1845. The benefits derived by the ratepayers in reduced rates, and in increased comfort and health, by the adoption of these principles, I will not now dwell upon, but they must have been very considerable.

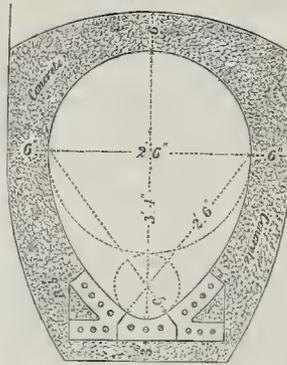
Formerly it was the practice to build sewers without reference to any general arrangement as to plan, fall, or sizes, with wide flat bottoms and upright sides, and of inferior bricks and mortar,—the bricks in the inverts being laid dry, or sometimes grouted. Part of the liquid discharged into these sewers from the house-drains was thus lost by seepage in the ground beneath, while the remainder, by being spread over wide flat surfaces, had no scouring power to keep the sewers free from decomposing deposit. The consequence was, that the sewers gradually choked up until the outlets of the house-drains were buried, and could no longer discharge their contents; then complaints were made by housekeepers that the house-drains were stopped, upon which the sewers were examined, and emptied or cleaned, by hoisting the soil to the surface, and carting it away. Nothing could possibly be worse than this state of things, and the sewers in consequence acquired the not inappropriate name of "elongated cesspools." For some time as clerk of works, and subsequently as chief surveyor to the Westminster and Metropolitan Commissions of Sewers, I waded through miles and miles of these sewers almost daily for years, to the permanent injury of my health, for the purpose of examining their condition, experimenting on the currents, and discovering, if possible, a remedy for the evil. The remedy came at last by the introduction of egg-shaped sewers, with the narrow end downwards, and by their systematic arrangement as to plan, fall, and sizes. The materials used were also of the very best quality, consisting of good, hard-burnt, square bricks, laid solidly in cement in the inverts, and in lime mortar in the sides and crowns. New plans of trapped gullies, with pipe-drains, were also adopted and largely used in the districts. Architects and builders were also "educated" in the principles of house-draining, and strongly urged to abandon brick drains for houses, and to use the cheaper and more efficient stoneware pipe-drains instead. Permeable brick-drains, which are now the exception, were then the rule for house-drainage. The saving to the rate-payers, and also to builders, by these improvements, has been enormous. I hope I am mistaken, but I believe the Metropolitan Board of Works knows little or nothing of what the condition of the metropolitan sewers was in years gone by. I think they have no idea of the great labour and persistent study which I gave to the subject day and night for years, for the purpose of bringing to perfection the improved system referred to, and upon which their drainage works have been and are still being executed by their officers. This, of course, is known to few persons, but the general public are now unacquainted with it after the lapse of so many years. The practice now is to build the sewers with bricks specially made for the purpose, laid in Portland cement, and to give to the face of the work the utmost degree of polish and finish. The expense of this method of construction is very great, the labour alone costing from 5*l.* to 5*l.* per rod, or from 9*s.* to 14*s.* per cubic yard.

The manufacture of Portland cement, of late years, has been brought to such perfection, that concrete made of it and clean sharp shingle or gravel, mixed in proper proportions, sets as hard and becomes as solid as ordinary stone,—indeed, so hard and solid does the admixture become in a week or two after it is made, that it would be as difficult to cut through it then as it would through Portland stone itself. As regards the use of concrete instead of bricks for sewers, there can be no doubt that if sewers be carefully constructed of this material, and with glazed stoneware invert blocks for the sewage to run on, they would become not only as strong and durable as brick sewers, but would cost considerably less. In truth, the cost would be about one-half that of the brick sewers, as now constructed,—that is, two miles could be laid at the present cost of one mile; and I have no hesitation in saying that they would be equally as sound, durable, and efficient. The inside surface above the inverts could be rendered quite even and smooth. The sewers which I have constructed of Portland cement concrete are perfectly hard and sound; indeed, they are like a

stone throughout. The three courses of stoneware invert-blocks, with bird's-mouth joints, used in the works, were made and supplied by Mr. George Jennings, to whom we are indebted for many useful sanitary improvements and inventions.

By using concrete instead of bricks from the invert upwards, there is also this advantage, that the entire spaces between the centering and the excavation, can be filled up and rammed quite tight against the ground, which not only prevents the earth or gravel outside the excavation from giving way or subsiding, but enables the runner-planks or poling-boards to be drawn, and the spaces they occupy to be filled up solid with concrete as the work proceeds. In tunneling, also, the whole space between the roof of the tunnel and the centering can be filled and solidly rammed with the concrete, which cannot be, or is not so well done when the arch is turned with bricks.

I submit herewith a section of an egg-shaped sewer, which I would recommend to be constructed in Portland cement concrete. The



height is as 4 to 3 of the width; the radius of the sides is equal to the width, and the radius of the invert is one-sixth of the width. The curves blend well together, and form a perfect egg-shape. The sides have more batter than is usual in egg-shaped sewers; but this I consider to be an advantage, inasmuch as the battering side-walls act like raking struts against the ground, and so tend to carry or deflect the weight down to or under the invert. The invert is also by this means made deep and narrow, which gives velocity to the current, and prevents, as before observed, any deposit from taking place.

The invert is formed of three courses of glazed stoneware blocks, in 18-in. lengths, with bird's-mouth joints. The blocks are perforated longitudinally with small round holes to facilitate the drying and hard-burning of the material in the interior, and to give a key to the cement at the end joints, which will prevent the sewage from leaking through and saturating the ground beneath. The blocks are laid solidly in concrete, properly jointed in cement, and half-banded. The blocks so made are nearly solid (a most essential thing) and imperishable, and they are not likely to be broken or shivered by the weight. In fact, they are far superior to anything of the kind hitherto used for the purpose. By being glazed they also afford a perfectly smooth channel for the sewage to flow on.

The sides and crown of the sewer are formed of concrete, the thickness of which should vary with the depth in the ground; but ordinarily it may be about one-fifth of the internal width of the sewer. The concrete should be composed of six measures of clean sharp shingle, or well-washed gravel, not large, but of various sizes, down to very coarse sand, and one measure of best tested Portland cement. The ingredients should be turned over twice in a dry state on a ganging-board, then wetted, and again turned over twice, so as to ensure thorough admixture, before using. The concrete so made should then be well and solidly placed in the work, and when it has set hard enough the trench may be filled up and rammed, and the centering removed, in the usual manner. The centering for supporting the concrete may consist of pairs of stout hard-wood, or T iron, half-bricks butting together at top, and resting on

stout hard-wood foot-blocks, placed across the invert blocks at bottom, with plating laggins (cleaned and oiled each time of using) laid loose on the ribs as the concrete is brought up. After the concrete has set and the ground is filled in, the centering can be easily removed by knocking away the foot-blocks. The face of the concrete can then be stopped and pointed, and made quite even and smooth with cement.

JOHN PHILLIPS.

VENTILATION.

In the 18th of January number of the *Builder*, Mr. Leeds has discussed, in some detail, statements made by me in a communication which appeared in the number for the 14th of September last, on the mode of ventilation adopted for the Drummond School. I beg, before commenting on his remarks, to thank him for the courteous terms in which he has animadverted on what he considers to be my erroneous operations and conclusions, and at the same time to thank him for pointing out, for the benefit of your readers, those matters which require from me further elucidation, as well as those inferences drawn by me which he deems to be wholly untenable. In *ultima*, however, I must protest against an assumption which appears in more than one part of Mr. Leeds's remarks, and which I cannot perceive to be warranted by anything which appears in the paper which you did me the favour to print. He says he thinks the theories upon which I have based my operations are entirely incorrect, and that I have been mistaken as to the results; and again, lower down, that my neglect of variations of temperature and density vitiates my theory. Now I beg to assure Mr. Leeds that I have no theory whatever to uphold; and if, as I believe it does, a theory means a true explanation of all the phenomena present, then I can further state that I am unable to offer explanation of many of the facts (noticed in the paper) which fell under the observation of myself and friends.

Mr. Leeds contrasts the mode carried out by me at the Drummond School with that of which he himself approves, and marvels at the discrepancy of our views; but it ought not to have escaped his penetration that he and I approach the subject under very different conditions: he has a prolonged and intensely cold winter to contend against, has abundance of fuel, and ample means at his disposal, and propels heated air into an air-tight compartment with two holes in it, one for the admission of the warmed air, the other for the escape of that which is displaced; while here at the Drummond School, since it has been opened there have not been twenty fires lighted in any of the sleeping-rooms, for the simple reason that we did not need them, and cannot well afford them: nor at the Royal Hibernian Military School, one wing of which is provided with Ross & Murray's batteries for heating, has warmed air been passed into the dormitories a dozen times these three years. Herein lies an amazing difference, quite enough to justify me in adhering to the present plan until it can be shown to be insufficient or objectionable: it, moreover, has certainly the merit of being very inexpensive.

Mr. Leeds next gives reasons for thinking that I have mistaken the results which I had supposed to have been realized, and which appeared to me to be so perfectly satisfactory. To this I am a little puzzled how to reply, further than to say that the facts were as I described them, and were recognised as facts by competent judges; that I took the readiest measures which suggested themselves to me for remedying the evils I perceived to exist, and that I was gratified to find an amount of success I had hoped for had scarcely anticipated. That the house was in a bad state and unhealthy, can admit of no doubt; that it is eminently the contrary now is just as certain—the conditions remaining precisely the same, excepting that the ventilators were introduced as described. Mr. Leeds computes accurately the amount of air intro-

* We have within the last few years passed through two epidemics, one of cholera, very prevalent in our immediate neighbourhood without any of the boys being affected; the last, just passed off, scarlatina, of most fatal character in all directions about us, eighteen boys were admitted into hospital, and not mild cases either; but so healthy are they that the fever and sore throat disappeared in four or five days, ushering in a rapid convalescence. I could point to a time in this very school, before sanitary matters engaged so much attention as they have done since the Crimean war, when during an epidemic boys died at the rate of one a week: it is not so now.

duced by the ventilators,* and finds it far too insignificant in quantity to permit him to entertain the notion that the results are solely dependent on them: in this he is so far right that the rooms do not depend on the ventilators exclusively, the windows and doors are by no means close fitting, but with the small steadily inflowing current through the ventilators which communicates motion to the mass, there proves to be sufficient to preserve the inmates in excellent health, provided their numbers be carefully adjusted to the area of the room. The fact is, my early difficulty was to know where to stop when enough, yet not too much, was being introduced through the ventilator, and this amount was only arrived at after several years' experience. I have been somewhat more enterprising lately, and have enlarged the ventilators; two of 2 ft. 6 in. by 6 in. having been introduced at a height of 13 ft. into a room at each side; but the room (664 ft. area) in this instance is not a sleeping apartment, though a large number of persons are in it at a time. It will be seen from the accompanying letter that the ventilation has been successful. But I should doubt the propriety of such a large quantity of air finding admission at a time when all the inmates were, being asleep, in a state of passive resistance. In reality, the purpose to which the rooms are applied and the area told off to each person must be taken into account.

"I beg to state for your information, that on my assuming the duties of 'Band Master' at this institution, I found the room to be, from want of pure air, most unhealthy, and, in fact, totally unfit for the purpose of practice. When the boys, to the number of fifty, were assembled in the room, for instruction, I found the stifling and unpleasant atmosphere most offensive, and to these causes I attribute a fit of illness which confined me to my bed for some time.

I have now to state that having reported this condition of the room to the commandant, he most promptly satisfied himself of the accuracy of my statements, and caused a thorough reformation to be made.

The room, which is about 25 ft. square and 20 ft. high, is now well ventilated, wholesome, and comfortable. I have never since felt any sensible draught nor undue lowering of temperature, and I may also state that the walls which used to be streaming with water are now always dry. As BARRY, Band Master R.H.M. School."

Since, then, we do not in these countries seal up our rooms and urge into them the entire of the air to be consumed, it behoves us to take every care to preserve the utmost purity in our rooms that may be practicable, by assisting natural ventilation in unobjectionable ways, and by cutting off all sources of noxious emanations.

Our first duty is to see that all sleeping-rooms, intended to be occupied by as large a number of persons as can be suitably accommodated, have fine open fireplaces with well-constructed chimneys. At one time, cast-iron stoves were largely introduced into barracks-rooms and dormitories on the fallacious pretence of economy. This was a serious mistake. In the first place, it deprived us of a most effective means of ventilation; next, it is by no means certain that the whole of the products of combustion are removed by the smoke-flue; lastly, depending almost entirely on connexion for diffusion of heat, the radiating power being exceedingly low, the exposed surface was quite inadequate to generate the heated air with sufficient rapidity or in anything like sufficient quantity; and the air so warmed was carried to a part of the room where it was not wanted, and where it was speedily and uselessly dissipated if proper ventilation were maintained. What we desire to have is a plentiful efflux of radiant heat from a large open fireplace; and, to gain as much effect as possible from the fuel, the grate should expose a broad front to the room, with as little fore-and-aft depth as may be practicable and convenient.

When it is borne in mind that each fan gas-light is equivalent to the addition of four men to the occupants of a room, the importance of rapidly removing the carbonic acid, watery

vapour, and other deleterious products, cannot be overlooked. Unless where some positive necessity exists, it would be far better, in lieu of gas escapes, which are troublesome to put up, and not entirely effective, to place the lights outside the room. The jets would then occupy the position of wall-shades, he at about 5 ft. from the ground, and in long rooms he placed alternately on opposite sides of the room. The jets should not be countersunk, should be cut off from the room by thickish curved glass-plate, and have a plentiful supply of fresh air from below to prevent undue heating.* Behind the gas jet should be two silvered reflectors, inclined at an angle of 130° to 140° to each other; and I find that glass silvered by precipitation with oil of cloves stands the heat well, but silvered metal plates may be preferred. The gas-escape pipe must lead into the roof (never into the chimney or outside the house), which always has sufficient leakage for the removal of the produced gases, and the steadiness of the flame is unaffected on a stormy night.

At one time the urinals and privies connected, for night use, with the dormitories of the Royal Hibernian Military School, were exceedingly unpleasant, notwithstanding that every care was taken by plentiful ablution, open windows, and well-fitting doors, to prevent any smell from them penetrating into the dormitories. Boys in the vicinity of the door leading to them suffered from ophthalmia, and it is possible their health was otherwise injuriously affected. This was obviated so completely some time back, that a description of the plan adopted cannot be otherwise than interesting to those who are watching sanitary improvements.

The urinals and privies are placed in a nearly square tower in rear of the dormitories; on each story a well-aired passage leads into them. The urinal is sheeted with 1/2-in. plate glass, a yard high, carefully cemented to the back wall, and along the upper edge a brass pipe sheds water over the surface continuously at night. The channel course is also of glass plate, and leads into a well-trapped sewer-pipe, so that everything here is as near perfection as may be. A difficulty was felt about the flooring of the urinal, it being very difficult to get the boys in the middle of the night to invariably go quite forward to the wall, and this is the only not quite satisfactory part of the arrangements. The floor declines to the channel course about an inch the foot, and is covered with sheet lead, but, being so cold under the boys' feet, is covered at night with a deal grating, which is carefully washed and deodorized each morning: notwithstanding every care, however, the grating acquires in time a rancid smell; it is then removed, burnt, and replaced by a new one. The privies, which are not often used, are on Macfarlane's principle "improved" and are very satisfactory. At the dormitory end of the passage, leading from the urinals, is a carefully hoarded-in compartment (each hoard related into that adjoining it), 10 ft. high and 5 ft. 9 in. by 5 ft. 9 in. in area: it projects 2 ft. into the dormitory, and has double doors in front and rear, closing with very strong springs, so that in passing in and out one set of doors must be securely closed before the other set can be reached to open. Right above head, nearly in the centre of the compartment, a jet of gas burns all night, which, through the fan-lights in front and rear, and in so much of the sides as projects in front of the wall, gives light to the urinal and to the dormitory. Above the lamp is a conical inverted funnel, with an eduction pipe for the escape of the heated products of the combustion of the gas and of any impure air from the urinals which may be carried up along with them. A visit to the end of this pipe in the roof will satisfy the most sceptical that this operation is conducted to a successful issue.†

What I have been describing has been some time in use, and the purity of the air in the dormitory is now completely preserved thereby from this source of contamination.

I cannot do better than conclude these remarks with the following quotation, which

"A small tube, with longitudinal slits or perforations, should lead up to the jet from the room, be filled with gas at half-turn of the stop-cock, so that the jet may be lighted; but closed off when the gas is full out.

In private houses a narrow frosted or tinted stripe should traverse the plate-glass, so as to cut off the glare when standing or sitting in part of the room usually occupied by the family, otherwise the more light in the room the better. It is more trying to the eyes to be in an ill-lighted room than when the illumination is equal to that of daylight.

† Of course if it were necessary ventilators could be introduced into the roof without any fear of the gases being put out on a stormy night.

announces in terse language the problem to be solved in these countries.

"How to supply at all seasons and temperatures, and by day and night, each room by itself, and independently of every other room, with a sufficiency of air to keep the room healthy, and at the same time to prevent the temperature from falling below what is required for the comfort of the men. To do this with the least possible interference with the structure of the rooms, on a plan not easily deranged, and at a minimum of cost."

We believe in these schools that we have advanced a step. ROBERT TEMPLETON, Deputy-Inspector General, Dublin.

THE EDUCATION OF AN ARCHITECT.

At a meeting of the Architectural Institute of Scotland, held in Edinburgh, on the 3rd inst., a paper on "The Education of a Young Architect" was read by Mr. GOWAN. In the course of his remarks, Mr. GOWAN said,—No man can be proficient in the science of architecture unless he has studied the theory and practice of it—the two being so closely linked to each other that the want of a knowledge of either is sure to be fatal to the success of any one who adopts architecture as his profession. This being so, no question to my mind is of more consequence to the rise of architecture than that of "Whether architectural students receive such an education as will make the most of their abilities and do justice to the science?" I am strongly of opinion that there is no thorough system for the study of architecture, and that it is lagging behind the sister arts in consequence, and therefore it is that I have brought the subject of this paper before you. There is a great cry-out at the present time for technical education; and, although no amount of such an education will ever result in imbuing that genius which the architect requires, still, in the maturing of the architect it is indispensable. Architecture, in my opinion, suffers from causes which sculpture and painting, in a great measure, are not liable to. As it would serve no practical use for me to point out what I consider to be the drawbacks to the progress of architecture without being prepared to suggest that which would be a remedy, I venture to bring before you what I consider necessary for providing the means of training which the architectural student should have within his reach. First, as to geometry: there is no doubt in my mind that geometry is at the root of all design, and that nothing good in architecture can be done without it. A thorough knowledge and application of geometry by architects would not only advance themselves, but would tend to educate or call for a better education of those who had the carrying out of their designs, as I am sorry to think that the holders in general know little of all of the science of their business; and to go from them to the workmen, I know as a fact that few of them know more than the use of the tools which are put into their hands. Second, as to geology, or, perhaps, mineralogy, these may be considered by some as outside of architecture; but I hold otherwise, as it requires few words to show the value of a knowledge to an architect of the stratification of the country from which he must get his material for building. The want of this knowledge in architects and engineers I have known to lead to useless expense, in carrying material from distances, while material equally suited for their purpose, and better adapted to the nature of the district, was lying almost underneath the structure they were erecting. And let me notice this, that if an engineer or an architect, from his geological knowledge, knows that a certain kind of material is within reach, the nature of this material in its structural use should determine the style of his buildings; and, if this be done, he may be sure that the structure he erects will always harmonise with the district. Third, the nature and strength of material, and the true application of it. Every kind of material requires a special constructive application—wood, iron, and stones require different treatment—that is, taking them separately; and when combined, it requires very great care indeed to use them so that they may amalgamate together, and bring about the required result. Mr. GOWAN, after giving some hints as to the treatment of different kinds of stones, and also as to the application of iron for building purposes, said:—Fourth, light and its properties. Now that there is no tax upon

either the number or size of windows, it is wrong to shunt out what conduces not only to health but to cleanliness, and yet you find buildings being erected at the present time where closets and such-like places are lighted by openings of the very smallest possible dimensions.

Another important point in the proper arrangement of a house, which is very much abused, is the position of water-closets, sculleries, and such places, which require the utmost amount of ventilation and light that can be got. Houses are now being erected where these places are in the centre of the building, and lighted and ventilated from the common stair, notwithstanding the clause in the Provisional Order recently got by the city, whereby it is provided "that all such places should be ventilated from the outer air." The proper drainage and piping of a building should also form the careful study of the architectural student. If water-closets and such places be in their proper position, neither the sewage-drain nor water-pipes require to go further into the building than the thickness of the outer wall. The ventilation and the elastic properties of foul and impure air are also worthy the attention of the student. The position of the various apartments also requires to be carefully considered, and disposed so as to receive the greatest possible quantity of light and air, and have free access without passing from one into another. After referring at some length to the laws of proportion and the principles which guided the Greek and Gothic architects, Mr. Gowans concluded as follows:—"There is nothing I wish for so much as that some lover of architecture who has the means at command would endow a chair of architecture in the same liberal manner as has been done by Sir David Baxter for engineering; and I am satisfied that no monument would be so lasting as a chair of this nature would, as the beneficial effects of architecture along with other arts are not easily traced, and never die.

THE GROWTH OF LIVERPOOL.

At the last meeting of the Liverpool Architectural Society Mr. Samuel Huggins read a paper on "The Growth of Liverpool and its Architectural Results." The rapid growth of Liverpool, he said, had been among the marvels of the present age; perhaps it was as unrivalled as regarded the quality of the material which in the course of its enlargement had entered into its composition. While the old or business part of the town had undergone one continued process of improvement in architectural character, the private department, or that devoted to residences, had retrograded. The extension of Liverpool in every direction had been mainly by the erection of dwellings for the poorer classes of people, and this had been left for the most part to men profoundly ignorant of art, and with scarcely an idea in their heads; and the consequence was that art in these productions had not only been ignored as out of the question, but a degree of meanness and wretchedness had extended over wide districts of this town that could scarcely have been deemed possible by those who had seen its pristine beauty. But he should not have brought this matter forward but for the conviction that these things had been growing worse of late, and that at no former period had such houses been built as were then outraging themselves on the pleasantest and most respectable neighborhoods. Assuredly a more melancholy contrast was never presented in architecture than was then presenting between the character and quality of the buildings they were pulling down and those they were rearing up. He was quite sure the New Zealanders would build for themselves, with the same means and materials at command, more pleasant-looking, less heart-sickening habitations than those now rearing in many parts of the town, which appeared to him more like a superior class of pigstyes than abodes of humanity. The destruction was not confined to one locality. Every beautiful and retired spot of private residence, in whatever direction in the town, north, east, or south, was in course of destruction; and there was not a private house or neighborhood anywhere but was in danger of being at any moment rendered valueless for private and genteel abode, not by the erection of small houses, but of ill-built houses. He had little hope of any effectual remedy for the evil being forthcoming: a new building Act might do something. But nothing less than the extension of legal protection to

certain neighborhoods would be effectual;—protection by laws which would be no more inimical to the proper and rational liberty of the subject than those that were enacted against theft. The remedy he mentioned had not been, and probably would not, for some time, be applied, owing to the indifference to architecture that everywhere prevailed, and was operating prejudicially on most of our towns and cities. A striking instance was seen of it at Chester, which had lately exchanged some of its characteristic and best Italian buildings for the most entire abortions that ever insulted the eye. Even the cathedral itself was in danger at least of serious injury, and had been already roughly handled by the new dema in the course of carrying out some new arrangements for the public services. Dr. Howson would, he had no doubt, in other ways do honor to his new appointment and to the church; but, from what had already occurred, the friends of art had reason to tremble for the material church in such hands. It was under the impression that it was the duty of all who felt this to raise their voice in the matter that he now ventured a word in behalf of the venerable pile, the nave of which, hitherto unbroken by hench or pew, was dotted all over with a myriad of little bedroom chairs of the meanest and slimmest description, furnished by the maker, he was told, at 1s. 9d. a piece. There was talk of restoring the cathedral, which to the ear of an artist simply meant destroying—destroying its antiquarian and historic interest and picturesque beauty. The most important operation in the central or business part of the town was the erection of the new Exchange-buildings. In a former notice of this work he had condemned it for being dissimilar in style from the old one, and so departing from that of the Town-hall. But, on a walk round it the other evening, he was glad to perceive an advantage resulting from this which had escaped him before, namely, that he had caused it to become one with the chief buildings around it, uniting several hitherto discovered blocks of commercial buildings into one continuous series. It united, for instance, Mr. Cockerell's block on the east of it with Messrs. Picton & Son's on the west, and so on of others at the northern extremities, till there would, when it was finished, be a complete district of fine commercial buildings, all in perfect accord, and unmistakably commercial in character, that he believed the metropolis only could parallel in this country.

THE WANT OF A FEVER HOSPITAL IN BRISTOL.

LAST week Mr. Alderman Proctor attended before the sitting magistrates, to ask their advice on an important matter, with which he felt himself unable to deal. A very respectable man, whom he had known for some time, kept a lodging-house; and about a fortnight ago a man, named Paul, who came from Cheltenham, took up his lodgings there. This man, it appeared, was now ill of maculated typhus fever, and he was in such a state that it was exceedingly dangerous for the owner of the lodging-house to remain there. He had called the attention of the officer of health, Mr. Davies, to the case, and Mr. Davies had written a letter, in which he showed that Paul, although he said he came from Cheltenham, lived in Picton-lane, Bristol, next door but one to Millett, now lying dead of fever there, where he had reported fever for three months. A fortnight last Saturday he (Thomas Paul) left Picton-lane for Cheltenham, and lodged there. After being there three days he sickened of his present complaint. He came back last Monday, and travelled in a railway carriage, in the middle of an attack of typhus fever. "If White and his family remain, White's life is not worth two months' purchase. Typhus has a great predilection for the life of the bread-winner. If we could get a separate house we might get Paul removed, but he will not go to the work-house." He (Alderman Proctor) thus felt a difficulty in the case. It appeared that there was an Act of Parliament in force to the effect that if there was a place to send the patient to, the magistrates would be able to order his removal. Unfortunately there was no such place in existence in Bristol, and it was such an important matter that he felt it necessary to place the responsibility with the magistrates.

Mr. Brice, the magistrates' clerk, said an order for the removal of the patient himself to

the workhouse had been obtained, but the patient would not avail himself of it, because, as he said, he was not a pauper. Then the only course for the officer of health to take was to fall back upon the Act of Parliament, authorising Local Boards in different localities, to provide hospitals for sick persons; and where such a hospital had been provided, there was power under the statute 29 & 30 Vic., chap. 90, section 26, as follows:—"Any justice may, with the consent of the superintending body of such hospital or place, order the removal to such hospital or place of such sick person." The short answer to that enactment was, that the Local Board of Health in Bristol, who were the nuisance authority under this Act of Parliament, had not provided such hospital or place; consequently, the application to the magistrates to remove a patient to a place not in existence would be simply ludicrous. It was not for him, nor probably for the bench, to say what was the duty of the Local Board; suffice it to say the necessary machinery did not exist, and let the consequences be what they might, the responsibility could not rest with the magistrates.

It is to be hoped the people of Bristol will take this case; and will, moreover, immediately insist on the provision of a proper place to which such cases may be sent. An epidemic of typhus would be costly.

RESTORATION OF BRISTOL CATHEDRAL.

WITH grand Masonic ceremony, on the 17th of April, the corner stone of the nave of the Bristol Cathedral was laid by Lord Liverick, the Provincial Grand Master of the mystic craft.

In 1866 considerable alterations were made in the road at the north side of the cathedral, access on this side being improved by the removal of the earth to a depth of several feet. The excavations thus made laid open to view the foundations of a nave and north porch. Previously to these discoveries, a movement had already been set on foot for the completion of the cathedral by the erection of a nave. The public attention drawn to the discovery gave an impetus to the efforts of Canon Norris and his friends; the private subscriptions increased; and on the appointment of Mr. G. E. Street as architect, he submitted plans for the building of the nave with western frontage and steeples or towers. His report was considered at a public meeting in June, 1867. The general design of his plan was to copy very closely the work in the present choir, with a few minor alterations, such as the sections of mouldings, the design of window traceries, and the character of the sculpture, sufficiently to show that the new nave was really a work of the nineteenth century and not of the fourteenth. He believed, however, that this would be in such complete harmony with the old work that in the general *coup d'œil* no difference would be noticed between the two works. With regard to the west front, he believed that the old plan did not contemplate steeples, but in his opinion the cathedral would in all respects be a more striking and effective building if it were finished with two western steeples than if it had simply a nave and aisles corresponding with and very nearly repeating the outline of the existing eastern portion of the church. The addition of the nave and western steeples would give the whole a bulk and importance which would make the cathedral—as it ought to be—the most conspicuous object in the distant view of the city; and it would then have so unmistakably the character of a cathedral church, that every one would be at once impressed with its appearance. The plan was adopted. The cost of the whole work was estimated at upwards of 50,000*l.*, and having obtained promises of subscriptions amounting to upwards of 15,000*l.*, the committee felt themselves in a position to commence work so early as October or November last.

The whole nave will have a length of 117 ft. from the transept tower, and a width of about 80 ft. It will be furnished with north and south-western towers, 130 ft. high, and have a northern and western frontage, and connected with it on the southern side will be the original cloisters, the architect having introduced an arcading or arched corridor in this part of his plan. The nave will be built of Donning stone; and in harmony with the walls of the old portions of the structure, the new walls will be 5 or

6 ft. thick, with the triforium or passage running between the windows in a similar manner to the design of the present building. The first contract, comprising two of the six bays of the nave, and the foundations and walls of the whole of the remainder to a height of 6 ft. above the ground-line, was undertaken by Mr. George Booth, of Gosport, the contract being taken at a sum rather exceeding the amount of subscriptions promised up to the present time. On the completion of the two bays, it is proposed to close them in on the west side by the erection of a temporary wall, so that the cathedral will be provided with a short nave during the completion of the undertaking.

ST. MATTHEW'S CHURCH, HULL, COMPETITION.

The following additional details have been furnished us in reference to the designs sent in for this church. The church is to hold 800 adults. The cost, including only lower portion of tower, was not to exceed 4,000l. The premium for the selected design is 25l. There were fifty-three competitors. The designs of all the competitors were numbered and arranged on tables and on the walls of a well-lighted room. The committee of selection, after spending several hours, picked out some twenty odd: from these ten were at the next meeting selected,—viz., those of Adams & Kelly, Leeds; Bellamy, Hardy, Lincoln; Besset, Norwich; Blesley, London; Clark & Son, Nottingham; Linklater, Manchester; W. H. Lockwood, London; Scamell & Inskip, London; R. C. Sutton, Nottingham; and R. G. Thomas, Menai Bridge.

The result of two other meetings was to reduce the number to four—viz., Adams & Kelly, Blesley, Clark & Son, and Sutton; and finally the design of Messrs. Adams & Kelly was selected; the chairman having decided by his casting vote that it, and not that of Mr. Blesley, for which an equal number of votes had been recorded, should be taken.

The style of the proposed new church is Early Decorated Gothic. The total cost, with tower and spire completed, is to be 4,500l.

No names were furnished with plans marked "Delta" and "Let there be Light."

THE TRADES MOVEMENT.

WE understand that the Liverpool master builders and the bricklayers in their employ have just taken a step which may prevent in future any resort to lock-outs or strikes to enforce changes in the rules of the trades. Both sides have agreed to a series of regulations, to come into operation next month, which will place all questions relating to overtime, country work, travelling expenses, payment of wages, &c., upon a basis satisfactory to all concerned; and they have also agreed, that in the event of any dispute arising, it shall be referred to a court of arbitration, composed of equal numbers of employers and workmen, with a final reference, if necessary, to an umpire. The rule headed "Authority of Employers" says,—

"Each employer shall conduct his business in any way he may think advantageous in the matter of letting piece-work, taking apprentices, using machinery and implements, employment of society or non-society men, employment of town or country bricklayers, and in all details of management, not infringing the individual liberty of the workmen."

Some London trades unions are about to call a conference between "large employers of labour and representative working men connected with trades unions, for the purpose of considering whether the relations between capital and labour cannot be brought into more harmonious action, whereby the disputes which are now constantly arising between those interests may be averted." By this means it is thought that some modification of objectionable rules may be obtained. The question of trades unions having ceased trade to go from this country to foreign countries is to be entered upon, and the unionists or some of their leaders say that it would be well for an understanding to be come to between capital and labour, that funds may be lessened and strikes and lock-outs limited by all subjects of difference being referred to arbitration.

A general meeting of the Yorkshire branch of the Master Builders' Association has been held at Wakefield, the chair being occupied by Mr. John Fawcett (Messrs. Wm. Fawcett & Son,

builders), of Huddersfield. After certain formal business had been transacted, and the report of the committee, read by the secretary, Mr. Wm. Longley, of Badsowley, had been adopted, the consideration of payment of men by the hour came on for discussion, and after a number of the members had spoken on the subject, it was agreed that the principle was just, fair, and reasonable; and that information should be obtained on the subject, in order that the matter might be fully discussed at the annual meeting to be held at Hull in August next. At the dinner which followed the conference, the chair was occupied by Mr. Fawcett, and the vice-chair by Mr. Longley, and the speakers included Mr. Beanland (Bradford), Mr. Crofts (York), Messrs. Whiteley & Woolley (Leeds), and other gentlemen.

It is now definitely settled that there is to be a trades union congress held this year in Manchester. At the quarterly meeting of the local Trades Union Council, held in Salford, the chairman stated that in consideration of the profound ignorance in the public mind with reference to trade societies, and the probability which existed that legislation would be proposed shortly on the subject, it had been resolved to hold a congress in Manchester, to which it was expected most of the combinations would send delegates.

At Bradford the painters' strike still continues. The *Bradford Observer* says the employers observe that it seems to be implied that 5½d. per hour is the highest wages which journeyman painters receive, whereas many men who are on strike were already paid at the rate of 6d. per hour, and some men up to 8d. and 10d. per hour, according to ability; and such men, they say, are on strike for the purpose of compelling the masters to pay 6d. per hour to the lowest men. As regards the refusal of the employers to meet a deputation from the men, they state that the question at issue has been thoroughly discussed in all its bearings, and that further meetings on the subject could add nothing new.

A letter from Geneva, dated the 10th, says: "The strike has suddenly come to an end as if by enchantment. Every one read this morning a white poster, signed by M. Camperio, the head of the department of Justice and Police, announcing that the propositions of the employers and contractors had been accepted by the delegates of the different sections of journeymen, and that, in consequence, all the workshops would re-open on Monday, the 13th. The document, moreover, declared that the present crisis would leave no trace of misunderstanding, and that its cessation testified the spirit of conciliation which had always animated masters and men."

As to the recent disturbances in Belgium, according to the *Journal de Liège*, the judicial authorities have discovered the source of the distribution of money made by the leaders of the late strike at Charleroi. The funds are believed to have been furnished by the "International Association of Workmen," which had also lately influenced the workmen at Geneva.

RAILWAY INTELLIGENCE.

National Conference of Railway Shareholders.—A conference of the railway shareholders of the United Kingdom has been held at Manchester, in connexion with the Railway Shareholders' Association. The object of the meeting was for the reading of papers and discussion of a practical character, "with a view to influence beneficially the interests of railway proprietors, by aiding in effecting improvements in the railway administration and legislation of the country." The first paper was read by Mr. Wrigley. "On the importance of securing a more effective control over expenditure, with a special view to an accurate division of capital and revenue charges." Mr. Parkes read the second paper, which was entitled "On the desirableness of enactments restricting any outlay by directors on capital account until the requisite funds have been provided; and on the expediency of making inquiry before Parliamentary committees into the financial arrangements made by promoters of new railways."

Traffic Receipts.—The traffic receipts of railways in the United Kingdom amounted, for the week ending April 4, on 13,215 miles, to 715,740l., and for the corresponding week of last year, on 12,913 miles, to 701,531l., showing an increase of 302 miles and of 14,209l.

A STEAM ROAD ROLLER.

THE Town Council of Sheffield have recently purchased a steam roller from Messrs. Aveling & Porter, of London and Rochester, at a cost of 900l., delivered in London. The machine arrived in Sheffield last week. The roller was driven through the streets to the bottom end of Bram-mall-lane, from which point there is a new street called Ellin-street, which emerges on Sheffield Moor, near to the end of Ecclesall-road. There was formerly a reservoir on the site of part of this street, and in comparison with other streets in the town, the ground was soft and shifty. It was covered to the depth of about 10 in. with the loose stony material used in road-making, and before the ponderous machine was driven upon it was as rough and untraversable as it well could be. The Mayor and several members of the Council, chiefly members of the Highway Committee, went to the place where the test was to be made, and steam being up it was not long before the huge machine began to cranch along the new highway. The weight of the roller is 26 tons. When the machine had gone over the street two or three times it had transformed it from a rough, impassable thoroughfare to one almost as level and satisfactory,—of course not so smooth,—as an ordinary asphalted footpath.

We give a view of the roller. It consists of four wheels or rollers, the two front ones being 3 ft. 6 in. apart, and the hinder ones running close together, 6 ft. diameter and 2 ft. broad. The hinder wheels overlap the front ones 3 in. The total width covered by the roller is 7 ft. 6 in.

The whole machine weighs 25 tons, equally distributed over the rollers. The boiler is horizontal, and the working parts are on the top of the engine out of the way of the dirt of the road. The power is communicated to the rollers by an improved endless chain of great strength.

The two hinder rollers are fitted in a turntable, and become the steering of the machine, which is perfect in its action. A boy twelve years old can steer the machine, and it can be completely turned in a road 30 ft. wide with great ease. We may add that the roller can be worked backwards or forwards. It is therefore seldom necessary to turn it.

A somewhat similar engine to this, but much heavier, is, we understand, working satisfactorily in the streets of Liverpool.

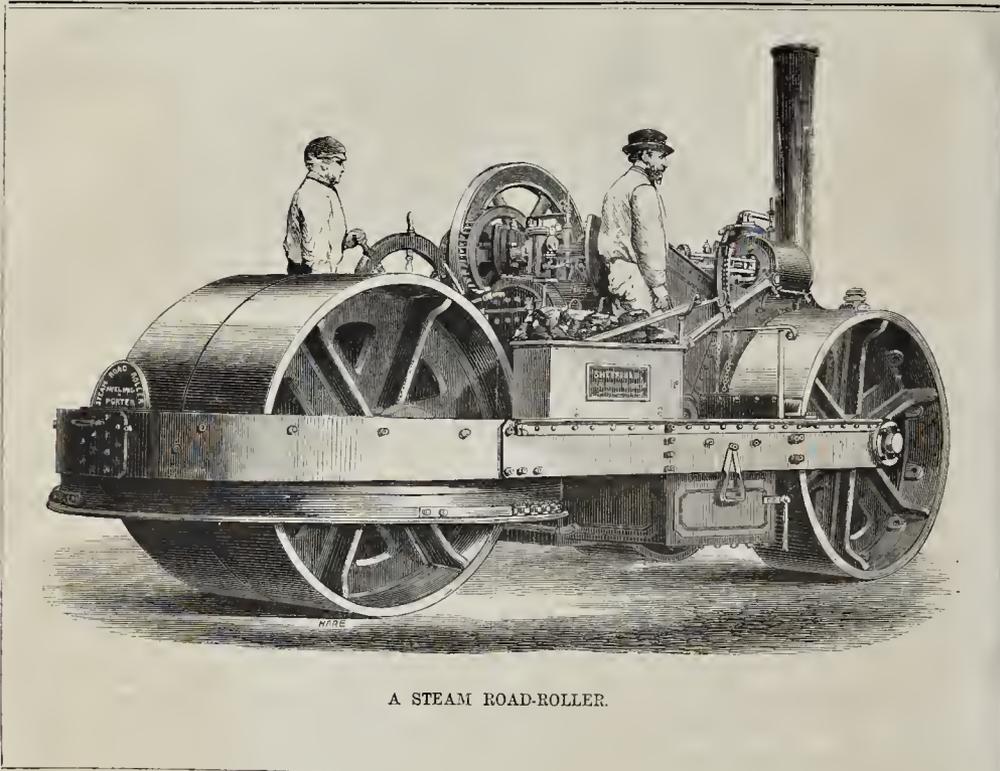
THE VICTOR EMANUEL GALLERY, MILAN.

THE completion of the Victor Emanuel Gallery is but the commencement of the work being carried out by the City of Milan Improvements Company, and consisting in the reconstruction and establishment of the whole quarter, including the Piazza del Duomo to the Piazza della Scala, and in the construction of an entirely new street, which is called the Via Carlo Alberto.

The ceremony of laying the first stone was performed by his Majesty Victor Emanuel on the 4th of March, 1865, and the gallery was publicly opened by the king on the 15th of September, 1867, the time occupied in its construction being thirty months, during which time about a thousand workmen were daily employed.

The gallery consists of two passages, on each side of which is a handsome row of shops. These passages cross each other at right angles, and form a nave, 640 ft. in length, leading from the Piazza del Duomo to the Piazza della Scala; and a transept, 460 ft. in length, from the Via S. Raffaele to the Via Silvio Pellico. The transept and nave are each 47 ft. 6 in. in width, and contain ninety-two shops. At their point of intersection an octagonal space, 118 ft. in diameter, is formed, which is surmounted by a dome rising to a height of 164 ft. above the level of the pavement. The shop-fronts are each glazed with a single sheet of plate-glass, and are separated by pilasters in the Ionic order, enriched at the level of the entablature and first-floor windows with panels containing ornamental designs in *bas-relief*.

Immediately above is an entablature in the Roccoco style which serves as a balcony for the second-floor windows, which are partly hid from view. A light and elegant balustrading, with a medallion bearing the arms of the principal cities in Italy in front of each window, completes the balcony. The third-floor windows are ornamented bandsomely, and are separated by



A STEAM ROAD-ROLLER.

caryatides, which support an entablature at a height of 85 ft. 6 in. above the level of the pavement, serving as a base for the light curved iron ribs of the glass roof. This roof rises to a height of 104 ft. 9 in. above the pavement; above this is thrown a small roof, likewise glazed, at a height of 6 ft. above the other, so as to admit of ventilation.

The gallery is paved in the Venetian style, consisting of geometrical designs in coloured pieces of marble embedded in hard cement; and in the centre under the great dome are the arms of the House of Savoy, the city of Milan, and the Royal arms of Great Britain and Ireland in Mosaic, in the Byzantine style, by Dr. Salvati, of Venice. Below the pavement are cellars and subways for the water and gas pipes.

The dome consists of sixteen curved double-webbed ribs united at the top to circular casting forming an opening 32 ft. in diam.; these at intervals are cross-braced by horizontal segmental ribs, on which are laid the bars of T section to receive the glass. The circular opening at the top of the dome is protected from the weather by a conical glazed roof, the apex of which is 187 ft. above the ground. The sides of this lantern are left open for the purpose of ventilation.

Under the dome, in the spandrels formed by the intersection of the arched roof of the transept and nave, are eagles with extended wings, supporting alternately the arms of Milan and Savoy; and over the four corner shops are frescoes, 47 ft. 6 in. by 23 ft. 9 in., representing Europe, by Angelo Pietrasanta; Asia, by Giuliano; Africa, by Eleuterio Pagliano; and America, by Casnedi. The frescoes over the archways at the entrance of the transept represent Agriculture, by Pagliano; Industry, by Pietrasanta; Sciences, by Giuliano; and the Arts, by Casnedi. At the height of the entresol are placed statues representing eminent persons of Italy, which add considerably to the general effect.

Entering the gallery from the Piazza del Duomo, the first statue on the left hand is that of Giovanni Battista Vico, by Amiconi; then Volta, by Magni; Lanzone da Corte, by Tabacchi; Giovanni da Procida, by Argenti; C. Bec-

caria, by Crippa; Vincenzo Monti, by Manfredi; Ferruccio, by Pierotti; Michelangelo, by Magni; Dante, by Tabacchi; Galileo, by Magni; Raffaello, by Barzaghi; Girolamo Savonarola, by Boninsegna; Ug. Foscolo, by Rossi; Marco Polo, by Pagani; Macchiavelli, by Garneri; Pier Capponi, by Magni; Romagnosi, by Santardini; Beno dei Gozzadini, by Pandiani; Christoffer Columbus, by the same sculptor; Galeazzo Visconti, by Corti; Vittor Pisani, by Calvi; Filiberto, by Romano; Cavour, by Magni; and Arnaldo di Brescia, by Solerani.

The archways at the entrances from the Piazza del Duomo and the Piazza della Scala are 78 ft. 9 in. in height by 40 ft. in width. The entrances from the Via Silvio Pellico and San Raffaele are 75 ft. 6 in. in height by 39 ft. in width.

The gallery is lighted by eleven sun-lights or chandeliers, and round the base of the dome by a ring of 300 gas-burners, and three rings of lights at the top, under the lantern; the total number of burners employed for the illumination being upwards of 2,000.

This work was designed and has been carried out by the architect to the company, Giuseppe Mengoni, to whom great credit is due.

It is not alone upon the creation of this really fine monument that the municipality of Milan is to be congratulated, since this forms but a fraction of the great scheme of improvement which has been organised for that Imperial city.

Our readers will, many of them, recollect the huddled buildings which crowded upon the splendid cathedral, and the narrow and tortuous alleys by which they could alone wind their way from the Piazza del Duomo to the vast, but not very beautiful, Theatre of La Scala. Already the Piazza is nearly cleared of the old buildings which disfigured it, and the Gallery itself provides a magnificent line of axis between the two great foci of attraction to all visitors to Milan.

The English company, by whom these improvements have been effected, have always looked upon the erection of the great Gallery as the least remunerative portion of that undertaking; but, already, they have succeeded in letting almost every shop and a large proportion of the apartments it contains.

The place wears the aspect of the greatest possible commercial activity, and it is difficult for any one visiting the gallery not to feel that for the purposes of trade, the rents must very speedily rise in the same proportion to those in other parts of Milan which the rents of the Palais Royal at Paris used to bear, in its palmiest days, when contrasted with those in the less popular streets of the same capital.

The next portion of the works with which the company will proceed, and for which the foundations are already brought up to the ground level, will consist of the extensive range of buildings which will form the southern side of the great Piazza del Duomo. The demolitions have already begun for the side of the same Piazza facing the west front of the cathedral, and a beautiful opening has been obtained to the very picturesque old Palazzo del Mercolanti, and the place surrounded with buildings which were famous as the head-quarters of banking and commerce, when the Lombard goldsmiths and hawkers were the great financiers of Europe.

Our countryman, Mr. Digby Wyatt, who, as one of the directors of the company, has taken an active part in assisting Mr. Mengoni to the realisation of his great scheme, has been fortunate enough to receive an honourable recognition of his services, both from the King of Italy and the Academy of Fine Arts of Milan, having received from the former the Officer's Cross of the Order of St. Maurizio and Lazzaro, and from the latter a nomination as honorary Academician.

Mr. Charles Barry, it will be remembered, was employed professionally to test the financial organization of the scheme prior to the establishment of the company.

The unprecedented state of the money market has, no doubt, operated in retarding the full realization of Mr. Barry's prognostics; but no one acquainted with the great commercial importance of the city of Milan, and who has once seen the crowds who continually throng, and make purchases in the Gallery we illustrate, can doubt that, sooner or later, the tree the company have succeeded through so many difficulties in planting will bear a due amount of golden fruit.



THE VICTOR EMANUEL GALLERY, MILAN, ITALY.—SIGNOR MENGONI, ARCHITECT.

FROM IRELAND.

Dublin.—The statue of Burke, by Mr. Foley, R.A., has been erected on its already prepared pedestal.

The Varty Waterworks.—The Irish Times says:—"The citizens will be glad to learn not only that the Varty Waterworks are practically completed, but that financially they are in a much better position than they could have expected. The works have been in progress for nearly seven years, but at last the accounts are closed, and closed with a balance of 2,000l. in hand in favour of the citizens. The great reservoir has been rendered watertight, and the water is now within 11 ft. of the summit. A sum of about 12,000l. is yet to be expended in completing the suburban works, but from this source an income of between 5,000l. and 6,000l. a year is expected. The waterworks committee have unused powers to borrow to the extent of 75,000l. in case of necessity."

The Dublin Exhibition Building.—A meeting of the proprietors of the Dublin Exhibition Palace Company, presided over by Sir Benjamin Lee Guinness, M.P., has been held, for the purpose of taking into consideration the offer of the Government to purchase the building for 45,000l.—the sum at which it had been valued by Colonel M'Kerlie and Mr. Ward Hunt. The directors had offered to sell the entire of the company's property (including buildings, grounds, engine, machinery, organ, &c.) to the Government for 60,000l.; but the proposition would not be entertained. A very strong opinion was expressed at the meeting against disposing of the building at so great a sacrifice as 45,000l., which would not be sufficient to cover the liabilities of the company. Several influential shareholders thought that another effort ought to be made to rescinate the undertaking, by raising money by the issue of preference shares, thereby preserving the palace and grounds for the purposes for which they were originally intended. Finally, a committee was appointed to consider how this object could be best effected.

FROM SCOTLAND.

Newhaven (near Edinburgh).—The Society of Free Fishermen at Newhaven have just completed the erection of a tenement of dwelling-houses, says the Scotsman, in a manner highly creditable to them. The tenement is situated in a Fountain-place, opposite the stone pier. The building contains six dwelling-houses, each consisting of room, kitchen, light bed-closet, and scullery, with water-closet for each flat. In addition to the range of dwelling-houses, the fishermen have erected a public clock, with an illuminated dial, 36 in. in diameter, placed in a prominent front of the building. The clock will be illuminated all night for the accommodation of the fishermen leaving and entering the harbour.

Kirkcaldy.—A commencement has been made with the execution of the Kirkcaldy and Dysart water-works, which are to supply one million gallons of water per day to the two towns, being at the rate of fifty gallons daily to each inhabitant. It is hoped that within a year the Lothrie water will be brought into and distributed over the burghs of Kirkcaldy and Dysart. The supply is said to be abundant, even for a great increase of population; and the quality is also very fine. According to the report of Professor Penny, of Glasgow, there are only 7 grains of dissolved impregnate in the gallon, of which 1.66 grain is organic matter, and the hardness is 3°.

Ayr.—The improvements on the north side of the harbour are approaching completion. These works have been executed by the Glasgow and South-Western Railway Company, who intend to ship coals at the new quay. The new quay wall in course of erection, by Mr. Stewart, is in a forward state. By other improvements the harbour has been widened from 30 ft. to 50 ft. The Harbour Trustees have accepted an offer from the Messrs. Hunter, Edinburgh, who have contracted to execute the necessary work on the pier and breakwater at a cost of upwards of 10,000l.

Cottage Accommodation in Scotland.—Mr. McLagan, M.P., and Mr. Thomas Graham Murray, M.P., having recently been in communication with the Enclosure Commissioners in reference to the commissioners' requirements for cottages erected on estates in Scotland under their sanction, a letter, addressed to Mr. McLagan, has

been received from the commissioners, in which they state that as the cost of four-roomed cottages has operated as a restriction on improved cottage building, every facility shall be given to extend the practice, which already has in many cases been adopted, of sanctioning cottages composed of three rooms, to be charged on the estate. In such cases it is recommended that the living-room should not be of a less size than 16 ft. by 18 ft., and 10 ft. in height, but in no case should the size be less than 12 ft. by 15 ft., nor the height less than 8 ft.—they think 9 ft. preferable. They are further of opinion that the method of structure which encourages the practice of having recesses in which box-beds are placed, should be avoided. A scullery or wash-up place, as well as the usual out-offices, they add, should of course be also provided.

ANCIENT CRUCIFORM PLATFORMS.

We hear of the discovery, near the village of Swinton, North Riding, and close to the old Roman road from Eboracum to Prætorium, of a cruciform excavation 8 ft. 9 in. in depth, cut into the solid rock. The arms of this cross were to the cardinal points, were exactly of a length, measuring from north to south and from east to west 19 ft., being 6 ft. wide at the point of junction, and 5 ft. at the ends. The sides were perpendicular, and the bottom was a flat surface of coralline oolite. Upon this level bottom of the excavation was raised a platform, also in the form of a cross, the arms of which extended the whole length (nearly) of the cutting, and were 2 ft. in height and 2 ft. wide. At the point of intersection was a large square block of calcareous freestone, and the whole of the platform was made of the same rock, in large blocks at the bottom and smaller stones upwards, all carefully placed. The excavation was filled up with soil, containing Roman pottery, beds of clay and charcoal, quantities of Medieval pottery, a worked hone pin, &c. A very similar structure, but formed on the natural ground, with a mound over it, was found at Helberthorpe, on the Wolds, about eighteen months ago. The cruciform foundation in the area of Richborough Castle, Kent, will be remembered on reading this notice.

SURVEYOR TO THE HON. SOCIETY OF GRAY'S INN.

The regretted death of Mr. Francis Wigg, the late surveyor to the Hon. Society of Gray's Inn, has left a vacancy, which does not appear to be generally known to the profession. He was appointed to the office on the 22nd of May, 1833, and he held it until his death, on the 28th day of February last. It is rather curious that his immediate predecessor was appointed to the office in the year 1800, so that they each held the office for nearly equal periods.

Upon the death of Mr. Wigg being reported to the benchers of the society, they declined, we have been informed, to fill up the office immediately, thinking that the vacancy might not be generally known amongst the profession, and that sufficient time had not been afforded to gentlemen to compete for the appointment.

OPENING OF THE NEW WORKHOUSE FOR WEST DERBY UNION, LIVERPOOL.

The new workhouse at Walton, the first stone of which was laid on the 29th of March, 1864, by Mr. Thomas Haigh (the then chairman of the West Derby Board of Guardians), has been formally opened. The edifice has been constructed to accommodate 1,000 inmates, and has cost, including the price of the land (purchased from Lord Sefton), 65,000l. The grounds extend over an area of 37 acres, and it is intended to devote a great portion of the land to cultivation, so as to afford useful employment for the inmates. At either end of the building are hospitals for male and female inmates, and it is intended immediately to proceed with the laying out of a cemetery and the erection of a church. The main building is already nearly full; and it is probable that in course of time the accommodation will not be too much for the numerous poor chargeable to the rates of the West Derby Union. Messrs. Culshaw & Summers are the architects, and Mr. James Walters, the builder.

SCIENTIFIC LECTURES FOR THE PEOPLE.

A SERIES of lectures, in connexion with Mr. Twining's Economic Museum at Twickenham, for the instruction of the poorer working classes in the principles of elementary science, and its applications to health and the requirements of everyday life, has been in course of delivery in various parts of London during the autumn and winter, the last for the season having been given at the Mayfair Literary Institute, Hertford-street, Mayfair. The course consisted of eight lectures. Mr. Twining prepared his lectures in clear and simple language, taking care to define and illustrate every technical term, however common it might be, before using it. The illustrations, consisting of diagrams, specimens, models, and experiments, were all likewise of the simplest kind. The lectures were provided gratuitously in all respects by Mr. Twining, and have been delivered two or three times every week (holiday times excepted), to audiences varying from 100 to 200 up to about 1,000 persons, at school-rooms, literary institutions, workmen's clubs, mission-rooms, and at the Lambeth Baths. They have been read by Mr. W. Freeman, curator of the Twickenham Economic Museum, the experiments being performed and the illustrations exhibited by Mr. George Whipple, of the Royal Kew Observatory. This attempt to bring elementary science within the reach of the poorest and most uneducated will be highly appreciated by all sanitary reformers, who find their greatest obstacle in dealing with the poor themselves to be their complete ignorance of the laws of science and health.

THE NUT FOR THE PROFESSION TO CRACK.

PAYMENT OF ARCHITECTS.

SIR,—The nut that "a country gentleman" gives "the profession" has surely been cracked by every professor his own way, and I cannot see what "convention" or "system too strong for individuals to break through" can possibly have to do with it. If ten "architects" or "engineers," or a thousand, whether forming an "Institute" or not, have each decided to be employed in the way he calls "unreasonable," it is simply that to each of these ten or thousand reasoners this appeared reasonable,—nay, the highest reason (to quote your other correspondent), "the best that could be devised under the circumstances." Others, as myself, to whom it never appeared reasonable at all for one instant of course never adopted it, but whatever appeared the best each of us could devise. Now, is not "devising" the architect's and the engineer's whole specialty? What is meant, then, by "convention beats them down" in this very first matter of devising? Has the professional deviser not devised the very first thing he had to devise?—how to reckon his own pay? Of course he has. The architect, the engineer, has devised, and this is his device! If it be not to your taste, or sense of the "reasonable," observe this is his architecture,—this is his engineering. Take it or leave it. What do you want either "profession" for, but for their devising?

If the "Country Gentleman" had been a "constant reader" any considerable time, he would know that his "Nut" is a very old acquaintance in the Builder's pages. I have noted the following times of its special appearances:—

- 1845 ... No. 150, p. 605 (Leader).
- 1847 ... Nos. 469-72, pp. 76, 91, 122.
- 1857 ... No. 748, p. 320.
- 1865 ... No. 1185, p. 752.
- ... No. 1187, p. 767.
- ... No. 1188, p. 788.
- ... No. 1189, p. 821.
- ... No. 1190, p. 829 (2 letters).
- ... No. 1192, p. 876.
- ... No. 1193, p. 884.
- ... No. 1194, p. 913.

Your correspondent would find the "professional" mind very satisfactorily displaying itself, I think, in No. 1187 (letter signed "Thomas Harrie"), No. 1192 ("E. L. Tarbock"), and an answer to the letter in No. 1194. What I presume "A Country Gentleman" and his public (as distinguished from the Institute's public) really want, is an alphabetical list occasionally advertised, like the annual list of "sworn hokers," of those who are declared or sworn owners' architects, as distinct from contractors' architects, being headed by some such declaration as this:—

"We, the undersigned, practising as owners' engineers, or owners' architects, building designers, or building surveyors, do hereby declare,—

1. That for no service on any building are we employed or paid, or will be so, by any but the owner or occupier of the same.

2. That we are not in partnership with any builder or other tradesman, or will be so.

3. That we have never received per centage on the cost of any work, nor will receive any."

As one of the latter of the four classes for whom the *Builder* is intended, I must say the really difficult and sole "nu." I find to crack, and which I consider a real hardship and grievance, is that one cannot practise in this country the useful and necessary art of building-design without being confounded popularly, and by writers like "A Country Gentleman," with the order of men that, of all others, from the palace to the goal, I most object to be classed with, the producers of your public buildings (things called "works of art"), in a word, professors of *Percentage-Art*—a style, not the smallest fragment of which, be assured, will ever be mistaken for aught else as long as a stone of it can be dug up. But whether one calls oneself architect, engineer, haulder, or mere surveyor, it is all the same. Each now is taken to mean what I abominate beyond all trades, penal or not.

AN ARTIST, NO PERCENTAGE.

DAMP.

In reply to your correspondent "G. D. B." in your publication of February last, I would recommend his trying, on a small scale, a "bright American varnish," laid on with a brush like paint. It should be kept warm during the process, so as to retain the consistency of paint.

A few days' delay in painting over the varnish will be sufficient, and a dry day should be selected. The cost per gallon of the bright American varnish is about 4s. outside. I shall be glad to know the result if "G. D. B." will forward it.

The "bright American varnish" may be procured at most sea-ports. F. R.

STORAGE OF RAIN-WATER.

RECENTLY Mr. Bailey Deuton has drawn attention to the storage of water. He tells us that we may expect a dry summer, and therefore it is well to look for economy in the use, and the careful preservation, of the supplies. He points attention to storage reservoirs, but I think there is another part of the subject which deserves more attention than it has received, and that is the preservation of rain-water for domestic use, by having a cistern specially to receive the roof-water.*

When I rebuilt my house, I put up a large cistern capable of holding 1,000 gallons, and it has been one of the greatest luxuries we have enjoyed ever since. The whole of the roof-water goes into it, and the overflow is connected with the rain-water pipe, which empties itself in the usual way. The cistern is carefully covered, so that the blacks are kept out, and the water is not more discoloured than I have seen water taken from streams in healthy districts. We use it for the bed-rooms, and other purposes of a like nature, but not for culinary or drinking purposes. Although mine is a large house, we have only once been without this water for four years. It might be made much clearer by a simple system of filtration, but I have never found it necessary to adopt this precaution, as we have become quite reconciled to its appearance, from the much greater softness it possesses than the water supplied by the company. To say nothing of the greater ease, comfort, and effectiveness with which the process of washing is performed, I am sure that I save the interest of my outlay in soap.

At this time all such measures are important. Quite apart from all consideration as to the saving of water it is of moment, but it is now understood that the report of the commission on the London water supply will be in substance against the large schemes for supplying London which have been proposed to us, but will

* We have specially urged this on more occasions than one.—Ed.

strongly recommend a constant supply. It will, therefore, be necessary that the public as well as the company, should look carefully at the question so as to check waste, and to economise the use of water. The erection of a rain-water tank in every house would greatly conduce to this end, while it would tend to promote cleanliness and health. S. S.

HORNCASTLE TOWN SEWERAGE TENDERS.

We have received the following list of propositors tenders sent in for sewerage Horncastle. The quantities were supplied, so that the differences are in price only:—

Barstow & Co.	£9,388	0	0
Speight & Sons	5,781	0	0
Morton & Sons	5,509	0	0
Monkton & Co.	4,900	0	0
Buns	4,600	0	0
Abell & Co.	4,534	0	0
Moore	4,139	0	0
Beard	3,162	0	0
Freery	4,074	0	0
Wainwright	3,812	0	0
Williams	3,723	0	0
Waller	3,710	0	0
Finsley	3,677	0	0
Esary	3,571	0	0
Finson & East	3,500	0	0
Hadsforth & Co.	3,348	0	0
Yeung	3,238	0	0
Edwards	3,230	0	0
Ford	3,223	0	0
Peter	3,185	0	0
Frow	2,992	0	0

"After the tenders had been opened and their sums made known, Mr. Young (3,288l.) pleaded an error, and was, in consequence, allowed to make a private proposal of 2,977l., which, being 15l. below the lowest, the Board, with the Rev. W. H. Miner, vicar, in the chair, accepted the new proposal or amended tender, to the discredit of the four contractors originally lower."

We give this statement as sent to us by more than one of the persons who tendered.

FOOTINGS ON ANOTHER MAN'S LAND.

A CORRESPONDENT, signing "Stylus," is very facetious as to "Surveyor," who asked a question, a few weeks back, concerning the right, or otherwise, of allowing the projection of his footings on the adjoining ground:—

"You can no more build," says "Stylus," "under another man's land than you can upon it, and the reasons are quite plain, and, if I may add, natural."

"In all buildings the walls, and the earth upon which they stand, are one and indivisible. In the case of leasehold land and freehold house, the person building the house hires the land upon which it stands for a given term, as a yearly tenement, which is called ground-rent. When the ground-rent falls, or the lease expires, the house then merges into the ownership of the soil.

This has been the law of England for more centuries than we need care to go back to. If a man chooses to widen the base of his building surreptitiously, so as to touch, or rest on, under, another man's land, then that other man, upon discovery, can call in the force of the law and have that portion of the building removed."

"Stylus" is evidently not aware that Building Acts which are or have been in force, have at times given this special right to builders. The Metropolitan Building Act of a few years ago did so. "Surveyor," however, must consider that, where there is no special Act in force, he cannot touch or encroach upon the soil of his neighbour.

HUSBANDRY IN HYDE PARK.

SIR,—Would it not be well that Londoners should be informed that in Hyde Park the rural scenes for the year have already commenced?

The other day, standing on the rising ground north of the barracks (in the centre) I was surprised at the truly rural scene before me. Looking in the direction of the bridge, scarcely a sign of London is to be seen, and, to enhance the view, an acre or more of grass had been removed, leaving the ground bare, and over which a fine horse was drawing a harrow, giving one the idea of a field under cultivation; men at work cutting sods, carts slowly moving to and fro to carry them away and bring earthy material to take the place of the green herbage removed, each cart making evident its progress and the route it had taken by the long depressions left in the sward, in some places two or three inches deep. It was, indeed, a truly rural scene; it required no stretch of imagination to believe oneself miles in the country. I say "it was," but it will be continued, sir, after these holiday times are over, if we may judge by the last two seasons, when on each occasion some three or four acres of the most beautiful grass in this park were removed as sods, and as yet this year they have cut but about one acre. And if Londoners very much approve of husbandry being thus carried on in Hyde Park, the authorities might, perhaps, this season be induced to continue it till all the grass be removed, and then we might be favoured, perhaps, with a ploughing match, as an accompaniment to the Cattle Show at Christmas. Is it not kind and thoughtful thus to

bring these rural scenes into the heart of London; and at the same time, you know, it saves purchasing sods elsewhere?

Unfortunately, going on a little further one comes to that drawback to the pleasure of a stroll over a farm, viz., the dung-heap, or, as it here must be termed the rabbit-heap. I regret to say I cannot admire their choice in placing it in the very centre of the Park, at the side of a course of trees, and in the hottest part. This would be one of the prettiest parts of the Park if it were but clean and sweet. Here, from time to time, one may see mud-carts rolling over the sward to add to the heaps their load of road-scrappings and coarse rubbish. Here it remains till wanted, being occasionally turned over to facilitate decay, and which I am sure it does, by the smell then given off.

Last year much of this (without sifting) was spread over the Park, and its contents might have furnished starting points to some Hervey for volumes of "Meditations." It seemed to contain remnants of everything in civilized society:—old shoes, rags, snuffboxes, sadine boxes, broken canisters, plates, dishes, wires of umbrellas, brickbats, broken bottles and glass, the sharp points of which sparkled on the ground amidst the relics of almost every conceivable thing, and which most allowed that to remain for many weeks, if not months, to be moralized on.

R. F. C.

DEATH IN THE ALLEY.

SIR,—The *Builder* has done much to enlist sympathy in behalf of the poor creature living (or rather dying) in narrow courts, dismal passages, and back streets, in London. Let me appeal to those who have the power and the will to aid in this work of mercy, for it is imperative we ought to obtain the width and wholeness of every tenement in the kingdom. Subsequently to an Act to be passed, all such places under 2 ft. wide in any part thereof should be closed as human dwelling-places the first year, under 3 ft. the second year, and so on till the third year, and so on up to 12 ft.; the minimum to be allowed by law. I have had plenty of sympathetic (pie-crust) promises from Members, but no good has resulted yet.

R. T.

CHURCH BELLS.

SIR,—In a late number of your interesting journal there is an account of the building of a church at the north of London, in the neighbourhood of Somers-town. Now, sir, it is a remarkable fact that there is not one church-steeple in the parish of Saint Pancras that contains a peal of bells, or in fact any part of the north of London, with the exception of the parish church of Islington. This church in Somers-town is building, I read, by the munificence of a gentleman, and a peal of bells would no doubt be novel to the inhabitants of the neighbourhood of the church.

AN INHABITANT.

EFFLORESCENCE ON BRICKWORK.

SIR,—All exposed brickwork in these parts (Swansea) becomes, after a short time, covered with a white powder or efflorescence, which renders any attempt to produce coloured patterns in that material quite futile. As a constant subscriber to your valuable journal, we beg to say that we should be greatly obliged if you or any of your readers would inform us of any means by which such disfigurement can be prevented, or effectually and permanently removed.

T. W. & J.

A SURVEYOR'S CLAIM AGAINST A LOCAL BOARD.

In the case of *Shuffelbotham v. The Wilms Local Board of Health*, the plaintiff, who had been surveyor to the Board, claimed for salary due on his dismissal, with the period of his previous notice of resignation. In consequence of disagreement with certain members of the Board, who seem to have had the appointment of an engineer-in-chief in view, the surveyor gave notice of his resignation in three months, and in the meantime performed his duties as usual, but had not attended two meetings of the Board, which were not included in his duties, but which he had been in the habit of doing. In a letter to the clerk, he had explained that in the one case he was unwell, and in the other, the Board were to discuss the appointment of an engineer. The Board dismissed the surveyor within a month or so of the expiry of his notice of resignation, offering him his salary up to the time of dismissal, which he refused. The defence was rather a shuffling one. It was argued that by the Act appointing local Boards, the Board had "a power of summary dismissal of which they could not deprive themselves," to which the County Court Judge, before whom the case stood, replied that he was not bound to discuss what must become of any local Board if their most confidential officers could go and leave them at any moment." The Board, however, contended that they had contemplated such an absurdity, or, as was also urged, that the Board could not do anything "which might work to the injury of the ratepayers, and the embarrassment of a subsequent Board." It was admitted, nevertheless, that a contract had been made with the surveyor which had not expired at the time of dismissal; and the idea seems to have been that the contract was binding upon the surveyor, but not upon the Board.

As the Judge was obviously against the defendants on these points, neglect of duty was next urged; but it was shown that evidence of any neglect or dereliction was not forthcoming. It was admitted, and that calling much into question, which the surveyor had punctiliously done, was a duty of the clerk to the Board. The defendants' counsel then contended with the plaintiff's, and agreed to a verdict for the 37l. 10s. claimed. The Judge seemed to be of opinion that more might have been claimed; for he said, "If the plaintiff gave three months' notice, and you wrongfully dismissed him within one month, you would be liable to claim the whole amount, even from the moment of his discharge." There was also a claim for special damage, which could not be entered into, so notice to that effect had not been given. On the whole, the Wilms Local

Board did not come out of the affair with credit to themselves, and they established no charge against the plaintiff. Indeed, that he was an efficient officer was declared in relation to the committee, and the finding of the Board said at the close of the case, that "the plaintiff had been able to relieve his character from an imputation, and make himself stand properly before the public as a respectable person entitled to the full trust."

The plaintiff, we understand, had given up the employment of Crews, with a good private practice, to undertake the surveying of Widnes, and had done some heavy and arduous duties for the Board over and above his ordinary duties.

THE DUKE OF BUCKLEUCH v. THE METROPOLITAN BOARD OF WORKS.

This action has been again before the judges in the Court of Exchequer.

Mr. Pollock awarded to the duke a sum of 8,325*l.* The jury found a verdict not only for that amount, but for interest upon it, and for the expenses of the award. Mr. Hawkins, Q.C., contended that if it should turn out that the empire had awarded any sum, however small, which he had no jurisdiction to give, the award was bad, and the defendants would be entitled to the verdict. Mr. Hawkins submitted that there was no grant of the jetty to the duke under either of the leases, that the jetty was really public property, and that, therefore, he was not entitled to compensation in respect of it.

Mr. Baron Martin said it appeared that the jetty had existed from the time of Charles II. He did not know whether Sir Walter Scott could be considered an authority upon such a matter, but he spoke in one of his novels of a jetty from Montagu House to the Strand.

Mr. Hawkins wished he could avail himself of such an authority, as the process would be both instructive and amusing.

Mr. Baron Martin said there could be no doubt the stairs belonged to the Old Palace of Whitehall, and the Crown could make a grant of them to any one.

Mr. Baron Martin said, as at present advised, I am of opinion there was abundant evidence to prove that the jetty was an easement and right of way belonging to Montagu House, and that it passed by the general words in the lease of the Duke, who is consequently entitled to compensation for the loss of it.

Mr. Hawkins then argued at some length that in regard to various other matters for which the empire had allowed the sums the plaintiff was not entitled to compensation.

The court granted a rule generally; rule nisi.

THE LIABILITIES OF ARCHITECTS.

SWATRIDGE v. COLSON.

This was an important case to professional men, heard in Sherborne. The plaintiff, a marble mason, of 17 Yeovil, sought to recover 16*l.* 13*s.* 8*d.*, for two stone chimneys erected at the house of the plaintiff's defendant, an architect, of Sherborne, conducted his own case. The defendant had been engaged in erecting a rectory at Sandford, and, in accordance with his instructions, the plaintiff made two stone chimneys, which were fixed there, and he now sued for their value. His Honour asked if the defendant undertook to pay for the chimneys. Mr. Watts gave the order.—His Honour: They are generally given by architects, and tradesmen are very much obliged to them; but the principal says.—Mr. Watts said the principal was not disclosed.—His Honour: The principal was not disclosed, and a person gave an order, and there was fraud, then he would have to pay; but in this case it seemed the order was given simply in the capacity of architect.—Plaintiff said he had always considered Mr. Colson the responsible party, and had entered the charges for the work done to him in his account-books.—His Honour said application must be made to the person who was liable.—Mr. Colson: He has become bankrupt, and you cannot get his money.—His Honour: Mr. Watts: Exactly; that's just what we say. Mr. Colson cannot get his money, so he disputes his liability.—The plaintiff then stated his case, and said that he had never seen the order.—Mr. Watts: The order had been given by Mr. Colson, who had looked at the books, and pointed out what items were to be charged to him and what to the defendant.—On the other hand, the defendant, on being sworn, said he was an architect, and resided at Sherborne. Swatridge called at his office several times early in 1857, requesting that he might supply some of the chimney-pieces at the rectory. He told him that he was in communication with a marble company, and showed him a book of designs, with list of prices, and a letter offering 15 per cent. commission on orders.

His Honour: Is that usual? I don't ask whether it is usual for architects to accept what they can get, but it is usual for companies to do that?

Witness: I don't think it is usual, but in this case it was done, however, I did not accept it.

His Honour: The defendant said he could not supply chimney-pieces at so low a price, and voluntarily offered me 5 per cent. commission. I told plaintiff on one occasion the nominee of the Green Anne's company.—The Rectory was erected by Cockworthy, was the owner, and the contractor Mr. Gale, then living at Portland. Plaintiff inquired what I knew of Gale as to his responsibility, and I read him letters from Mr. Gale referring to that Mr. John Trust and Mr. David James, of Stoke, were his sureties. On the 3rd of May, having obtained the consent of the contractor that Mr. Swatridge should be employed, I delivered plaintiff tracings, and drawings from which the chimney-pieces were executed and erected, under my instruction.

In November last I requested Mr. Swatridge to supply me with a memorandum of the cost, and other items, to enable me to measure for and make out my bill of extras. I left him the memorandum, which he has produced, and he sent me an account. I made out the bill of extras in the usual manner, allowing the contractor the amount of 6*l.* 13*s.* 2*d.* for the extra value of chimney-pieces, beyond the amounts named in the specification. The plaintiff has seen that bill of extras; and in December last the nominee attended, and settled the balance due to the contractor, and tradesman who had also been employed under my instructions, attended, and were paid the accounts by Mr. Gale. Most likely if Mr. Swatridge

had attended the settlement, he would also have been paid, as Gale received a very considerable balance.

Plaintiff: But you promised to write to me and say whether you would be bound to pay him.

His Honour: That shows where you expected to get your money.

Defendant said he had witnesses to call who had been similarly employed by him.

His Honour, however, did not think that necessary, and in delivering his judgment said there was no doubt that Gale was the contractor for the works. It was one of those unfortunate cases in which the person really liable had become insolvent. It must be very strong evidence that would make him believe that the case was one out of the ordinary run of business by which an architect made himself personally liable instead of merely giving directions. They had been told that before the work was done the plaintiff was informed of the name of the rector and the contractor, and that he offered 5 per cent. on any commissions defendant could obtain for him. If that was so it was conclusive, and it had not been contradicted; and it seemed that the plaintiff had also inquired as to the means of Gale, in reply to which the defendant had read several letters as to his character, and had informed him of his sureties. All that was perfectly inconsistent with the assertion that he looked upon the defendant as making himself personally liable, and nothing having been made out to his satisfaction that the verdict should be against the defendant, he should give it for him, with his personal expenses.

THE COST OF IMPROVING PARIS.

The reports of the tribunals which have adjudicated the sums received by tradesmen for leaving their places of business just now in the Rue de la Paix and its immediate vicinity facing the new Opera House, say:—

"The expropriations for the opening of the new street, the Rue Réaumur, are actively going on. The jury who estimate the sums to be paid for this relinquished property are now engaged upon the section between the Rue du Port Mahon and the Rue de Choiseul. Three of these purchases alone have cost each of them more than a million of francs. [The reader will bear in mind that a million of francs is 40,000*l.*, and 100,000, 4,000*l.*] For the house No. 25, in Rue Augustin, 1,200,000*fr.* has been paid for No. 7, Rue de Grammont, 1,025,000*fr.*; for No. 3, Rue de Choiseul, 1,000,000*fr.* In one house alone in the Rue Neuve St. Augustin the indemnity paid for loss of trade exceeded half a million; a florist obtained 240,000*fr.* for an unexpired term of his lease of six years; a dealer in lace, 160,000*fr.*; and the Restaurateur Bignon, whose cellars were in Rue de la Mochodere, No. 8, received 200,000*fr.* A question presented itself as to the claims of the Athletic Union Club, established in the Rue de Choiseul, the question being, whether the members of a club constituted a society properly so called, and whether they could claim as such? The question has been determined in their favour, M. De Barthélemy, who appeared for the club, having obtained 800,000*fr.* The total purchases made in the present series of awards exceeds 15,000,000*fr.* The jury has since proceeded to sever other awards for buildings required to be taken down in pursuance of the improvements everywhere going on in the city of Paris. In the Rue Louis le Grand, No. 38, the proprietor demanded 1,000,000*fr.* for his interest, and was paid 800,000*fr.* In the case of the proprietor of No. 39, Rue de la Paix, he demanded 1,500,000*fr.*, and obtained 1,320,000*fr.*; one of the shops belonging to this house is occupied by Madame Lucy Hoquet, a modiste, and to whom has been awarded 300,000*fr.*; 100,000*fr.* to a Glover, and 230,000*fr.* to a jeweller in the same house. The total amount of indemnities paid for several houses reached 800,000*fr.* The total amount of the sum amounts to 7,000,000*fr.* The gross total is somewhere about 26,000,000*fr.*, or 1,040,000*l.* For the short term from the Rue Louis le Grand to the angle of the boulevard the indemnity amounts to 60,000,000*fr.* The figures here given, it will be understood, are sums paid for expropriation and to the landlords. After this expenditure the new houses have to be built.

SANITARY MATTERS.

Surveyor's Reports on Newcastle-upon-Tyne.—Reports by Mr. Bryson for 1865-6-7, have been printed by order of the Newcastle Town Improvement Committee, showing the progress made during the last three years in sewerage and drainage, street improvement, &c. On the subject of the public health of the borough, the surveyor says:—

"It is a matter of serious concern that, notwithstanding the strenuous efforts made by the committee to improve the sanitary condition of the borough, a high rate of mortality still prevails.

In connection with those questions, underlying that of public health, which come within the range of my department, I may remark that, although a great deal has been done in the way of sewerage and house drainage, still much remains to be done in the ventilation of sewers, and in the paving and surface drainage of the extended parts of the town, especially in the neighbourhood of Scotswood-road and other places.

While, however, these improvements are all good as far as they go, still it is considered that a better accommodation be provided for the working class, the death-rate will not be very materially reduced. So long as the old houses in the overcrowded parts of the town are permitted to remain above ground, they will find inmates; and I would like the liberty of suggesting that, if some of those schemes of street improvement through Pandon and the lower parts of the town were carried out, they would be of immense service in this respect, and, in addition to opening out sites for such a purpose, would afford great relief to the commerce of the quay.

Another and most important problem which has yet to be solved relates to the disposal of the town sewage. At present it is, as you are aware, by the system of water-closets and sewers now in use, discharged into the river,—a system which is a great improvement upon the former

objectionable use of cesspools; but, looking at the matter in an economical point of view, a great inconsistency is observed: while, on the one hand, we send thousands of miles, at a great cost, for the excreta called guano; on the other, we not only throw away that we already possess, but render it worse than useless by converting it into an element of disease. But, whatever might be the benefit in pecuniary result of utilizing the sewage, the benefit of ridding the town of it is an advantage in point of health beyond money value."

CHURCH-BUILDING NEWS.

Brooklands (Manchester).—The church of St. John the Divine, at Brooklands, built and endowed at the cost of the late Mr. Sam Brooks, has been formally consecrated by the Bishop of Chester. The building, which was commenced in 1864, has only just been completed. It is situated on the west side of the road running through the Brooklands estate, due south from the South Junction Railway. The church is in style Gothic, and as evidenced by its most distinctive feature, such as sections of moldings, proportions of arches, and carving, of a simple type, belonging, perhaps, to the earlier period of French work, rather than to that of England. The materials of which it is built are, externally, Yorkshire shoddies of a warm tint, with dressed work of Halifax stone; whilst, internally, the walls are lined with fire-bricks, cream and brown, in bands and diaper-work. The plan is a nave of six bays, 90 ft. long by 33 ft. wide, without clearstory, roofed in one span, having transepts north and south, taking up the two easternmost bays, divided from the nave by arcades of two arches. The extreme width across the nave is 68 ft. Reached by a broad flight of steps are a choir and chancel, 32 ft. long by 20 ft. wide, with organ-chamber to the south, and on the north a small door leading to the sacristy. The building is entered at three doorways,—one in the west front, a porch on the north-west, and a porch at the angle of the sacristy and north-west transept. The chief façades of the building are the west and east. Right and left of the canopied western doorway the wall-space is broken up with a simple arcade, above which, and occupying nearly the whole of the gable, rises an arch, filled in with a pair of three-light windows, with traceried heads of three plain circles, a piece subdivided by geometrical iron glazing grilles. The sill of these windows is kept up a considerable height from the ground, and between it and the sub-sill of the main arch, under which the windows are grouped, are two large circular medallions, one on either hand of the door canopy, filled with highly relieved sculpture. The subjects are the Gall of St. John from his fishing-net to become a "fisher of men," and his writing of "the things he saw in the isle called Patmos." At the east is a rose window, of seven circles; all but the centre are cusped and uncanopied. Below the window is an arched panel, containing, in relief, the evangelist's symbol, the eagle. The reredos, painted in wax-colour, covers a space of 13 ft. wide by 5 ft. 6 in. high; it is divided into three compartments, the central subject being our Lord in Glory, with, on either hand, angels in postures of adoration, and at the four corners of the central panel are cherubs. The background of the work is filled in with plants of wheat and vine conventionally treated. Above the reredos, in the spandrels below the rose window, are two medallions, filled with Caen stone heads of the Virgin Mary and St. John, with gilded aureoles. The choir and chancel-floor and walls, to a height of 4 ft. 6 in., are laid with encaustic tiles. The whole of the windows are glazed with two tints of green glass, with the geometric forms in tracery picked out with touches of brilliant colour. The church is at present towerless, having but a slight headed wood-hell-tache rising from the nave-ridge, and supported by the roof-trusses. The building is arranged to accommodate at least 500 people, and a large proportion of the seats are free.

Gloucester.—St. Catherine's new Church has been consecrated. The edifice consists of nave, transepts, and chancel, with circular apse. The nave is 68 ft. long and 28 ft. wide; the transepts are each 20 ft. by 13 ft.; and the chancel 22 ft. by 22 feet. There is a vestry on the north side and an organ-chamber on the south side of the chancel. The church is of Early French character. The chancel is lighted by five windows; the transepts by three lancet windows with trefoil heads, and a pierced Catherine-wheel window of seven lights, with plate tracery; the west end by two double-lancet windows, and a

Catherine-wheel window of nine lights, with plate tracery. There are also double-lancet windows on each side of the nave. Severn-side bricks form the chief material used. Outside, the walls are relieved by bands and devices in black and white Staffordshire bricks, and by stone-dressings. Inside, the walls are lined to the height of the window-sills with red bricks, with an arcading in black bricks; above the sills the walls are lined with white Staffordshire bricks, relieved by bands and ornamentations in red and black bricks, pointed with white cement. The roof timbers are all stained and varnished, and the spaces between the rafters are plastered. Hereafter the panels of the chancel will probably be decorated with colour. The fittings throughout are of deal, stained and varnished. The system of warming is that by Porrett's underground stove. The roof is covered with red and blue Broseley tiles, arranged in ornamental patterns. At the west end a bell-cot has been erected of brick and stone, surmounted by a stone cross; at the east end, over the chancel, there is an iron finial, painted in chocolate, relieved with gilding. The porch is at the north-west corner of the nave, and is surmounted with a light iron finial. The whole of the floor of the nave is laid with tiles, blue, red, and white, arranged in patterns. The floor of the chancel has been laid with tiles by Godwin, of Lugwardine. The chancel-arch is of red and white stone, and rests on corbels, on which are carved angels. The corbels in the chancel are carved with the cross and crown, and the emblems of our Lord's passion. There is a credence on the north side of the altar. The five windows of the chancel are filled with stained glass by Messrs. Clayton & Bell. The subjects are,—Our Lord as the Good Shepherd in the centre, and the four Evangelists, two on either side. Beneath the figures, which are all in standing attitudes, are placed in quatrefoils the emblems of our Lord and the Evangelists,—the Agnus Dei, the Angel, the Lion, the Ox, and the Eagle. An organ of six stops has been placed in the church. It was built by Messrs. Bryceson, Brothers, of London, and was shown at the Paris Exhibition last year. The whole of the iron-work and gas-fittings were made by Mr. Cornell, of Cheltenham; the seats and roof have been stained by Mr. Barnes, of Gloucester; and the church has been erected, under the personal superintendence of Mr. Henry Medland, by Messrs. King & Godwin, of this city. The outlay has exceeded 2,000l.

Rushall.—The church here has been re-opened after alterations and repairs. In the alterations the style has been adhered to, but by an addition of a spire a new appearance has been given to the building. The nave has been enlarged 33 ft., and so 104 new sittings have been obtained. The whole building has been repaired and renovated, and the work has been done by Mr. Highway, builder, Walsall, from designs by Mr. Cranston, architect, Birmingham. The cost of the whole is about 2,000l., which has been defrayed by Mr. W. Mellish, Q.C., one of the patrons of the church.

DISSENTING CHURCH-BUILDING NEWS.

Liverpool.—The new Welsh Presbyterian Chapel in Prince's-road has been opened for divine service. We are indebted to the local *Journal*, which gives a description of the edifice, accompanied with an engraving, for the following particulars. The chapel, with its two lecture-rooms, two vestries, keeper's house, &c., occupies an open site at the corner of Upper Hill-street and Prince's-road, the principal façade being towards the latter. The chapel proper is built of stone throughout, yellow sandstone being used for all the finishings and ornamental portions, and grey-tinted Yorkshire shoddies for the general wall surfaces. The style of architecture is Gothic, with a strong bias towards the Early French school in all the details. In plan the chapel is in the form of a T, although not perfectly so, for the nave is continued eastward of the transepts about 5 ft., forming a recess for the reception of the pulpit and its accessories. The ground-floor is seated for about 800 persons, and is free from all obstructions to sight, except two slender marble columns which support the centre of the transept galleries. The two columns supporting the end gallery are so placed as to be out of the line of vision of any sitting behind them. The three galleries are seated for about 300 per-

sons. At the north-east corner of the chapel rises the tower and spire to about the height of 200 ft. This feature is described as being the finest in this district. The lower portion of the tower forms the principal porch. The upper stage of the tower is pierced with eight deeply-recessed and shafted heltry-lights. At this stage the eight great buttresses of the tower terminate against the base of the angle pinnacles in open tabernacles, supported on red columns. Above the parapet, in the base of the spire, are four lofty lucarne lights with pinnacled canopies supported on long detached red columns. The tower is attached to the body of the chapel by a vestibule, in which are placed the stairs to the end gallery of the nave. The main gable to Prince's-road contains a group of three deeply-recessed and traceried windows, the centre one being about 40 ft. high. A projecting porch is placed on the south side of the nave opposite the tower vestibule. The side windows of the nave and transepts are large, and the transept gables are pierced with triplets of lofty traceried windows. The west gable, over the pulpit, has a large rose window of plate tracery. The whole of the windows throughout the chapel are glazed by Messrs. Edmondson & Son, of Manchester. The whole of the woodwork of the interior, with the exception of the pulpit, is of selected pitch pine. The seating is open, and furnished with crimson cushions. The gallery fronts are arcaded with moulded arches, supported on black shafts, and bracketed from the beams. The latter are supported on wall corbels and columns of green marble with carved capitals. The pulpit (not quite finished) is constructed of oak, relieved with rosewood, teak, ebony, and boxwood. The chief feature of the interior is the ceiling. It is plastered between transverse and horizontal wood ribs, and is in shape a pointed cradle roof. The curved transverse ribs are supported on wall columns with carved capitals of various designs. The chapel is lighted by gas-fittings in wrought iron and brass, designed by the architects, and manufactured by Messrs. Charles Smith & Sons, of Birmingham, who also supplied the whole ornamental ironwork and ironmongery about the buildings. The cast railing of the boundary-walls was made by Messrs. Harrison & Son, of Liverpool. To the west of the chapel are large and convenient buildings in ornamental brick-work, containing two lecture-rooms, two vestries, and keeper's house, with other conveniences. The masonry was executed by the late Mr. Stirling and Mr. Edwards, of Liverpool. The woodwork has been executed by Mr. James Robbers. The plastering, &c., was done by Mr. vanishes by Mr. A. Lillyman, painter and planter. The architects from whose designs, and under whose superintendence the whole of the works have been executed, are Messrs. W. & G. Andsley, of Liverpool.

SCHOOL-BUILDING NEWS.

Liverpool.—The chief stone of St. Titus's National Schools, Portland-street, has been laid. It was estimated that about 4,000l. would be required, and towards raising this amount the Government and the National Society promised 700l., and the Liverpool Church and School Extension Society 1,000l. A space of ground was obtained on the right-hand side of Portland-street, and the schools will be erected nearly opposite to the church. The building will be a very plain and substantial one, and executed in grey bricks, with stone dressings. There will be three floors, each having a school-room 56 ft. 6 in. long by 18 ft. wide, with class-rooms 24 ft. long by 15 ft. 6 in. wide. Stone staircases will lead to each floor. There will be a spacious playground attached to the schools, which are estimated to accommodate 500 children. The architects are Messrs. Culshaw & Summers, and the contractors Messrs. J. Burroughs & Sons.

Sursey.—A contract has been signed with Messrs. Mansfield, Price, & Co., for 15,000l., for the county school buildings, to accommodate 300 boys. This contract includes a chapel, which is the gift of Mr. W. H. Peck, of Wimbledon House. The new buildings are to be completed in twelve months.

Stockport.—The foundation-stone of St. Paul's New Schools, Portwood, was to be laid on Wednesday. The schools are to accommodate 500 children. They are to be fitted with separate lavatories for boys and girls, and to be warmed with Haden's heating apparatus. The architect

is Mr. Medland Taylor, of Manchester; and Mr. W. H. Brown is the contractor.

Wakefield.—The foundation-stone of new National and Sunday Schools to be built in Zealand-street, in connexion with the Wakefield Parish Church, has been laid. The buildings, which are of Gothic design, and are intended to afford accommodation for 500 children, consist of boys' school-room, 60 ft. by 20 ft.; girls' room, 66 ft. by 20 ft.; infants' room, 52 ft. by 21 ft.; and two class-rooms, each 16 ft. by 16 ft. Cloak-rooms and lavatories will also be fitted up adjoining the entrances. The boys' and girls' rooms are so arranged that they can be thrown into one. The external faces of the walls will be of pitched-faced stone from quarries in the neighbourhood, with tooled dressings. Internally the rooms will be plastered, also ceiled at the rafters, and the roofs being high-pitched and open-timbered, wrought, stained, and varnished. The whole of the inside wood-work will be stained and varnished. The roofs will be covered with blue and purple slates in hands, unroofed by red ridge tiles. The contracts for the various works have been let to Mr. Geo. Fawcett (brick and stone), Mr. J. P. Hill (slating), Mr. C. Driver (plastering), Mr. J. B. Goldthorp (carpenters' and joiners' work), Mr. Drake (plumbing and glazing work), Mr. Thomas Hudson (ironwork), and Messrs. Hodgson & Son (painting and staining). The cost of the buildings will be about 1,800l., and they will be carried out from the designs and under the superintendence of Mr. William Watson, of this town, architect.

Miscellaneous.

HOUSES OF THE PEOPLE IN EDINBURGH.—Sir J. Y. Simpson states that in the old town of Edinburgh there are 13,000 families, consisting of 60,000 individuals, living in one-roomed houses; and that 1,500 rooms are the shoddy, day and night, of from 5 to 15 persons. About 120 have no windows, and 900 of them are cellars.

THE ARCHAEOLOGICAL SOCIETY OF MALTA.—At a recent meeting of this Society, Colonel Collinson, R.E., and Deputy-Adjutant Commissary-General Furse presented a plan of the Phœnician ruins at Hagiar Kim, near Crendi, about six miles distant from Valetta. A lecture was delivered in illustration of the plan by Mr. Furse, which gave the audience some idea not only of the ruins themselves, but of who are to be considered, according to the description of ancient authors, and the generally received tradition, the first inhabitants of these islands and the architects and builders of Hagiar Kim.

SELF-FEEDING PENHOLDERS.—A renewed attempt has been made to form a self-feeding penholder on improved principles. Mr. F. F. Benvenuti, principal of the Swansea Training School and Literary Institute, is the inventor. The *Cambrian* states that he has given the pen a thoroughly practical trial, and readily acknowledges its advantages over others. Ink can be kept in the holder for several days together—always at hand when wanted; whilst in writing, blots, which accompany other self-feeding holders, are almost impossible. Messrs. George Rowney & Co., of London, his agents, add our authority, recently received a testimonial from Mr. Redgrave, the principal of the Science and Art Department of the South Kensington Museum recommending it as a drawing-pen, and a valuable acquisition to the architect.

VALUE OF ILLUSTRATED BOOKS.—The *Publishers' Circular* mentions an incident at the sale of the library of the late Mr. Windus, of Tottenham, as showing the increasing value of choice books. One of the gems of the collection was a copy, on large paper, of Dr. J. T. Dibdin's "Bibliographical, Antiquarian, and Picturesque Tour in France and Germany," illustrated with etchings, India proof engravings, private plates, original drawings by Lewis, Pugin, and others, extending the three volumes to six. The copy was formed by Mr. Eyton, and at the sale of his library twenty years ago it was purchased for 63s. by Mr. Lilly, who disposed of it for 100l. The same book to Mr. Harvey, of St. James's-street, the next bidder being again Mr. Lilly, its former possessor. This sale afforded many other exemplifications of the same fact, which is, indeed, obvious to any one who takes an interest in literature.

ARCHITECTURAL EXHIBITION SOCIETY.—The private view of the Exhibition will take place on Wednesday, the 29th inst. A *Conversazione* will be held on the 5th of May.

THE NEW ST. THOMAS'S HOSPITAL.—Her Majesty has named Wednesday, the 13th of May, half-past eleven o'clock, for the ceremony of laying the first stone of the new St. Thomas's hospital.

OPENING OF THE NOTTINGHAM FREE LIBRARY.—The Mayor has opened the Free Library in the presence of a large number of gentlemen. It contains 3,500 vols. of voyages and travels, biography, and history; 5,000 of poetry, novels, & miscellaneous works; 1,200 of the sciences, philosophy, &c.; 600 of theology and ecclesiastical history; and 400 politics, law, economy, &c. A reading-room, a museum, and a reference-library, are also shortly to be added.

MEMORIAL TO SERGEANT BRETT.—A stone tablet, in memory of the victim of the Fenian outrage, has just been erected in St. Barnabas's church, Manchester. The inscription is as follows:—Erected by the minister and congregation, in memory of Charles Brett, police sergeant, of this city, who for many years worshipped in this church, until he fell at his post of duty, a victim of the violence of sedition, on the 18th September, 1867. A faithful man. Though offered life, he chose a cruel death rather than betray his trust.

FINSBURY AND ALEXANDRA PARKS.—The fencing and laying out of the grounds of Finsbury Park, formed on the site of Hornsey Wood and its extensive grounds, is advancing favourably. The fencing around the extensive and picturesque tract of land for Alexandra Park, situated between Muswell-hill and Woodgreen, Tottenham, is now completed, and the planting of flowering shrubs, herbaceous plants, and flowers along the borders of the flower-beds and grass-plots progresses rapidly, many of the earlier descriptions being in bloom. The entrance carriage-drives through the park are finished, and the large trees on the Muswell-hill side are left standing.

TINNING THE INTERIOR OF LEAD PIPES.—A method of tinning the interior of lead pipes has been patented by Mr. Peter Naylor, of New York, U.S. The invention consists in a mode of applying to the interior of the pipe a flux that protects the lead from oxidation, and insures a perfect coating of tin when the tin is poured through the pipe, or the pipe is dipped into the bath of tin. After the lead pipe has been made, place the same in a vertical or nearly vertical position, and pass down through the same a strong cord, to which a weight is attached to draw the cord through the pipe, and at or near the other end of the cord a sponge, or piece of very porous elastic material is attached, of a size to fill the pipe, and of any desired length, say 6 in., more or less. The flux employed is either grease or muriate of zinc, but any other wax may be used. The sponge or porous wad, being saturated with this flux, is drawn through the pipe, and by its length insures the covering of the entire surface of the inside of said pipe with the flux, so that the melted tin, subsequently applied, will adhere to all parts with uniformity and firmness.

OPENING OF ANOTHER TUMULUS IN NORTH WILTSHIRE.—The Rev. Canon Greenwell, of Marlborough, has commenced the examination for scientific purposes of the large tumulus situated at the western scarp of the Yorkshire Wolds, at an altitude of about 750 ft. on the Kirby Underdale estates of Viscount Halifax. A week's digging on the southern side of the barrow has produced an unexampled number of burials, all Anglo-Saxon and secondary interments, so that very little progress has been made towards reaching the primary. With the remains of men have been found bronze and iron swords and knives, and with women headdresses, brooches, &c., and various beads. The strange feature has been that the bodies have many of them been interred in the doubled-up way, hitherto thought to pertain only to the ancient Britons; but some were at full length, and when so were east and west. The results so far are enigmatical, presenting the first samples of contracted Anglo-Saxon burials. The full examination will stand over till summer, when several of the leading archaeologists will attend. It is believed the Anglo-Saxon burials surround the mound, which will contain the earlier British ones in the centre.

GAS.—The Sheffield Gaslight Company have declared a dividend of 10 per cent. for the last year.—The Colnbrook Gas Company, under new management, have reduced the price of their gas another shilling per 1,000. The price is now 6s.

SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—Mr. Hyde Clarke, D.C.L., at the last meeting, gave a lecture on "Ephesus," when the collection of photographs by Mr. Sochoda were exhibited in the rooms of the society. Mr. F. Y. Hnrstone, V.P., and Pres. S.B.A., was in the chair. The lecturer, briefly alluding to the prehistoric period of Ephesus, with its caves and rock pictures, regretted that such a mine of artistic and archaeological wealth had not met with more explorers; and next reverting to the historic period, remarked that within a circle whose radius was 30 miles were concentrated the schools of art of great cities, to which artists then resorted as to the galleries of Europe at the present day. Mr. Falkener, like Professor Donaldson, was only a few days on the spot, and had therefore but little time to examine the monuments, the unhealthiness of the district hindering further investigation. In the discussion that followed, Mr. A. A. Fry said that he hoped the facilities now afforded in travelling would induce the educated classes of England and France to visit the cities of Asia Minor, and explore localities of such surpassing interest.

VOICES TO SCIENCE AND ART DEPARTMENT.—The estimates propose a vote this session of 239,290, for the Science and Art Department, an increase of 29,567, over the vote of last session. The increase is chiefly in the grants in aid to schools of science and art—10,300, in the payments to teachers on results, and 15,750, in the payments to managers under the Minutes of 1865. The number of persons under instruction in science in May, 1867, was 10,230, an increase of no less than 3,388 over the number in May, 1866. The students taught drawing in schools of art and in night classes, day schools for the poor, &c., were 104,668 in 1866. The vote for purchase, circulation, and loan of objects of art shows a large increase. A vote of 10,000, is proposed, in part of 20,000, for the removal of the iron building at South Kensington to a site offered at Bethnal-green, with a view to the establishment of an auxiliary Museum of Science and Art in the East of London. The vote for the National Portrait Exhibition is 3,000, and the receipts for admission are estimated at a like sum of 3,000; the expenditure in 1866 amounted to 3,882. The accounts for 1867 were not closed when the estimates were prepared for this session. The vote for the permanent buildings at South Kensington this year will again be 32,500, on further account of 195,000.

THE POST-OFFICE AND THE TELEGRAPH.—The report of Mr. Scudamore to Lord Stanley of Alderley, upon the advisability of working the electric telegraphs by the Post-office has just been published. It is prefaced by a letter from the late Postmaster-General, in which he states that for some years he had been in favour of uniting the managements of the telegraphs and the post. In the report itself Mr. Scudamore compares at some length the results of the Belgian and Swiss systems with the English. In 1869, in Belgium, the proportion of telegrams to letters sent was 1 to 218. The Government reduced the price from 15d. to 10d., and immediately the proportion rose to 1 telegram to 114 letters. A further reduction to 5d. has raised the proportion still further. It was in 1865, 1 to 48. In Switzerland, too, a low rate,—1 fr. for 20 words,—prevails. In 1865 the proportion was 1 telegram to 69 letters; while in the United Kingdom the proportion, which in 1863 was 1 to 197, had only risen in 1865 to 1 to 151. Mr. Scudamore then passes on to consider the objection that the subordinate agents of the Post-office department in the small provincial towns are incompetent to control the telegraph. He answers that there is nothing peculiarly disqualifying in a postmaster, and that an increased pay would bring greater efficiency to the work. He thinks that the whole of the companies' properties and rights might be bought for 2,400,000, and as much as 2,500,000, would be required to start the scheme. If we got the same proportion of telegrams to letters as Belgium, and set the average of product of each telegram to 1s. 2d., deducting all charges, there would be, Mr. Scudamore shows, a net produce of something over 500,000.

SOUTH KENSINGTON MUSEUM.—During Easter week, free, the visitors numbered 31,500; and there went to the National Portrait Exhibition, by payment, 3,441.

ARCHAEOLOGICAL REMAINS IN THE SOUTH AMERICAN HIGHLANDS.—Some remarkable remains of the aborigines have been discovered in Chili, on the summit of the Cordillera of Dona Ana.

INFECTIOUS DISEASES.—The committee of the University College Hospital have, through the Hospital Carriage Fund, been placed in the possession of a carriage for the convenience of persons suffering from infectious diseases. The committee have determined that persons requiring it, and who reside within a three-mile radius of the hospital, may obtain it upon application to the clerk at the hospital, and paying the actual expenses of hire.

THE LEEDS SEWERAGE.—A report, by the borough surveyor, Mr. A. M. Fowler, to the Streets and Sewerage Committee of the town council, upon forming a drainage district for the south-west portion of the borough of Leeds, and the effectual sewerage of the same, has been printed by authority of the council. The cost of draining the district, including storm outlets and contingencies, is estimated at 40,500. The question how the borough sewerage can best be ventilated is at present referred to a sub-committee.

ROYAL MICROSCOPICAL SOCIETY.—At the annual *soiree* of this society, held at King's College, on Wednesday evening last, the 22nd inst., a large number of the scientific novelties of the day were presented in a very attractive form. Amongst the most remarkable, we may mention a preparation showing the decomposition of water, and two solid pieces of plate-glass, an inch and a half thick, pierced by the electric spark. Under the microscopes were shown sections of the human tongue and brain, and the usual number of living beings from the invisible world. Amongst the works of art were exhibited a large collection of highly-finished drawings of botanical, physiological, and zoological subjects; a number of handsome bronzes, by F. Sparrell; and a collection of flower-vases and *repoussés* salvers in beaten metal, by Richardson, Slade, & Elton.

"THE WALL OF ANTONINUS."—The *Edinburgh Courier* says, in the course of some improvements on the property of Mr. Cadell, of Grange, the workmen turned up a large stone, which at first was thrown aside as an ordinary boulder, and for a time was allowed to lie on the surface. An examination afterwards made, however, showed that the reverse of the stone contained an inscription which seemed to identify it with the wall of Antoninus (commonly known in that quarter as "Craham's Dyke"), built during the Roman occupation of Lollius Urbicus, for the purpose of shutting off the wild tribes to the north, and which was supposed to extend from the Forth to the Clyde. From the inscription it is conjectured that this stone was intended to commemorate the finishing of the wall; and, if so, it will prove a valuable aid to antiquarian research, as showing how far the work actually did extend eastward. It is to be hoped *this* will not be sold to go to America.

FROSTING IN COLOURS, AND ON PAPER AND COTTON FABRICS.—A curious discovery has recently been made by M. Auguste Bertsch, and turned to practical account by M. Kuhlmann, the celebrated chemist. The beautifully symmetrical and yet fantastic figures of leaves and flowers depicted on the window panes of a room on a frosty morning have been closely imitated, according to *Galvani's*, by means of Epsom salts (sulphate of magnesia) dissolved in beer, together with a small quantity of dextrine (artificial gum), and in this state applied to a pane of glass with a sponge or brush. The liquid may receive any colour whatever, at the option of the operator. M. Kuhlmann, on being apprised of the fact, conceived the idea of transferring those fairy-like creations to stuffs and paper. For this purpose he first got the crystallizations on sheets of iron, on which he afterwards laid one of lead. By means of a powerful hydraulic press the minutest details of the figures in question were directly imprinted on the soft metal, and a copy of them in relief was then obtained by galvanoplastics. In impressing cotton stuffs the patterns must be continuous. This obstacle has been overcome by effecting the crystallization on the cylindrical surface of a roller.

AN ENGLISH CHURCH IN DRESDEN.—The foundation-stone of an English church has been laid here, an English lady having generously subscribed the sum of 4,000*l.* towards the execution of the project. The design for the structure is by an English architect. The new building is to bear the name of All Saints' Church.

SALISBURY CATHEDRAL.—The Dean of Salisbury has received a cheque for 500*l.* from the Rev. C. B. Bicknell, rector of Stanton, for the purpose of placing twelve statues in the west front of Salisbury Cathedral, in addition to the forty which have been ordered by the dean and chapter. Fourteen statues have already been placed in niches.

MEMORIAL CHURCH IN CLERKENWELL.—A church is about to be erected in the St. John-street-road, for the new district of St. Peter's, in the parish of St. James, Clerkenwell, upon the site secured as the nearest available to the scene of the Smithfield martyrdoms. The total cost, including schools and parsonage adjoining, is not to exceed 10,000*l.*

THE DRINKING FOUNTAIN IN MARYLEBONE-LANE, OXFORD-STREET.—We regret to learn that this fountain is being allowed to fall into a state of dilapidation. The malicious acts of drunken varlets fresh from beer-shops only show how desirable it is to place drinking-water within reach of thirsty wayfarers, and we hope the authorities will not be disheartened by repeated acts of this description, but that they will set watch for the depredators, and hand them over to the police-courts, where they will meet with their deserts.

GUN-COOTS AND ITS SAFETY.—Mr. James Wilson (of the North-Eastern Goods Manager's office) has reported upon experiments undertaken for the purpose of investigating the risks incurred in the conveyance of compressed gun-cotton charges upon the North-Eastern Railway. The experiments were conducted by Mr. Prentice, of the Gun-cotton Company. The results of the experiments are said to have been convincing, and enabled Mr. Wilson to report that the railway company might safely carry gun-cotton along with other goods in ordinary wagons, adopting the same rules as now apply to the conveyance of cartridges.

THE MANCHESTER NEW STOCK EXCHANGE.—On Tuesday last, the members of the Manchester Stock Exchange assembled for the first time in their new room, in Commercial Buildings, Cross-street. The Exchange-room forms a part of a large structure which has been erected by the Commercial Buildings Company, and is now fast approaching completion. The front will be occupied by shops and offices; and there is a separate entrance in Newmarket-street to the Stock Exchange, which is upon the first floor, and is reached by two flights of steps. The Exchange-room is 66 ft. in length, by 46½ ft. in breadth. There is accommodation for about 120 members; and opposite to the main entrance are a reading-room, and offices for each of the telegraph companies. Messrs. Walters, Barker, & Ellis, of Manchester, are the architects, and the entire contract for the building has been executed by Mr. Wm. Southern.

UTILIZATION OF WASTE.—The refuse ore which formerly used to obstruct the entrance to some German mines has become highly valuable since it was discovered that it contains metals so important as nickel and cobalt. The lignor which the manufacturers of soap formerly allowed to run off as useless is the source from which we derive glycerine. The sulphuric acid which used to poison the atmosphere and to destroy vegetation in the neighbourhood of works for roasting sulphurets, is now carefully saved and converted into sulphuric acid. The "soda waste," which was permitted to accumulate in mountains in factories, is now made to yield quite a number of useful products, such as sulphur, hyposulphite of soda, and others. In many instances still, products, solid, liquid, and gaseous, are wasted, permitted to escape with the atmosphere, to fill the sewers, or to decay out of doors, which would yield a rich reward to the man who would turn them to serve some useful purpose. Nothing ought to be thought too insignificant for consideration. Who knows, says the *Scientific American*, but what even the carbonic gas which we are now glad enough to get rid of by our chimneys may hereafter be conveniently rendered useful in the economy of our households.

BEQUESTS TO BRITISH MUSEUM.—The late Mr. Felix Slade, of Lambeth, has left to the British Museum his collection of glass, consisting of vases and other objects illustrative of the art of glassmaking from the earliest period to the end of the seventeenth century. He has likewise bequeathed to the Museum his extensive collection of engravings; also the sum of 45,000*l.* to be applied to the endowment of fine arts professorships at Oxford and Cambridge, and at University College, London, where some exhibitions also are to be founded. The fine collection of Venetian glass belonging to Mr. E. W. Cooke, R.A., is about to be sent to the South Kensington Museum on loan for a year.

REFORM OF THE PATENT LAWS.—On Thursday last the Hon. Anneton Herbert, B.C.L., presided at a Second Conference on the Reform of the Patent Laws, at the Inventors' Institute. The secretary of the Institute, Mr. R. Marden Latham, read the report of the proceedings of the committee nominated a month ago, and composed of members of the council, together with representatives of various public bodies. From this document it appeared that arrangements are in progress for an effective agitation in the interest of inventors, and that already Mr. A. H. Layard, D.C.L., M.P., has consented to preside at a public meeting to be shortly held in London. The chairman moved the adoption of the report; and in doing so expressed his thorough appreciation of the important steps which were being taken. A petition was then submitted, and having been unanimously approved of, was ordered to be signed by the chairman in the name of the meeting.

THE EDUCATION GRANT.—The vote proposed for public education in Great Britain for the year ending with March, 1869, is 842,554*l.*, an increase of 136,689*l.* over the vote for the fiscal year just expired. The calculation based upon the number of scholars in average attendance in schools inspected in the last school year in England, with the percentage added for the ordinary increase, gives 985,200 as the estimated average attendance in 1868; but an addition of 45,000 is made for half-timers under the Workshops Act, and of 16,000 for scholars in Congregational and other schools newly admitted to aid, raising the estimated number of day scholars to 1,046,200. Briefly, the vote for Great Britain to be proposed this session stands thus:—Office in London, 29,482*l.*; inspection, 64,103*l.*; normal schools, 74,250*l.*; building grants, 45,000*l.*; annual grants, England and Wales, 549,639*l.*; grants to teachers in Scotland, 79,500*l.*; unexpired pensions, 580*l.* Total, 842,554*l.*

ARCHAEOLOGICAL DISCOVERY AT BERWICK.—While trenching ground for a garden at a recently-erected villa, in the Inner Cow-close, on the corporation property, the gardener, being compelled to go deep, came upon the skeletons of several human beings in different parts of the ground. On each side of three of the bodies were slabs of undressed stone, with rude stone coverings. On one was an incised cross, with a rose in the centre; and on another, the crest of a child, was a Latin cross. The place was probably at one time a burial-ground, but at what time it is impossible to say. At another part of the ground there was discovered a tower-like structure, in front of which is a wall 4 ft. thick, and running in a transverse direction into a portion of the adjoining land. Permission was obtained to trace the wall into the adjoining land, and it has been ascertained that the wall is 94 ft. long, by 43 ft. in width; the solid masonry is 23 ft. square, and between the wall and the building is a space of 20 ft. From a small piece of architectural moulding which was found, it is presumed that the building belonged to the Norman period.

TENDERS.

For alterations and additions to Thorpe Rectory, near Norwich, exclusive of old materials. Mr. R. M. Phipson, architect:—	
Hood	£2,336 0 0
Brookes	2,310 0 0
Leary	2,299 0 0
Bell	2,270 4 0
Dowling	2,210 0 0
Newell (accepted)	1,854 0 0
For restoring Stoke Ash Church, Suffolk, exclusive of old materials. Mr. R. M. Phipson, architect:—	
Burrell	£87 15 6
Rednall & Vane	69 12 6
Bishop	57 5 0
Cornish (accepted)	58 0 0

For new shop-front, &c., at No. 5, Esmont-street, Clerkenwell. Mr. Wm. Smith, architect:—

Dove, Bros. (accepted)	£495 0 0
For alterations, Messrs. Coates & Co.'s, Whitechapel, Mr. J. L. Linnell, architect. Quantities supplied:—	
Messrs. Leeming & Nicol and Mr. C. A. Gould:—	
Browne & Robinson	£819 0 0
Webb & Sons	815 0 0
Asby & Sons	810 0 0
Asby & Horner	796 0 0
Hill & Keddell	787 0 0
Little (accepted)	783 0 0

For Hemel Hempstead Church, Messrs. Drury Lovejoy, architects. Quantities supplied by Messrs. Curtis & Son and Bales & Rowell:—

	A seats.	B seats.
Cook	£3,722 0 0	23,705 0 0
Humphreys	3,325 0 0	3,325 0 0
Chappel	3,175 13 0	3,289 3 0
Wood	3,170 0 0	3,240 0 0
Nightingale	3,138 0 0	3,178 0 0
Harris	3,025 0 0	3,050 0 0
Webb	2,925 0 0	2,965 0 0
Watkins	2,602 0 0	2,882 0 0
Gibson (accepted)	2,500 0 0	2,864 0 0

For a chapel at the Grissenhall Union, Norfolk, exclusive of stone. Mr. R. M. Phipson, architect:—

Harold	£687 10 0
Skinner	564 0 0
Perkins	530 0 0
Lerner (accepted)	527 0 0
Nelson	425 0 0

For St. Paul's District Schools, Stratford, Essex. Mr. Ong, architect. Quantities supplied:—

Hedges	£2,834 0 0
Wood	2,831 0 0
Mortimer	2,817 0 0
Manfield	2,810 0 0
Chelton	2,636 0 0
Bivett	2,493 0 0

For chapel, Victoria Docks, for Mr. Duncan, Marshall, architect. Quantities supplied:—

Cheffins	£1,566 0 0
Weston	1,500 0 0
Manly & Rogers	1,470 0 0
Engles	1,788 0 0
Sherrin	1,648 0 0
Cutbush, Bros.	1,570 0 0
Rivett	1,537 0 0
Perry & Co.	1,516 0 0
Mortimer	1,497 0 0
Ennor	1,480 0 0
Clubb & Co. (accepted)	1,350 0 0

For alterations at the Church of St. Francis, Xaverius, Liverpool. Messrs. Pictor, Chambers, & Bradley, architects. Quantities supplied:—

Huish & Co.	£5,350 0 0
Weston	4,898 0 0
Mallen	4,790 0 0
Urmon	4,654 0 0
Jones & Son	4,640 0 0
Engles	4,600 0 0
Callie	4,510 0 0
Bowe (accepted)	4,414 0 0

For house and offices, Sutton Oak, near St. Helen's, Messrs. Jno. Marsh & Co. Messrs. Pictor, Chambers, Bradley, architects. Quantities supplied:—

Westham	£320 0 0
Harrierson	316 15 0
Harris (accepted)	797 10 0

For alterations, &c., at 21, Aldersgate-street. Mr. R. Campbell, architect:—

Myles	£1,057 0 0
King & Sons	763 0 0
Anderson	740 0 0
Carter	737 0 0
Sewell	730 0 0

For rebuilding warehouse, No. 21, Crutched Friars, Messrs. Hy. Bucknell & Sons. Mr. Arthur E. Pictor, architect. Quantities supplied by Mr. Joseph Clevier:—

Thompson	£3,223 0 0
Higgs	3,114 0 0
Rider & Son	2,883 0 0
Kilby	2,769 0 0
Browne & Robinson	2,720 0 0
Ennor	2,718 0 0
Conder	2,650 0 0
Henshaw	2,675 0 0
Mortier (accepted)	2,643 0 0

For the erection of a village residence at Grays, Essex, for Messrs. Sturgeon & Sons. Mr. D. A. Cobbett, architect. Quantities supplied by Mr. Geo. Mortimer:—

Harris	£3,626 0 0
Rivett	2,630 0 0
Crabb & Vaughan	2,465 0 0
Hell	2,347 0 0
Forrest	2,260 0 0
Blake (accepted)	2,285 0 0

For the erection of a villa residence near Severndroog Castle, Shropshire, Hill, Mr. C. F. Barrow, architect. Quantities supplied by Mr. Geo. Mortimer.

Newman & Man (accepted)	£6,226 0 0
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For new workhouse for St. Mary's, Ilminster, to be erected in St. John's-road, Upper Holloway. Mr. R. H. Bondon, architect:—

Nutt & Co. (accepted)	£84,200 0 0
For Nottingham County Court, Mr. Thos. C. Sarby, architect. Quantities supplied by Mr. J. Scott:—	
Hell	£6,280 0 0
Barkie	6,280 0 0
Huddleston	6,188 0 0
Simpson & Co.	6,078 0 0
Marriott & Co.	5,980 0 0
Dennett	5,879 0 0
Bell & Co.	5,839 10 0
Stephenson & Co.	5,698 0 0
Johnson	5,650 0 0

for the erection of a Congregational church at More-
 mington, Devon. Mr. John Tarring, architect:—
 Briggs & Dyer £1,325 0 0
 Pillar 1,091 0 0
 Beam & Mervin 1,098 0 0
 Tarring & Avery 1,099 0 4
 Luscombe 891 10 0

for rebuilding wharf and warehouse for Messrs. Nash,
 & Nash, at Pickle Herring Lower Wharf, exclusive
 of wall and foundation. Mr. S. Brookes, architect,
 assisted by Messrs. Curtis & Son:—
 Piper & Wheeler £8,350 0 0
 Perry & Co. 6,005 0 0
 Cowland 5,990 0 0
 Gilbert & Wisbey 5,300 0 0
 Wells 2,467 0 0
 Willis 5,409 0 0
 Newman & Mason 5,368 0 0
 J. & P. Coleman 5,333 0 0
 Henshaw 5,325 0 0

for a pair of villa residences on Norham Manor, Saint
 Osford, for Mr. Osmond, Mr. Fredk. Codd, archi-
 tect. Quantities not supplied:—
 Curtis & Son £1,716 0 0
 Dover 1,543 0 0
 Selby 1,540 0 0
 Gray 1,150 0 0

for erecting a new farmhouse and buildings at Lower
 Chubury, Salop. Mr. R. Powell, architect. Quan-
 tities supplied:—
 Lockley & Ward £1,579 0 0
 Whaley 1,039 0 0
 Evans 995 10 0
 Hanckison & Williams 945 0 0

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 Draughtsman with a Builder.—Address, W. X. Y. Z. at Mr. Pike's,
 Hammersmith, Whitehorse-street, Rectory, W.

TO MASTER PLUMBERS.
 WANTED, by a Young Man, who served
 his time in a Joiner's shop, to EMPLOY in the PLUMBING
 Age 34.—Address, 21, St. Peter's-street, Notting-hill.

TO CARPENTERS AND BUILDERS.
 WANTED, by the Advertiser, a SITUA-
 TION as IMPROVER. Has served his time; can work
 well. Good references.—Address, G. W. R. 35, Southbrook-street,
 New-road, Hammersmith.

TO BUILDERS AND CONTRACTORS. WANTED, by the Advertiser, aged 28, a RE-ENGAGEMENT as CLERK or TIME-KEEPER. Address, G. H. 14, Northumberland-place, Paddington, W.

TO ARCHITECTS, &c. WANTED, by an experienced DRAUGHTSMAN, an experienced DRAUGHTSMAN. Can prepare and finish drawings from rough sketches and make out details. Good style. Has some knowledge of Gothic. Salary, 50s per week. Address, J. M. C., 20, Hatfield-place, Barton Crescent, W.C.

WANTED, by the Advertiser, a SITUATION or JOB, as PLUMBER, in town or country. Address, S. B. care of Mr. Levy, 4, High-street, Kensington, W.

TO BUILDERS, PLUMBERS, &c. WANTED, a SITUATION, by a good PLUMBER, in Three-branch Head. Address, PLUMBER, 47, Brentford-road, S.W.

TO BUILDERS AND HOUSE AGENTS. WANTED, by a PLUMBER, PAINTER, and GLAZIER, a Constant Situation as WORKING FOREMAN or elsewhere. Undertakes general repairs of houses, is a good distemperer, and can do papering if required. Satisfactory reasons for leaving present employ. - G. W. 2, King Henry's Walk, Ball's-pend road, London.

WANTED, a SITUATION, by a Young Man, aged 19, as PLUMBER, GAS-FITTER, and ZINCS WORKER. Address, W. C. Mr. Little, Plumber and Gas-fitter, 5, East Devon. Reference from last employer if required.

TO BUILDERS. WANTED, by a Young Man (aged 19), a SITUATION as CLERK to a BUILDERS OFFICE. Writes a good hand, can trace plans, &c. Willing to make himself generally useful. Three years' good character from last situation. Salary moderate. Address, G. C. 205, Camberwell-New-road, S.

WANTED, a SITUATION, as MARBLER, FLOWER and ORNAMENTAL PAINTER, and GILDER, in town or country. Has been working at Mr. Magou's, 51st, Waterloo. Address, ASTON, 5, Hatfield-place, Fickering-street, Essex-road, Islington.

TO BUILDERS AND PLUMBERS. WANTED, by a steady, respectable Man, a SITUATION as good PLUMBER. Has no objection to fill up his time in good or bad weather if required. No objection to town or country. A good reference can be given. Address, P. T. 37, Abbey-street, Southwark.

TO BUILDERS. WANTED, a RE-ENGAGEMENT, by a practical Builder, Carpenter, and Joiner. Good references. Address, A. B. 3, Scarle's Library, Murray-street, Horton, N.

TO RAILWAY, SANITARY, AND OTHER ENGINEERS, CONTRACTORS, &c. WANTED, by the Advertiser, a SITUATION as GENERAL ASSISTANT. Good draughtsman, surveyor, and leveler. Well up in quantities, measurements, setting out, and superintending construction of work. Good references. Salary moderate. Address 314, Office of "The Builder."

TO BUILDERS AND MASONS. WANTED, by a good MASON, an EMPLOYMENT in town or country. Can undertake a job. Can do lettering. Address, MASON, 67, Murray-street, Hoxton.

WANTED, a SITUATION, as CLERK of WORKS, Joiner by trade. Thoroughly acquainted with all branches of the building trade. Good references. Address, B. B. 20, Rotherhithe-street, Blount-square, N.W.

TO BUILDERS, CONTRACTORS, AND OTHERS. WANTED, by a thorough PLUMBER, well experienced in all kinds of new and old work, a SITUATION or JOB, or will take work at a price on reasonable terms. Good references if required. Address 31. - Address, PLUMBER, at Mrs. Mullane's, 23, Princes-street, Drury-lane, W.C.

TO JOINERS. WANTED to APPRENTICE a Youth to a JOINER and BUILDER. - Apply to W. P. A. Postoffice, Daventry, Northamptonshire.

TO BUILDERS AND CONTRACTORS. WANTED, a RE-ENGAGEMENT, by a practical General Foreman. Well up in all branches of the building trade. Good references. Address, M. M. 430, Essex-road, Ball's Pond.

TO ARCHITECTS. WANTED, by an ASSISTANT, aged 25, a RE-ENGAGEMENT in an Architect's Office. Well up in perspective. Address, A. J. Post-office, Malden, Essex.

TO FIBBER MERCHANTS, &c. WANTED, by a respectable Young Man (aged 27), of thorough business habits, a RE-ENGAGEMENT as FOREMAN and YARD SALESMAN. Has a thorough knowledge of the English as well as the foreign trade. Could undertake the management of a saw-mill if required. Salary not so much an object as a thorough good house of business. Address, with particulars, to "FIDELITY," care of Atkinson & Co. Stationers, London Bridge, E.C.

TO BUILDERS, &c. WANTED, by a Young Man, aged 22, a SITUATION as CLERK, &c. Can take out quantities, estimate, measure up work, &c. Six years' experience. Good references. Address, C. R. 10, Devonshire-place, Edgware-road, W.

TO BUILDERS, SMITHS, AND OTHERS. WANTED, by the Advertiser, a SITUATION as SMITH, STOVE-RANGE, and GENERAL FITTER. Address, L. B. 7, Paulton-terrace, Paulton-square, King's-road, Chelsea.

TO ARCHITECTS AND SURVEYORS. WANTED, by an ASSISTANT, an ENGAGEMENT. Six years' experience. Salary, 60 per month; if permanent, 70. Address, J. M. 19, Curial-road, Finsbury, bulidings-trade. Address 29, Joiner by trade. Address, 825, Office of "The Builder."

TO CONTRACTORS AND OTHERS. WANTED, EMPLOYMENT, by a practical Man, who thoroughly understands the appertaining veyor, Croydun, Surrey. - Address, Mr. GAID, Road Bur-

TO BUILDERS, &c. WANTED, a RE-ENGAGEMENT, by a BUILDER'S CLERK, well up in measuring, bookkeeping, and the usual duties of an office. Good references. Address, H. B. care of Mr. Jones, 7, Great Charlotte-street, Blackfriars, S.W.

TO ARCHITECTS AND SURVEYORS. WANTED, by the Advertiser, a RE-ENGAGEMENT as General Foreman. Twelve years' practical experience as such. Well up in all the branches of the building trade. Address 29, Joiner by trade. Address, 825, Office of "The Builder."

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WANTED, by a competent ASSISTANT, a RE-ENGAGEMENT in an Architect's or Surveyor's Office. Salary moderate. Address, A. C. 15, Bishop's-grove, Ball's Pond-road, 3, East-office, Whiteley.

TO ARCHITECTS. WANTED, to place a Young Gentleman (aged 21) as RESIDENT PUPIL with an ARCHITECT of good practice, on moderate terms. Country preferred. Address, G. B. Post-office, Whiteley.

WANTED, by a practical FOREMAN of MASONS, a RE-ENGAGEMENT, and references. Address, A. R. C. 23, Convent-gate, Kensington Park-road.

TO NOBLEMEN, ARCHITECTS, CONTRACTORS, &c. WANTED, an ENGAGEMENT, to PLAN, ERECT, and REPAIR FARM, or other BUILDINGS, of a Clerk of Works, or Builder's General Foreman. Age 38. Thoroughly practical, and in every way qualified. Excellent testimonials. Address, V. V. 9, Post-office, Lodge-gate, Windsor, Liverpool.

TO PAINTERS, DECORATORS, BUILDERS, &c. WANTED, an ENGAGEMENT, as WORKING FOREMAN of PAINTERS. Thoroughly experienced in all branches of house-decoration; can do walling, graining, embossing, &c. Address, J. W. C. 23, Fressing-street, Colindale-road, Islington, N.

WANTED, by a thoroughly practical Builder's Foreman and Clerk of Works, a SITUATION to SUPERINTEND the ERECTION of HOUSES on a gentleman's estate to collect rents, and superintend the repairs of lease property; or would not object to take ground on building leases where all transactions would be made. Good testimonials and give security if required. Address, W. A. 4, Camden-lane, Gray-hill, Upper New-road, S.W.

TO PLUMBERS AND BUILDERS. WANTED, by a Young Man, a SITUATION as TRAVELER to a BUILDERS Office in the trade. Address, by letter, A. W. 4, Lutan-place, Gough-street, Greenwich.

WANTED, a RE-ENGAGEMENT as General Foreman, Foreman of MASONS, or FICER. Has a thorough practical knowledge of the building trade. Good testimonials. Address, G. C. 35, Polham-place, Brentford, S.W.

TO ARCHITECTS, CONTRACTORS, AND OTHERS. WANTED, by a First-class QUANTITY TAKER, DEARTHMENTS, Carpenter by trade, an ENGAGEMENT in town or country (temporary preferred). Age 25 and Highest testimonials. With the building trade in all its branches. Good references. Terms moderate. Address, B. A. Mr. Kington, Stationer, 106, Seymour-street, Camden-town, N.W.

TO BUILDERS AND CONTRACTORS. WANTED, by a steady practical Man, an ENGAGEMENT to MANAGE a small BUSINESS or otherwise as Foreman in any MANUFACTURE or TRADE. Well up in setting out work, superintending men, keeping accounts, &c. Assorted to all branches of the trade. Carpenter and Joiner. Good references. Address 28. - W. A. 27, Hellington-street, Avenue-road, Camberwell.

TO ARCHITECTS AND BUILDERS. WANTED, a RE-ENGAGEMENT, by a good and rapid DRAUGHTSMAN. Well up in construction, town or country. Address, L. M. N. 9, Havelock-street, Colwyn-gate-street, Islington, N.

TO BUILDERS AND BUILDERS. WANTED, by a respectable Man, a SITUATION as PLUMBER. Address, S. P. 2, Serle's-place, Lincoln's Inn-Fields, W.C.

TO BUILDERS AND PLUMBERS. WANTED, a SITUATION or JOB, by a Young Man, a good Plumber and Gasfitter; understands both work. Willing to fill up his time with painting if required. Address, A. B. 4, Gerard-street, Islington.

TO ARCHITECTS, &c. WANTED, by an efficient ASSISTANT, a RE-ENGAGEMENT. It will fill up all branches of the profession, and a good colorist. Terms, 50s per week. The best references can be given. - Address, No. 901, Office of "The Builder."

TO BUILDERS AND CONTRACTORS. WANTED, by a thoroughly practical Man, a Carpenter and Joiner by trade, a SITUATION as GENERAL WORKING OUTDOOR FOREMAN, with 12 years' testimonials and references. No objection to the country. Address, 835, Office of "The Builder."

TO BUILDERS, CONTRACTORS, AND OTHERS. WANTED, by a respectable Young Man, a SITUATION as TIME-KEEPER or GATE-PORER. Well situated and writes a good hand. Address, R. Office of "The Builder."

TO TIBBER MERCHANTS, &c. WANTED, a RE-ENGAGEMENT, as FOREMAN, in a retail yard, or to Superintend a sawing-mill. - Address, Twenty years' experience. Address, A. B. 15, Bywater-street, King's-road, Chelsea.

TO BREWERS ADVERTISING CONTRACTORS, &c. WANTED, by an experienced SIGN and GLASS WRITER, an ENGAGEMENT. Is thoroughly practical in every branch of house-decoration, could measure work, and take the charge of men. B.-frees to work in every part of London. - Address, 835, Office of "The Builder."

TO PLUMBERS AND BUILDERS. WANTED, a RE-ENGAGEMENT, as WORKING FOREMAN of PLUMBERS, by a competent, steady, and thoroughly efficient Foreman. Can estimate, and is used to town and country work. Good references. Address, F. D. DAVIES, Plumber, 4, Adel Lane-street, in an north, S.W.

WANTED, by the Advertiser, a RE-ENGAGEMENT as General Foreman. Twelve years' practical experience as such. Well up in all the branches of the building trade. Address 29, Joiner by trade. Address, 825, Office of "The Builder."

TO CONTRACTORS AND OTHERS. WANTED, EMPLOYMENT, by a practical Man, who thoroughly understands the appertaining veyor, Croydun, Surrey. - Address, Mr. GAID, Road Bur-

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WANTED, by the Advertiser, a RE-ENGAGEMENT in an Architect, Surveyor's, or Builder's Office. Has had considerable experience, and is willing to make himself generally useful. Address, Messrs. Malby & Co. The Merchants, corner of Tottenham-square, Finsbury, E.C.

TO BUILDERS, CONTRACTORS, and DECORATORS. - A first-class WRITER, GRAINER, PAINTER, &c. desires a permanent SITUATION. Has been accustomed to take the entire charge of painters' work in general. Good references can be given as to ability, experience, &c. Address, Z. 3, Clifton-square, Hammersmith, W.

TO CONTRACTORS, ENGINEERS, AND BUILDERS. THE Advertiser, experienced in the construction of public works, railways, docks, sewage works, &c. as accurate leveler, clerk at setting out, measuring up, estimating a good draughtsman and accountant, seeks an ENGAGEMENT. Has been much abroad and speaks several languages. Terms moderate. Address, C. R. Leo Cottage, Cowley-road, Islington.

TO BUILDERS or MASTER PLUMBERS. THE Advertiser, a good PLUMBER, is open for an ENGAGEMENT. Two years' reference from present employer. No objection to the country, on a job. Good wages required. - Address, H. B. 14, Post-office, Manchester-square, London

TO ARCHITECTS AND JOINERS. THE Advertiser WANTS a SITUATION, as above. Has some knowledge of lines and setting out work. Wages moderate. Address, 891 Office of "The Builder."

TO ARCHITECTS AND SURVEYORS, &c. THE Advertiser seeks a SITUATION. Is a good draughtsman and estimator, competent to undertake working and drawing drawings, measuring, &c. - Address, K. 9, Great-street, Plymouth, Devon.

TO BUILDERS, PLUMBERS, PAINTERS, &c. THE Advertiser seeks a Permanency as WORKING FOREMAN of Three-branch Head. I quite conversant with general and particular work of a good building shop. I will do pump and closet work, and quite capable of managing a branch concern. - Address, W. S. No. 1, Post-office-lane, Notting-hill Gate.

TO NOBLEMEN, GENTLEMEN, AND BUILDERS. THE SUPERINTENDENT of WORKS on an Estate will shortly be discharged, and wishes a similar ENGAGEMENT; or would take charge of Works for a Builder. Is thoroughly practical and preserving. Wages moderate. Age 45. Good references. - Address, D. 149, Pentonville-road North, London.

TO ARCHITECTS, &c. THE Advertiser, having just served his articles with an Architect and Surveyor in the country, and having been employed in a similar office in London, is now desirous of entering a LONDON OFFICE, at a small remuneration in the first instance. Is a fair draughtsman. Address, A. B. 20, Post-office, Newchurch, Rossendale, Manchester.

TO ARCHITECTS AND OTHERS. THE Advertiser is open to an ENGAGEMENT. Many years with last employer (an architect, &c.) Undertakes management of household property. Good references and security if required. - Address, X. Y. Z. 43, Dagmar-road, South Hackney, N.E.

TO ARCHITECTS AND CIVIL ENGINEERS. THE Draughtsman, who is a first-class general draughtsman, desires an ENGAGEMENT. Forms set prepared. Has just completed a three years' apprenticeship in Egypt. Address, A. Z. B. 74, Oxford-road, Brompton, N.

REQUIRED, a SITUATION, as FOREMAN of PLUMBERS and PAINTERS. Testimonials, W. W. Post-office, Shaftesbury.

CARPENTER and JOINER, good Workman, wishes EMPLOYMENT. Town or country. Day or piece. Wages 75s per hour. Address, G. R. 81, Borough-road.

TO ARCHITECTS. AN experienced DRAUGHTSMAN desires a RE-ENGAGEMENT in town. Qualifications - Design (both exterior and interior), and construction of a superior class. Eleven years in the profession. Two years outdoor experience. References. An estimate of work. Terms moderate. Address, BARKLEY'S, 4, Crutchein-street, Hamstead-road, N.W.

TO DIRECTORS OF WATER WORKS, TOWN CORPORATIONS, and LOCAL BOARDS OF HEALTH. A GENTLEMAN, having had great experience in the designing, construction, and management of water works, wishes to be open to an ENGAGEMENT as RESIDENT ENGINEER; also understands sewage and gas works. Address, 54, Office of "The Builder."

TO BUILDERS. A RESPECTABLE YOUTH (aged 17), who has some knowledge of Bookbinding, wishes for a SITUATION where he will LEARN the Business. Is well acquainted with architectural drawing and measurement. Wages not so much an object as a suitable situation. Address, J. T. M. 170, Drury-lane, W.C.

TO MARBLER and STONE CARVERS. An age, wishes to be apprenticed to learn either of the above. Address, F. W. 14, Upper Park-place, Dorset-square, N.W.

TO ARCHITECTS. AN ASSISTANT desires a RE-ENGAGEMENT in town. Is competent to prepare finished working drawings, and will fill up in general other work; understands perspective. Address, 816, Office of "The Builder."

TO LAND AGENTS, LAND SURVEYORS, AND OTHERS. A GOOD practical LAND SURVEYOR and neat DRAUGHTSMAN wishes an ENGAGEMENT in town or country. Salary moderate. Address, 855, Office of "The Builder."

TO ARCHITECTS AND SURVEYORS. A JUNIOR ASSISTANT, aged 19, is desirous of an ENGAGEMENT. Writes an excellent hand, and has been four years with a District Surveyor. Address, D. B. G. 20, Clarendon-road, Bow, E.

TO ARCHITECTS, BUILDERS, &c. A RE-ENGAGEMENT as General Foreman or Clerk of Works. Is offered by a thoroughly competent Man. Joiner by trade. Address 37. For more than three years foreman to one of the largest firms in London, leaving only an account of duties of an office. Good references. Address, 45, care of Mr. Palmer, 39, Harrison-street, Gray's-inn-road, London, W.C.

A BUILDER'S ESTIMATING and MEASURING CLERK of good practical experience is open to an ENGAGEMENT. Will fill up office work, making out accounts, &c. Good testimonials. Address, G. F. M. Thomas's, Tea Dealer, 5, Kingland-green, N.E.

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The Builder.

VOL. XXVI.—No. 1317.

Meeting of the Art-Union of London.

BEFORE the hour appointed for the meeting of this association on Tuesday last, for the reception of the annual report and the distribution of the funds subscribed for the purchase of works of art, the new Adelphi Theatre was well filled with an elegant and attentive audience, and the stage almost inconspicuously so. Amongst the members of the council present were Mr. Antrobus, F.S.A.; Mr. Bennoch, F.S.A.; Mr. Butterworth, F.S.A.; Sir Thos. Gabriel, bart.; Mr. Chas. Hill, F.S.A.; Mr. R. Hudson, F.R.S.; Mr. Chas. Mayhew; Mr. L. Pocock, F.S.A.; Mr. Zouch Troughton; Professor Westmacott, R.A.; and others; and amongst the visitors were Mr. W. E. Frost, A.R.A.; Mr. Maclean, F.S.A.; Mr. Jas. Pahey, and other well-known artists. In the absence from England of the president, Lord Houghton,—

Professor Westmacott was called to the chair, and having explained the circumstances under which he took it,—

Mr. Godwin, F.R.S., read the following

REPORT.

The Council are glad to be able to commence the thirty-second annual Report of the proceedings of the Art-Union of London with an announcement of its continued prosperity. The subscriptions for the present year amount to the sum of 13,622 14s. 6d. The engraving to which each subscriber is entitled, "The Play Scene in Hamlet" (after Maclean), has been received on all sides with the greatest approbation, and the periodical press have echoed the good opinion of the public. It could scarcely be otherwise. The cost of such a print under ordinary circumstances would be at least two guineas, and a large part of each subscriber's guinea will nevertheless come back to the body of members in the shape of prizes.

Various other engravings of great importance are in the hands of the Society already known; and in addition to these Mr. W. Holl, who engraved the "Mortyrmagny," has been commissioned to produce a plate in his best manner after the picture "Rebeckah," by Mr. F. Goodill, R.A.

Mr. Vincent Brooks has made for the Society a chromolithograph from a charming picture by Mr. Birket Foster, called "The Kites," examples of which, framed, will form part of the present distribution.

The Council have in hand for next year a copy in chromolithography of Mulready's well-known picture "Choosing the Wedding-Gown," one of the most attractive paintings in the South Kensington Museum. "I had scarcely taken orders a year," says Goldsmith's immortal "Maiden," "before I began to think seriously of matrimony, and chose my wife as she did her wedding gown,—not for its glossy surface, but such qualities as would wear well." On this observation the picture is founded. Mulready's works depend so greatly on colour and light, that they are peculiarly suited for production in chromolithography. If real artistic feeling and careful manipulation are brought to bear on such a work, there will be no danger of its inducing a feeling against this mode of reproduction. The Art-Union may, however, point to the "Young England," after Frapp, examples which none but those constantly in the habit of examining such works are able to distinguish from the originals. In the case of Mulready's picture above mentioned, there will be many colours, and the great care and skill required in "registering" may be imagined, since, of course, the deviation, but by a hair's breadth, in placing one colour over another would be as fatal to the whole work, and render useless all the previous paintings. Turning to another department,—

Mr. Leonard Wyon has successfully completed for the Society dies for a medal of the late Sir Richard Westmacott, R.A., sculptor, impressions from which will be allotted on the present occasion.

Mr. W. F. Woodington, one of the artists engaged to model the bas-reliefs on the base of the Nelson column, has prepared an exact copy of this monument on a scale of 1-7th in. to the foot; and copies in bronze, executed by Messrs. Franchi, will form part of the prizes.

A vacancy in the council, caused, soon after the last meeting by the lamented death of Edward Hawkins, esq., late of the British Museum, was filled by the election of the Right Hon. Sir Thomas Gabriel, bart., then Lord Mayor of London. Mr. Hawkins was a member of the executive council of the Society, and gave constant and valuable assistance for many years.

The Right Hon. T. Moncell, and Peter Graham, esq., have been elected members of the council in place of Philip Hardwick, esq., R.A., and Chas. Leaf, esq., who retired in accordance with our by-laws.

The following is an outline of the receipts and expenditures.

Detailed account, duly audited, will be printed hereafter, as usual.	
Amount of subscriptions.....	£13,612 14 6
Cost of engraving and printing "Hamlet," exhibition, and reserve of 25 per cent.	25,155 11 0
Agents' commission, rent, salaries, postage, &c.....	2,232 2 0
Expended in pictures, bronzes, parian, &c.....	6,285 0 0
Total.....	£13,612 14 6

The amount available for the purchase of works of art from the public galleries by the prizeholders themselves will be divided in the following manner:—

22 works at.....	£10 each.
20 ".....	15 "
14 ".....	25 "
12 ".....	30 "
12 ".....	35 "
10 ".....	40 "
6 ".....	45 "
6 ".....	50 "
8 ".....	60 "
6 ".....	75 "
3 ".....	100 "
1 work at.....	150 "

There will also be distributed,—

- 25 Bronzes of the Nelson Column.
- 20 Medallion Bronze Inkstands.
- 100 Statuettes, "The Wood-nymph."
- 250 Chromos, "The Kites."
- 30 Silver Medals, commemorative of Sir R. Westmacott, R.A.

There will therefore be, with the parian busts, given to all who have subscribed for ten years consentively without gaining a prize, 758 prizes, in addition to the engraving received by every member.

On the plan followed on other occasions, the smaller prizes will be allotted by numbers drawn from the wheel, in the same manner as the picture prizes; but as the drawing of these would occupy more time than the business of the theatre would allow, the drawing will take place at the office to-morrow morning, at eleven o'clock, when any members desirous of being present are invited to attend.

The reserved fund now amounts to £14,478.

One of the galleries from which prizeholders have been allowed to select—that of "The British Institution for Promoting the Fine Arts"—is no longer open. The casual intimation that has reached the public, that this Institution, which was founded in 1806, has ceased to exist, is felt to be unsatisfactory. The British Institution has done good service, as well by bringing artists and the public together, and by the rewards bestowed on painting men, as in its periodical gatherings, and exhibitions of the works of the old masters which are scattered over the kingdom, and are not thought to be seen; and the art-loving public had a right to expect an authoritative statement of the position of the Institution, and the opportunity to assist in preventing its disappearance.

The painters of past times still live in the memory of the present generation cannot afford to give up the study of them. A moderate acquaintance with the wondrous masterpieces of former times, should teach us humility, and how is it that the works of Raphael and Leonardo da Vinci remain unapproached,—seem still unapproachable? And who could estimate the debt that humanity owes to these men? What steps should a nation take to secure the best chance of developing similar powers? This is an inquiry worth making,—and at some cost, too.

It has been contended again and again in the reports annually made to you, and at a time when it was needed, that slavish copying, alone, of Nature (the power of drawing having once been acquired) is not the course that will produce great artists. Every really great work of art is ideal; it sets forth the ideas of the producer, the mind of the workman,—a striving after the best,—as well as the material objects sought to be represented. The sentiments and feelings of the human mind are the subjects the artist must deal with who would leave behind him works that will move, enthral, and influence human kind.

Following the course adopted at intervals on previous occasions, and which assisted in bringing before the public, early in their several careers, Mr. F. R. Pickersill, R.A., Mr. Henry Selous, Sir J. Noel Paton, Mr. John Tenniel, Mr. W. Cave Thomas, Miss Pistrucchi, R.A., and other artists, who have been and will be in the hands of the public, the Council in September last invited a competition in designs. The sum of 500 guineas, with a further sum of 100 guineas, if a production of very high character were submitted, was offered for a series of drawings, illustrating some poetical or historical work of a British author, or events in British history; the series selected for the premium to become the absolute property of the Art-Union, with copyright. In response thirty-five sets of drawings have been received, several of them being works of great merit. With the obliging permission of the Committee of Privy Council for the Department of Art, the whole of these designs will be exhibited to the public in the South Kensington Museum in the course of next month, and the decision will then be announced.

With reference to a previous set of illustrations issued

to the members, "The Ancient Mariner," the Council have assented to the request of a photographer for the permission to produce photographs from those plates, for the purpose of illustrating by the magic lantern a reading of the poem about to be given in various country places, and to compose his successful cantata, "The Ancient Mariner," first produced at the Birmingham Musical Festival, by turning over our illustrations of the poem which made its capabilities apparent to him.

It is a matter of last year your Council, as representatives of the Society, were entertained at the Mansion House, by the then Lord Mayor, Sir Thomas Gabriel, an incident that should scarcely go unrecorded. In proposing as a toast the success of the Art-Union of London, and aiding artists, he maintained, could enable us, as the Lord Mayor dwelt effectively on the part that had been played by the Society in ministering to the gratification and advantage of the community,—in improving the labour of this Society were necessary, they were so at this time; for nothing, he maintained, could enable us, as a nation, to keep our place among the manufacturing countries of the world but a thorough education, and training of the people in all that belongs to the arts. A love for the beautiful was innate in human nature, and the savage would prefer a decorated and well-proportioned tool or instrument to a rough, ugly article; but, if this were true in that class of manufacture, how much more so was it with reference to all those productions of various classes required to meet the luxurious taste of the day incident on the vastly increasing wealth of every country. We might therefore depend upon it that if we wished to avoid seeing ourselves altogether distanced in the manufacturing of all articles in which anything like taste could be introduced, and left as the manufacturers of only coarser works, we must diligently do all that tends to improve and raise the taste of our people.

One of the Honorary Secretaries, in replying to the Lord Mayor, referred to the eventual career of the Society, and claimed that when the history of the progress of art in this country should be fully written, it would be found that the Association had played no unimportant part. The early progression of it was remarkable. When Mr. Henry Hayward, Mr. Lewis Pocock, Mr. Bent Gabriel, and himself, the only four of the founders remaining, the Council had sat down at a small table in a small room to organize it they had hardly expected such a result as had followed. Scarcely able to obtain a subscription of 500*l.* in the first year, it soon became 1,000*l.*, then 2,000*l.*, 5,000*l.*, 12,000*l.*, 14,000*l.*, and so mounted to nearly 16,000*l.*, after which it subsided to a comparatively steady income of from 13,000*l.* to 14,000*l.* a year. About 350,000*l.* had been raised by its means, the whole of which large sum, with the exception of the necessary expenses for room, printing, and so forth, had been devoted to the encouragement of artists, and the dissemination of works of art. All over the kingdom, in every colony, wherever, indeed, English men and women were to be found, whether China, India, Barbary, Egypt, Russia, Turkey, New Zealand, or the gold diggings of Australia, the Art-Union had a colleague engaged in the dissemination of works of art. It was surely no small thing thus to have spread over the world an associated brotherhood interested in the progress of the arts that ennoble and refine. Looking round the hall in which they were assembled, the speaker said, he was reminded of a member of their council, the late City architect, through whose endeavours mainly the corporation had been led to aid nobly the sculptors of the country, by filling the niches of that apartment with their works. It was to be hoped that before long their exertions would be led to call in the aid of the sister-art, painting. Strange to say, there was not a single picture in that Mansion House of the richest city in the world. He hoped he might not be thought impertinent for mentioning it; at any rate, it was a fact not to be proud of, and ought to be remembered. For many years the reports of the Art-Union have urged the desirability of placing works of art on the walls of public meeting-places, and where they might delight, appeal to, and improve the multitude. Public galleries of works of art in our provincial towns were greatly needed. In most French towns, as at Rouen, Caen, Lyons, Lille, Bordeaux, there are galleries of art to which the public have free access; it is surely not creditable to us,—it is not even commercially, that, with the exception of those in the three capitals, no such collections are to be found in England. Liverpool, prompted by a right spirit, determined some time ago to erect a building and found a public gallery of works of art. An examination was made of the best galleries at home and abroad, and plans were prepared. It appears, however, that on the ground of commercial depression the development of this excellent determination has been postponed for a time. It is to be hoped this time will be very short. The appropriation to such a purpose of some part of the immense revenues of Liverpool will be a most profitable, important, and praiseworthy step.

The Corporation of Manchester have recently determined on the erection of a new Town-hall at the cost of more than a quarter of a million of money, and, assisted at different stages of the selection by the advice of two members of your Council, have fixed on a design which promises to result in a building of great magnificence. The expression of a hope that sculpture and painting of the highest excellence obtainable will be enlisted for its adornment, may not be thrown away.

It is a subject for congratulation that sculpture to a considerable extent is to be introduced in the external adornment of the new building for the University of London, Burlington Gardens; though as much can scarcely be said in regard to the whole proceedings of this fine site. Instead of three separate buildings without congruity, under three different architects (one of the buildings—namely, that for the Royal Academy—tacked on to an existing structure), a noble and harmonious pile might have been erected that would have done something more than amply fill the wants of the various bodies that are to be lodged there.

The Thames Embankment now approaching completion not merely affords good opportunity for the introduction of high-class sculpture, but absolutely demands it. Let artists, then, prepare themselves for coming tasks. Statues have recently been set up in Westminster Hall, and there seems to be a disposition elsewhere to employ sculpture to a larger extent than heretofore. Some works of this art have been going in hand. Many years have elapsed since the country voted a sum of money for a monument in St. Paul's to our great commander, the Duke of Wellington, and as yet even the model is unknown. With whom rests the fault, with the

well worth careful study, as they show the different stages through which the design passed before the final drawings were commenced.

Secondly, the designs submitted for the ultimate competition for the New Town-hall, Manchester, are, most of them, on the walls; amongst them the successful design of Mr. Waterhouse. Those of the profession who were not so fortunate as to see the complete collection in the Rooms of the Corporation in Manchester, will be glad of this opportunity of observing the principal positions. In addition to some of those submitted in the first competition for the same Town-hall, there are also many beautiful drawings by eminent French architects, which were to be seen at the late Paris Exhibition, and were highly spoken of at the time. They have been kindly lent for the present occasion. These drawings were brought over from Paris at the cost of the Society, and have to be returned to their owners, free of expense.

A new phase in the existence of this Society is, that instead of being short of material where-with to fill all the wall-space at its command, they now exhibit about 100 designs more than on any other former occasion, while many have been rejected for want of hanging-room.

Valuing highly as we do drawings as proofs of artistic power, we yet heartily welcome the presence of numerous photographs showing portions of buildings, as they represent more faithfully than any drawing can the result of the architect's labour, and the manner in which the workman has succeeded in carrying out his intention. Photographs of this sort are also invaluable as representing the status of our art-workmen,—a class whose interest has ever been the care of the *Builder*.

We again call upon the profession to make, without delay, such return for the disinterestedness and energy of this Society as lies in their power. Let them enrol themselves as contributors, and for the future be more careful in supplying them with the best subjects at their command. Were these annual exhibitions discontinued for a few years, architects would find how much they suffered by the suspension of the Society's efforts, and be glad to have a renewal of their good offices at any price. It is, in short, the great arena in which the architect may try his strength with brother athletes, and he has the satisfaction of knowing that his place in the struggle will be assigned to him by judges. The drawings and photographs now on view in this Exhibition number about 700 or 800 separate subjects in some 450 frames. The series commences in the large room near the entrance, and after passing round the apartment is continued in the first or smaller room, and from thence to the screens. We will now approach the drawings, and examine them in consecutive order, referring, however, only to such as we consider deserving of special notice, either for their virtues or faults. Mr. John Croft exhibits some clever interior views of different parts of Westminster Abbey. The detail and perspective are well attended to, and the colouring (with the exception of his peculiar weakness for grass-green tint on some portions of the building) is pleasing and harmonious. Mr. Edward P'Anson contributes six views of different buildings in Russia and parts of Germany; amongst them are a tower from Dantzio, with bulbous-headed cupola in two stages; the St. Isaac Cathedral, St. Petersburg, showing the central and clustering domes; a tower in the wall of the Kremlin, Moscow; the town-hall, Breslau, and others. The sketches are outlined in ink, and slightly tinted. Many drawings, by Mr. E. J. Talbot, are to be found on the walls; one of them is No. 9, called "A Study from the Roof of St. Mary's Hall, Coventry." It is a water-colour drawing, and includes the church spires and their surroundings.

No. 6. View of the Church of St. Jacques, Antwerp;" and No. 12, "View in the Church of Notre Dame, Lambader, Brittany," both by Mr. E. S. Cole, are well worthy of examination. In the first, the view is taken from the south aisle of the nave, showing the junction of the chancel and south aisle with the choir and south transept. The whole length of the south aisle to chancel is given, with a portion of the clear-story and groining to chancel, the part under that being occupied by the Renaissance chancel screen, with its side altar, at which Mass is being celebrated. The picture is finished on the left-hand side by one of the circular pillars of the nave arcade.

No. 5. "Interior view of S. Andrew's Church, Oshensfurth, Bavaria; and No. 10, "Sketch of Ancient Synagogue" at Worms, by Mr. H. W. Brewer, an engraving from which we have published, are for sale. The detail and architectural character are well preserved. No. 5 shows an apsidal end, with four lofty and narrow two-light windows; then flamboyant traceried heads, finishing close up under the groining of the chancel roof, which springs from carved corbels. The side wall space is very bare for want of shafts or impost. The chancel arch is of *low pitch*, and composed of nothing more than the continuation of the shallow pilaster of its joints, the whole having a very weak effect. The altarpiece is very lofty, and of the local phase of Renaissance. It is in three stages, and contains in the lowest compartments carvings in high relief, richly gilt, of the three crosses on Calvary, with figures of SS. Mary and John, in niches on either side. In the second state is the "Resurrection," and in the uppermost the "Coronation of the Blessed Virgin."

No. 14. "Exterior view of Manchester Cathedral," by R. H. Bentham, from the south-east. Until within the last twenty years this building was the old parish church, and is now one of the smallest cathedrals in England. The roof over the nave is coloured, with carved angels on the hammer beams, and with richly carved choir stalls, good examples of the period. The drawing shows the late restorations, and the new tower erected by Mr. Holden.

No. 16. A window and part of a bay from the ruined Abbey at Kirkham, near York, by J. H. Leonard. The beauty of the rich mouldings, shafts, and caps of this graceful lancet-window are very well shown, and the colour of the stonework is pleasing and true. Nos. 18, 20, and 21 contain eight coloured sketches by the Rev. J. L. Petit, taken from buildings on the Continent, with the one exception of that at Peel, in the Isle of Man. Mr. Petit has a true eye for colour, and had he chosen art as his profession, would have achieved a good position amongst the fraternity.

No. 24. "View of the Great Temple of Edfoin," and No. 35. "Capitals, drawn to a large scale, from the temple of Esneh," both in Egypt, are by Mr. R. Phend Spiers, who contributes many other valuable drawings to the collection. No. 24 is a very bold and crisp drawing, slightly coloured, but well conveying the effect of solemn grandeur invariably connected with the best work of the Egyptians. No. 35 is very carefully drawn and delicately coloured, and is altogether a valuable drawing. No. 28, "Laborare est Orare," by F. P. Cockerell. A masterly composition delicately treated. It is an old friend, and having been alluded to in a previous number of this journal, we will pass on to No. 33, "Hotel de Ville and Church, Berque, near Dunkirk," by Ernest George; a valuable study, showing two very fine towers. Both the sketching and colouring are spirited. No. 39. "Competition Design for Church at Hemel Hempstead. Interior View," by Mr. Henry Hall, marked "*Palnans qui meruit ferat*," rather a dangerous motto, we think, to attach to this composition.

No. 40. With the exception of the perspective of some of the arches, this is a very careful and refined coloured drawing of the Interior (looking east) of S. Charles Borromeo, Ogle-street, Marylebone, by Messrs. Wilson & Nicholl. The roof over the nave looks very bare, which rather damages the look of the drawing.

No. 46. A pen and ink drawing of the Interior, looking east, of the Church of St. John, Torquay, Devon, now in course of erection, by Mr. G. E. Street, A.R.A. It is rather scratchy and confused in parts; but the general correctness of the perspective and accuracy of detail, in conjunction with the architectural merits of the composition, render it a very valuable addition to the exhibition. The chancel is shown to be square on plan, having in the east gable a fine window of five lights, with an octagonally-treated wheel-light over the same. The roof is groined in three bays, and lighted by a clear-story reaching to the crown of the groining. On the south side are two arches, supported on clustered columns, and occupied by a metal screen giving access to a south aisle. Three steps and a gate in the chancel-wall lead into the nave. On the north of this wall, and at the junction of the nave and chancel piers, is a circular stone pulpit, having a small arcade with circles over running round the whole.

We shall continue our notice next week.

ON BUILDINGS FOR EUROPEAN OCCUPATION IN TROPICAL CLIMATES, ESPECIALLY INDIA.*

THERE exists nothing of a physical nature which causes such an entire revolution in our feelings and habits, in ourselves and in our surroundings, as the addition or withdrawal of a few degrees of heat. Even within the limits of our own temperate climate, we know no contrast so strong as that between a sweltering harvest heat, and the cold of a keen black frost,—the sunny life of a brilliant summer day, and the bound-up torpor of a deep winter snow-storm; and when we carry our inquiries to the climates which lie at the extreme limits of human endurance, either of heat or cold, we find almost every condition of life reversed. The food, the dress, the dwellings, and the habits of the Esquimaux have hardly a single thing in common with those of the Hindoo, and both differ widely from our own.

Many of the countries where the heat of the sun is far greater than in England, and especially the East Indies, are so connected with us by commerce or colonization that, from time to time, English architects are called on to design buildings to be erected within their limits. Not fewer than eight Fellows of this Institute and four or five other architects practising here have been, within my own knowledge, lately called on to prepare designs for proposed buildings in Bombay. Two others, Messrs. Owen Jones and Digby Wyatt, have, within the same time, been called on to act as advisers respecting a large proposed building for the same city, the plans of which I had to prepare; and they, in that capacity, rendered me cordial and most invaluable assistance, which I am happy to seize this opportunity of publicly acknowledging. Some five or six English architects also are, or lately were, residing and practising in that one city,—facts which show that buildings for such countries as India may be fairly considered as not too remote from our own possible practice to be treated here. If, then, the conditions of life in a tropical climate are very far removed from those with which we are here conversant, it cannot be that many differences will exist between the buildings with which we are familiar as suiting our climate and such buildings as will suit the tropics; and it will be our business to-night to consider a few of these differences. First we shall take note of some of the essential requirements for European life in a tropical climate, such as that of India; afterwards we shall consider a few of the peculiarities which will affect the actual erection of the buildings, and the most obvious of the difficulties to be apprehended. Throughout I must be understood as referring to buildings for the use and occupation of Europeans only: my time is too short, and my information on the point too imperfect and fragmentary, for me to say anything on the interesting though less important subject of such buildings as are occasionally put up in tropical countries for the use of natives. In each of the two heads of this inquiry we shall be naturally led, as we go on, to notice such expedients and methods as may be best employed, or as have been actually found efficacious in meeting the needs which we shall discover. My own justification for bringing forward this subject is, that I have been obliged to make myself acquainted with the requirements and circumstances of, at least, one tropical climate, that of Bombay. The Government of Bombay proposed, in 1864, to erect the European Hospital in that city, from designs which I had submitted in competition. This led to my visiting Bombay at the end of that year, and to my being associated with Mr. Trubshawe, the consulting architect to the Bombay Government, in the preparation of working drawings for several public and other buildings of importance; I can, therefore, offer you the results of some little practical experience; and I hold it as almost a bounden duty of any member of this body, whose practice has led him to acquire information not readily accessible, and likely to prove of some use, that he should come forward here, and contribute it to the common stock.

It may provoke a smile to say that the great peculiarity of a tropical climate is, that it is very hot there; but, nevertheless, that is the great peculiarity, and the one point an architect must never forget, remembering that even what is called the cold season is far hotter than our

* By Mr. T. Roger Smith. Read at the ordinary general meeting of the Royal Institute of British Architects, held on the 27th of April, Mr. W. Tite, M.P., president, in the chair.

summer. It is also very light in such a climate; at some period of the year it is further very wet, the rain falling at times in torrents, and the air being saturated with moisture; but in the fine season it is ordinarily uninterrupted fine, remaining so for long stretches of time. Climatic disturbances, however, when they come, are violent; wind-storms, dust-storms, thunder-storms, with driving rains—perhaps earthquakes—must be expected occasionally; and such disturbances are more sudden in their visits, and more violent in their force, than in our climate.

Insect and reptile life are far more prominent within the tropics than here. Household pests there include such formidable enemies as the cobra, the scorpion, and the white ant. The white ant is an enemy of the most destructive powers. It eats almost all kinds of woods, and if the timber with which a house is built be such as it will devour, it will be not unlikely that all the woodwork of the house will be hollowed out and eaten away. The essential oils of one or two woods, such as teak and blackwood, seem to protect against them, but all ordinary wood is liable to be eaten by this ant. The damp of the monsoon time is a second powerful destructive agent; any unpainted or ungalvanized surface of iron would be found oxidized to a remarkable extent; and whether it be this, or the saline particles of the air, or an extra dose of actinic power in the sunlight, I know not, but the climate of Bombay, though free from frost, appears to act almost as destructively on building-stone as that of London.

The people, again, who will be about you in the tropics, are essentially different from Europeans. They will be all, or nearly all, natives; and if in India, all of various castes. The number of servants will be very great; they will dispense with most things that an European wants, but, on the other hand, they will require some things which in Europe would not be thought of. No English gentleman, for example, would think of planting all round his private house, a sort of hamlet of little cabins for the wives and children of his servants, any more than he would dream of his valet being willing, under any emergency, to sleep on a mat outside his bedroom door, as a personal retainer might have done here in feudal times. In India both would seem very reasonable things. The people engaged on the work will also differ altogether in their notions of workmanship, and especially of accuracy and finish, from the European artisans for whom we are accustomed to make drawings. Their setting out will be defective, and their finish, to an European eye, faulty; but, on the other hand, if the right sort of men be found out, and employed in the right way, their ornamental work, obtainable in India even now, after long disuse has caused the higher branches of the art of building to languish, will be very beautiful, and much of the workmanship excellent. The joinery and cabinet-work especially, executed with very rough tools, and put together without glue, will surpass most English work for solidity and durability.

To return, however, to the heat and light. Where the sun's heat is so powerful that nothing but English pluck prevents the attempt to work being altogether given up, and between sunrise and sunset it is almost impossible for an European to expose himself safely to his rays—where walking a few hundred yards, at midday, even under an umbrella, would be an exhausting and imprudent exertion for an European—where fresh air is the greatest essential of comfort, almost of life—where the glare of light is so intense, that the smallest unshaded opening seems, in the hours of sunshine, to admit more brightness than is compatible with comfort—and where the main walls require to be screened, both from the pelting heat of the sun in the fine season, and the driving rains of the wet season, it is almost self-evident that rooms should be large and airy, windows and doors so open as to admit every breeze that blows, yet so shaded as to keep out as much of the light as possible; and that walls should be far thicker than here, is necessary, and sheltered by some outer screen.

Outside all the external walls, or, at any rate, on all sides open to the sun's rays, a screen called a verandah is essential; and it becomes, in fact, the leading feature of buildings for the tropics. This may be best described as something like an external cloister, ordinarily about 10 ft. wide, the roof usually running over it in a continuous line, and overhanging it. The verandah is, of course, often constructed of slighter materials than the main wall, but,

where practicable, it is better to be of masonry. It is, of course, desirable to have it as many stories in height as the building, and covering most or all of the wall, but it admits of many variations, corbellings, projections, breaks, &c. The floors of the verandah should be water-tight, and should slope away from the building. Towards the quarter of the wet winds, it will be well to provide means of partly or entirely closing the openings; this is usually effected by temporary matting, and some permanent contrivance for the purpose is rather a desideratum. In the day time the floor of the verandah, as indeed that of the rooms, is often sprinkled with water for coolness. These roomy appendages are not all lost space, advantage is taken of them when in shade, or catching the passing breeze, and then they serve as workrooms for native workpeople, or for lounging, smoking, walking, and even dining and sleeping in; little studied, compared with comfort. The verandah, with its unglazed openings, its deep shadow behind them, and its overhanging roof, affords the chief, and a remarkably fine opportunity, for external architectural treatment in more artistic native houses, it is beautifully treated in carved wood. As an example of the treatment of it in masonry, I may refer to the Mahomedan buildings at Ahmedabad, shown in Mr. Hope's photographs, or to the fine design of Mr. Burges, for the Bombay School of Art, which exemplifies excellently this as well as many other points of the proper treatment for a building for the tropics. Allied to the verandah are corbelled balconies, and open oriels thrown out to catch the breeze and afford a cool evening walk; such features occur in the best Mahomedan work, and afford an excellent opportunity for picturesque treatment.

Behind the shelter of the verandah, the doors and windows should be spacious. The building should, if possible, be made to point so as to catch the prevalent breeze; for in the tropics winds often blow with a wonderful regularity from the same quarter for months together. And the building should, if possible, be so arranged, with rooms *en suite* from side to side, and having openings opposite to openings, that the wind may blow quite through it, windows opening down to the floor, and doors placed opposite the windows, and both made wide and high. The necessity for a thorough draught, and the use as a thoroughfare all round the building of the verandah, have combined to exclude the corridors almost entirely from dwelling-houses; and your life in an Indian bungalow (or house) is public to a degree that would here seem strange, and would, in fact, be unsuitable to a temperate climate.

The general plan of all buildings for the tropics ought to be, as will have been already understood, very simple, and at once compact and roomy. All servants reside apart, and few stores are kept in any house; consequently, buildings intended for residence are relieved from almost all that gives rise to great complication in Europe. The external verandah will be found to swell the bulk of the building extraordinarily, but then it is constantly used for every sort of purpose to which room space might have been appropriated; and it is also so capable of furnishing here and there an odd corner to be architect to reduce greatly the number of parts into which the block of his building is divided, and so to render the form as simple as possible.

Over this simple mass a simple roof should be thrown. If not a terrace, its pitch should be flat and its eaves overhanging, so as to give most shadow, and throw the heavy tropical rains well off the foot of the walls. In many, perhaps in most hot countries, however, flat roofs are the rule, their comfort during the hot part of the year being felt to overbalance their inferiority in the rainy season. The dome also forms a leading feature of many Oriental styles of building.

In one or two good Mahomedan domestic buildings which I visited, I found the stories but low. This, however, would not at all satisfy any European resident, or I think be suitable to our great need, in a sultry climate, of all the air we can get. The ordinary height of a story is about 13 ft. or 20 ft.; and stairs being a serious fatigue in a hot climate, buildings of many stories are not common. An underground basement is not usual; it would become a harbour for vermin and filth, and would be flooded or damp in the monsoon (or wet) season. The ground-floor is usually not less than from 2 ft. to 3 ft. above the

level of the surrounding earth, and raised on a solid terrace. This height is, I believe, chiefly given as a protection against moisture, and hollow floors are avoided because vermin and snakes would be sure to get into them. Many residences, where ground is plentiful, are only one story in height, and few buildings could conveniently have more than three stories. I may here suggest that the frequent use in hot climates of timber-built houses, of only one story high, may be in part accounted for by their being safer than any other in times of earthquake. This can hardly, however, be the reason of their use in Bombay. Between the ceiling of the top story and the roof there should be a space well ventilated and unoccupied, to keep the top story cool, a precaution often neglected.

It may be almost unnecessary to remark that no fireplaces or chimneys are ordinarily required, and that kitchens ought to be, where practicable, an outbuilding apart.

Coming now to the openings for doors and windows, they will rarely require to be filled, inside the building or out, with a solid door or shutter. The ordinary window is a large casement hung folding, and each fold in two flaps; the flaps are divided into several heights, and filled with louvres, like those of a Venetian blind, only finer, and capable of being set close or open; the ordinary internal door is of the same character. Internal openings are often, however, not even fitted with doors of this sort, but left as arches, to be closed occasionally by the use of silk or open black wood screens, often of beautiful design, reaching only to the spring of the arch, and with a space of a foot in depth left open underneath, to admit a current of air along the floor. This substitution of some sort of pierced work for panels, I may observe, is carried out in many directions. In some of the beautiful Mahomedan buildings the panels of pierced brass-work and pierced stone which occur in the openings form the most beautiful decorative feature conceivable. These have been elaborated in such a case as the window in the mosque of Seedein Soyed, at Ahmedabad, to a point which challenges comparison with our most complete tracery. Other modes of filling openings may be used; for example, in Cairo and many other Eastern cities the most effective grilles for filling windows are formed of small turned wooden spokes, fitted together in a simple effective way. In the Egyptian Okei, in the park of the Paris Exhibition, this was well shown, as were other peculiarities of structures suited for hot climates.

It occurs, sometimes, in most or all tropical climates, that from external openings it is necessary to keep out the wet, and sometimes even the heat. I believe even, that in some very hot inland regions, away from sea breezes, the air is so hot during the sunshining hours that it is customary to keep it out instead of letting it in. Here, of course, external openings are made capable of being thoroughly closed, and comparatively small. It is also necessary in some districts to be able to shut out night fogs, or sea fogs, or some other injurious state of the air, and even cold winds; and in Bombay, which is on the sea-shore, I found that it was necessary to be provided with the means of closing external openings against the humidity of the monsoon or wet season, and even against driving dust; accordingly there all window-frames have two sets of folding casements, one with the Venetian louvres already described, the other glazed, and left folded back out of the way, except in the wet season. I am not aware that our sash-windows have ever been attempted to be employed, and they are just such a contrivance as I should expect would be ill carried out by native workmen. Casements in solid frames are preferable, and those frames that I have seen, internal doors as well as windows, are always framed with a cill, which in doorways you have to step over.

It is not, I think, usually requisite to make provision for strongly protecting any building for European occupation against robbery. It is usual to have watchmen patrolling round even private houses all the night, and more reliance is placed on them for protection than on fastenings or doors. Notwithstanding the general simplicity upon which I have insisted, one or two points, in the arrangement of buildings where Europeans are to reside, in India, at least, often cause some perplexity to the architect; but these it is imperative he should attend to. For instance, the bedroom of any European entitled to the smallest comfort must have appended to it a bath-room, in which stands, on a

large cement platform with a raised ledge, a large sponging bath: this has to be daily filled by a water-bearer: often it is so placed as to be filled through a pipe; but however this may be, the arrangement is not that water is laid on as in England, but that it is brought daily in a skin on a man's shoulder to the outside, if not the inside of the room. For this purpose, consequently, access must be reserved for the bees-tee (or water-carrier). But this is not all. In or adjoining each dressing-room is a convenience taking the place of a water-closet. The system of water conservancy is not established, and may probably never be found available in India; while even the more suitable system of Mr. Mount and his earth-closets would not obviate the necessity of removing, more or less frequently, fecal matter by hand. This is at present done twice daily, and the persons whose business it is to do this work (and who are termed sweepers) must not, both on account of the offensive nature of their work, and on account of their lowness of caste, come into the building so as to risk their contact with higher caste servants. Hence it becomes necessary to provide a sweeper's staircase, and often several such (which are very frequently external staircases, more or less open), with means of access along verandahs or otherwise to the external wall of each dressing-room, and to form at each convenience a small doorway through the wall. In a complicated building this necessity for a dressing-room to each bed-room, and for a secluded and external access to each dressing-room for the water-carrier and the sweeper, makes no inconsiderable demand on the ingenuity of the architect, and even on the space at his command. I may add that as regards bath water a regular system of drain-pipes to carry it off does not seem usual. Provision is made for discharging it by some simple outlet to the exterior of the building, where it flows over the surface of the ground, and soon sinks in, or is evaporated by the sun's heat. Here it may be fitting to add, by-the-by, that eaves-gutters and down-pipes, and means of storing rainwater, do not seem to be in use.

Another peculiarity of tropical life is that, as every European who can afford it must ride to his business, and about his business or his pleasure, every building requires a carriage porch, sheltered from the wet of the monsoon and the heat of the other seasons. Every house and most public buildings will also require stabling and coach-houses. These are very much ruder than our own, but must be spacious.

Special attention must be paid to the great value of one aspect as compared with another—the breezy and the shady sides of a building are preferable to the other aspects in a very great degree, but the difficulty of securing a good aspect for as many rooms as possible in a building being not unknown in England, I will not enlarge upon it.

Wherever practicable, an Indian building is placed within an ample walled enclosure, called a compound, which is a kind of compromise between a meadow, an orchard, and a garden; and in this compound, when a number of attendants are required, nestles a cluster of huts where they and their families live, and other huts, such as the cook-house, where the household work is mainly done. In city buildings it is usual to give up the whole or some part of the ground floor to the servants, though in some buildings lately erected in the city of Bombay they, and the kitchen (called cook-room), have been provided for in the topmost story. The number of attendants required is very great. As a rule in all tropical countries native labour is cheap and plentiful; each individual does not do much, and the subdivision of labour is carried out to a perplexing extent. It is worth taking a good deal of trouble to arrange the stables and these servants' dwellings, so that they shall not come to the windward of the building they belong to,—that is, if the prevalent direction of the wind is known. Various bad odours are likely to arise there, and even the fuel burned in cooking in these places, being cakes of dried cow-dung, gives forth an unpleasant smell, and this or any other bad smell is peculiarly offensive in a hot climate.

Having now said something upon the arrangements and features desirable in a building intended for a tropical climate, we are next to consider some other peculiarities which may have to be provided for in preparing to execute such a building. The difficulties attendant upon the actual carrying out of any building in a

tropical country are often serious. They are of two classes; those of a structural nature,—as difficulties relative to materials, to labour, to modes of working, &c., and those of what may be termed an administrative nature, that is to say, those affected by the peculiarity, or arrangements, or want of arrangements, for getting building work done. It is not sufficient to prepare plans for a building which would be a good-looking and suitable one if it were built. It is also necessary that the plans and arrangements should be fitted as nearly as possible to the material and moral circumstances of the case. This necessity is too often overlooked, ignored, or at best inadequately met; and in consequence works well designed in this country have often been ill carried out, abandoned, or modified in a destructive sense abroad. There may be many things that would prove good if done, which yet cannot be done, and others which could be done, but which people cannot be got to do.*

ON THE UTILIZATION OF SEWAGE BY IRRIGATION.†

Norwood.—At Norwood the results of irrigation have proved equally remunerative, the land being, as has already been stated, on a clay formation distinct from that of Croydon. The arrangements for the purification of the water are most elaborate. By gravitation the sewage is conducted from the outfall, through a covered straining tank, whence the solid refuse is pumped by hand, with moveable apparatus. The covering of this tank is questionable policy. It simply effects the concentration of the sulphuretted hydrogen, which if exposed to the atmosphere, could do little offence, and renders the cleansing a duty of tenfold danger. From this point, the sewage is passed in conduits, covered and open, and flows through the soil three several times ere it is finally discharged. The natural conformation of the ground is admirably adapted for this, and the purification is perfect. The quantity irrigated is about 37 acres. Prior to the application of sewage to the land at South Norwood, it was considered a very poor soil indeed; but recently the present tenant, Mr. Cousins, has offered 16l. per acre per annum for a twelve years' lease.‡

Edinburgh.—It is recorded by various authorities that town sewage has been here applied to the same land for a period of at least 200 years. The value of this fact is great, for in it we find a decisive proof that the land is not exhausted by this method of cultivation, even after the lapse of generations, but that exceeding fertility continues to be its characteristic. The soil upon which the utilization is mainly effected cannot be said to have ever been abundant of the elements of fertility, being simply the pure sea-sand. An additional valuable fact is, that throughout this long period of cultivation, conducted in a very rude and imperfect manner, there exists no record of injury to the health of the vicinity having been sustained therefrom. These considerations, taken in conjunction with the enormous rents that have long been paid for the irrigated land, give Edinburgh a prominent position as an exponent of the vast manorial wealth which lies hid in the form of common town sewage. The late Mr. Smith, of Deanshouse, in reporting upon the application of sewage to the purposes of agriculture, gives the following description of the irrigation works at Edinburgh:—"The sewer-water, coming from a section of the Old Town, is discharged into a natural channel or brook at the base of the sloping site of the town, at sufficient height above a large tract of ground to admit of its being flowed by gravitation over a surface of several hundred acres. The water as it comes from the sewers is received into ponds, where it is allowed to settle and deposit the gross and less buoyant matter which is carried along by the water, whilst it flows on a steep descent. From these tanks or settling ponds the sewer-water flows off at the surface at the opposite end to its entrance. The water so flowing off still holds in suspension a large quantity of light flocculent matter, together with the more minute débris of the various matters falling into the sewers, chiefly of vegetable or animal origin. The water is made to flow over plots or plateaux of ground, formed of even surface, so that the

water shall flow as equally as possible over the whole, with various declinations, according to circumstances; and it is found in practice, that the flow of the water can easily be adjusted to suit the declination." The report goes on to say: "The practical result of this application of sewer-water is, that land which let formerly at from 40s. to 6l. per Scotch acre is now actually let at from 30l. to 40l.; and that poor sandy land upon the sea-shore, which might be worth 2s. 6d. per acre, lots at an annual rent of from 15l. to 20l.," a veritable mine of wealth. This land produces from four to five crops of Italian ryegrass per annum: and as much as eighty tons per Scotch acre have been taken off in a single year. Yet so little alive are the rate-payers of Edinburgh to their own interests, that, glad to be rid of this valuable commodity, they make a free gift of it to their farmers, or rather to their landlords; who, on their part, find no better occupation than in turning its rich fertilizing ingredients into gold. The consequence of this disregard of public interest, so little creditable to the practical genius with which the Scotch are supposed to be gifted, is, that instead of being applied in a careful judicious manner, so as to make the most of it, the sewage is allowed to flood the land with wasteful prodigality, by reason of which a very considerable portion of it escapes without effecting the slightest good. It may be a necessary policy, during the infancy of irrigation experiments, to grant concessions of sewage at a nominal or pepper-corn rent; but after men have grown grey in the experience of its value, it is simply neglect to suffer a few private individuals to reap the advantage which should accrue to those whose sole property it is, to wit, the rate-payers.

Rugby.—The works at Rugby, like those at Croydon in their earlier stages, may be said to have been of excellent service in demonstrating what is to be avoided in sewage irrigation; and we cannot do better, in viewing this side of the question, than attentively study both these examples, and profit by their errors. In 1853, Mr. G. H. Walker took a lease of the sewage of Rugby, at an annual rent of 50l., with the twofold object of procuring the River Avon from pollution, and at the same time fertilizing his own land. He constructed a tank capable of holding 150,000 gallons, and erected a steam-engine of 12-horse power. He then laid down six miles of iron pipes, in five radiating main branches, with subsidiary branches. Through these pipes the sewage was pumped from the tank into gutta-percha hose affixed to hydrants, and so distributed over the land. The hose and jet system proved a failure, and was exchanged for open carriers, necessitating great additional expense. Other costly mistakes were discovered. The outfall, instead of being so low as to require steam-power to raise the sewage on to the land, might have been so constructed as to have admitted of its flowing over the ground by gravitation only, whereby the cost of engine and pumping apparatus, with their annual working expenses, might have been saved. The six miles of iron piping, of far too large a section for their original purpose, as well as of too great a lineal extent, were, on the adoption of open carriers, rendered useless, being abandoned by the lessee.* The land upon which the sewage was applied, instead of undergoing a special preparation for a special crop, was old farrowed pasture of the ordinary kind, covered with a strong stubborn turf, entirely unsuited for treatment by irrigation. The system of application was also injudicious, and it is not surprising, after Mr. Walker's catalogue of errors, Rugby should stand forth as a signal exception to the usual success of the utilization of sewage by irrigation. Yet, although the Rugby experiment has proved a failure so far as the enterprise of the lessee is concerned, it has by no means affected the estimation of sewage manure. Mr. Walker has stated in evidence that, under proper management, the money returned by the sewage disposal expense, even with the existing arrangements; and he considers the Rugby farm to be more valuable and productive since the application of sewage.† Nowwithstanding, then, the untoward circumstances which have attended the works at Rugby, they cannot justly be looked upon as a failure in demonstrating the value of sewage but rather as a proof that mismanagement will bring the most promising enterprise to a disastrous end. Rugby was the scene of Mr. Lawes's experiments.

* To be continued.

† See pp. 148, 169, 202, 222, 230, and 250, *ante*.

‡ *Leam. Congress Papers*, p. 142.

* *Rep. Met. Sewage*, 1861: 3603 to 3610, 3737.

† *Rep. Met. Sewage*, 1861: 3738.

Milan.—The drainage of Milan, which receives little or nothing of the solid excrement of the population, is received into two conduits, which make the inner and outer circle of the city, and unite in a natural channel called the Vettabbia, at the southern outskirts. The Vettabbia flows ten miles, and during its course to the Lambro, wherein it falls, distributes the sewage thus diluted over a considerable area of level meadow. The irrigation is carried on by the system of submersion, and is very successful, four crops of grass and three of hay being cut in the year. Professor Way adverted to the sewage of Milan in his report to the Commission,* and stated that although it was so dilute as hardly to be distinguished by the senses from ordinary stream water, yet it conferred upon the land to which it was applied, an increased value of from 4l. to 5l. per statute acre per annum above that obtained for land irrigated by streams containing no sewage.

The National Advantages of Sewage Irrigation.

It is not within the scope of the present crude statement of facts to enter into anything like a minute consideration of the manifold and widely-extended benefits which may be expected to accrue from the realisation of success in utilising the contents of our sewers. It will, however, be to the purpose to summarize the most prominent of them.

In the first place, it will be the means of effecting a sanitary reform unrivalled in the history of cities; and this may be submitted as the primary object to be attained. It is well if our impure refuse can be converted into gold; but it is better that it should first be rendered harmless to the public health. By this method, then, we not only obtain perfect facility for drainage, but we divert it from those abundant sources of water supply which hitherto it has perennially defiled; so that besides effectually banishing the noisome stenches and putrid epidemics which hover over the shores of he-fouled rivers, we render these latter once more to the beneficent purposes of nature, and swell the diminishing bulk of our present water supply by immense volumes of the purest and most wholesome water. Secondly, in placing the sewage upon the land, the country will become possessed of a permanent revenue, derived from a solid basis—a welcome relief to a heavily-taxed community. Thirdly, in thus developing the national resources, by multiplying the productive power of extensive districts, and enriching soils at present barren or impoverished, an important law in political economy will be carried out, and that dependence upon foreign supplies done away with, which is an ominous and almost unique feature in the commerce of this country. Lastly, the development of a large field for manual labour tends to a wholesome reduction of the evils of over-population.

The following is a tabulated statement of the value of London sewage per head of the population. The calculations are based upon its estimated worth per ton, taken with the net quantity of sewage discharged, the population roundly numbered at 2,500,000.—

Net weight of sewage, Tons.	Price per ton.	Population	Value per head.
155,544,000 (Mr. Bassigette) ...	0s. 2d. 0 11 0 1	2,500,000	£0 10 4½ 0 7 9 0 5 2½
215,762,000 (Capt. Galton)	0 2 0 1½ 0 1	"	0 14 4½ 0 10 9½ 0 7 2½
266,000,000 (Mr. Ellis)	0 2 0 1½ 0 1	"	0 17 9 0 13 3½ 0 8 10
			9½ 15 7
Average value per head			£0 10 7½

Thus we find that the average estimated value of London sewage per head of the population is about 10s. 7½d.; and if we roughly estimate the whole population of England and Wales at 20,000,000 souls, it will be found that our drainage refuse represents a gross annual value of 10,625,000l. sterling. Of this, say that not more than three-fourths can be rendered fully available, and there is still left the sum of 7,968,750l., a fact worthy of the attention of political economists. It may, nevertheless, with truth be alleged that a very considerable portion of the drier and more solid parts of sewage are not at present wasted, being applied to the soil. But the privies and cesspools of our most populous

* Rep. Met. Sewage, 1861: 4721.

towns, which chiefly contribute to this imperfect utilization, are already under condemnation upon the strongest sanitary grounds, and will sooner or later yield to the substitution of water-closets. It must not be forgotten also that under the existing state of things, immense sums are being annually paid from borough rates for riddance of this valuable commodity. At Manchester 6,600l. per annum is paid for the removal of the contents of cesspits,* an expense which more or less is universal throughout the country. At Aldershot it has already been said that 500l. or 600l. was annually paid for this purpose before the introduction of main-drainage. The population was then six or seven thousand: the cost therefore would amount to nearly 2l. per head. It is truly to be hoped that the fact of this extraordinary waste of national wealth will not long have to be recorded against those numerous and powerful corporate bodies in whose hands the administration of sanitary government is centred.

"All our advances in arts and sciences," says Liebig,† "are of no avail in increasing the conditions of human existence; and although a small fraction of society may by their means be gainers in material and intellectual enjoyment, the load of misery weighing upon the great mass of the people remains the same. A hungry man cares not for preaching, and a child that is to learn anything at school must not be sent there with an empty stomach.

"Every step in advance, however, made by agriculture serves to alleviate the sufferings and troubles of mankind, and to make the human mind susceptible and capable of appreciating the good and the beautiful that art and science present to us. Improvements in agriculture constitute the only solid foundation for further progress in all other branches of knowledge."‡

M. P.

NEW TRENT BRIDGE FOR NOTTINGHAM.

THE town council have resolved to erect a new bridge in place of the old Trent bridge from a design by their surveyor, Mr. Tarbotton, at a cost of 31,000l. The site will be a little lower down the river than that of the old bridge. The structural part of the bridge will be allied in its mechanical details to the modern bridges over the Seine and the Thames. The material for the abutments and piers below the lowest water mark as also for the hearing of the same will be of the best brickwork. The exposed surfaces of the abutments and piers will be formed of rock-faced Derbyshire or Yorkshire grit-stone, with the more ornamental parts of red sandstone, magnesian limestone, and granite. The arches will be of cast-iron, as being most suitable to resist the strains pertaining to the condition of the ribs employed. The upper platform to support the roadway will consist of wrought-iron girders supporting wrought-iron buckled plates as used on Westminster and on the largest railway bridges, or similar material. The surface of the roadway will be of Yorkshire landings for the footpaths, bituminized concrete and macadam for the carriage-road, and cast-iron channels, similar to those used by Mr. Tarbotton in building the Navigation Bridge, for the gutters. The parapets will be of cast-iron, with geometric ornamental open work, containing medallions composed of lilies and other water flowers and leaves, made of cast-iron and conventionally treated. These are intended to be gilded, and the rest of the ironwork painted. The width of the bridge clear of the parapets will be 40 ft., containing footpaths 8 ft. 6 in. wide, and a roadway capable of accommodating three lines of carriages with ease and safety.

IMPROVED DWELLINGS FOR SALFORD.—At a meeting convened by the mayor, it has been resolved that a company be formed under the provisions of the Companies Act, 1862, to be called "The Salford Improved Industrial Dwellings Company, Limited," with a capital of 25,000l., in 1,000 shares of 25l. each, and that a subscription list for shares be opened, and so soon as the list amounts to 8,000l., the mayor will convene a meeting of the members for the purpose of electing directors and other officers of the company. Subscriptions amounting to upwards of 6,000l. were at once put down.

LUDUS PATRONYMICUS.*

DR. CHARNOCK has made a collection of upwards of 3,000 peculiar surnames, and prefaced them with an etymological scrutiny into the real meaning and derivation of a large number of the most curious of them. The volume containing the result of his examination might well be entitled "The Consolations of Etymology," but he has preferred to call it "Ludus Patronymicus." Although some of our peculiar surnames are nicknames, most of them are corruptions from onomastic appellations; and the supposition that the owners of names that are disagreeable in their present form would be glad to return to the original or proper orthography, instead of changing them for new ones, has been the main-spring that has directed our author's labours. The familiar instance of the abasement of St. Anby into Stubbs is not more startling than scores of similar degradations. Modern usage, with its tendency to abbreviations in all words, has reduced Fenwick to Phoenix, and thence to Spinks; in other words, in the course of generations the Plantagenet Squire Fenwick and his Tador moustrooping descendants have lapsed into police-constable Spinks. Some of the De Veres are now Wires and Weirs. The Seymours, or St. Mans, are Simmers. Some of the Luceys are Lace. The Traceys have contracted to Tress. Sir William de Sevenoake is represented by Snooks. The Tremaynes have degenerated into Trimmings; the d'Aubignies into Twopennys; the Fitz-Paynes into Phippens. "Few," says Dr. Charnock, "would probably change their name from Buggin or Simper to Smith, if they thought they were justified in writing Bacon and St. Pierre. The same might be said of such names as Death, Dearth, and Diaper, from d'Aeth, d'Arth, and d'Ypres respectively." Everybody, we must warn, who owns a peculiar name is not certain of improving it by tracing it to its source. To be stripped into Evans after having been Havens would scarcely be so satisfactory a return to a starting point as the instances just quoted. But the rule is in favour of the investigation.

The amount of research expended upon the perfection of Dr. Charnock's work may be realised when we scan the list of authorities he has consulted, some seven-and-twenty in number, including the works of the most esteemed German and Danish philologists. Some of his verbal explorations are, indeed, polished pieces of scholarship. We will quote a few of our best-known eccentric names, beginning with Cubitt. This Jamieson gives as a probable abbreviation of Cuthbert; but our author thinks that, with Cupit, Cupett, and Cobbett, it may be a diminutive of Cohl, Copp, Cope, the old German Cohlho, Coppo, Cuppa, whence the patronymics Cobbing, Copping, &c.; "from A. S. *cop*, O. H. G. *kop*, Mod. G. *kopf*, D. *kop*, the head; O. Fr. *coppe*, *coppeau*, *coppe*, *coupeau*, *cime* *sommet*, *pedage*. Cob is also a name for the sea-fowl, the sea-cock; and in some parts of England for a spider; from O. D. *kop* or *koppo*, retained in *koppessin*, *spinnokop*, a spider. *Cob* is also a close-built strong kind of pony; and *cob*, *cop*, is still used for the top or head." Telford, formerly written Telfer, is from the Norman name Taillefer, cut iron, in recognition of a feat performed by William, Count of Angouleme, who with one stroke of his sword Darissime, cut in two the body and cuirass of King Storrin. In Scotland, in the sixteenth century, it was written Taitzfer. The celebrated engineer, our author thinks, could not have been aware of this origin when he changed his name to Telford. Sheepshanks has been supposed to refer, like Cruikshanks, to mal-formed legs, but our author has given another possible origin. There is a narrow lane in Canterbury, called Sheep-Shank, which he thinks must have referred to some tavern, such as the Sheep or Ship Tavern, from the G. *schenke*, a drinking-house, or ale-house. The surnames Schenck and Schenck signify a publican or vintner; hence Sheepshank may be a combination of the tradesman and his sign. Going on to less remarkable names, we come to further singular deviations. Dolman was perhaps a man from Dol in Bretagne; Farthing was Fardan, in the days "Domesday" was compiled. Pennythorn belongs to the family of names starting from the Welsh *pen*, head, chief, end, which includes Pennycook, Manypenny, Turpenney, &c.

* "Ludus Patronymicus; or, The Etymology of Curious Surnames." By Richard Stephen Charnock, Ph. D., F.S.A., F.R.G.S., &c. London: Trübner & Co., No. 60, Paternoster-row, 1865.

† "Natural Laws of Husbandry," p. 226.

‡ To be continued.

Front is a corruption of Provost. Smiles is more properly Smellie, from *smeech leag*, smooth pasture. Tite is the French form of Titus; Trenchit, corrupted from Tyrwhitt, has been Tyrell, and was perhaps the diminutive of *turris*, a tower. Virtue, with less transformation, is from the French town on the Loire, Vertou; Wiggs can look back for consolation to the ancestry of Cerdic, king of the West Saxons, and can write themselves Wiga, as in "Domesday." The still more objectionably named Willgoose can likewise refer to the genealogy of Anglo-Saxon Kings, for, as Wilgis, his occurs in those of Northumbria. The well-known name Speke, written Spink in a Devonshire map, Dr. Charnock refers to Bramford Speke in that county. He remarks, "Lower says the Spokes of Somersetshire descend from Richard le Espeke, who lived in the reign of Henry II., but that he is unable to explain Le Espeke. A correspondent of *Notes and Queries*, thinks 'Willi le Espece' may be a misreading for 'Willi le Espece,' that is, William the Swordsman, or William of the Sword; another thinks *espece* may mean a *syder*, who was formerly something between a grocer and a chemist, and he quotes Riquetfort, 'Espece, epicier, drogoniste, apothecaire; de species, specierum.' The O. Fr. *spec* is an inspector."

A curiosity in Dr. Charnock's volume is an autobiographical sketch written almost exclusively in surnames. It purports to be written by Aretchid Kooez. We give a short sample of this mastery of patronymic language:

"I've Been a Great Traveller, and Such a Walker! I've Traded Many Lands, And Was Once a Pilgrim to Calvary, Galilee, Nazareth, Jordan, Jerusalem, And Gath, without Kirman Nor Pass Port. By Jove! the Weather Does Not Stop Me: It's His Ain the Same; I've Washed, I've Washed, Merrywash, Ever Foun weather. I Delight In Tempest, Snow, Storm, Rain, Shower, Hail, Thaw, Sleet, Frost, Dew Wind, Fog, Mist, Gale, . . . I Once Went to Church; and the Parson, in His Sermon, Said, 'If One Was Just, Had Faith And Trust In the Gospel, And Was a True Man, in the Coming World—i.e., Paradise, Nor Kingdom of Heaven—One Might Be a Perfect Man (Wart Blas!); Butt, if One Was a Badman, after Getting Off Our Mortal Coil, Thayer Was a Good Chance of Going to the Devil. Cant Say Him a Croker, Butt Death, Collins, Churchyard, Graves, Tombs, And Monuments Air By Noe Means Pleasant Things."

These who contend the human race is dwarfing and degenerating instead of developing might use for an argument some of the etymological facts newly arrayed before us. The kingly Canute, they might say, has shrunk to Mr. Nntt in our hands. Pele has been clipped and rolled into Pili; the Humphrey of former days is a mere Pili in ours. But it is, as we have said before, the consolations it administers that will form one of the chief sources of popularity of the volume. How consoling to Mr. Shovel to know that he is in reality Ceely; for Mr. Shovel to know that his ancestors were Escovilles; for a Smallbone to reflect that his forefathers were Seabornes (seabears); for a Slumber to believe one member of his family has been a St. Lambert, if, as our author inquires, there ever was such a saint or sinner; for Slow to return to Do la Slo; for the Sextys and Sixtys to know there was a Sacristan in their family in former times; for the Slippers to know they were once sword-grinders, having slipped downwards from the Tent. Schwerdt-Scheiffer; for the Gammles to be able to plume themselves upon having been Fitz-gamels as well as Gamhoils (from the gund-hold—bold in war); or for the Gins to know that scholars trace their name to the root of *Plantagonista*, accident also having made the difference. The Painters, Panters, Pantlings, have had at some time in their generations the post of breadkeeper or *panetarius* either in a monastic or other large establishment; and Paradise, unlikely as it appears to be, also bears within itself the hedge of former servitude from the O. G. *paradous*, a servant. But, to return to our string of instances in which it is consoling to look backward: the Sands, on the contrary, numerous and unpretending as we should suppose them, have probably been sent forth, in former times, as envoys or princely messengers, if we may take the etymological evidence of five languages as an index of their origin. Leaf, seemingly, so valueless, is a corruption of Léof, beloved, precious. Muffin is a contraction of Morfin, a sea-brink. Our author traces Gotobed to Gottedah, pray to God. Deadman should be Debenham, from a place of that name in Suffolk, much to its gain; and Scaredevil may likewise take the name of a town for its origin, this time, perhaps, Ecardenville, Normandy. Snch, when given in full, is Ashby-de-la-Zouche. There is a curious evidence of the departure of a name from its original meaning preserved in the parish

register of Brenchley, in Kent, where an entry states that in 1612 "John Diamond, son of John du Mont, the Frenchman, was baptized."

Interspersed with the mass of etymological facts there are not a few smart puns upon names introduced, which, however, we must record are not profanely made by Dr. Charnock, but quoted from the American writer, Bowditch, and other sources. Thus, against the name Deed, Deeds, we read, "Doubtless for Daid, Daids; from David, Davids. There is also a Deedy. The Messrs. Deed, of Toronto and of Philadelphia (says Bowditch), may be regarded as the representatives of conveyancing." Again, the same writer says, Abraham Shurt, of Pemaquid (near Bristol, M.E.), took an acknowledgement of an Indian deed in 1826, twenty years before any enactment on that subject, and he dedicates his work "To the memory of A. Shurt, the Father of American Conveyancing, whose Name is associated alike with my Daily Toilet and my Daily Occupation." Against the name Vowell there is another quotation from the same humourist. "Our newspapers mention that a friend informed Mr. Barton that Mr. Vowell was dead. He said 'Vowell dead? O! how glad I am that it is not 'v or t!'" On another page we read that the *Boston Courier*, in June, 1859, mentioned that Mr. Slim had a narrow escape from drowning.

Against the name Smoker, which Mr. Ferguson thinks may be derived from the Anglo-Saxon *smoce*, elegant, polished,—but which our author deems more likely to be derived from the Danish *smok*, fair, handsome, fine,—there occurs a note to the effect that before the Reform Bill of 1832 was passed, every person at Preston, who had a cottage with a chimney, and used the latter, had a vote, and was called a *smoker*. We can give, however, but one more sample of this phase of the work. It occurs with reference to the name Wisdom. "Mathew Hele, of Holwell, Devon, was high-sheriff of the county the year of Charles II.'s restoration, 1660, and so numerous and influential were the family, that he was enabled to assemble a grand jury, *all of his own name and blood*, gentlemen of estate and quality, which made the judge observe, when he heard Hele of Wisdom, esq., called,—a gentill seat in the parish of Cornwall,—that he thought they must all be descended from Wisdom, in that they had acquired such considerable fortunes." A curious combination occurred at the Liverpool Police-court once, when "the witnesses and solicitor in two cases bore the ominous names of Death, Debt, and Daggers." Our author does not attempt to account for the two last-mentioned. These samples of the anecdotes illustrating some names must not lead to the inference that entertainment is the aim of the writer. These are but as the leaves to the leaf, the work being, in reality, a serious, industrious, instructive series of suggestions, inquiries, and conclusions. As the author remarks, some of the suggestions are but guesses, but, we must add, they are made with the assistance of the discrimination that complete acquaintance with the subject ensures. Indeed, if we consider the difference of opinions held by etymologists over the probable radicals of hundreds of words, concerning which there was no doubt, there is little more than that can be said for nine derivations out of ten. Take the famous name of Shakespeare with its variations Shakespeare, Shakespere, Shakesper, Shaxper, and Chackesper. "Concerning its etymology there can be no doubt," says Lower, as he assigns the ordinary practice of vibrating a spear to ascertain its strength before using it as its origin, and calls Homer to witness; nevertheless, Dr. Charnock sees considerable doubt about the correctness of this view, and suggests that the name of our great poet may be a corruption of Sigisbert, renowned for victory, while Mr. Ferguson thinks that Scisper, or victorious bear, is more likely to have been the etymon: finally, our author abandons his first conviction, in favour of the supposition that *Jacques Pierre* is the true solution of the riddle; and who shall say which is right? Seeing that the differences of etymologists rival those with which doctors are solely accredited, it is, perhaps, sufficient to remark that the erudition of the author before us, and the continuity of his philological labours, entitle his opinions to consideration, if not to acceptance. Some curious names he accounts for as the result of a tendency he has observed them to possess of drawing towards a meaning, as in Sweetsir, which is evi-

dently merely a slight departure in sound from the German Schweitzer, a Swiss; or Broadlock, which must have been Bradford; or Wedlock, which must be but a derivation from Wedlake. Gem, from James, with the aid, perhaps, of an intermediate Jim; Giddy, from Gideon; Gird, from Carle, are samples of surnames with English meanings made out of Christian names by force of this tendency. More attractive than these in the brimming volume we here recommend to all interested in the pleasing study of etymology, are the names which the old Scandinavian heroes left among us, among which Rùm is a curiosity. This is supposed to have once been *rum*, a giant, one who, we agree with our author, would, in all ages, have been considered "a rum customer."

THE NEW WATERWORKS AT SWANSEA.

THESE works, just now completed, were designed and carried out by Mr. R. Rawlinson, C.B., assisted by Mr. Edward Consins, the borough surveyor. The Act of Parliament giving powers to the local board of health to construct reservoirs on the Llan, Lliw, and Blaenmant ddw streams was obtained, after a good deal of opposition, in 1860. The Board, determining to proceed in the first instance with the construction of the Lliw reservoir and the necessary conduit, tenders were invited; and, in 1861, that of Mr. Wm. Williams, of Swansea, was accepted. In March, 1862, Mr. Williams commenced work, and in the month of June following the first pipe was laid for the conduit. Tenders were afterwards received for cast-iron pipes, valves, hydrants, and for laying and jointing cast-iron pipes; and contracts were entered into with Messrs. D. Y. Stewart & Co., of Glasgow; Messrs. Gaest & Chirnes, of Rotherham; and Mr. Thomas Crump, of Derby, for these works. The conduit and cast-iron main from Morriston to Swansea were vigorously pushed forward; and in June, 1863, or about twelve months after the commencement of the works, they had so far progressed as to admit a supply of spring-water found on the line of conduit being taken to the town, and, on the 8th of November, water flowed to Swansea from the river Lliw, and has done so since. The reservoir was filled to overflowing for the first time on the 24th of October, 1867. From daily gaugings taken in 1867, it was found that 1,000,000 gallons of water passed into the conduit from the Lliw reservoir for the supply of the town during the year, being an average of 2,765,000 gallons per day. The estimated quantity of water supplied to the town during the progress of the works is 3,000,000 gallons, which, at 2d. per 1,000 gallons, would represent a money value of 25,000l. The period has been about four years and a half, so that the benefit to the town of this mode of working has been at the rate of 5.540l. per year. The greatest observed daily volume of water in the river Lliw, was on the 13th of January, 1866, when about 143 million gallons flowed down the stream in twenty-four hours. The lowest recorded flow was on the 19th October, 1865, when the volume was about 322,000 gallons in twenty-four hours. All the permanent works of the reservoir, as valves hie-wash, waste weir, &c., are competent to remove safely upwards of 100 millions of gallons of water per day. The drainage area of the Lliw valley above the reservoir embankment, is about 1,860 statute acres, 1 in. of rainfall over which would be 42,077,217 gallons. The area of top water of the reservoir is about 32 acres, the depth of available storage, 64 ft., and the storage capacity about 300,000,000 gallons. The works, as contracted for by Mr. Williams, were for a reservoir to contain only 200,000,000 gallons, and having an embankment 70 ft. in height, the cost of such being 28,071l. 10s. 6d.; but in August, 1864, in consequence of the very strong recommendations of Mr. Rawlinson, the enlargement of the reservoir was determined upon by the Local Board of Health, and the embankment raised 12 ft. above contract level, by which means storage for an additional 100,000,000 gallons were obtained. The cost of this additional storage has been about 4,000l. The embankment is formed principally of sandy and stony material, with a small portion of gravel, nearly the whole of which was excavated above top water from adjoining land. The embankment is 650 ft. long, and 403 ft. wide in the widest part. It is 82 ft. high in the deepest part above the original surface of the ground, the puddle trench being carried 18 ft.

below this level, or 100 ft. below finished top bank. The embankment is 12 ft. wide at the top, the outer slope 2½ ft. to 1 ft., and the inner slope 3 ft. to 1 ft. in the lower portion, and 2 ft. to 1 ft. in the upper portion. The puddle is 20 ft. thick at the original surface, and 9 ft. thick at the top bank. The puddle wall is supported on both sides by selected material, and the loose, rocky material is placed to add support to its height. There are two outlet culverts,—lower and mid-level. The lower outlet culvert is 8 ft. diameter, and the mid-level outlet culvert 6 ft. diameter, with valves, &c. The two valves in the lower culvert are 6½ ft. below top water, and therefore it will not be necessary to work any valve in connexion with the outlet works under a greater pressure of water than 29 ft.—the difference between 35 ft. and 6½ ft. The overflow is 46 ft. in length, and is so constructed that at a slight cost arrangements may be made for increasing the depth of water by fixing stop-planks on the top of the coping; an increased depth of 18 in. will give about 20,000,000 gallons of additional storage, which, filled three times a year, the service capacity of the reservoir will be increased some 60,000,000 gallons. The wastewater channel, which is 8 ft. broad, is formed of steps varying from 7 ft. 6 in. to 37 ft. 6 in. long, and having a vertical fall of from about 2 ft. to 4 ft. 6 in. To insure at all times a body of water on each step, and form a fish-ladder, a cast-iron girder or plate 6 in. in depth has been fixed on the edge of each step, and the steps have a fall inwards of about 12 in. The total fall from the top water-line of the reservoir to the river below is 85 ft.; but the velocity and force with which the greatest flood can enter the river from the bye-wash will very little exceed that due to the last fall of about 4 ft. The materials used and work executed in connexion with the Embankment and outlet arrangement are as follow:—

Shipping and trimming surfaces	47,798 square yards.
Soiling slopes	12,698 "
Pitching inner slope	2,291 "
Metalling road	1,065 "
Flagging	156 "
Earthwork in Embankment	179,150 cubic yards.
Excavation in earth	11,739 "
Ditto in rock	5,074 "
Puddle	23,443 "
Dry rubble work	311 "
Masonry in mortar	5,276 "
Ashtar and coping	12,022 "
Ashtar pitching	6,191 "

The conduit between the Lillw reservoir and Morrington is 7 miles 339 yards in length, contouring the intervening district, the principal portion being formed of stoneware pipes 2 ft. in diameter. The lengths of the different descriptions of conduit are—stoneware pipes, 6 miles 283 yards; brick culvert, 1,438 yards; cast-iron pipes, 378 yards. Upwards of 4,000,000 gallons of water have passed through the conduit for the supply of the town in twenty-four hours. There are on the line of conduit sixty-three man-holes, with moveable covers and ventilators, ten tunnel-shafts and seven wash-outs, or one man-hole to each 173 yards. There are also 122 gates on the line of conduit. The cost of the conduit and the works at Morrington has been 20,837l. 7s. 10d. The main from the well at Morrington to the town commences with a pipe of 24 inches diameter, diminishing to 18 inches, of which size it continues to the town. The highest part of the town will have to be supplied from a small service reservoir, proposed to be constructed at an elevation of about 575 ft. above the sea, and into which the water must be pumped either by steam power or by a turbine worked by water from the main flowing into Cwm Donkin reservoir. The highest district at present in operation is supplied from the well at Morrington, the height of which is 291 ft. above ordnance datum, and the greatest pressure is on the pipes under the river Tawe, which are 301 ft. below the Morrington tank. The cast-iron pipes, valves, and works were supplied and executed under contracts entered into with Messrs. D. Y. Stewart & Co. of Glasgow, for pipes, and Messrs. Guest & Chrimmes, of Rotherham, for sluice-valves. Mr. Thomas Crump, of Derby, executed the laying of the pipes. The amounts of the several statements are: Messrs. Stewart & Co., cast-iron pipes, 10,885l. 18s. 5d.; Messrs. Guest & Chrimmes, for valves and hydrants, 1,123l. 6s.; Mr. Thomas Crump, for excavating, laying, and jointing, 4,567l. 16s. 5d.; total, 16,580l. 0s. 10d. Upwards of 2,005 tons of cast-iron pipes were supplied by Messrs. Stewart for these works. Summarising the total cost of the works, we find that the contract with Mr. William Williams,

for work in connexion with Lillw reservoir, was 32,071l. 10s. 6d.; ditto, for conduit to Morrington, and works in connexion therewith, 20,837l. 7s. 10d.; allowed for completing conduit before specified time, 500l.; ditto, for works in connexion with temporary water-supply, cast-iron clips, and stone-ware pipes, 366l. 15s. 3d.; total of Mr. Wm. Williams's contracts, 53,775l. 12s. 10d. Contract with Messrs. D. Y. Stewart & Co., 10,885l. 18s. 5d.; contract with Messrs. Guest & Chrimmes, for sluice-valves, &c., 1,123l. 6s.; contract with Mr. Thomas Crump, for laying pipes, 4,567l. 16s. 5d. The money for cost of works, 70,355l. 13s. 8d. The money has been borrowed from the Public Works Loan Commissioners, the repayment being extended over a period of thirty years.

ALEXANDRA PARK, MUSWELL HILL.

On the 30th of June and the 1st of July next, races will first be run in Alexandra Park. The Grand Stand is finished, the course is all in order, and, on Saturday last, a large number of gentlemen interested in such matters, and others connected with literature, science, and art, were invited to go over the grounds and the Palace, and were afterwards hospitably entertained by the directors, Mr. William Haves presiding, and efficiently making known the objects of the undertaking.

The Park race-course is formed on slightly undulating ground, commencing near the Wood-green railway station, and extending along the south side of the Palace. It has been drained and levelled throughout, and the turf taken up and carefully relaid on a bed of ballast, to improve its elasticity. The T.Y.C., or 5-furlong course, is 30 yards in width, and nearly straight. The 1½-mile course commences near the Grand Stand, and joins the 5-furlong course by an easy curve.

The Grand Stand is situated at the west end of the 5-furlong course, and on the edge of the rising ground leading up to the Palace. It is approached by a wide road from Hornsey as well as from the Wood-green station.

The general character of the architecture of the exterior is Italian, with a frontage of steps from the lawn to within the whole length and width of the building. The ground-plan consists of an entrance-hall, 40 ft. by 18 ft., adjoining which are two towers containing the stairs leading to the Grand Stand room and lead flat. On this plan are also first and second class refreshment-rooms, together with entrance to the lawn. The Grand Stand room, 130 ft. by 25 ft., is on the first-floor, and divided into private boxes and stewards' compartment. Adjoining these are the ladies' refreshment-rooms, &c.

Above the Grand Stand room is a graduated lead roof 130 ft. by 25 ft. It struck us that, if the stand had faced a little more towards the east, a greater number of the occupants would have seen the whole race.

The main building is situated on the highest part of the park, commanding all sides beautiful views of the surrounding country. It is erected partly from the material of the late Exhibition building at Kensington, altered to make it appropriate to its new situation and purposes. The general plan consists of a nave 900 ft. long and 85 ft. wide, a centre transept 190 ft. long and the same width as the nave, and two shorter transepts, each 320 ft. long, the same width also as the nave, and intersecting at a short distance from each end. There are, therefore, three points of intersection of the nave and transepts. The centre has erected over it a great dome, which is 170 ft. in diameter and 220 ft. high in the interior, appropriately panelled and decorated, light being admitted near the top and by lunette windows at the sides. At the intersections of the shorter transepts with the nave there are pendentive octagon cupolas supported on slender columns, lighted by windows in the sides. The ends of the nave and three transepts are terminated with large circular windows, decorated with stained glass.

On each side of the nave and transept are erected buildings about 50 ft. wide and two stories in height; these have brick external walls, with arched openings and windows, and form extensive galleries next the nave and transept. The ground-floor on the south-east side will be almost entirely devoted to refreshment and dining rooms, opening by French windows to

a verandah overlooking the terrace beyond; and in the basement beneath are extensive and complete cellar and kitchen arrangements.

Other arrangements, such as news, reading, writing, and coffee-rooms, library, museums, picture-galleries, sculpture, plants, and flowers, &c., are all considered, together with many things tending to the entertainment and comfort of the public, and a great organ will form the centre of an orchestra for musical performances on a grand scale. The building will be lighted by gas in an ornamental manner, for evening promenades.

The organ, now in course of erection in the north transept, is of gigantic proportions. It is constructed by Mr. Henry Willis, the builder of the organ in St. George's Hall, at Liverpool. It possesses five claviers, four for the hands and one for the feet, and there are 101 stops, eighty-seven of which are sounding stops. The wind is supplied by two steam-engines, placed in the basement, and remote from the organ itself. The instrument is governed by various contrivances for varying its powers and qualities of tone. Amongst these are the pneumatic pistons for the hands, each clavier possessing six. There is also a complete system of combination pedals, acting precisely as those in the grand organs recently erected in the cathedral at Notre Dame and the church of St. Sulpice at Paris. The cost will be about 6,000l.

The interior is elegantly decorated throughout in coloured ornamentation, and is to be filled with objects of beauty and interest arranged in spaces so as not to interfere with the grand avenues for promenade.

Externally, the end of the nave and transepts present eight façades flanked by supporting incrusts, containing the large windows and entrances. These façades are united by the walls of the lower buildings, two stories in height, and by the clearstory walls and roof of the nave and transepts, and the whole is terminated by bold cornices and ornamental parapets.

The general character of the architecture of the exterior is Italian, and consists principally of brickwork in colours, with stone dressings and ornamentations. Above the roofs in the centre of the building rises a bold tambour, pierced with windows, from which springs a great dome, terminated at the top by a single balustraded parapet, and a standard mast 50 ft. high. This dome and the octagon cupolas at the smaller intersections are decorated with moulded ribs and panelling in bold relief.

On all sides of the building are spacious terraces, on which, and the ornamental slopes adjoining them, stand many large and handsome trees, giving relief and effect to the building. The terrace on the north-west side, which will be 1,000 ft. long and 160 ft. wide, supported by Italian arcades, will cover a railway-station, from which access will be had directly to the building at the ends of the three transepts, and to which station all the railways of London will ultimately be brought.

At present, however, the nearest railway station is some quarter of a mile from the building, and this has led to a determination, which seems to us to be regrettable, to postpone the opening of the building till the 1st of May next year. The decorations, very light and elegant, and the gilding of the ironwork, are all done, and must suffer, we should fear, during that time. The loss of interest, too, on capital will be considerable. Doubtless, however, the directors have carefully weighed the pros. and cons. Messrs. Lucas & Kelk have erected the building, and contributed a large portion of the capital. For the architectural design and details Mr. John Johnson is responsible, and for the construction and engineering, Mr. A. Meason. The decorations of the interior were executed by Mr. C. H. Schmidt, from Mr. Johnson's designs.

A CURIOUS CLOCK.—A clock of singular workmanship, designed by Raingo the Elder, and of the period of the First Empire, is now on view at M. de Boos's, 20, Down-street, Piccadilly, and the base is a musical box, which plays every hour. The front dial has, in addition to the usual index of time, a record of the days of the week. The signs of the zodiac and days of the month are also registered, and in connexion with these is a mechanical arrangement, exhibiting from day to day the relative positions of the moon, earth, and sun. The whole of this mechanism is worked by three springs.

SELECTED DESIGN FOR THE
MANCHESTER TOWN-HALL.

We illustrate in our present number the design by Mr. Waterhouse for the proposed Town-hall in Manchester, which has been selected by the Corporation of that city. Our view, being taken at the angle, shows the Entrance or Albert-square front, and the Princess-street front. The plan we give is of the one pair or main floor. In a previous number we reviewed the design at some length. On the present occasion we shall confine ourselves to a *resumé* of the designer's own statements, as best calculated to set forth his intentions.

The ground-floor is raised a few steps from the street, thereby gaining a cartway from Lloyd-street into the courtyards on the basement level.

Most of the business rooms look towards the street; the corridors and staircases, on the other hand, are lighted from the internal courts.

The corridors have a minimum width of 10 ft. along the Cooper-street, and Lloyd-street sides, and 12 ft. 6 in. along the Albert-square front. They open out at intervals into wider spaces, convenient for consultations, and which break the monotonous effect of long corridors of uniform width.

A porch and groined entrance-hall (in the centre of Albert-square front), with porter's offices on either hand, lead into the grand staircase hall, 52 ft. by 35 ft. Out of this the main staircases are carried up, by double flights, one on either side, each of them 10 ft. wide, to a similar hall on the main floor, which gives access, on the one hand, to the public hall in the centre of the building, and on the other to the suite of reception rooms. On the ground-floor the principal hall is lighted by the staircase windows on either side.

In addition to the main entrance in Albert-square there are three other principal entrances to the building; one in the centre of the Cooper-street front, another near the corner of Albert-square and Princess-street, and a third near the corner of Albert-square and Lloyd-street.

Each entrance has its porter's office, double-swing doors, one within the other, and close to it one of the three principal staircases placed in the angles of the corridors, which staircases ascend to the uppermost story in the building, and descend to the basement, thus giving direct access to the various stories from the street.

These three principal staircases are circular on plan, and average 21 ft. internal diameter. An open well has been placed in the centre, thus making the steps at their narrow end not less than 11 in. or 12 in. on the tread, with a rise of 5½ in.

There are, in addition to the grand staircase and the three principal business staircases, two secondary flights in the middle of the Princess-street and Lloyd-street corridors, rising up to the third floor. They are united together by a hall or corridor on each floor, thus giving inter-communication between the centres of the Princess-street and Lloyd-street fronts.

The private entrance for the mayor adjoins the public entrance in Princess-street, and is placed there in order that the same porter may command the two. It gives separate access not only to the mayor's private rooms, but to that portion of the Albert-square corridor which runs behind and communicates with the reception rooms.

The public hall is placed in the centre of the building. It would be approached by the public from Albert-square by the grand staircases through a large hall on the main floor, forming a sort of anteroom to it, and adding about one-third more available standing space on the occasion of a crowded town's meeting. The hall is lit on either side by two-light windows. The roof, though of hammer-beam construction, has a ceiling of an average height of only 42 ft. (to render successful the acoustic properties of the room).

In order to prevent onward thrust at so great a height from the ground, the roof is tied across. The walls of the central hall will be of stone, the lower part panelled in oak, with seats in the window recesses. At the farther extremity of the hall are two entrances, with retiring-rooms attached, which communicate with the two secondary central staircases, and the Lloyd-street and Princess-street corridors. Above these retiring-rooms is a gallery for an organ and orchestra, or capable of seating sixty people.

It will be observed that the hall is on the same level as the reception-rooms.

The mayor's reception-rooms front Albert-square; the large committee-room and the council chamber being placed in a line with them, so as to make one magnificent suite of entertaining rooms, 300 ft. in length, and occupying the whole of the principal front of the building on the main floor. These rooms are 23 ft. in height. The space over the main entrance is occupied by the anteroom, which can be approached either by the grand staircases or by the mayor's private staircase.

One one side of the dining-room is a serving-room and butler's pantry, with a staircase and hoist from the kitchen. From this staircase another flight, for servants, leads to the higher portion of the mayor's staircase, and so to his private rooms.

The mayor's private room is in easy communication with the town clerk's.

The cloak-room is placed so as to be easily accessible either from the grand staircase or from the mayor's private staircase.

Above the serving-room, in a mezzanine, are placed lavatories and other conveniences.

The mayor's suite of apartments is placed wholly on the second floor, looking for the most part towards Albert-square. In addition to this suite there is an extra sitting-room over the mayor's business-room, on a rather lower level, approached like the rest of these rooms by the mayor's private staircase.

Below the reception-rooms are placed the kitchens and servants' apartments.

Adjoining the anteroom on the main floor is placed the principal committee-room, so as to be in immediate connexion with the reception-rooms, and only separated from the public hall by the Albert-square corridor.

Annexed is a small serving-room, with staircase and lift down to basement, so that this principal committee-room might be made use of as a supper-room, if required.

Beyond the committee-room comes the anteroom of the council-chamber.

The council-chamber itself will be a well-lighted apartment, with a retiring-room on one side. It is planned so as to be approached by members either from the anteroom or the retiring-room, or, if needful, direct from the corridor. Above the retiring-room is a gallery capable of seating 113 people, with a separate staircase from the principal Lloyd-street entrance.

The other three general committee-rooms are in the centre of the Lloyd-street front, with the committee clerk midway between them and the town clerk and assistant town clerk's rooms.

The town clerk's rooms, connected together by a private corridor, face Princess-street.

The assistant town clerk's rooms adjoin and are brought into close contiguity with the committee-rooms, by a corridor running across the centre of the building.

The clerk of prosecutions is placed immediately over the assistant town clerk, with the Princess-street staircase connecting the rooms.

The treasurer's offices look into Albert-square, and are so placed as to be contiguous to the two entrances nearest the centre of the town, so that persons receiving cheques from other departments could pass the treasurer's offices on their way out of the building.

The surveyor occupies a portion of the main floor looking towards Princess-street, adjacent to the assistant town clerk. His offices have a north light and a private staircase to the room on the second floor.

The Chief Constable is placed in the centre of the building under the public hall, so as to be reached with facility from all the public entrances.

The Lloyd-street staircase leads direct from this department to the committee-rooms on the main floor in the centre of the building. The department is still more contiguous to the committee-rooms on either side of the main entrance.

The water department is placed at the Cooper-street end of the building. On the ground-floor the rooms look into Princess-street, and on the main floor into Lloyd-street. The two floors are connected by a book-lift and by the Cooper-street staircase. From the ground-floor rooms a private staircase descends to the stores in the basement.

The gas offices occupy the centre of the building, chiefly on the Lloyd-street side, and would be approached with equal facility from Lloyd-street and Cooper-street entrances. The

rooms on the ground-floor and main floors are connected together by a private staircase and paper-lift.

The building, sanitary and nuisance, and hackney carriage departments are placed on the southern half of the Albert-square side. Doors have been placed across the corridors, cutting off these and the scavenging departments from the rest of the building, and so admitting of the corridors adjoining the departments being used as waiting-halls if desirable.

The scavenging department is on the Lloyd-street side.

The workshops for the weights and measures department are in the Lloyd-street front towards the Cooper-street end, and have a recess for carts to unload.

The markets and paving and highway departments are placed on the Princess-street side of the building.

The court of record is on the ground-floor adjoining the Cooper-street entrance.

The muniment-rooms are in the basement. They intercommunicate and have a separate staircase.

The lamps' department, though in the basement, has a ready approach from the street by the cart entrance.

Large cellars have been provided for coal stores in a central position accessible by the cart entrance, with lifts to the upper floors on either side.

Housemaids' closets have been placed on the different floors.

In addition to the private water-closets, lavatories, &c., connected immediately with the principal officers' rooms, are groups of retiring rooms, in close connexion with all the three staircases in the basement, and on the second floor with the staircases on the Lloyd-street side of the building.

The head porter's rooms are on the third floor, approached from Lloyd-street by a separate entrance and staircase. His rooms are in connexion with a large dining-room in the centre of Lloyd-street front.

With regard to the warming of the building, it is proposed to place in a large sub-basement, three hot-water boilers, two of them for ordinary use, the third as a reserve for use while either of the others was under repair. The smoke from the furnaces will pass through two wrought-iron smoke flues, enclosed in brickwork, between which and the iron flues will be an intervening space for extracting vitiated air, as hereafter described. From these boilers hot-water pipes will traverse the main corridors, in channels below the floors, everywhere on the window side. These lines of hot-water pipes will form the mains from which coils of pipes, wherever wanted, would be fed.

The prisoners' cells will also be warmed by hot water.

For the extraction of the vitiated air, it is proposed, in the case of the public hall, to have a horizontal air shaft above the ceiling with numerous openings into it, communicating with the two vertical extraction shafts before alluded to. These shafts would be warmed by the boiler fires in the winter and by special means in the summer.

The clock tower and the Cooper-street tower will form convenient means for the extraction of vitiated air from the other portions of the building. Horizontal air flues, carried behind the cornices, will lead to vertical shafts in the angles of the towers, accelerating power being provided as required for summer ventilation, or whenever the reception-rooms happened to be crowded.

The whole of the building will be fireproof, constructed, where practicable, on the principle of the Dennett arch. The internal areas will be lined with light glazed tiles, and ceramic ware will be largely introduced against the walls of the corridors, staircases, and the principal rooms.

The clock tower in the centre of the Albert-square front will be 235 ft. high to the gilded globe at its summit, and 155 ft. to the illuminated clock dial, which is shown, 15 ft. wide.

At the other end of the building there is a secondary tower, and there is a staircase tower in the Princess-street front, so as to give variety of sky-line.

With regard to cost, the building is designed not to exceed the 250,000*l.* mentioned as the sum the Corporation are prepared to spend.

The building contains, above the ground-floor, exclusive of towers and chimneys, 3,956,815 cubic feet; and below the ground-floor line, 956,518 cubic feet.



MANCHESTER NEW TOWN HALL: SELECTED DESIGN.—MR. ALFRED WATERHOUSE, ARCHITECT.

INSTITUTE OF PAINTERS IN WATER-COLOURS.

The thirty-fourth exhibition by this society, now open, consists of 316 pictures. The society have strengthened their ranks by the election of a certain number of "honorary members," four of whom, Mlle. Rosa Bonheur, M. Louis Gallait, Mr. F. Goodall, R.A., and Mr. Millais, R.A., have sent works. Mr. Goodall's "The Arab Messenger" (30), and "Rachel" (205), are important contributions. Mr. E. H. Corbould has a powerful piece of colour, "Salome Dancing before Herod" (53), in which all the light is brought to bear on the figure of Salome. The action depicted is so momentary that the wreath thrown to the dancer has not yet fallen, but rests partly in air, a condition that fatigues. Mr. Louis Haghe has several drawings, of which we prefer No. 62, "A Tribunal of the Holy Inquisition in the Low Countries." Two unpleasant-looking familiars are taking a child to the torture, apparently with a view to work on the parents, who are also present. The general result is less impressive than might be desired. Mr. H. Tidey maintains his position with "Jennie Morrison" (displaying much feeling), and 225, "The Woman of Samaria." Mr. C. Green's picture, "The First Bouquet" (36), will hold the observant visitor some time. It represents "Behind the Scenes," during the performance of a pantomime; a little girl, apparently the clown's daughter, has come off with a bouquet. Various characters are introduced, an ineane dandy talking to one of the ballet-girls, and a poor, snarly old man, who holds under his arm the jolly rubicund mask he has worn before the public, not less truthful than many a face of flesh. "Seven A.M." (76), G. G. Kilburne; "Lady and Child" (130), E. H. Webber; "A Gipsy Forge at Seville" (163), Mrs. E. Murray; "Happy Hours" (196), Guido Bach; "Bombay Fruit Sellers" (242), Henry Warren; are amongst the other figure subjects that will obtain attention. "The Children of the Forest" (244) is the largest and most important work sent by Mr. Edmund G. Warren, and is a fine specimen of his manner. A smaller work of his, however, "An English Cornfield" (131), in the back room, gives us even more pleasure. "Mont St. Michel" (20), John Mogford, is an excellent seascape. At sight of "Crossing the Channel" (65), we notice an involuntary "Good Lord, deliver us!" If Mr. W. Bennett got his materials on the spot, he must needs be a good sailor and a brave man. 49, by George Shalders:—

"Then homeward through the twilight shadows stray,
Sauntering and slow;"

"Watford, Herts" (277), Mrs. W. Oliver, and some landscapes by Mr. Fahey, Mr. Chas. Vacher (especially the Palace of Rameses III., with the ruins of Luxor in the distance), W. W. Deane, H. G. Hine, R. Beavis, Reed, John Chase, B. R. Green, who continues to increase his collection of architectural subjects, Whynper, Telbin, and others, ought not to escape praise. Mr. Carl Werner's interiors include figure subjects, and have singular merit. "Hareth Ben Herraddin the Notary's House in Cairo" (137), and "The Mufti of the Hafenites at Damascus, sitting near the prayer niche in the Great Mosque" (218), have all the minute fidelity of photographs with breadth and colour superadded.

The sales, we hear, on the private view day, were above the average: so is the collection.

IRRIGATION IN INDIA AND SPAIN.

INSTITUTE OF CIVIL ENGINEERS.

On April 21st, the first paper read was "On Irrigation in India," by Mr. Allan Wilson. The value of artificial means of irrigation, for increasing the fertility of the soil, was recognized in India at an early date. In the Punjab, canals for this purpose, as well as for navigation, were constructed as far back as the middle of the fourteenth century. But it was in the southern parts of India, where the rainfall was more precarious, and the river supplies were less easily available, that the most extensive works were to be found. It had been estimated that, prior to the establishment of British rule, there were, in fourteen of the principal irrigated districts of the Madras Presidency, upwards of 43,000 tanks and channels in repair, besides about 10,000 out of repair, having, probably, 30,000 miles of embankments, and 800,000 separate masonry works. Some of these tanks and

reservoirs were on an immense scale, for irrigating many thousand acres, while there were smaller tanks, wells, and springs which watered only a few acres. It was remarkable that the Government should have allowed so many fine works gradually to fall into decay, without replacing them by others; as great natural facilities existed for storing water, and for forming canals to lead it on to the land. The irrigation works on the Godavary and Krishna rivers, in the northern Circars, and on the Coleroon, in Tanjore, had only recently been completed; but many large rivers were still allowed to flow into the ocean, almost unused for agricultural purposes.

With regard to the most general and least expensive mode of irrigation by means of artificial reservoirs, and to the methods adopted in forming such reservoirs, it was stated that in selecting a site it was essential to ascertain in the first place that the foundation was suitable; the next point to be determined was the extent of land to be irrigated, and the quantity of water necessary for such irrigation. The area of the drainage or gathering grounds could be estimated from the trigonometrical survey maps of India, and the quantity of water that would pass into the tank during floods should be calculated according to the known rainfall, due allowance being made for absorption and evaporation. With these data, the dimensions of the different works could be fixed. It should, however, be borne in mind, that depth of water was of greater importance than a large surface area, as the evaporation would be less in the former case. An examination should also be made of the valleys in the vicinity of the proposed reservoir, with a view to ascertain whether the surplus water flowing through the tank during floods could not be carried across intervening ridges, and be stored in natural basins at a small outlay, so as to fill a chain of tanks. It was explained that a tank was simply a reservoir formed by throwing an embankment, or bund, as it was called in India, across a valley to dam up the drainage. The most simple description of bund was constructed entirely of earth, which was generally dug from the bed of the intended reservoir. The breadth at the top was usually about 12 ft. The inner slope was 3 to 1, and this was faced with a pitching of loose stone, while the slope of the land side varied from 2 to 1 to 1 to 1. Puddle was seldom, if ever, used; indeed it was not required, as, owing to the lodgment of silt, a tank would puddle itself as soon as it had been once filled. In illustration of this fact it was mentioned, that Major-general Sir Arthur Cotton had stated that in a channel cut through loose sand, within a yard of the water's edge to a depth of 5 ft., not the least moisture was found in the excavation; the lining of silt having rendered it completely watertight. In addition to this embankment, some of the large Hindoo works had a massive retaining wall of masonry in front. Many of these walls were built of dressed stone, close-jointed, backed with rubble and a rough description of concrete; and flights of steps of cut stone were constructed down to the edge of the water.

To obviate the danger of an excessive influx of water during floods, most tanks were provided at one end, and not infrequently at both ends, of the embankment, with a waste weir (known in India as a calingulah), to allow the surplus water to escape after the tank had been filled. In constructing a tank, the discharge capacity of the calingulah was an essential feature. It was a safe rule to allow one-fourth more than the dimensions obtained by calculation, so that the water might have a free passage in the event of an excessive flood, as otherwise the earthwork might be entirely destroyed. The author had found that many of the tanks which were now useless had been breached from no other apparent cause than the want of sufficient outlet to carry off the surplus water during floods.

With a view of showing how favourable some parts of India were for forming reservoirs of large capacity, attention was directed to a design for a large artificial lake, which it was proposed to construct by damming up the gorge of a valley. This reservoir would be capable of storing sufficient water to irrigate 200,000 acres of land,—an area equal to the county of Buckingham, allowing the usual average of 500 acres to the square mile as being under cultivation. Taking 170,000 acres as the extent of land to be irrigated for a single crop, this would require provision to be made for the discharge of 170,000

cubic yards of water per hour at each end of the tank; and discussion was invited as to the best description of sluice for discharging such a vast volume of water.

A paper was read "On Irrigation in Spain, chiefly in reference to the Construction of the Henares and the Esla Canals in that Country," by Mr. G. Higgin.

It was stated that, of all the countries in the world, there was perhaps none that so much required irrigation as Spain, nor one which so gratefully repaid the labour expended upon it, by rich and valuable results. The climate of the south and east of Spain was suitable for the production of crops of almost all kinds. Productions of the torrid and temperate zones here grow together. In the gardens of Murcia and Valencia might be seen wheat, barley, corn, maize, the orange, the lemon, the date palm, the olive, the citron, the peach, the pear, the apple, rice, pepper. In Malaga and Seville, in addition to these were the sugar-cane, the cotton-plant, the prickly pear, and, in sheltered spots, the plantain, which was seldom found out of the tropics. The soil of most of the river plains was a rich alluvial deposit, from 3 ft. to 10 ft. in depth. Nothing was wanting but water; and this might frequently be seen a few yards off running to the sea, useless and unproductive. A few charts of comparative rainfall and temperature had been prepared, which showed that, with the exception of Oran, Spain was by far the driest country.

The earliest, and, indeed, almost all the irrigation works in Spain, were constructed about A.D. 800 or A.D. 900, when that country was under the dominion of the Moors. Perhaps the system of irrigation and the whole administration of the waters in Valencia and Murcia were as perfect as well could be, and the results were very surprising. It was not possible, however, within the limits of this paper, to give more than a cursory notice of these works; but such data were collected as would assist in the description of the new canals now in course of construction by the Iberian Irrigation Company. The areas of the several large irrigated districts in Spain were then detailed, amounting together to 680 square miles. According to the published Government returns the total amount of irrigated ground in Spain was 4,439 square miles, so that it would seem that there was an area of 3,759 square miles irrigated from water-wheels, small canals, tanks, &c.,—a quantity which was believed to be excessive. Admitting, however, that the returns were correct, then only 44 per cent. of the whole cultivated land was irrigated. While the rate of population in all Spain was only eighty-one to the square mile, in the irrigated garden of Murcia there were 1,681 inhabitants to the square mile, and in Oriuela 767 inhabitants per square mile. The effect of irrigation was to raise the value of land ten, fifteen, or twenty times. Several illustrations of this were cited, and it was stated that, as a rule, all over Spain, good land in the valleys when unirrigated might be bought at an average price of from 6*l.* to 10*l.* per acre, while irrigated ground fetched from 80*l.* to 120*l.* per acre. In proportion to the value of the ground was the value of the water. Colonel Baird Smith gave the value of a cubic foot of water per second in Piedmont at 16*l.* per annum, and in Lombardy at about 15*l.* per annum. In most of the old systems of Spanish irrigation the water was attached to the land, and was sold with it, and the value of the water could not, therefore, be ascertained. But, perhaps, the fair average value of a cubic foot of water per second in Spain might be taken to be that fixed by the Government for the Henares Canal, viz., 375*l.* per annum, which was not considered a high price.

The projects for irrigating the Henares and the Esla valleys were of very old date; but it was only during 1859 that the concessions were granted, and in 1863 that a company was formed in London to carry out the works. The river Henares rose amongst the mountains of the Somosierra; its course was extremely steep, and very rapid; the total fall of the river, from the weir of the new canal to Alcalá, a distance of thirty-six miles, being 407 ft., giving a mean fall of 11.3 ft. per mile. The total length of the new canal was twenty-eight miles. It received its water from the river at a point sixteen miles above Gnadálajara, just below the junction of the Sorbe and Henares, and ended at Alcalá. The area of ground capable of irrigation in this valley, after deducting that due to roads, streams, towns, &c., was 27,170 acres. For this purpose the volume of water conceded by the Govern-

ment was 175 cubic feet per second for the nine months from October to June inclusive, and 105 cubic feet per second for the remaining three months. From accurate measurements made near the new weir since the commencement of the works, it appeared that during the months of July, August, and September, the average quantity of water carried by the weir was 210 cubic feet per second, the lowest point which it had touched being 140 cubic feet per second. During the remainder of the year it carried an average of 300 or 400 cubic feet per second; but it was liable to enormous floods, and some came during the progress of the works, which were estimated to amount to 8,000 cubic feet per second. The weir, it was calculated, would discharge 20,000 cubic feet per second.

The most difficult portion of the works was comprised in the first division—involving a rock cutting, 16 ft. in depth, immediately after leaving the river; then a tunnel 3,171 yards in length through a high limestone cliff, followed by a deep cutting in gravel. At the ninth kilometre the canal crossed the Madrid and Saragossa Railway; and at the tenth kilometre, a wide torrent bed. These were the ruling points in this section, and it was with reference to them that the actual height of the new weir was fixed. At the site chosen for the weir, the bed of the river was composed of compact clay rock, very impermeable, mixed with strata of excessively hard conglomerate. The front wall was built of rubble in hydraulic mortar, the foundation being hatched into the rock. The main body of the weir was of hydraulic concrete; but in order to guard against filtration, a continuous line of cut stone was let into the rock in the centre of the concrete, all the stones being bedded in pure cement. The apron was entirely of cut stone, and from the top of the rubble wall to the crest, the weir was also of cut stone. The water for the canal was drawn off by five sluices, set in masonry arches, built of large blocks of rock-faced ashlar. At the entrance of the canal three sluices were fixed, for the purpose of scouring out any deposits which might accumulate in front of the gates. Immediately inside the head sluices, and forming a portion of the head works, there was an overflow weir, to provide for the discharge of any water which a sudden flood might admit into the canal during the absence of the guard. The weir was 130 yards long between the abutments, and its total cost, including all the head works and the waste weir, had been 17,343l., or 2l. 10s. per cubic yard, as the mean price of the total cubical contents. Details were given of the prices paid for different classes of work, and of the materials employed. One flood, which came down when the weir was unfinished, tried it severely. The water rose 4 ft. over the crest of the finished portion, completely filling up the gap, and pouring with great force on the exposed concrete bearing of the unfinished end. This flood was estimated to have a volume of more than 9,000 cubic feet per second, yet not a single stone was displaced.

The Esla Canal, as regarded ease of construction, was perhaps one of the best in Spain. The whole estimated cost of the works, including a weir 191 yards long, was a little under 100,000l., and for this amount 32,140 acres would be perfectly irrigated at a cost of 3l. 2s. per acre, while the cost per acre of the Henares Canal was 7l. 7s. The land in the Esla Valley was exceptionally rich; it was very thickly populated, and the only objection that could be made to it was its distance from any seaport.

One of the most interesting questions in the construction of an irrigation canal was the acreage which could be irrigated with a certain disposable quantity of water. Opinions varied very much upon this point. The amount supplied in different districts was given, and it was stated that in Spain the usual dotation for rice-crops was considered to be 24 litres per second per hectare. It had been found, by M. Ribera, from a series of experiments made near Madrid, that the quantity of water consumed in the irrigation of a nursery garden was 0.35 litre per second per hectare, and for a market garden 0.47 litre per second; in both cases the water being supplied without stint. The author had found, by experiment based on the quantity of water actually employed by cultivators also near Madrid, that 1/2 litre per second would irrigate one hectare every twelve days. This, it was thought, was quite sufficient for the cultivation of almost any crop except rice; and taking into account the fact that, in a large valley, such as

the Henares, there must always be a great variety of crops, many of which would only require irrigation every twenty or thirty days, it was evident that half a litre per second was a good dotation for a canal. This, in English measure, amounted to 1 cubic foot per second for every 140 acres. The quantity allowed in India varied, it was believed, from 120 to 200 acres per cubic foot per second. The canon fixed by Government for the Henares Canal was equivalent to 3s. 9d. per irrigation of 450 cubic metres, and for the Esla Canal, 2s. 9d. for the same quantity; the lower price in the latter case being due to the less expensive character of the works. Some particulars of the price of water in Spain were then furnished.

ON THE WATER-SUPPLY OF LONDON.

PROFESSOR FRANKLAND, F.R.S., has been lecturing at the Royal Institution "On the Water Supply of London."

The Professor said that out of every thousand people upon this globe at least three live in London, which fact alone shows the importance of the subject of the water supply of the English metropolis. The water at present supplied to London, he continued, is greatly contaminated with sewage, and it is of hard quality, the first of these characteristics being bad for health and the second bad for washing. A year ago he had brought under the notice of the Royal Institution five or six schemes which had been set afloat for supplying London with better water, and since that date the quality of the water from two of the proposed sources, namely, that of the sources of the Severn in the neighbourhoods of Pimlico and Cader Idris, and that of the Cumberland lakes, had been tested by Dr. Odling and himself. The results of those tests he intended then to make known; also two curious facts discovered in the course of the analyses, one revealing the peculiar effect of the detritus from lead mines upon water, and the other the conditions which determine the action or non-action of water upon lead. The samples of water from the sources of the Severn were collected at Cader Idris and Pimlico. The projectors of both schemes propose the construction of an aqueduct to carry the water. The one from Cader Idris would be the shortest, but the other would supply many large towns on its way to London. These schemes are not intended to endanger the present large water companies, arrangements to buy them up being included in the estimates; in short, the only effect upon them would be to abolish a certain number of hoards of directors. Both plans are very costly. The Welsh scheme is estimated to cost 10,850,000l., and the Cumberland scheme, 13,500,000l. These enormous sums, however, need not trouble the ratepayers, the only question for them being how much they will have to pay for the water when one of the plans is carried out. From the calculations of the engineers it appears that after constructing the works and compensating the companies, London will be supplied at a less cost than at present. Now we pay 1s. 5d. in the pound. On the completion of the Welsh scheme it is estimated that the payments will be 10d. in the pound, supplemented by a public rate of 2d. in the pound. The payment for Cumberland water would be 1s. 1d. in the pound. Of course he could not speak as to the entire accuracy of the foregoing estimates, but the figures given show that the enormous capital required need not stagger the Londoners or prevent them from taking the schemes into serious consideration. Where the saving is effected is evident when it is considered that every gallon of water now used in London has first to be pumped up by magnificent steam machinery to a height of from 150 ft. to 200 ft., and even then the supply is intermittent. In the Welsh and Cumberland schemes gravitation will do the work of steam. Why should water be pumped up by these fine engines when the sun is willing to do all the work for us gratis? The sun flings the water up to the tops of our mountains daily, and we in our imbecility let it fall, and go through the work of raising it again by steam. Coal would be saved by economising the power of the sun as proposed, and this is worth consideration when the exhaustion of our mine is a matter for serious thought, even though the saving thus effected would very slightly alter the figures given by Mr. Jevons.

The quality of the proposed waters is also a subject of interest, and in this respect, as shown

by tables exhibited by the lecturer, they are much better than the water now supplied to London. The present water supply, he observed, is largely contaminated with sewage, and the fact that this is somewhat oxidised is no guarantee that its noxious properties as regards health are removed. Some of the companies, especially those on the south side of the Thames, supply badly filtered water, and the quality of the water supplied to London is worse than that supplied to any other town whose water he had tested. The specimen of muddy water supplied to Lambeth, which he now placed on the table before them, would show what kind of water could filter through an Act of Parliament. The Lambeth, Vauxhall, and Chelsea Companies had long been supplying badly-filtered water, much worse than that of the New River Company, which delivers the best in London.

Again, the organic matter in water may be of animal or vegetable origin, and may be judged of to some extent by the proportions of carbon and nitrogen it contains. Nitrogen comes principally from vegetables, and on examination of the tables it would be seen that there is in this respect a vast difference between the Welsh and Cumberland, as compared with the London waters, for the organic matter in the last comes principally from animals.

In the course of the analyses a very curious effect of the detritus of lead mines upon water had been discovered. Water collected near these mines contained very little nitrogen or organic matter, and though full of mineral matter is nearly colourless. The fact is that the finely-divided quartz from the mines has the power of destroying organic matter nearly to the same extent as animal charcoal. It was likewise pointed out that lead would not contaminate the Welsh or Cumberland waters in the supply-pipes. Pure water acts violently upon lead, but it had been discovered in the course of the recent investigations that the presence of a very minute proportion of phosphoric acid in water entirely prevents its action upon lead.

Two of the tables referred to we append.

Previous Sewage or Manure Contamination in 100,000 parts of various River and Lake Waters.

Name of Waters.	Ammonia.	Nitrogen as Nitrate and Nitrites.	Previous Sewage Contamination.
<i>River Waters:—</i>			
Nile	—	.102	700
Rhine at Bale	—	.026	0
Seine at Notre Dame	—	.152	1,200
Orca	—	.223	1,210
Thames .....	.065	.224	2,062
Lea .....	.02	.220	1,901
Severn (near source) .....	.013	.067	0
Lower Clyde .....	.044	.086	0
Tarancon .....	.008	.021	0
Ceryst .....	.001	.063	210
Carno .....	.003	.049	190
Beraw and Eira .....	.004	.023	0
Vyrnwy .....	.003	.011	0
Tywy .....	.003	.004	0
Upper Ribby .....	.008	.002	0
Lower .....	.002	.003	0
Ken .....	.001	.045	140
Spirit .....	.000	.021	0
Fourteen other Cumberland streams	—	—	0
<i>Lake Waters:—</i>			
Bala Lake .....	.001	.009	0
Thirlmere .....	.003	.002	0
Haweswater .....	.004	.000	0
Ullswater .....	.003	.005	0
Wendlandt Tarn .....	.003	.006	0
Loch Katrine .....	.002	.031	0
Five lakes and jars examined by Hounsington	—	—	0

Soap destroyed 100,000 lb. of various Waters.

Name of Waters.	Pounds of soap destroyed.
<i>Metropolitan Waters:—</i>	
Thames water	212
River Lea	204
Kent Co.'s water	265
<i>Other Waters:—</i>	
South Essex Co.'s water	233
Caterham Co.'s water	54
Water supply of Worthing	285
" " Leicester	101
" " Manchester	32
" " Preston	80
" " Glasgow (Loch Katrine)	4
" " Lancaster	1
Bala Lake	5
Thirlmere	8
Haweswater	16
Ullswater	23

THE FOOD RESOURCES OF THE PEOPLE.

Some interesting information in regard to the food resources of the United Kingdom was given in a paper recently read by Mr. Caird before the Statistical Society, and since reprinted as a pamphlet. The yield of wheat in England, he had estimated eighteen years ago at 264 bushels per statute acre, and he believes from careful inquiries and observations it would not be safe to take credit now for a greater increase than 1½ bushel; this will bring the present rate of yield up to 28 bushels. The domestic demand for bread-corn in 1863 was satisfied by an expenditure of 40,000,000*l.*, about one-seventh of this sum, 6,000,000*l.*, being paid for foreign grain. Last year, according to Mr. Caird, the necessary supply cost 70,000,000*l.*, and nearly half—i. e., 33,500,000*l.*—was spent for imports. The cost in 1867, as compared with 1863, was therefore raised 30,000,000*l.* against the consumer, but nearly the whole increased payment went out of the country, since we took in value 27,400,000*l.* worth of foreign wheat beyond the imports of the earlier year.

Good and bad harvest years run in cycles of varying length: 1866 and 1867 were both "bad," the former two bushels and the latter six bushels under the average.

For our requirements, till the harvest of 1868 is garnered, Mr. Caird computes that we must depend upon the foreign supply of wheat to the extent of 9,600,000 quarters. A table prepared by Mr. Caird exhibits the results of some rather elaborate calculations to ascertain the average value of the principal agricultural products consumed as food in the United Kingdom.

	Home Production.	Foreign Supply.
Corn	484,769,000	£25,000,000
Beef and Mutton	475,000,000	6,500,000
Butter and Cheese	31,100,000	5,400,000
Potatoes	18,000,000	200,000
Total	£180,000,000	£10,100,000

Another table compares the value of British with Irish agricultural produce. On the aggregate value, for 100*l.* worth raised in Great Britain 26*l.* was produced in Ireland, the Irish percentage for corn being 14; for cattle, 27; for potatoes, 66; and for flax, 100 (since the growth of this fibre is restricted to the sister Isle), on the respective British values.

An interesting experiment in meat preservation, indicating the possibility of utilising for our own benefit the enormous supplies of animal food in far off countries, has just been completed in America. On March 2nd, a dinner was given at Everett House, New York, for the purpose of eating mutton which was furnished by the carcasses of sheep killed and subsequently preserved in England one, two, three, and four months previously by Professor Gamgee, by means chiefly of sulphurous acid. The *Tribune*, speaking of the dinner, remarks that the "meat dishes were pronounced to be excellent, and even far superior to the mutton usually eaten on this side of the Atlantic." Judge Paschal, of Texas, in the course of the evening, remarked that he had often, encountering the great herds of beef which roam over the 270,000 square miles of his own state, asked Bulwer's question, "What will we do with it?" He thought the interrogation answered. Mr. Richardson detailed numerous ways in which he had tested the character of the preserved meat, and gave it as his opinion that the best beef "would soon be sold in New York for four cents a pound." [Mutton, by the way, was sold not long ago in Melbourne, it is said, at 1*d.* a pound.] The mode employed by Professor Gamgee, in the preservative process, and in which the whole body of the animal is kept entire, is as follows:—

"The beast is made to breathe carbonic oxide gas, by which it is suffocated. It is then bled, killed, and dressed as usual. The carcass is now placed in an air-tight receiver, from which the air is exhausted. The vacuum is filled up by carbonic oxide gas, and a communication is opened between the chamber in which the meat is placed and another containing charcoal charged with sulphurous acid. By this means the meat is impregnated by the gas in such a manner that it may be hung up, and will remain unchanged for, it is said, months."

One way of turning large quantities of foreign or colonial beef and mutton into good wholesome and tasty food for consumption in the country, would be to convert it into the well known and esteemed form of spiced beef and mutton, sometimes, though not quite correctly, called beef and mutton ham.

In a report just published on the subject, Mr. F. T. Buckland states that the salmon fisheries of England and Wales are on the increase, and a hope is held out that by-and-by this descrip-

tion of food will be placed within the reach of those who have hitherto been unable, through its high price, to obtain it. M. Agassiz, in a recent lecture on artificial fish culture, declared, contrary to the accepted opinion, that of all animal substances fish is the best adapted for food for those engaged in mental labour, and is the most nutritious in repairing the wear and tear of the human brain. This is no doubt on account of fish containing much phosphorus. The shining of fish in the dark while decomposing is an ocular manifestation of its richness in phosphorescent material; and, on the other hand, the human brain requires more phosphorus in its composition than any other organ.

The Paris correspondent of the *Post* remarks that the high price of food and the general stagnation of commerce are continually bringing from various parts of Europe distressing accounts of the condition of the working classes. The privations to which the working classes in Italy are exposed are very severe, especially at Turin, where the winters are extremely cold. If provisions are cheaper in Turin than in the large towns of France wages are not so high. For instance, a mason or a carpenter is paid scarcely 2 fr. a day. Most of the carriers receive only 1 fr. 60 c. for a day's work; and the men employed in the manufacture of arms and in the arsenal have little more. The most essential commodities at Turin are very dear; bread is at a higher price than in Paris; salt in Italy is three times dearer than in the French capital. Wine is cheaper; but the workmen scarcely ever drink it except on Sundays. The labouring population are ill-provided with domestic comforts, two-thirds of them sleeping usually, not upon good mattresses, but on maize straw. The misery of these poor people, says a letter from Turin, is augmented by the indolence and idleness of the women. In this important particular the difference between Turin and Paris is very marked; for, in the latter, a variety of businesses give employment to the women. An idea may be formed of the trifling earnings of the Turin workpeople, from the fact that there are very many instances of a family of four persons living upon 1 fr. 60 c. a day (1*s.* 4*d.*).

AGED AND INFIRM WARDS FOR MARYLEBONE.

SOME new wards have been erected for the purpose of relieving the over-crowded state of the house, and providing more suitable accommodation for that class of persons to whom only a workhouse should he made attractive. The Guardians of St. Marylebone are anxious that their aged poor should be made as comfortable as the rules of a workhouse will permit.

The building is erected at the south-east angle of the workhouse ground, and occupies the site of the old bakehouse and laundry.

The wards, six in number, are each 40 ft. wide, 60 ft. long, 13 ft. high, and give 780 cubic feet of air space to each occupant. The beds are ranged down either side of the room, and a double row of beds occupies the centre of the room, which is divided longitudinally by a partition 5 ft. 6 in. high. The western ends of the rooms are formed as large double hay windows, and constitute the day rooms. The skirting at the back of the beds forms a box 9 in. square, with a perforated zinc front; below these boxes are channels containing hot-water pipes; at the ends of these channels, and in the front and back walls, are large openings through which, by raising a damper, is admitted the external air. By this means the fresh air will be first warmed by passing over the hot-water pipes, and then rising upwards he emitted through the perforated front of the skirting boxes into the wards immediately under the beds. The foul air is carried off through wide channels in the ceilings, which communicate with large flues running up the side walls, and terminating just above the level of the eaves of the roof; each opening into a flue is provided with a door that is under the control of the nurses only.

The upper wards are somewhat differently constructed from those of the lower wards, inasmuch as the ceilings follow the line of the sloping sides of the roof, which are supported at intervals on semi-elliptic cast-iron ribs. The emission of foul air in these wards is provided for by a channel in the apex of the ceiling, running the whole length of the room, and has zinc flues at intervals open to the air.

The walls are plastered throughout, the lower portion being finished with Portland cement; they are coloured with varied and pleasing tints, which give them an appearance as cheerful and homely as they are unlike the bare, lime-washed, vault-like brickwork of an ordinary workhouse ward. The basement of the building contains store-rooms, heating-furnaces, coal stores, and other offices.

The total cost of the building as finished for occupation, including every description of fitting, gas-lighting, architect's commission, and all other contingencies, was about 6,400*l.*; and this being for the accommodation of 240 inmates, is at the rate of 27*l.* per bed.

The architect is Mr. H. Saxon Snell; Messrs. Manley & Rogers are the builders; Messrs. Potter & Sons executed the heating, ventilating, and sanitary works; and Messrs. Abercrombie the gas-lighting apparatus.

MURAL PICTURES FOR THE HOUSES OF PARLIAMENT.

MR. E. M. WARD, R.A., has completed three more of the Illustrations of English History confided to him, and has lately shown them to some of his friends in the trumpery shed which an appreciative Government provides, adjoining Victoria Tower, for distinguished artists. The subjects are,—*"The Acquittal of the Seven Bishops," "General Monk Writing to the Parliament,"* and *"William and Mary receiving the Lords and Commons in the Banqueting House."* They are painted with all the careful attention to truth and research as to detail that distinguish Mr. Ward's works. The heads are portraits, and King William look somewhat insignificant, and Monk short-necked and gouty, it is because these were characteristics of the men. We need scarcely say that they are all works of high character.

They may be described at present as simply water-colour pictures on plaster. The question how shall they be made permanent remains to be settled. The artist, we understand, would not object to fixing them as they are and protecting them with a glass, but this is scarcely the right solution of the question. It might, however, be adopted temporarily, pending further inquiry and experiments.

KEBLE COLLEGE, OXFORD.

THE foundation-stone of a new college, dedicated to the memory of the Rev. John Keble, was laid, in Oxford, by the Archbishop of Canterbury, on the 25th ult. The site is almost facing the new museum, and lies between the new park laid out by the university authorities and St. Giles's Church, where hitherto there have been only a few tumble-down houses and half-wasted gardens. Here will be built rooms for 100 students, in wings forming three sides of a quadrangle. The material will be red, white, and grey brick, with stone dressings, and the style will be Early Decorated. Mr. Butterfield is the architect. When additional funds are obtained, the plan will be completed by the erection of a chapel and hall, an entrance gateway, and some additional rooms.

The whole of the spectators afterwards went to the Sheldonian Theatre, which was soon crammed, and various addresses were made. About 35,000*l.* have been subscribed to carry out the idea.

NEW COTTAGE HOSPITALS.

THE memorial stone of one has just been laid by the Countess of Bradford at Walsall. The site consists of about one acre and three-quarters, at the junction of the Wednesbury-road, Bradford-street, and Dudley-street, above which it rises to a considerable height. The soil is sand and gravel. The building is the premises called The Mount, formerly used as a school, and in making the alteration advantage has been taken to utilise and convert every part that could actually be brought into use, with a view to the strictest economy. The main block of buildings now form the administration department. The school room and the dormitory have been converted into two spacious wards, and the stable buildings have been converted for the washhouse and laundry. The new buildings comprise the

entrance of the kitchen and culinary department, in-patients' department, and out-patients' department. The general arrangement of the building externally is not very pleasing in effect; the architect evidently having brought his judgment to bear upon utility and convenience for the internal arrangement and management, guided by the strictest economy, in which the comfort of the patients, however, has been the prevailing element. The two new wards are designed for eight beds each, giving 1,120 cubic feet to each patient; at the end of each ward are semi-detached buildings forming the bath-rooms and lavatories, the closets and urinals; the architect carrying out the pavilion principle. On the upper floor is a nurse's room, having a command of the upper wards. There are four wards—two on the ground floor and two on the upper floor, the whole arranged to accommodate thirty patients. On the upper floor there is an operating room. The buildings have been carried out from designs, and under the superintendence, of Mr. G. B. Nichols, of West Bromwich and London, architect; Mr. Adkins, of Walsall, being the builder.

The committee recently appointed under the presidency of the Hon. and Rev. K. H. Digby, of Titchshall, have determined to make such preparations as will enable a Cottage Hospital to be opened at Litcham on the 1st of July.

WEST LONDON SCHOOL OF ART.

The committee of the West London School of Art, Great Portland-street, have issued a statement of the extent and success of the school's work, and its financial position, with the view of obtaining subscriptions to pay off existing liabilities to the amount of 400l. One of the strong grounds on which they appeal to the public is that the establishment is essentially an artisan school, and, though the latest established of the ten metropolitan schools of art, this school is teaching more than a fourth of the entire number of artisans (1,750) taught in the whole of the ten London schools; and an analysis of the occupations of those attending the school during 1867 suggests in a general way the advantage gradually being derived by a great number of local industries. The Examiners' Report on Schools of Art for 1867 shows that, among the ten London schools; and an analysis of the occupations of those attending the school during 1867 suggests in a general way the advantage gradually being derived by a great number of local industries. The Examiners' Report on Schools of Art for 1867 shows that, among the 100 existing schools in the kingdom, only five schools had a greater number of students under instruction; only five had a greater number of students examined; and only three sent up sets of works for examination from a greater number of students during the year.

This school obtained the greatest number of prizes taken by any school in 1866, the National Art Training School at South Kensington alone excepted. The Examiners' Report for 1867 also shows that only two schools passed a greater number of students in the personal examination; and only two schools obtained a greater number of prizes upon the sets of works sent up for examination during that year.

THE NUT FOR PROFESSIONS TO CRACK.

II. PAYMENT OF ENGINEERS.

SIR,—Though I have long ago stated in the *Builder*, more than once or twice, my solution of the standing "nut" that "A Country Gentleman" has once more brought before you as regards architects—(I did so last in 1865, October 25th, p. 829),—and have never met with or elicited any objection to it, I cannot learn of any engineer having applied similar principles to the regulation of his claims, and will therefore ask for a column to suggest what appears to me the parallel method for most of the work now special to that profession.

In a healthy state of morals and education these would not be two professions. The engineer's, which is the mother profession, and bears the older, indeed the sole indigenous English name—for "Elias the Engineer" was the name and style of the artist of this empire's grandest work of art, Salisbury Cathedral—this original profession would have continued in such culture as never to require supplementing with the offshoot, or rival school of pedantic tatomongers, begun by Inigo Jones, and dubbing themselves with the affected classic euphuism of "architect," which of course is only barbarised Greek for the native term "engineer." It is quite right, therefore, that these dilettanti should be con-

signed, as they are, to one part (and the smaller that part the better) of the practice of the engineer (or real *apixiretos* of the ancients); while this latter, of course, includes, and must always include, all the modern "architect's" province, and much besides.

As far, then, as the engineer does what is called a modern architect's work,—that is habitable buildings of any kind,—I assume his basis of charge to be the same as mine, the area of internal floor space. I have explained (if so simple a thing really needs explanation) why there must be no cubing, but only squaring of dimensions, and why they must be internal. Of course, too, the engineer can get, as I do, for all unnecessarily varied detail, its market value,—that is, if there are twenty features of the same position, dimensions, and use, I lay before my employer as many sketches for one as I think suitable, be they two or a hundred, with a price on each; and he pays without demur invariably my prices for such of them as he likes to have carried out, be they the twenty dearest or only the one cheapest. For the mere charge per square of floors I only hold myself strictly bound (though I should never, perhaps, do so little) to make the details all alike, even on different stories, which (though the most impudent thing a shameless percentage can possibly do) does not hinder the Record Office in Patterlane from being, *on the whole*, to my taste, the least offensive modern work I know in the whole Isle of Great-Britain.

As for different prices per floor-square, I really do not believe any single artist need have more than one. A lower price would, doubtless, be fair for warehouses, and perhaps the larger sort of workshops and mills. But in aught else there seems a kind of compensation between utilitarian design and artistic. To make an exterior plain and good may as often be harder as easier than to make it rich and good; and if a church needs more artistic study, height, proportion, and better construction than a house, so it does less division and contrived arrangement. The addition I once reckoned by the exposed girth of each story is really a needless refinement. Architect's work will be best done when paid *only* on the two bases above described.

But now, coming to the wider provinces of work rightly held peculiar to the engineer, we shall find by far the largest of them, indeed their vast majority at present, fall under the general head of *ways*, always the kind second only to shelters in importance. Under "ways" of course I mean to include ways for any and everything, trains, ships, barges, carriages, foot passengers, letter-bags, water, fire, gas, or electricity. Now, it is common to all such ways to unite two given termini, and to be at a more or less variable height, or depth above or below (or both above and below) the natural surface. Moreover, in the parts that are raised above that natural ground-line, certain areas of void require to be left for snarrows, culverts, &c. For each of these classes of ways, then, I would let the engineer's pay be composed of two parts; one based on the area of longitudinal section of the whole line of work, as included between the natural ground-line and the finished way,—the other similarly reckoned on the area of all snarrows openings. I would have no extra for snarrows over the sunk parts of the line, because their need and their dimensions are created by the engineer's own design, and the numbers of them to be expected being always practically uniform, they should be included in his general price as things of course. Moreover, observe that the area of longitudinal section of the whole line must always be reduced in the ratio that the direct distance of the termini bears to the line's length. This will not, as might at first appear, give the engineer much interest in taking you straight rather than roundabout, but rather make length of detour indifferent to him (which would otherwise be advantageous). For, suppose two points fifteen miles apart are, joined by one road of sixteen miles, and another of twenty miles. If, as is probable, their longitudinal section-areas were in about the same ratio, say 16,000,000 and 20,000,000 square feet, both being reduced by this rule to 15,000,000, would pay their engineers the very same fee.

You will observe that *width does not enter my equation*. I think it fair that a work of a given class and given longitudinal section should invariably pay its engineer the same fee, whether it be 10 ft. wide or 100 ft. Take a bridge, for instance, as the class of work to be charged on the highest scale (but all bridges, without exception, on the same scale). Had Westminster

Bridge been required only for a footway, or an aqueduct, on the other hand, of double its present width, I do not see, in either case, what part of the engineer's duty would have been *materially* lessened or increased. Hence I exclude *width* from the bases of the way-engineer's charge, as I do *height* from those of the shelter-engineer (or "architect").

Among those few engineering works that come not under the head of Ways, I think all docks ought to pay by a uniform scale on their cube water-space; but for reservoirs of water (or gas, &c.), as the merit and utility of the work is greater the less ground it occupies, the cube contents ought to be divided by the square root of the outside area occupied by the work and all its necessary adjuncts. You must not divide by the area, but only by its square root; otherwise a great and small reservoir, of the same average height, would pay the same, which is not intended.

I may beg space for a word or two on this "Nut," as regards some other trades and professions. EDWARD L. GARBETT.

CURE FOR A SMOKY CHIMNEY.

I OFTEN see in your journal remarks on what is called "the Smoky Chimney question," and complaints are constantly made against architects and builders for smoky rooms; therefore I suppose you will not object to make public a cheap, simple, and sure remedy for eight out of every ten bad chimneys, without the requirement of unsightly chimney-pots. I find from experience that, by the use of fine wire gauze, of from 36 to 40 wires to the inch, as a screen, blower, or guard, judiciously applied to register stoves, ranges, or stove doors, little if any smoke will come into a room. The atmospheric pressure prevents the smoke entering the room through the gauze; and if applied immediately to the front of the fire, more smoke will be consumed than by any other means. In that case the wire should be kept 2 in. from immediate contact with the hot fire.

Any respectable ironmonger will readily supply both cheap and ornamental screens of this kind, either as permanent or movable. I. O. U.

RECREATION AND WORK.

SIR,—I have but just now seen the letter in your impression of the 28th of March, commenting upon a remark made in my paper read before the Society of Arts on Technical Education. The writer takes exception to the passage in which I stated that I looked upon the pursuit of geology in my case as a recreation merely. He says he is of opinion that "it ought not to be looked upon as merely recreative; neither does it prove so." Our friend appears to have a great dread of recreation as others would have of work. Why, sir, work and recreation are relative terms, and if one can convert what another is right down hard work into recreation or the means of it, so much the better. It depends much upon circumstances, and upon the light in which it is viewed, together with its results, whether a pursuit is recreative or not. Work with me is not irksome. I stand to it and am dependent upon it, and my wages are equal to any in the same manufactory. I also find time to write for the press what brings handsome addition to my income; and, would your correspondent rather than from the profit derive therefrom. But with respect to geology, I regard my pursuits in that line as having been eminently *recreative*. Geology with me has converted this earth, which some sordid individuals persist in regarding as "a desert," and "a bowling wilderness" into a very paradise full of good and beautiful things, which it is source of great gratification to me to become familiar with. It brings me face to face with nature, takes me down into deep dingles, and up to the summit of great hills; and whilst it stores my mind, and supplies that food for which it craves, it has a *re-creative* effect upon an entire system, imparting vigour to the body and elasticity to the spirit.

But your correspondent, I have no doubt, will see that he has mistaken my meaning altogether, when he comes to look again at the passage he quotes and its connexion. My argument was that if a working man could gain the distinct

of being elected a Fellow of the Geological Society of England in consequence of studies in a science which had been pursued merely as a recreation, why should there not be some means whereby similar distinctions could be awarded "to men who devoted their energies to the attainment of excellence in their own particular business"? The passage occurs at the close of the discussion, in urging the necessity of district colleges, which should have the power of conferring such distinctions, and is as follows:

"If thought it would be well, if these district colleges should be established, that they had the power of conferring honorary distinctions upon such persons as showed themselves worthy of them in their particular calling. He had seen made a Fellow of the Geological Society in consequence of his studies in that science, which he looked upon merely as a recreation; and if some similar distinction were awarded to men who devoted their energies to the attainment of excellence in their particular business, it would be very likely to have a very beneficial effect, especially on the rising generation."

JOHN RANDALL, F.G.S.

TEMPLE BAR AND OLD ARCHWAYS.

HAVING long outlived its period, it is difficult to imagine wherefore this ancient gateway is suffered to obstruct the traffic of the most central and crowded City thoroughfare: there is barely room for two vehicles to pass together under the arch, and the footway on either side will only admit of two pedestrians abreast; whereas, by the removal of the crazy old structure, the roadway in this, the narrowest strait of the whole line, would freely admit three carriages, and the footway four persons on either side.

The line of Fleet-street westward from St. Dunstan's Church gradually narrows towards the Bar, as it does also from Clement's Dances eastward; so that, to make the width of roadway at all equable or adapted to the route of this great and leading thoroughfare, the whole line from Chancery-lane to the space cleared for the new Law Courts should be opened, and the frontages withdrawn at least 10 ft. in a graduated line.

There are impediments in the way, for one side of the arch is occupied as a barber's shop and cutting-room; and the other, together with the small chamber above the arch, has been the appanage of Child's Bank, time out of mind, probably for the amusement of children to see Lord Mayors' shows.

If there exists a corporate veneration for their ancient relique of the Bar, can they not find out a favorable location for it somewhere? But let them not reconstruct it over any great leading thoroughfare, where it must cause an arterial constriction, or an aneurism in the heart of commerce.

Another ancient gateway, possessing architectural pretensions of a higher order, which formerly opened its portals to royal processions, now seems to sink unheeded into the slime of the Thames; it is buried to the top of its pilasters in heaped rubbish, and must be taken down, but it must be reconstructed.

QUONDAM.

THE TENDERS FOR THE HORNCASTLE SEWERAGE.

See.—The list of tenders for the sewerage of Horn-castle given in the *Builder* for April 25th, is followed by some remarks conveying a false impression; and as my name is given in connection with the statements there made, it seems due to myself and the Board to set ourselves right with your readers.

Mr. Young did not put in an error, nor was he allowed to make any private proposal to the Board, nor did he ask to be allowed to do so; nor was he allowed to alter one figure in his tender as regarded the works for which the other parties tendered. Compared with the others, item by item, he was all along the lowest. What really occurred was this: the applications for copies of the specifications were so numerous that when Mr. Young applied the specification was out of print, and only the bill of quantities was sent to him. In the bill of quantities mentioned was made certain castings, which the specification showed the contractor was only to fix; but Mr. Y., not having the specification, included the cost price of the other castings. This cost price was not included in any other bids, and therefore was very properly struck out of Mr. Young's, to put him on a level with the rest; which being done, he was the lowest, and his tender was accepted.

I hope Mr. Frow was not one of those who assented to the erroneous statement, because he was in possession of the real facts of the case, as the following extracts from our minutes will show.

"Board Room, Horn-castle, 9th April, 1868. A letter from Mr. Frow was read, complaining of the non-acceptance of his tender, when the clerk was directed to reply that Mr. Frow was not allowed to lower any item for which Mr. Frow had tendered; and so far as they had tendered for the same works, Mr. Young was all along the lowest; and, moreover, the Board never bound themselves to accept the lowest or any tender."

W. H. MILNER.

MODELLING.

See.—Will some one inform me what is the material to model in which does not shrink or crack in drying?

I have modelled a good deal, as an amateur, in clay, and made my warts and pieces moulds; but this is too much trouble for the sake of one copy; and, besides, the modelling I now allude to is not suited to this method of casting, but must remain in the modelling material: I mean those pet animals from life, and figures elaborately under-cut and delicately light and gauzy in the drapery. I have seen many such objects from Italy, and I thought the material was an earth found there; but I have since been informed that it is a composition resembling modelling-clay made in England, though I have not yet been able to get any of it.

FUZZOLANA.

"THE IRON MOP."

See.—Will you kindly get an answer to a query arising out of the excellent letter which you lately inserted from the pen of a Canadian lady?

What is the "Iron Mop" that is to supersede the labours of our housemaids? Where can it be produced? and how does it perform its functions?

A well-cranked deck, with convenient scupper-holes, may indeed be scrubbed and sluiced at arm's length; but how can we remove dirt and superfluous water from an ordinary floor (without damage to ceiling beams), unless by the deprecated process of "going down upon our knees"?

A reply will greatly benefit many old housekeepers, besides a constant reader of the *Builder* and

Your humble servant,

DOLLY.

* * * The floors alluded to by our Canadian correspondent had evidently no ceilings beneath.

PROVINCIAL NEWS.

Stockport.—The workmen and others engaged in the erection of the bridge connecting St. Peter's Gate with the Market-place, to the number of about forty, have been entertained at supper, at the Egerton Arms, in celebration of the completion of the work. The chair was taken by Mr. James Whitaker, one of the assignees appointed by the corporation to carry out Mr. Pierce's contract; and the vice-chairs were occupied by Mr. George Roy (the other assignee), Mr. John Whitaker, jun., and Mr. Simpson, assistants to Mr. Brierley, C.E., by whom the plans were made, and who has personally superintended the work.

Kingston (Sussex).—It having been found by the guardians during the severest part of the winter that additional accommodation was necessary for inmates, the subject was discussed and a committee appointed to consider the question. The committee unanimously recommended the Board to increase the buildings of the house, so as to accommodate 200 additional inmates, and they approved of Mr. Luck's plans for the proposed alteration. The Board of Guardians, however, by a vote of eight to four, have decided that the alteration of the house, which was estimated to cost about 10,000*l.*, should be deferred at all events till the new infirmary is completed, as it was thought by some that the new infirmary would relieve the house of some cases, and so afford a certain amount of room.

Cambridge.—The market committee are considering the question of a new corn-exchange. The council had referred the matter to the committee, and a report has been drawn up strongly recommending the building of a new corn exchange. Three sites have been considered, but the most eligible one is said to be in Wheeler-street, upon property known as Parson's-court.

Rochdale.—At a meeting of the estate committee of the corporation, after a lengthened discussion, it has been decided to commence the proposed alterations and improvements in the Guildhall of this city forthwith, from the plans proposed by Mr. H. Andrews, the city surveyor. The alterations to be effected will include improvements in the portion of the Guildhall devoted to the magistrates, and a renovation of the interior of the old hall.

Worcester.—The three slaughter-houses ordered by the Town Council to be erected at the north-west end of the Cattle-market approach completion. They have been built according to the plans of Mr. Rowe, city architect. The houses are lofty and have ventilating cupolas. At the rear of each house are fasting pens, from which the beasts are brought for slaughter. There are in addition a boiling-house and other requisite offices for obtaining water, &c. The whole is well drained.

Wigan.—At the next quarter sessions of the peace for the county, the following resolution is to be moved.—"That a plot of land containing 340 square yards, or thereabouts, situated at Ince, in the division of Wigan, be taken on lease for the term of 999 years, at a yearly rent of

5*l.* 13*s.* 4*d.*, and that a police-station and strong rooms for the temporary confinement of prisoners be erected thereon; and that for this purpose a sum not exceeding 890*l.* be granted out of the police rates of the division of Wigan."

Stratford.—The chief stone of the new Town-hall has been laid. The building will be in brick, with stone facings, and will comprise extensive cellarage on the basement floor, and above this will be the board-room of the Board of Health, with clerks' rooms, and suitable offices; board-room for the meetings of the Board of Guardians, offices, &c.; and the plans also provide a justice-room for the magistrates of the division. The architects are Messrs. Angell & Giles. Mr. Thomas Ennor is the contractor, and the amount of the contract, exclusive of four or five hundred pounds for cellarage, which was forgotten at the outset, was 10,239*l.*

CHURCH-BUILDING NEWS.

Louth (Lincolnshire).—Leigh-on-ear Church has been re-opened. For some months past it has been undergoing restoration. In the nave, chancel, and aisles, nothing of the old church remains, except the stonework of the walls, arches, and windows. The woodwork of the roof is new. The old lead has been re-cast. New seats and flooring have taken the place of the old pews and decayed floor. There is a new organ (by Messrs. Foster & Andrews, Hull), new pulpit, lectern, and reading-desk. In the stonework of the nave arches and the windows the mouldings are of a simple character, and there is no carving in stone. The carved oak screen which formerly occupied the chancel arch has been restored and replaced there by Mr. J. L. Fytche. Two chapels are formed at the east end of each aisle by carved oak screens. The nave and aisles are filled with open seats of pine. The fittings of the chancel correspond with those of the nave as to design. The stonework of the exterior has been repaired, and where it had been previously repaired with brick the brickwork has been removed and stone inserted. The architects employed were Messrs. Rogers & Marsden; and the builder, was Mr. M. J. Thompson, Louth.

Wilcote.—The parish church has been re-opened for Divine service, after having been closed since last September, for the purpose of undergoing a restoration, under the superintendence of Mr. A. W. Blomfield, of London, architect. It was found that only the walls of the old church were in a condition to be left up, so that the restoration comprises, besides a new porch, new roofs, floors, doors, windows, and fittings. All the wood-work is oak. The roof of the nave has a deep cornice on the wall-plates, moulded principals and purlins, the circular ribs carved in the spandrels, and the space above the collar-beam filled in with cusped tracery. The roof is covered at the backs of the rafters with oak boarding. The chancel-roof is boarded, and divided into panels by moulded ribs, with carved bosses at the intersections. The seats in the nave have tracery in the panels of the bench ends, and the fronts of the book-boards. The pulpit and prayer-desk are moulded, and have open tracery work in front, with a considerable amount of carved work. The font is in stone, with oak top and ornamental iron-work. The altar is of oak, with carved panels in front, and the altar-rail is supported on pillars, carved and moulded. The floor (except under the seats, being there of wood) is laid with tiles and pieces of stone alternately, some of the tiles glazed and some plain. The masonry has all been restored, and a bell-turret added to the west gable,—the old turret having been gone for many years. The east window has been made somewhat larger, and filled in with stained glass, the subject being the parable of the "Good Seed," executed by Messrs. Heaton, Butler, & Bayne, of London, who also supplied the mosaic-work over the altar. The other windows are filled in with cathedral glass in small quarries, with a narrow ruby border, the two quatrefoils of the west windows being occupied with the arms of the Pickering family. This restoration has been carried out at the sole cost of Mr. Leonard Pickering, of Wilcote Grove. Mr. Joseph Castle, builder, of Oxford, executed the works, and the carving was done by Mr. Chapman.

Blackheath (Worcestershire).—The memorial stone of a new church at Blackheath, Rowley, has been laid by the Countess of Dudley. The

intended church has been designed by Mr. Hopkins, architect, to the Worcester Archdiocesan Church Building Society, and the building will be erected by Mr. Wilson, of Birmingham. The estimated cost is 6,400*l.*, of which 5,071*l.* (including 2,000*l.* from the Earl of Dudley and 2,000*l.* from "Delta") have been collected. The church will, when completed, accommodate 850 persons, and contain a nave, north and south aisles, vestry, organ-chamber, and children's chapel. The church is to be built of bricks. The nave is 80 ft. in length, 29 ft. wide, and 54 ft. high.

Liverpool.—The chief stone of St. Saviour's New Church, Breckfield-road North, Everton, has been laid. It will accommodate a congregation of 900; and the style of architecture is that of the end of the thirteenth century. According to the plans, it will consist of a nave with two aisles, and of a chancel with two chantries. The length of the nave and chancel will be 109 ft. The nave will have a clearstory, and its walls will reach to a height of 47 ft., the height to the ridge of the roof being about 70 ft. The church will have three entrances from Breckfield-road North,—one with the centre of the nave, and the other two by porches, one of the latter being intended to serve as a base for a tower and spire, which it is hoped will be raised at a future time. The roof will be an open one, and that portion over the aisle will be supported by cross arches of masonry, instead of by timber framings. The chancel-window will have five lights; it will contain 230 ft. of glass. At the opposite end of the building will be another large window, having four lights, with tracery in the head, and a rose-window over. The arches at the side of the nave will be of 21 ft. span, 17 ft. to the spring, and the height will be 27 ft. There will be three of those arches at each side, and the arrangement is such that the chancel and chantry arches will spring at the same level. The material to be used is principally the native red sandstone. The walls are already 5 ft. above the floor. Wrought stone is used throughout. In the chancel, and for the main part of the dressings, white Stonor stone is being used, and the pillars and other portions of the erection, which will have to support a heavy weight, will be of Cefn stone, with red Mansfield stone in the smaller shafts. The pavement will be of Staffordshire tiles, with stone borders, except in the chancel, where Minton's tiles will be used. The roofs will be covered with green slate, from Wales. The seats will be of pitch-pine, and there will be no gallery; but one-half of the fittings will be free. The entire cost of the building itself will be about 6,400*l.*, and the cost of the site is 1,600*l.*, of which 1,000*l.* have been contributed by Mr. F. A. Hamilton, and the remainder by the Church Extension Society, who have also given 3,000*l.* towards the building of the church. The architect is Mr. Gordon M. Hills, of London; the contractor, Mr. Tomkinson, of Liverpool; and the clerk of works, Mr. James Howea.

DISSENTING CHURCH-BUILDING NEWS.

Parkgate, near Rotherham.—A new chapel, erected by the members of the United Methodist Free Church, has been opened at Parkgate. The new building is of stone, in the Early English style of architecture, and surmounted by a tower and spire. In the basement below the chapel is a schoolroom. The total cost of the erection has been 2,600*l.* Messrs. Blackmoor & Mitchell-Withers, of Rotherham, have been the architects; and Messrs. Askew, Brothers, of Parkgate, the builders.

Birkenhead.—A new church, to be called "The Hamilton English Presbyterian Church," has just been commenced in Laird-street. It is intended to accommodate 620 persons. The contract is being carried out by Messrs. R. Anderson & Sons, of Liverpool, for the sum of 2,200*l.* Mr. James N. Crofts, of Liverpool, is the architect. The lecture-hall, which does not form part of the contract, will not be commenced at present. It will be placed at the back of the church.

Shipley.—A new Moravian chapel has recently been erected at Baildon. The style is Gothic, and in size the edifice is capable of accommodating between 600 or 700 people. All the fittings are to be free. The cost of the erection is 1,400*l.*, towards which about 1,000*l.* have been subscribed. Mr. Samuel Jackson, of Bradford, is the architect.

Chipping-Norton.—The new Wesleyan Chapel

has been opened. This chapel is situated in one of the principal thoroughfares of the town. It is built in the Italian style of architecture, from designs by Mr. W. Peachey, of Darlington, the builder being Mr. C. Young; it will accommodate upwards of 500 persons.

Kidderminster.—The new chapel which the Baptists have been erecting in a central part of the town has been opened. The building stands in Church-street. It has a Gothic front, and two flights of steps lead up from the entrance part to the doors giving access to the interior. The area of the chapel is 72 ft. by 40 ft., and it will seat about 600. Underneath the chapel are a large school-room and four class-rooms, and they will accommodate about 400 scholars. The work has been carried out by Messrs. Scholes & Warrington, from the designs of Mr. Bidlake, of Wolverhampton. The total cost, including site, will be about 2,400*l.*

Farsley.—The foundation-stone of a new Baptist chapel has been laid at Farsley. The edifice, which is to be built from the designs of Mr. John Simpson, of Leeds, will be 90 ft. by 45 ft., inside measurement, and 40 ft. from the floor to the crown of the segmental ceiling. The walls will be built of Horsforth stone, lined on the inside with brick. The style of architecture will be the Italian, with a bold stone cornice and rusticated quoins at the angles, and moulded dressings to the whole of the windows. The principal entrance will be a portico, with rectangular rusticated piers, surmounted by an entablature and ornamental vases. The edifice will seat 1,100 persons; and the total cost of it, including fencing, lighting, and warming, will be 3,500*l.*, towards which at least 2,000*l.* have been already obtained.

Bowdon.—The Congregational Church on Bowdon Downs has been re-opened for divine service. The nave or body of the building has been prolonged westward as far as the site would permit, and transepts have been added on both north and south sides. Each transept is divided from the body of the church by two arches supported by double columns. These columns are in two tiers, the lower portion connected together by curved capitals, carrying the principal support of galleries, the upper portion supporting the arches having similar capitals. There are galleries provided in each transept, the separate means of access to each being well arranged. There are also two new vestries. The style of architecture is the enlargement of the Gothic of the Early Perpendicular period, the old portion of the building being also Perpendicular, but of a debased character. The new west end and each of the transepts have large wheel-windows in the gables of different and original designs, and two windows of two-lights each under, the heads of the windows being filled with tracing of the Perpendicular type. The wheel-windows in the transepts lighting the galleries is the same. The gables are surmounted by crosses. There is additional accommodation provided for about 530 persons. The works have been carried out from the designs and under the superintendence of Mr. Ernest Bates, architect, Manchester, and we believe it is in contemplation further to improve the building, particularly the part facing the Downs.

STAINED GLASS.

Congregational Church, Ramsbottom.—A large stained glass window has been placed in the west end of the new Congregational Church, Stubbin's Vale, near Ramsbottom, co. Lancaster, in memory of the late wife of Mr. Joshua Townsend. The window is composed of five openings and tracery. In these openings are figures, life size, of our Lord in the centre, with the four Evangelists, two on each side, beneath canopies. Under these, and forming the base of the window, are smaller canopies, the central being occupied by a figure of David, king and prophet; and the side canopies are filled with the emblems of Evangelists, bearing scrolls, on which are inscribed the beginning verse of each Gospel. The tracery is filled with inscribed scrolls, monograms, and foliated works. In addition to this window the whole of the glass in the church is of an ornamental character, consisting of geometric work in different tints of cathedral glass and colored borders. The windows are from the establishment of Messrs. R. B. Edmondson & Son, of Manchester.

Church Preen.—This little parish church has lately received an additional adornment in the form of a large stained-glass window, placed in

the chancel by Mr. Arthur Sparrow (the patron), as a memorial of his father, the late Mr. William Haubury Sparrow, of Penn, in the county of Stafford, and lord of the manor of Church Preen, by whose liberality the restoration of the church was principally effected two years ago. The figures on the window represent nine events in the life of our Saviour, viz.—Magi, Presentation, Christ with the Doctors, Baptism, Temptation, Agony, Crucifixion, Resurrection, and Ascension. It was executed and supplied by Mr. Frederick Preedy, London.

St. Stephen's Church, Carlisle.—Miss Burdett Coutts has filled with stained glass the windows of the west end of this church, at a cost of about 300*l.* Messrs. John Scott & Son, Dickergate, Carlisle, furnished designs for the windows, the firm having already filled with stained glass for Miss Coutts the east windows of the edifice. The main window is composed of four lights; and the history of Stephen having been chosen as the subject for illustration, each of the four lights is devoted to an incident in the martyr's life. Each group is under a crocketed canopy, and in the tracery above these canopies a demi-figure of Christ is placed; while the cinquefoil on each side of this central circle is filled with angels playing upon harps. The groundwork of the window is ruby glass, upon which is a scroll pattern, and the predominating colours are ruby and gold, an effect having been produced by the introduction of a good deal of white. The general style of the groundwork is floriated. The five small single lights below the main window have been filled with a geometric pattern. The new windows are much lighter in their effect than those in the apse, where greater masses of deep colour have been used.

SCHOOL-BUILDING NEWS.

Edgeley, near Stockport.—New schools for girls and infants are being built at the Roman Catholic church here. The foundation stone was laid on Easter Monday, by Mr. E. W. Walker, M.P., with the usual formalities. The estimated cost, including fittings, will be 1,600*l.* The architects are Messrs. M. E. Hadfield & Son, of Sheffield; and the builder is Mr. J. Paul, of Kutsford. The exterior is of brick, with stone facings, and some slight admixture of tiles, strings, &c. The entrance and staircase are at one end of the building through a dome gabled, and surmounted by a cross. There are spacious play-grounds, and the site is cheerful and open. The schools are in all respects planned to suit the requirements of the Privy Council aided by a building grant. The schools will accommodate 500 children, and it is expected they will be completed by the end of September.

Masbro (Rotherham).—New schools for boys and girls are being erected near the church of St. Bede, Masbro, by Messrs. Hadfield, architects. The group of building is composed of two schools, 55 ft. by 20 ft., placed at right angles so as to communicate or be thrown together, with spacious class-rooms and porches. The design is a simple broad treatment of brick architecture, of the twelfth century, with stone facings, the face of the wall being secured by bands of pressed brick; the roofs are covered with slate. There are play-grounds separate for boys and girls. The roofs are of open tracery timber. Mr. J. Ripley, of Masbro, is the builder. The estimate, with fittings, is 950*l.*

Brinkworth.—The new school here has been opened. It stands on the hill-side, about a stone's throw from the church. It has been erected from the designs of Mr. Darley, of Chippenham; and is a brick building with free stone dressings. It is in the Gothic style, though very moderate in this respect with regard to windows, which have been altered to suit a suggestion from the Privy Council. The main room is 57 ft. 3 in. long by 18 ft., and there is a class-room 20 ft. by 14 ft. Both rooms are 17 ft. in height from floor to ceiling. The schoolroom has a vaulted roof of stained deal. There are two entrances to the building, one on the north side and the other on the south-west side, over which a bell-turret stands. At the end of the school is the schoolmaster's house, which is a new building, and in character with the school. The total cost has been about 1,200*l.* Mr. Milhaud, builder, had the contract.

Denholme.—The foundation-stone of an Independent Sunday school has been laid here in

connexion with the chapel erected in 1844. The new building will accommodate 300 children. Its cost will be about 8000. The building will be 66 ft. long by 36 ft. wide; inside dimensions, 18 ft. high in the centre, and 14 ft. high at the walls. It is to be entered from the front, facing the road, by two doorways, with large three-light, ornamental window over them. The front will be gabled and surmounted by a moulded pediment cornice. Six semicircular-headed windows at each side and two at the front, in addition to the window over the door, will give light to the interior. The roof is intended to be supported by two rows of cast-iron ornamental pillars, which, being braced longitudinally by timber arches, will give the interior somewhat of the effect of nave and aisles. There will be two class-rooms at the end, which will be connected with the large room by sliding doors. These class-rooms will have fireplaces, and the large room will be warmed by hot-water and lighted by gas. The style of architecture is Italian. The plans have been designed by Mr. T. C. Hope, architect, Bradford. The works have been let to Messrs. Robinson & Ibbotson, masons, Thornton; Messrs. Thresh & Illingworth, joiners, Bradford; Mr. Thomas Walton, plumber, Bradford; Mr. Joshua Taylor, plasterer, Denholme; Mr. B. Hill, slater, Denholme; Mr. W. Atkinson, painter, Denholme.

Rotherham.—The foundation-stone of a new school building, in connexion with the Rotherham Congregational Church, has been laid. The total cost of the new building will be 6000, and it will provide accommodation for 500 children. It will be erected of stone, similar in quality and appearance to that of the church, and in the same style of architecture; and it will have a chapel-keeper's house adjoining. It will contain one large room, 60 ft. by 33 ft., with an infants' room, 19 ft. by 16 ft., and several class-rooms. Mr. Masterton, of Rotherham, is the architect; and the contractors being Mr. Harper and Mr. Woodhouse.

Beccles.—The new National School-rooms in this town, which were commenced building nearly twelve months since, have now been opened by the bishop of the diocese. The building, which is situated in Ravensmere, is a large structure, in red brick, having Gothic windows with stone mullions, and a slate roof ornamented and surmounted by a bell-turret. It has been built by Mr. R. A. King, of this place, from the plans of Messrs. Hayley & Dawes, of Manchester, at an entire cost of about 2,000. It will contain 150 boys, 100 girls, and 150 infants. There are convenient class-rooms attached to the boys' and girls' school-rooms, and also lavatories for each school.

Books Received.

The *Quarterly Review* for April contains a good paper "On the Use of Refuse," which, though the subject is not new, has many points of interest and importance, some of them no doubt new for the first time collected together, and the whole forming one of the best papers in the number.—"A Shilling's worth of the United States of America," compiled by Belding, Keith, & Co., and published by Cassell, Petter, & Galpin, London and New York. Messrs. Belding, Keith, & Co., have prepared this epitome of the finances, railroads, trade, laws, population, &c., of the United States, with a business purpose, as American bankers and merchants who offer their services for the transaction of business; but the compilation is a very useful one, containing an immense amount of tabular and other information.

Miscellaneous.

THE THAMES EMBANKMENT AND THE DISTRICT RAILWAY.—The Metropolitan Board of Works has considered a proposition received from the Metropolitan District Railway Company that the Thames Embankment from the Temple Gardens to Blackfriars Bridge should be a solid embankment, and that the question of liability to pay compensation be referred to an arbitrator. An answer was ordered to be returned accepting the proposition on certain terms,—that each party should deposit half the estimated amount of compensation, and the railway company pay forthwith to the Board the 200,000, referred to in their Act of Parliament; an answer to be returned in seven days.

HER MAJESTY'S THEATRE.—We are able to state that the rebuilding of Her Majesty's Theatre will be commenced in about a fortnight's time, the site being nearly cleared. The designs, prepared by Mr. Charles Lee, of Whitehall-place, have been approved by Her Majesty's Commissioners of Woods and Forests, the site being Crown property.

UNCOVERING OF A STATUE OF THE PRINCE CONSORT IN BIRMINGHAM.—The Mayor of Birmingham has performed the ceremony of unveiling a statue of the Prince Consort in the Art Gallery of the Midland Institute. The statue, which is of white marble, is the work of Mr. Foley, R.A. It stands on a pedestal as near as possible to the spot where the Prince Consort stood when he laid the foundation-stone of the Midland Institute. The cost of the statue is 1,100, which has been raised by public subscription.

A LANDLORD AND HIS POOR TENANTS.—At an inquest held at the Sessions House, Broad Sanctuary, relative to the death of Elizabeth Nutts, aged 70, who fell from a dangerous staircase at 16, New Peter-street, and so met her death, it was stated in evidence that the house in question is let out in single rooms, the deceased occupying the first-floor back. In order to get to her room she had to walk along a narrow piece of board, placed over a well-staircase. From that board she fell, and sustained a compound fracture of the leg, from which she died. Several of the lodgers spoke as to the decayed and broken-down stairs, and their ineffectual complaints to get them repaired. All the landlord or his agents thought of was to collect the rents, and leave the positively dangerous stairs unrepaired. The jury found a verdict of accidental death, and expressed their opinion that the landlord should at once have the stairs repaired, and not allow them to remain unprotected and in a dangerous condition.

VENEERS FOR WALLS.—According to the *Boston Transcript*, a man in Cambridge, Mass., has made an invention by which wood hangings will take the place of paper. "A very delicate, simple, and beautiful machine has been constructed, which will take a portion of a tree, after it has been cut the right length and width, and shave it up into thin ribbons as wide as a roll of house-paper, making 150 to the inch. These rolls of wood are placed on the walls by paperhangers with paste and brush, precisely in the same manner with paper. The wood is wet when used, and really works easier than paper, because it is much more tough and pliable. In these days, when variety is sought for, one can finish the walls of his house in different woods to suit his taste. One room can be finished in bird's-eye maple, another in chestnut, another in cherry, another whitewood, and so on. Thus he has no limitation, but the real genuine article upon his walls." Something similar, we believe, has been done in England for some time past.

THE PRISONS OF LONDON AND MIDDLESEX.—The Howard Association have issued another tractate, treating especially on this subject. They state in it that two at least of the metropolitan prisons (that of Holloway, belonging to the City, and Coldbath-fields, belonging to the county) have, under the able management of their present governors, displayed in a noteworthy degree the practicability of a great and advantageous increase in the adoption of remunerative and reformatory labour in gaols. Whereas the average cost of each English prisoner is 34s., and the average earnings of each only 2s. (in many prisons only one, or two farthings per day), the inmates of Holloway Prison (most of whom are committed for a month or less) have earned upwards of 900. Clear annual profit on their labour, in addition to a specially large amount of useful economic service rendered within the walls. Some of the long-time prisoners almost earn their own cost. It is of importance that the industrial reformation of criminals should continue to be promoted in the London prisons, and there is room for much further advance even in this direction. But just at present the subject of prison dietary claims the attention of the Association. Prisoners, however, should certainly not be placed in a condition even equal to that of the honest outside or workhouse poor; but the chief deterrent, and at the same time the most reformatory and economic treatment, should consist in a rigorous enforcement of an ample quantum of task-work. Real hard work, and the enforcement of it (but without semi-starvation), is a condition most useful and most hateful to the generality of criminals.

LADY DE ROTHSCHILD'S INDUSTRIAL EXHIBITION.—It is announced that the industrial exhibition to be held at Hulton, Bucks, under the patronage of Lady de Rothschild, will be opened with much ceremony on Whit Monday by Mr. Disraeli. An influential assemblage will be present.

NEW ENGLISH CHAPEL AT CHANTILLY.—A new Wesleyan chapel was opened at Chantilly for divine worship on the 21st ult. It was announced that the chapel was all paid for, and that there only remained a comparatively small amount to be raised for the surroundings of the building.

STEAM RAISED BY GAS.—A machine on Jackson's Patent, at Lyon's-wharf, one of the granaries near Queenhithe, is exciting attention. The principle is the substitution of gas for coal, but in such a form that power can be obtained in a small space. The machinery which illustrates the working of the process was erected by Middleton, engineer, of Southwark, and in a space of about 6 ft. by 5 ft. the power is supplied for raising sacks of grain from the barges in the river at four different places at once. The boiler will generate steam from cold water in twenty minutes after the gas is lighted, and when once generated steam can be kept up by one burner at trifling cost. It is proposed to apply it only where small power is needed.

THE PROPOSED NEW WATER WORKS FOR LIANELLY.—At a recent meeting of the Local Board of Health, tenders for haulage and laying pipes in connexion with the new water works were opened. There were twelve tenders sent in for contract No. 3, the lowest by Messrs. Bewicke & Lambert, being 1,421l. 13s. 4d., and the highest by Messrs. Griffiths & Thomas, 1,918l. The number of tenders for contract No. 4 was the same. The lowest was by Mr. T. Jesson, 282l. The next highest was by Messrs. Bewicke & Lambert, 295l. 15s., and the highest was that of Messrs. W. & T. Thomas, 663l. 6s. 8d. After some discussion the tenders of Messrs. Bewicke & Lambert for both contracts were accepted, subject to the usual inquiries.

INAUGURATION OF THE SHAKESPEARE MEMORIAL LIBRARY AT BIRMINGHAM.—The Shakespeare Memorial Library at Birmingham has been formally opened in the presence of the mayor, several members of the town council, and a large number of the donors. The library, which contains upwards of 1,000 works in English and foreign literature, together with a number of portraits of the great poet and pictures illustrating his writings, &c., has been incorporated with the free libraries of the town, and made over to the town council under certain conditions for its proper maintenance. A handsome room has been fitted up for the reception of the collection. The furnishings of this room, which are of a quaint and Shakspearian character, have cost the corporation 600l.

GREEN GLASS FOR PLANT GROWTH.—Mr. William Thompson, of Dalkeith, in speaking of a visit to Belvoir, says:—"Descending to the large kitchen-garden in the vale beneath the castle, we saw a long span-pit full of greenhouse plants, including azaleas, epacris, and such like, and which had all the glass shaded green, by being washed inside with what painters call green distemper powder mixed with butter-milk, except two sashes. The plants, when placed in this pit some months before to make their summer growth, were all in the same general state as to health and vigour. They got the same treatment as to water, ventilation, &c., the only difference being that those in the two lights referred to were under the clear glass, the others under that which was shaded green; and had we not seen the plants with our own eyes, we could not have believed that there could have been such a difference in their health, growth, and general appearance, and all in favour of those under the green glass. Nor was this growth at the expense of maturity, for we examined the azaleas minutely, and found them well set, with fine hard flower-buds. The shade of green was but a light one, yet such was its effect in this case: and we beg to call the attention of physiologists to the fact, in which there may be something of great importance to horticulture. If such a shade is found to be permanently beneficial to vegetation, glass of the colour could easily be made. If beneficial in summer only, then Mr. Ingram's colouring can be made available for the summer, and be washed off in autumn."

IMPROVEMENT OF EDINBURGH INFIRMARY.—A movement has been set on foot to raise a fund for the rebuilding of the medical hospital of the Royal Infirmary of Edinburgh. The estimated cost of the work is about 100,000l. Nine subscriptions of 100l. each, and several of 500l., have been announced.

THE PAXTON MEMORIAL MUSEUM.—There has just been held a large meeting of working men at Leighton Buzzard, in promotion of a movement set afoot by the Working Men's Institute there, for the erection of a museum in that town in honour of Sir Joseph Paxton, who spent his earlier days in the vicinity. Funds are flowing in, and Lord Charles Russell is expected to lay the first stone on an early day.

AN AGREEABLE MEETING OF WORKMEN AND MASTERS.—The employes of Messrs. Pictor & Sons, Bath stone merchants, Box and Corsham, Wilt., with a few of Messrs. Pictor's friends, upwards of 300, recently met at dinner in the new workshops of the firm, which were decorated with evergreens, &c. The feast was given to celebrate the coming of age of Mr. W. S. Pictor, and his accession to the firm. There were many present who had been employed by the firm upwards of thirty years. The men continued to enjoy themselves with singing, &c., until late in the evening, when they broke up, well pleased with their entertainment, notwithstanding the arrangements had been conducted in strict accordance with the principles advocated by the firm, viz., "total abstinence from all intoxicating liquors." The workmen employed at Messrs. Pictor & Son's depot at Paddington were entertained at a supper, and so participated in the general rejoicing of employers and employed.

THE ALBERT MEMORIAL MUSEUM AT EXETER. This structure, of the selected design for which, by Mr. Haward, we gave a view and plan in our volume for 1864, page 415, has been formally opened. The edifice has been erected at a cost of 12,000l. A grand fancy fair was held, besides a host of festivities, during a whole week, in commemoration of the event. It was soon after the death of the Prince Consort that Sir Stafford Northcote suggested, at a meeting of the Exeter School of Arts, that a memorial should be erected in honour of his Royal Highness. The idea was warmly taken up, and it was agreed that the memorial should take the shape of a museum, school of art, and free library. At a public meeting, 1,800l. were subscribed towards the object, and the late member for the city, Mr. R. E. Gard, gave the site, which is worth 2,000l. The foundation stone was laid October 30, 1866. In the interior the main architectural feature is the staircase leading from the ground-floor. The stairs commences in the centre of the floor, and at the top of the first flight is a niche filled by a statue of the Prince Consort, which has been executed by Mr. Stephens, a local sculptor.

TENDERS.

For Mr. Southcott's new premises, Commercial-road, Finsbury. Mr. P. Sullivan, architect. Quantities supplied by Mr. Parker: Jackson £1,605 0 0 Keeble 1,298 0 0 Piper & Wheeler 1,207 0 0 Ring & Son 1,280 0 0 Richards 1,266 0 0 Lacy & Flexman 1,240 0 0 Saunders 1,090 0 0 Manspratt 983 0 0 Richardson 835 0 0

For works at Cowfold, Sussex. Messrs. E. Habershon, Brock, & Webb, architects:— Keys £3,365 0 0 Manley & Rogers 2,790 0 0 Simpson 2,675 0 0 Halton 2,523 0 0 Wilcox & Spragg 2,395 0 0 Bland 2,349 0 0 Bish 2,277 0 0 Nightingale 2,207 0 0 Fencoe 2,247 0 0 Hall 2,245 0 0

For erecting premises at Bermondsey, for Mr. Wallace. Mr. J. Gale, architect:— Epps & Gates £830 0 0 Wells 584 0 0 Meiers 563 0 0 Nightingale 553 0 0 Wood 507 0 0 Sheppard 495 0 0

For alterations at premises, Millstreet, Bermondsey, for Messrs. Roberts, Adlard, & Co. Mr. Elkington, architect:— Coleman £195 0 0 Eustace 183 0 0 Wills 177 0 0 Wale 174 0 0 Preston (accepted) 162 0 0

For a pair of semi-detached houses to be erected on the Godstone-road, Caterham, Surrey. Mr. Geo. Robson, architect:— With attics. Without attics. Ward £985 0 0 £015 0 0 Ellis 894 0 0 843 0 0 Baldwin 900 0 0 890 0 0 * Accepted, subject to reductions.

For new bathing establishment at Folkestone. Mr. Joseph Gardner, architect. Quantities by Messrs. Pain & Clark:— For Building. Prebble £9,085 0 0 Bowley 7,987 0 0 Denton 7,125 0 0 Head 6,980 0 0 Holdron 6,980 0 0 Unwin 6,911 0 0

For Machinery. Gwyns 2,982 0 0 Wails 1,800 0 0 Hayward 1,665 0 0 Deane 1,585 0 0 Aley 1,568 0 0 Smythe 1,449 0 0 Hoad 1,440 0 0 Francis 1,248 0 0

For erecting a new chapel for the Welsh Presbyterians, Newcastle-Emlyn, South Wales. Rev. T. Thomas, Swansea, architect. Materials fit for the new fabric of chapel to be taken by contractor at the architect's valuation, and the sum deducted from amount of tender:— Woodward & Davies £1,401 17 10 Jones & Thomas 1,370 0 0 Jones & Williams 1,350 13 6 Lloyd & Evans (withdrawn) 1,192 7 8 Edwards & Evans (accepted) 1,180 0 0

For new Wesleyan chapel, Alsager, Cheshire. Mr. Geo. B. Ford, architect:— Strenger £2,522 0 0 Booth 2,440 0 0 Keen 2,230 0 0

For three houses at Wokstanton, near Barslem, for Mr. Clement N. Nash. Mr. Geo. B. Ford, architect:— Estlin £2,878 14 0 Woolrich 2,822 4 3 Bennet & Cooke 2,765 0 0 Brimley & Critchlow 2,660 0 0 Blackhurst 2,483 0 0 Bowden 2,432 0 0 Newton 2,020 0 0

For St. Paul's church, Addiscombe, Croydon. Mr. E. B. Lamb, architect. Quantities supplied by the architect:— Cook £6,610 0 0 Patman & Co. 6,910 0 0 Carter & Son 5,979 0 0 Claxton & Hoys 5,839 0 0 Fish 5,630 0 0 Gammon & Son 5,773 0 0 Key 5,500 0 0 Staines & Son 5,468 0 0 Wardle & Baker 5,400 0 0 Mundy & Hutchinson 5,250 0 0 Hallidge 5,240 0 0 Knight 4,888 0 0 Lacey & Flaxman 4,880 0 0 Wright 4,846 0 0 Hatton 4,643 0 0

For house on Prospect Hill Estate, Walthamstow. Mr. W. A. Longmore, architect. Quantities not supplied:— Munday & Hutchinson £750 0 0 Palmer 745 0 0 Bailey 695 0 0 Elms (accepted) 680 0 0

For twenty-seven houses in the Old Kent-road. Mr. W. Smith, architect:— Fitcher £9,611 0 0 Monday 8,284 0 0 Watkins 7,875 0 0 Welsh 7,749 0 0 Brown 7,734 0 0 Lewis 7,570 0 0 Crabbe & Vaughan 7,500 0 0 Sabey 7,300 0 0 Forster 7,272 0 0 Hearle 7,247 0 0 Bowler 7,215 0 0 Johnson 7,149 0 0 Davis 6,840 0 0 Schofield 7,000 0 0 Blackmore & Morley 6,937 0 0 Blacore 6,096 0 0 West 6,473 0 0 Sherrinur 6,390 0 0 Ellis 6,182 0 0 Smith & Simmonds 6,158 0 0 Wigmore 6,100 0 0 Manspratt 5,631 0 0

For erecting a new Congregational chapel at Cannington, near Bridgewater, Somerset, for the Rev. B. Hurman and the Committee. Messrs. Habershon, Brock, & Webb, architects:— Shortney £910 0 0 Kitch, Brothers 790 10 0 Paddon 767 10 0 Hartree 750 0 0

For building new Baptist chapel and school, Coventry. Mr. John D. Webster, architect. Quantities supplied:— Hewitt £2,560 0 0 Wolf & Kendall 2,400 0 0 Marriott 2,378 0 0 Norwood 2,289 0 0 Trow & Sons 2,210 0 0 Malspeace 2,158 0 0 Claridge 2,079 0 0 Bennett 2,063 0 0 Hayward 2,000 0 0 Wilson 1,900 0 0 Halsall & Co. 1,820 0 0 * Accepted, with slight modification.

For additions and alterations at No. 36, Golden-square, for Mr. A. Gagnier. Mr. Elkington, architect:— Kendall £1,980 0 0 Gammon & Son 1,807 0 0 Little 1,829 0 0 Coleman 1,787 0 0 Conder (accepted) 1,756 0 0

For houses, cottages, &c., for Mr. John B. Soper, Basingstoke. Mr. Charles Smith, Reading, architect:— Barnicott £2,190 0 0 Barnicott 2,158 0 0 Thorne 2,003 7 0 Musselwhite 1,997 0 0 Pool 1,931 0 0 Matthews 1,951 0 0 Stevens 1,830 0 0 Dover 1,827 0 0 Grover 1,816 0 0 Bland 1,678 3 7 Alway (accepted) 1,630 0 0

For constructing sewer in the Crown-road, Fulham, for the Board of Works for the Fulham district:— Reddin £3,120 0 0 Wilson 2,890 0 0 Chamberlain 2,800 0 0 Chamberlain 2,900 0 0 Bloomfield 2,858 0 0 Moxon 2,840 0 0 Floyd 2,410 0 0 Goodair 2,128 0 0 Hirst & Co. 2,059 0 0 Whitlock 2,040 0 0 Wainwright 2,000 0 0 Williams & Co. 1,950 0 0 Wigmore (accepted) 1,990 0 0 Porter 1,350 0 0

For constructing sewer in the Fulham-road, Fulham, for the Board of Works for the Fulham district:— Reddin £3,967 0 0 Wilson 3,420 0 0 Keeble 3,410 0 0 Chamberlain 3,200 0 0 Goodair 3,068 0 0 Whitlock 2,950 0 0 Williams & Co. 2,940 0 0 Chamberlain 2,820 0 0 Bloomfield 2,818 0 0 Moxon 2,750 0 0 Floyd 2,718 0 0 Porter 2,250 0 0 Wainwright 2,200 0 0 Wigmore (accepted) 2,190 10 0

For both of the above:— Porter £240 0 0 Nicholson 5,100 0 0

For constructing the King's Scholars Pond sewers, St. John's-road, for the Metropolitan Board of Works:— Scott & Co. £11,333 0 0 Hill & Keddell 13,800 0 0 Ferguson 12,499 0 0 J. & S. Williams 11,800 0 0 Wigmore 11,900 0 0 Smith & Co. 10,300 0 0 Crockett 9,300 0 0 Nicholson 8,350 0 0 Morris & Bloomfield 9,140 0 0 Hirst & Co. 8,849 0 0

For finishing public-house and shop adjoining at Leyton Essex, for Mr. W. Richardson. Mr. J. M. Dean, architect:— Smith £853 0 0 Davey 650 0 0 Mansfield 489 0 0 Harris (accepted) 467 0 0

For a wing to Beaumont-lodge, Winchmore-hill, Middlesex. Mr. J. H. Rowley, architect. Quantities by T. Green:— Crabb & Vaughan £1,854 0 0 Field & Sons 1,280 0 0 Rivett 1,213 0 0 Bayes 1,191 0 0 Shepherd 1,129 0 0 Patman 1,064 0 0 Rig & Sons 1,071 0 0 Sharpington & Coles 1,048 0 0

TO CORRESPONDENTS.

THE B. & W.—J. R. S.—E. D. R.—G. L.—W. H.—R. E.—F.—S. C.—W. & S.—J. R.—A. H.—G. S.—A. K.—I. F.—G. L. P.—W. F. R. T. C. J.—J. S.—R. T.—J. H. J.—Builder.—V. V. & M.—M. & H. C. L.—J. M. D.—W. R.—H. A. J. (where has the method alluded to been successfully put into practice? P. A. (treated)—M. E. E. (which would depend on circumstances. Take proper advice). G. J. (next week).

NOTE.—Architects who are unwilling (as we are) that their name should not accompany lists of tenders with which they are concerned may prevent the omission by sending lists themselves. We can repeat lists on the ground of such omission.

We are compelled to decline pointing out books and gifts addressed to us.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily a publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

Advertisements cannot be received for the current week's issue later than THREE o'clock p.m. on THURSDAY.

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The Builder.

VOL. XXVI.—No. 1318.

Idling at
Amiens Cathedral.

N idle tourist has a complacent senso of conscientiousness as he concludes a short day's travelling by rail from Hazebrouk at Amiens. Would not an opportunity of revisiting the cathedral justify the pains of even a hurried traveller? This, perhaps, is the French cathedral that is more familiar to Englishmen than any other, except Notre Dame, in Paris; and by delineation, description, and occasional reference, it comes under the notice of lovers of architecture with a frequency

that would make the very mention of any less interesting structure an annoyance. We visit it again and again, however, with confident expectation of renewed pleasure, and we renew notes of observation upon it with the calmest reliance on the tolerance of those who are not so fortunate as to be again upon the spot. The notes are but those of an idler, yet even these are set down without apology, for they rather ask for sympathy with enjoyment than make any pretence of novelty or particular instructiveness.

The west front of the cathedral seems at present as falsely presented as that of Cologne, facing, as it does, an aggregation of insignificant and base structures in irreverent proximity; but we have only to pass through the intersecting streets to perceive that encroachments have covered up the ground that, originally open, sloped upwards to the grand portales, and afforded the façade its noblest aspect.

Noble and effective as this façade must always remain, it is impossible, after a fair appreciation of the interior, not to regret that it was not to be the completed work of the genius to whom we owe the body and choir of the cathedral. The westward interior terminations of aisles and naves of cathedrals generally are apt to be ineffective,—to afflict us like the hithos of a grand intention,—and Amiens is not the exception. This was the portion of the structure usually left to the last, and here the master-mind of the original designer was more likely, where growth of art so largely extended beyond ordinary limits of life, to be withdrawn from the work. Even at Cologne, uniform as the entire ancient work at first appears, the signs of degradation in intersecting and vanishing mouldings are palpably apparent in the western pier-arches.

At Amiens the influence of a modified design is as visible in the western details within as in the façade, which is as absolutely secondary to the main structure as that of Reims. Reims, however, with a general analogy of design, is incomparably superior in respect of breadth,—the more wonderful as it is as pure an application to a completed front as if such a front as

that of Amiens were now to be attached to the existing façade of Notre Dame at Paris. But breadth most exquisitely distributed, and most forcibly felt, is the noble characteristic of the interior of Amiens. Gothic architecture here has attained its majority,—has completed its emancipation,—has sealed its independence and originality. Proud as we have every right to be of the bold originality of Salisbury, it is impossible to compare it with the most genuine part of the design of Amiens, and not to feel that, in holding on to the indulgence of the horizontal story instead of breaking boldly with established lines and giving predominance to the vertical compartment, the especial privilege of loftiness which is the appanage of the style, its grand chance of most distinctive character, was missed,—missed the more unfortunately as it received such magnificent expression in the spire without, and the graduated heights of transepts and nave. Salisbury, however, he it said in passing, has an excellence, though only in rudimentary form, that the style of Amiens has passed by to reach at once a simple and more speedy finish. The eye is but ill satisfied with the nestle contours of the English compound roll-mouldings; but they introduce the combinations of multiple archivolts that were soon to be drawn more decisively and contrasted with a knowledge of light and shade and instinct for subordination that give the Early English style at its heat a high place amongst the very highest.

The predominance of the compartment is effected at Amiens, in the simplest but perfectly effective way. The ranged supports of the columniated nave are still not entirely obliterated, but shafts attached to the cylindrical piers rise from their bases, and proceed upward with well-defined prominence, and uninterruptedly to bear the transverse arch of the quadripartite vaulting. The comparatively close spacing of these shafts, and the happiness of their proportion, albeit extended to the very extreme of permissible loftiness, give to the nave the noble expression of a continuous arcade that passes by no sudden break, but in natural development, into the wide span of the central crossing. A secondary effect of the same kind was obtained by the vaulting shafts attached at the back of the piers, and responsive to wall shaft, while two intermediate shafts completing four about the vast central cylinder, and of well-subordinated diameter, bear the archivolts of the arches between aisle and nave. The shafts which carry the diagonal ribs of the nave rise from bases which nest in nooks upon the abacus of the nave pier; those which bear the arch mouldings of the clearstory rise from nooks upon the triforium band or string course. The tendency of such a successive augmentation of the group of shafts is, no doubt, to introduce an appearance of incongruous widening of the pier from below upwards,—a disadvantage that was afterwards sought to be counteracted by giving to each and all independent and conjoint origin at the very base of the nave pier.

Howbeit, it does not appear to an idle and might not even to a more concentrated observer, that the disadvantage has declared itself in the order of Amiens. The whole is a question, not of absolute propriety and strict law of style, but of propriety and style as conciliated by proportion. The proportions appear to be so harmoniously arranged here that style fairly makes a pause and asserts the sufficiency of its resources, even at this stage of development, to realize well-balanced beauty. The next stage will be one of transition,—that is, of that intermediate disturbance of balance which it will be for a new genius again to subdue and regulate by new adjustments; but in the mean time,—fairly enough even for all time,—the design of a bay of Amiens Cathedral remains a completed triumph of architecture.

This simple bay is relieved and varied by the most graceful differentiations of span in aisle and crossing, and choir and aisles of choir, and reaching the most pleasing and most marked contrast in the closer spacings at the turn of the apse behind the altar. The compound piers of the choir aisles and the graceful treatment of the vaulting of the crossing, are developed naturally from the same combination, and must command admiration, even when space warns that detailed exposition may be superfluous.

There is at least a seeming divergence from verticality,—an inward how,—in the great shafts of the arch at the crossing; but whether more than seeming is not easy to decide; the seeming effect might result easily from optical contrast with the bow of the arch: the real effect has a *vera causa* at hand in the pressure of aisle arcuation; the lamps of the nave are suspended by wire of such rigidity as to be useless for the service of a plumb-line. The bow is probably too true a reality, although the eye can detect none of the openings and faults of joints that should be its necessary consequence. The piers of the choir of St. Paul's seem really affected in the same unfortunate way; and yet Wren, as we have it under his hand, was quite aware of the liability in cathedral building. Be it how it may—a reality or a seeming—the mere appearance is a blemish and lamentable drawback.

It is among the glories of Amiens, as an early model of a perfected style of Gothic, that the clearstory windows, with their mouldings, accurately and entirely fill the groined openings,—the entire plane up to the proper vaulting. The clearness—cleanness of articulation—thus achieved has all the value in architecture that a Greek ascribed to the freedom from superfluous fat and idle muscle and overgrowth of bone in a well-formed athletic frame, that had had all the advantage of persistent and able exercise and training.

The terminations of the transepts, like that of the western nave, are of later date and design than the ever-to-be-exalted nave and choir, but they are true to the original principle in this respect, and their enormous windows fill, with no excessive margin of moulding, the vertical plane from spring of archivolt to apex. The design of the transept windows, again, however later, adheres generally to the leading distributions of the original windows. In these a circle, almost as large as the head of the pointed arch will admit, rests upon the points of arches of two sblights below, divided by a central pillar. The transept window is but such another on an enormous scale, with the differences that are enforced and suggested by scale: a circle of such diameter would have but inadequate bearing on a pair of arches, and their numbers are necessarily increased on this account, as well as for further subdivision of wide spaces.

Precisely the same principle is observable in the transept windows at Sens Cathedral. The heads of these are each filled with one large circle, having its centre on a line with the spring of the arch; the interval under the apex is filled with symmetrical but insignificant foiled circles; and the grand circle rests on the points of five sblights of varied height, the smaller in the middle, the mouldings of the side-lights being confluent with the great circle at the points of contact and interference.

So we may trace the origin of that important feature of French architecture—the great rose-window, of elaborate design and exquisite mouldings,—thus most directly, though, as in the case of so many other developments, it is the concurrence of influences that ultimately induce decision. At Sens and at Amiens we see the great rose-window, rudimentary in smaller lights, ready to detach itself from its adjuncts, from ogival opening and supporting awnlight, and yet the last detaching process might never

have taken place,—nay, the development might never have advanced so far, if the Lombard architect had never set an example and never been followed by the Norman.

The rose of the north window at Amiens seemed to the observer,—idle eyes,—much the finest, the southern in the second place, and lastly the western, of which the designer seemed to have had more consideration for the external effect of his moldings and pattern than for susceptibility of illuminated effect,—certainly, than for receptiveness of a storied design, as seen from within.

The cathedral has received an extension that is very considerable but was never contemplated by the original designing genius, in the chapels which now open out of the side aisles, and fill up the spaces between the buttresses. It is not alone that the inferior and, indeed, often very wretched, tracery of the windows betrays the later date,—the marks are palpable in groove and attachment, where the windows were originally inserted, filling the arch which now gives entrance, through wall broken down to the ground, to these supplementary chapels. Their effect upon the exterior is not happy, as they aid very much a certain inflated and boneless look that makes the structure unattractive, if not ungainly, from without. This, however, might be condoned,—the questionable value of the deep buttress-walls being taken into account,—if the interior really receives from them an accession of value. This is at least very doubtful. They certainly give a degree of expansion to the nave that detracts from the gradation of effect with which the choir, with its additional aisles, most formerly have been so advantageously approached. Moreover, it can scarcely be overlooked that a series of windows of such magnitude filled with coloured glass must have added an effect to both aisle and nave much surpassing the remoter borrowed reflections from a multitude of smaller openings.

In this respect then, as in others,—in the secondary transepts and western front,—there seems cause for regret that we have lost a portion of the original conception of the first great architect: thankful, however, all must ever be who have either idled or studied at Amiens, that we have left to us in uniform simplicity and consistent grandeur so large a proportion realized in the existing fabric of one of the very grandest imaginations that man has ever dared to hope to carry into execution.

DEFRAUDED DEBENTURE HOLDERS.

HAVING on more than one previous occasion called the attention of our readers to the calamitous story of the London, Chatham, and Dover Railway Company, we should not now revert to the lengthened proceedings which are slowly unveiling such a serpentine train under the mild patience of Mr. Commissioner Winslow, were it not for the appearance of new and striking features in a case which might have been accounted, two months ago, very noticeable in the list of *causes célèbres*.

So intimately is the present waning phase in the history of the public works of this country connected with the operation of the principles, or (to coin a word) the unprinciples, now illustrated, that it is of extreme importance to all those in any way connected with the engineering profession, or with the shrewdness of the builder or of the contractor, to understand the actual course by which sums so enormous, as matter of figures, have evaporated into figures alone. The long and careful reports published by the daily papers are necessarily extremely condensed, and it requires some considerable amount of independently acquired knowledge of the case to be able fully to understand them. In addition to this circumstance, it must be regretted that the investigation now taking place is carried on before a court almost entirely unchecked and unassisted by the presence of a bar. The conduct of a case by a solicitor, however eminent, is almost necessarily less satisfactory than the more rapid but more practised manner in which a leading barrister pounces upon the salient points. In the present case, too, there has been the additional misfortune of the absence of any such opening speech as should lead those who watch the important inquiry to see always distinctly the point at which the examiner was aiming. Time, on one or two occasions, was, if not sheerly thrown away, yet dealt with as if it were one of the most valueless of commodities;

and the result of a personal attendance on several occasions, with the sole object of watching the proceedings, was the conviction that the accuser had lost his way, that the personal discredit of the bankrupt was his only aim, and that the case of the directors of the London, Chatham, and Dover Railway was only rendered more and more obscure—morally, not intellectually, obscure—by every fact elicited by their advocate.

The two last examinations have modified this opinion. First, we come to the nonobscuring conclusion that, however tedious the proceedings, and however exorbitant the consumption of the time of commissioner, attorneys, and witnesses, the public is unquestionably the gainer by that full exposure of an almost incredible course of action, which, perhaps, could not have been attained by any other machinery.

Secondly, we think that a point which has been present to the mind of the examiner, and lost sight of by others, is the question of the official identity of the present directors of the London, Chatham, and Dover Railway with their predecessors. The former can be regarded in no other light than as principals in any irregularities in which the contractors—their servants and agents in law, though their masters in wit, such as it was—were, after all, only accessories. It is in this respect that the heavy blows planted by the solicitor on the face of the honourable baronet tied to the stake seemed so roughly to shake the platform of the attack. But if the case had assumed, or could be made to assume, the aspect of a claim on behalf of the plundered and misled shareholders to restitution from those who had induced them to subscribe their money on pretences now shown to be absolutely untrue; then, and then only, every effort of the solicitor for the Company would have been deserving of entire approval.

We have already referred to the fact, as proved in the earlier sittings, that the actual result of the several agreements between the old directors and their contractors was, that out of the original parliamentary capital of 2,200,000l., the sum of 1,375,000l. was actually subscribed and paid by the public in hard cash, while the nominal sum of 825,000l., represented by the "A. Shares" the nest-egg of the whole proceeding, was handed over to the contractors, for no other consideration whatever except the fact that they had induced certain brokers to induce the public to subscribe. Nor was this all; for, in addition to the shares, which of course would have no actual intrinsic value except in so far as they represented a claim to dividend out of the working of the railway, the sum of 34,375l. *in cash* was further handed over to the contractors under the same unusual condition. The whole of this extraordinary proceeding was invested with as much regularity as the exchange of clear and precise letters, the passing of resolutions by the Board, and the aid of the legal advisers of the several parties (the joint-advisers of the several parties) could impart to it. The brokers, indeed, may be thought to have secured the lion's share of the spoil, as five per cent. on the amount of the contract, and half the commission or rebate at which the shares and bonds were taken by the contractors from the Company (that is to say, half of 859,375l., plus five per cent. on the amount of the contract) was claimed by these persons for putting their hands into the pockets—not, as it turned out, of their own garments, but of those of the public. Very near half a million of money,—in cash and shares,—ran down this sink-trap.

The new feature which the examinations held during the month of April have disclosed was indeed indicated on the 11th of March. A certificate was then read to the effect that the capital of 1,650,000l. for the construction of the Western Extension had been subscribed, and the examination was directed to establish the fact that this certificate, which was rendered necessary to comply with the provisions of the Companies Clauses Consolidation Act, had been obtained by false evidence. The difference of opinion, the discussion of which occupied no inconsiderable portion of one day's hearing, was this:—Mr. Linklater insisted that a subscription (a nominal subscription) of 618,750l., or 825,000l. less the "rebate" of 25 per cent., was not a subscription of 825,000l., as sworn in order to obtain the certificate. Sir Morton Peto saw an essential difference between a subscription of only 75 per cent. of the nominal capital, which he denied that he had arranged for, and a subscription of 100 per cent., with an agreement for the return of a rebate of 25 per cent., which he admitted.

The court handsly allowed the disputants to elucidate this important difference, each in his own way. It is to be hoped that the distinction was fully satisfactory to the conscience of Sir Morton, which, indeed, appeared to be the case.

The precise amount of cooking, however, or in any way making pleasant the steps taken to obtain the colourable fulfilment of the requirements of the law, in this instance, are so trifling in comparison with what followed, that they excite interest merely on account of their tentative and experimental character. This first certificate was merely the pilot balloon, sent up to test the currents in the upper regions to which the Great Nassau monster was about to be elevated. If a subscription with a "rebate" was a subscription according to Act of Parliament, the amount of the rebate was a mere matter of detail. If 25 per cent. was legal, who should say that 50, that 75, that 100, would be illegal? So by-and-by capital was subscribed for under a discount of all per cent.

Even the formality of exchanging cheques was abandoned. The simpler process of exchanging receipts was had recourse to for "carrying out the transaction without paying the cheques through the bankers: they were not, in fact, signed. He (Sir Morton Peto) was informed that Mr. Newman had said that he should prefer that receipts were given in lieu of the cheques."

The London, Chatham, and Dover Railway Company, in their report, for the information of the shareholders, on the accounts between this Company and the contractors, admit the receipt by the Company from the public of the sum of 533,000l. under the title of "Debtentures, 1864." In authorising railway companies to raise money on debtentures the Legislature has stipulated that a proportionate share-capital shall have been previously not only supplied, but in part paid up. The intention of this very proper provision is, that those who advance money under a mortgage shall have some tangible security. 100l. subscribed, and 50l. of it spent, has been regarded as the least admissible margin on which 33l. could be safely borrowed. This is the object and the purport of the law. The manner in which the "financiers" of the London, Chatham, and Dover Railway Company, under the advice of their legal officers, proceeded to fulfil the intentions of the Legislature was as follows.

In April, 1864, Messrs. Peto & Co. applied to the finance committee for some 200,000l. debtenture-bonds and debtentures, in order to deposit with the Imperial Mercantile Company. Sir Morton knew, at the time that this application was "accepted," that the Company was not authorised to issue the securities, and that half the amount of capital had not been paid up. He was likely to be fully informed on the subject, as he had contracted with the Company to "subscribe" for rather more than a million of the 1,600,000l. capital known as "A. Shares, 1864," on the security of which these debtentures were to be legalised, "at 40 per 100." That is, at a discount of 60 per cent., a great improvement on the hezzyry 25 per cent. of the "rebates" on the "A. Shares" of 1860. Towards this parliamentary capital "a nominee of witness" subscribed the trifling amount of a quarter of a million sterling. John Harvey, "a clerk to the firm," subscribed 100,000l.; Mr. Trevelthick "in the employment of the firm," subscribed 100,000l.; Mr. Christian, "the manager," subscribed 130,000l.; Mr. Miller, "a broker's clerk," subscribed 65,630l. "The shares for which the firm did not sign they had agreed to take," and the shares for which the above capitalists had signed "for the firm" were afterwards handed over to the latter commercial entity. But when the firm obtained the debtentures, the legality of the issue of which depended on the *bonâ fide* subscription, and half payment-up, of the sums in question, it had "paid nothing in respect of the 1,600,000l." It seems, therefore, to have been almost a superfluous piece of candour for Sir S. M. Peto to write, on the 3rd of November, 1864, "We feel no delicacy in asking you to allow me to have the remainder of the Metropolitan Extension stock." The only curiosity excusable on the matter is, as to what edition of the "Complete Letter-Writer," or other repository of enthusiastic English terms, Sir Morton could have resorted to obtain the singularly happy expression, "delicacy." A man of less genius would have been content with a simpler word.

The 1,600,000l. shares, then, were handed over to Sir M. Peto. Some were "given away" the rest he held in May, 1865. In February, 1866,

the holder attended the half-yearly meeting of the Company, when the shareholders were informed that 804,000*l.* had been paid up on those shares! The Credit Fancier Company succeeded in selling nearly the whole of these shares to the public at 52*l.* 10*s.* for the 100*l.* share (the contractors having taken them at 40*l.*, which was to be paid "in works"), with interest at 6 per cent. guaranteed for two years and a half. Afterwards the firm repurchased three-fourths of this stock, at a premium of 3 per cent., "in order to make a market." It was a fortunate event for the sellers.

Subscription by subscribers who represented other persons, not any of whom had any idea of paying except to the amount of two-fifths of the nominal amount, at some indefinite time, "in works" was not, however, quite sufficient to keep all parties within the four corners of the Act of Parliament. But, as extremely eminent lawyers advised them all, it was thought as well to attempt some colourable compliance with the letter of the law. The person who designed the method of doing this deserves a brighter immortality, a more wide-spread fame, than even the inventor of "Lloyd's bonds." No living writer can hope to do justice to that fertile invention. The pen of the writer of the "Provincial Letters" alone could have been relied on for that purpose. And amid all the casuistry dissected by Pascal we miss the great novel doctrine of "anticipation." Subscriptions were paid by anticipation, works were done by anticipation, were as naturally paid for by anticipation. So it came to pass that the public took the debentures on anticipation, only this latter anticipation had an element in it which was absent in the former instances; it was the element of actual payment of cash invested in anticipation of even the most shadowy security. It was a triumphant application of a new law.

On the 22nd of April, 1864, Mr. Christian signed a receipt for 429,700*l.*, as "part of the arrangement by which the firm was to provide one-half the capital of 850,000*l.*" (This appears to be a reversion to an imaginary arrangement prior to the bargain to take the whole 1,600,000*l.* at 40*l.*) In exchange for that receipt, Mr. Johnson, the secretary of the Company, handed to Mr. Christian two receipts, one for 214,000*l.* in deposit, and in anticipation of Metropolitan Extension A. Shares, and the other for 215,000*l.* in respect of Metropolitan Extension B. Shares. By the exchange of these three pieces of paper, which it is to be hoped were duly stamped, all difficulties were triumphantly surmounted, under the guidance of Messrs. Froehfield & Newman. Sir M. Peto "knows very little about it."

It seems as unnecessary as it might prove tedious to go into any more detail. The next hearing of the case is adjourned till the 27th of May, and no doubt there are further disclosures forthcoming. But enough is as good as a feast. And if it be not enough to the grown-up and educated men, peers and members of the House of Commons, stockbrokers and contractors, directors, clerks, and agents, engaged, under the advice of men of the highest repute as solicitors, in the deliberate evasion of the law, and the patient and skilful construction of a trap for the money of the public, it is hard to say what is enough. People must be uncommonly hungry who ask for more.

As to the direct object of the gentleman conducting the examination, as we remarked before, we feel somewhat in the dark. On the case as far as it has gone at present we do not see any justification whatever for the claim made by the directors of the London, Chatham, and Dover Railway Company against the estate of Messrs. Peto, Betts, & Crampton. We do not see how the directors of 1868 can repudiate the regularly recorded official acts of the directors of 1864. The case of the shareholders as individuals, on the other hand, appears to us to be clear and simple. It is liable to the remark that "it is ill taking the brooks off a Highlander;" and probably the sooner the attention of the sufferers is turned to some mode of replacing their loss by industry not connected with "l'exploitation de l'homme par l'homme," the better for them. Still it is extremely desirable that the whole case should be brought out into full daylight. Nor does it seem less desirable that such a judgment should be pronounced on the matter as shall mark with judicial reprobation all the parties to this great fraud. If they have nothing to pay, it does not follow that the injured should freely forgive them all. Especially does it seem appro-

priate that those persons who occupy positions of what may be called public confidence should be duly noted and branded for their complicity. Any explanation they have to offer should, of course, be patiently listened to, but unless forgery be added to the imputations thrown upon those who already have enough to answer for, there seems but little available ground for defence. The law speaks of what it calls conspiracy in the harshest and most peremptory tones. The mere accusation of men as conspirators is an offence, unless it be judicially justifiable. But what other term in the English language is applicable to the series of "arrangements" by which the hoodwinked public were induced to subscribe 638,000*l.* for "Debentures, 1864"?

THE ARCHITECTURAL DRAWINGS IN THE ROYAL ACADEMY EXHIBITION.

In the year 1768 the Royal Academy of Arts was founded (the Exhibition was opened January, 1769), and on Monday last the public were admitted, for the first time, to view the one hundredth exhibition held under its auspices. The walls of the different rooms are covered with pictures of average merit. The number of paintings sent for exhibition was, we understand, very much in excess of the number submitted last year; the wall-space remains the same, and the consequence of course is that the number of the rejected and discontented has proportionately increased. The "Eldest Sister of the Arts" has fared but poorly at the hands of the Council. It is to be desired that next year may see the Academy occupying their new home in Burlington-gardens, as, judging by the way in which the space allotted to architecture has been gradually curtailed, and their having already elbowed the art into the corner of an ante-room, we might expect, at the same rate of progression, to see it, in another season or so, kicked down the steps, and out of the building altogether. The few drawings hanging there are not fair specimens, and do not represent the capabilities of architects of the present day.

In the new building, painting will have a glorious opportunity to make amends to her injured relative for many years of cruelty. The advancement of architecture was one of the primary objects for which the Academy was founded, but this particular clause in the charter seems to be overlooked. Why are there so few architects amongst the body of academicians?

To guard against the probability of any of our readers being unable to find the small collection of architectural drawings, we may mention that the right-hand side of the south room—the first entered by the visitor—is thus appropriated. Let us see what is to be found there.

No. 831, "Brambletye, near East Grinstead," now erecting for Mr. Donald Larach, on designs, and under the superintendence of Mr. T. Roger Smith. This is a quiet and unpretending domestic group, in which each part of the building honestly expresses the purpose for which it was designed. The entrance-porch, hall, and tower are well accentuated by a richer treatment of detail and dignity of parts. The colouring is bold and harmonious, and some parts of the drawing are really charming pieces of landscape painting. The well-known ruins of Brambletye House remaining, it seems to be a mistake to give this name to a new building.

No. 832, "Holyrood Chapel, Edinburgh," T. Cafe, jun. The sketch of this fine old ruin has the merit of appearing to have been worked out on the spot. The colouring is dull; but this may be intentional, to keep the drawing more in harmony with the shattered fortunes of the place.

No. 842, "Mausoleum (of Sicilian marble and granite) erected from the designs and under the direction of J. Gibson." The upper is the best portion of this design, but it is too depressed to produce a pleasing outline in execution.

No. 843, "Design for a Mansion, proposed to be erected at Encombe, Dorsetshire, for the Right Hon. the Earl of Eldon," by David Brandon. The style adopted is Late Tudor, and it is altogether a very good example of what such a residence should be. The house is shown to be charmingly situated at the foot of some well-wooded hills, having ornamental water in front of it.

No. 845, "Chartres Cathedral," E. George. The sketching is clever and spirited, and the glow and tone of the colouring highly satisfactory.

No. 846, "The Sanatorium at Harrow School," C. F. Hayward. The open porch and pyramidal roof (with its *niche* termination placed over the staircase) is well-considered and effective. The materials employed in the building are red and blue bricks, with cut stone for mullions, &c., having coloured tiles for the roofs.

No. 849, "The Convent of Santa Maria della Salute," F. W. Scholander. The drawing of the domes is very commendable, and the climatic effect well indicated in the colouring. This drawing repays close examination.

No. 850, "View of the Quadrangle of Miss Burdett Coutts's Market in Bethnal-green," now approaching completion, from the designs and under the superintendence of H. A. Darbishire. We have already published an illustration of this building. The tower is the least satisfactory part of the design.

No. 851, "Exterior of the Convent of Saint Margaret, East Grinstead, Sussex," erected from the design of G. E. Street, A.R.A. A pen-and-ink drawing of a very severe design. The gable to the left side of the group is good, and the spire looks better in execution than it does in the drawing.

No. 852, "St. John's College, Cambridge: View of the New Chapel," now nearly completed, from the designs of Professor G. G. Scott, R.A., by J. D. Wyatt. This is a pretty drawing, delicately treated. The east end is apsidal and well arranged, the north chapel or transept resembling one of the old monastic rooms of an abbey, with its blank arcade corresponding to the main windows of the chapel, and its isolated hipped roof seems to have little connexion with the rest of the building. A good opportunity for raising a graceful spire appears to have been missed.

No. 853, "Silk-mercers' Bazaar, Cairo," by R. P. Spiers, has a cool and refreshing appearance. The shade thrown upon the street is pleasantly varied by the rich costumes of the merchants and their customers. This is a good specimen of Mr. Spiers's appreciation of form and colour.

No. 854, "New Church for Taunton," B. Ferrey. The tower, with its low spire of tiles, placed over the junction of the nave and transepts, is dignified. The chancel seems too short to balance the length of the nave. The windows to the aisles are too small in proportion to those forming the clerestory of the nave.

No. 855, "Design for a Town-hall, to which the Soane Medalion for 1867 was awarded by the Royal Institute of British Architects, G. Vials. The tower is fair in outline, but on far too large a scale for the rest of the main facade. The extremities of this principal front are not sufficiently imposing and lofty to balance the central tower. As the design of a young man it is highly creditable.

No. 859, "Mechanics' Institute," J. P. Jones. An unfortunate column of the same diameter as the rest in the main arcade, has to support one half of a lofty angle tower in addition to the full allowance of upper story!

No. 861, "Interior of a Church," by H. Conybeare, is a highly-finished coloured drawing of a building by the author, already illustrated in the *Builder*.

No. 863, "Crews Hall Restored, with Additions," E. M. Barry, A.R.A. The materials used are red brick, black brick for the diagonal patterns, and cut-stone dressings. The style is Elizabethan, similar to that of the old hall not long since burnt down. The roof of the tower might wisely be raised, on account of the depressing effect which the angle chimneys will exercise over it.

Mr. Waterhouse's design for the Manchester Town-hall has been so recently described and illustrated in those pages that we may pass over No. 865.

No. 869, "Mansion at Possingworth, Sussex," by M. D. Wyatt, is a very varied and effective group in the Tudor style. The material used throughout is cut stone. The conservatory is handsome. Mr. Wyatt also exhibits his India Office Court.

No. 870, "Interior, looking east, of the Crimean Memorial Church, Pera, Constantinople," just completed from the designs of G. E. Street, A.R.A. This view is quietly coloured, and for the most part well drawn. The chancel is groined, clustered columns marking the separation of the sanctuary from the choir. A rose window of pleasing design is placed over the altar. The clerestory to the nave is finely composed.

No. 873, "Design for a National Gallery upon

the present site," being an adaptation of a design submitted for the gold medal of the Royal Academy in the year 1849, H. S. Legg. A rather pleasing Classic composition. The central dome is too low to be equal to its position, and the circular features flanking the main façade are not sufficiently imposing.

No. 875, "Houze, Coombe Lammas, Esher," F. Wallen. An original group. The finish of the bay window is suggestive, and would be improved by its roof being carried up in a pyramidal form above the gables of the dormer windows.

No. 876, "Alley's College, Dulwich," by C. Barry, we propose to illustrate shortly in our pages.

Nos. 884 and 885 are coloured sketches, by E. George: one of "Lansanne Cathedral," and the other showing the "Churches of Notre Dame and S. Pierre, Caen." The sun of Academic favour evidently shines upon this artist, judging from the number of his works exhibited.

No. 887, "New Mansions, Bayswater-road," now in course of erection, by R. W. Edis. The extremities of these groups are well accentuated by bold pavilion roofs, and the most is made of the broad stack of chimneys on the outer wall. The bow-windows and balconies are calculated to look well in execution.

No. 889, "Premiated Design for the Bristol Assize Courts," E. W. Godwin & Crisp. This is a handsome and manly composition. The lower story is quiet and massive, all the architectural enrichment being reserved for the principal story. Over the windows on the main floor are crocketed hood gables, springing from corbels supporting staves under canopies. Above is a rich cornice abutting against small circular angle turrets. The dormer windows are remindful of those of the Hôtel de Cluny. The clock-tower is original and pleasing in design.

No. 891, "Holy Trinity Church, Shaw, near Oldham," by R. W. Drew, is a most clumsy affair altogether, and it should never have been submitted by the author, much less hung by the committee.

No. 896, "The Reredos now in progress for Chiochester Cathedral," Slater & Carpenter, is noticeable for the amount and size of the sculpture introduced.

THE ARCHITECTURAL EXHIBITION, CONDUIT-STREET.*

No. 52. "New Roman Catholic Church, now erecting in Kensington," by George Goldie. This coloured drawing represents an imposing interior, one calculated to look better in execution than in the view given. The columns to the nave arches are pleasing, but the soffits of the arches themselves are bare and flat, being of the full thickness of the wall, and relieved by nothing more than a plain angle bead. The roof is somewhat low in effect; it is trefoil in shape, having the purlins forming the angles of the cusp supported by shafts resting on carved tie-beams. The chancel is groined with the ribs springing from angle-shafts. The eye painfully feels the want of a ridge-rib. No. 53, "New Cemetery Chapels, Diss, Norfolk," J. W. Muskett, is interesting solely from being an architectural perspective view treated in oil-colours. The trees and sky are, however, the most pleasing part of the picture. No. 60, "New Church at Great Yarmouth," J. T. Bottle. The treatment of the upper part of the tower is suggestive. The spire, however, requires further consideration. No. 67, "Sketch of Sideboard," by B. J. Talbot. Substantial and quaint in design, delicately drawn and coloured. No. 75, "Pencil-sketch of a Drawing-room," by the same architect, showing a complete set of furniture as well as general decorations, carefully worked out.

Nos. 80 and 82. "Design for the Bristol Assize Courts," to which Mr. A. Waterhouse awarded the premiums, are hold and manly in feeling. No. 91, "Design for a Clock-tower, Leicester," J. Johnson, is in the Neo-Grec style. The outline is pleasing, but the portion above the clock is quite capable of improvement. The perspective of the circular finish, as well as of the clock-dials, is faulty. Red and yellow courses alternating are shown in the main portion of the tower. No. 97, A Gothic version, in a free treatment of the Early French style, of the same subject, and by the same

architect, is also good on the whole. The transition, however, from the square balcony over the clocks to the octagonal lantern which finishes the composition is by no means happy, for the space between the angle pinnacles and the side of the octagon is excessive. There is also a want of buttresses at the base of the tower.

No. 105, "Town Hall, Luton," T. T. Smith. An imposing design, well-considered in outline and detail. The colouring and finish of the drawing are worthy of careful examination. Nos. 106 and 107, "St. Swithin's Church, Lincoln," Messrs. Spiers and Drury. The tower and spire are decidedly fine, but the canopies resting on the brackets of the spire should be re-considered. The shafts to these canopies, being above vertical in the drawing, bave, from their proximity to the raking lines of the spire, the unpleasant appearance of tumbling forward. To avoid this damaging effect, the shafts should, in reality, incline slightly towards the spire. The treatment of the groining to the square-ended chancel is peculiar.

Nos. 115 and 116, Two frames containing ten sketches, principally from France and Germany, by Mr. T. H. Watson, who gained the Soane Medallion or Travelling Studentship of the Institute. The drawings are very valuable, from the number of measured details amongst them, and the crisp and decided manner in which they are executed. Nos. 120 and 121 contain twenty sketches from Italy and Venice, by George Patrick, and form a useful collection.

No. 152, "Sketch of the Bath-haus at Cologne," by H. W. Brewer. An oil-painting, showing in the foreground the grand portal of two stages, with ogee-shaped roof, and behind it the tower of the same building. The colouring is rich and varied, yet natural, and the detail and perspective of the different parts are carefully preserved. The grand portal is the only portion in high light,—an arrangement that assists greatly in the successful composition of the picture. No. 153 is the already known design for the Royal Exchange, by the late C. R. Cockerell, R.A.

No. 176 is the plan of the Pompeian house of H. H. Prince Napoleon, Avenue Montaigne, Paris, by M. Normand. Five other drawings, with the addition of some photographs from the building itself, illustrate this design, to which the Gold Medal of the Paris Exhibition, 1867, was awarded. On plan the porte-cochère is approached from the road by a carriage-way, enclosing a parterre, containing an ornamental water-basin, having a bronze group on a marble pedestal in the centre. On the right and left of this parterre are gates for ingress and egress, and beyond them porters' lodges. This porch gives access to an outer vestibule, which is but partially separated from an inner one by a flight of three steps, having a low balustrade on either side. The staircase leading to the upper story will be found to the right of this vestibule. In addition to this entrance-hall, two small reception-rooms, an office with private side-entrance for business purposes, and a room for archives, occupy the main front on the ground-floor. In the centre of the building is an atrium or hypæthral court. The shed-roofs are supported by four columns at the corners of the central water-basin, which is lined with ornamental tiles, to correspond with the surrounding pavements. The portion over this basin is open to the sky. The upper part of the roofs to this atrium is formed into a terrace, having doors leading on to it from the chamber floor. To the left, again, is the library, and on the right the dining-room, and below are the kitchen offices and heating-room. Beyond the atrium lies the state-room, which leads into the *salon privé*, an apsidal-ended room, supplied with a dais, and used for concerts. A bedroom and dressing-room, with small staircase leading to the upper floor, are placed on each side of the state-room, and on the left of the music-hall will be found the workshop, pinacothèque, swimming-bath, and hot-room. On the opposite side is the boudoir, and between them lies the flower-garden. The coach houses and stables, giving accommodation for more than forty horses, occupy the remainder of the site to the right of the residence. These buildings can be entered either from the Avenue Montaigne or the Rue Jean Gonjon. Illustrations of this building will be found in a previous volume of the *Builder*.

Nos. 174, 177, 179, and 180 are sections of different portions of the same building, drawn to a large scale, and showing the coloured decorations on the walls of the different apartments.

The beauty and delicacy of the drawings and richness of the coloured decorations render them very good examples of the style in favour at the Ecole des Beaux-Arts. In the whole of this series, and, indeed, in all the French drawings exhibited, the sectional portions are left white, instead of being heavily coloured in a manner similar to the walls of a plan, according to our usual custom.

Ten frames, containing nearly twenty drawings, illustrate a design by M. Charles Lamire for the interior decoration of a church, founded upon the Apocryphes of St. John. To this series a gold medal was awarded by the Commissioners of the late Paris Exhibition.

No. 192, "Perspective View of the Chevet and of the Triumphal Arch in this Church." In the centre of the vault over the choir, which has a bluish-green ground, and represents the Sea of Glass, is the Lamb with seven horns, resting on the hook with the seven seals, and pressing down the lid of the phial of the wrath of God, accompanied by the four beasts symbolical of the Evangelists. On the diagonal groining ribs, which spring from arched pendentives containing the four Greater Prophets, are angels holding captive the four winds of heaven, viz., Boreas, Eurus, Notus, and Zephyrus. On the arches above the cornice, enclosing the dome-lights, are placed the twenty-four elders, and on the spandrels below, the altar of God, and the horses with their riders that went forth of Jerusalem to execute the judgments contained in the great book. On the piers are placed the twelve Apostles.

No. 194 contains a Perspective View of the Porch. The doors are divided by two piers, having carved on their front face the Apostles St. Peter and St. Paul, the pillars of the Church. Above, in the tympanum of the arch, are the symbols of the Evangelists corroborating the truths of the Gospel. On the domed roof of this porch is a mounted angel, clothed with the dalmatic, raising the triumphant labarum. Below, over the angle piers, are colossal beads of the four divinities that Christianity has conquered, viz., Jupiter as Europe, Buddha as Asia, Isis as Africa, and Huitzilopochtli as America. All the figures are wrought in yellow bronze, and the artistic treatment and power of conception displayed upon them are very great.

No. 198, "Section of Nave, Choir, Sanctuary, and Apse." Each bay of the nave is occupied by two semicircular arches springing from a square cap of Byzantine design, the style adopted in this building. Above this a triforium occurs having four openings in each bay, divided by piers with semi-detached columns; on these rest moulded corbels supporting square lintels. The space between the triforium and main cornice is occupied by frescoes representing the invasion of the Barbarians and the Empire of Byzantium, the Merovingians and Carolingians, the houses of Valois and the Bourbon and Napoleon dynasties. The clearstory windows, one in each bay, have semicircular heads, and are covered into the arched ceiling. This ceiling has a bluish-grey ground, and angels with red wings and gold and green vestments worked upon it. The triforium is continued round the apse, but the openings differ from those in the nave, from their heads being semicircular. The domed ceiling has a gold ground, with white figures outlined in red representing the Word of God seated upon a horse standing on the vanquished dragon, and accompanied by the noble army of martyrs. Around the apse and behind the altar are nineteen seats for the choir, somewhat similar in arrangement to the ancient church at Torcello, near Venice. Stalls are placed on the north and south sides of the sanctuary. Those are amongst the most complete and carefully worked-out set of decorative drawings that we have ever seen. The architecture of the church is very tame, and some portions of the colouring might be objected to, but as a finished work the whole is very praiseworthy.

No. 201, "Design for Museum and Library at Grenoble, France" (gold medal, Paris Exhibition, 1867), by M. Charles Questel. The interior view of library exhibits three tiers of light wooden galleries, with ornamental railings, supported by metal brackets and bronze hands encircling coupled columns, separated from the wall by the width of the gallery. From the entablature over these columns spring flat segmental arches, bearing shallow domes glazed in the centre. The effect of these low arches is very depressing. As a drawing this approaches nearer to the English style than any of the other French designs exhibited.

* See p. 310, ante.

CONVERSAZIONE OF THE ARCHITECTURAL EXHIBITION SOCIETY.

ON Tuesday evening last the opening of the annual Exhibition of this Society was inaugurated by a *soirée* held in the rooms, in Conduit-street. In an opening address, Mr. Bevesford Hope, M.P., as President of the Society, said he thought the Exhibition of this year was the best that the Society had ever succeeded in collecting. He would not attempt to give any opinion of the drawings separately, as that was the pleasing duty that every one present had to perform for himself; nor would he enter into a detailed history of the progress of the movement: he would address himself to other topics. He considered that the conduct of the Royal Academy towards architecture had compelled architects in self-defence to commence an exhibition of their works under their own control. He called the attention of the meeting to the presence, upon some of the screens, of Sir Charles Barry's designs for the Houses of Parliament. These drawings, he considered, marked the most important epoch in the history of modern architecture. Before that time architecture was understood and enjoyed only by the favoured few, whereas now she was the welcomed guest of every educated gentleman, from the country parson to the highest in the land. The President next touched upon the subject of competition, which he viewed as a useful system if judiciously and honourably employed. He regretted to say, however, that the people who composed building committees were seldom conversant with the subject upon which they were expected to adjudicate impartially and successfully. He praised highly the system adopted in the late Manchester Town Hall competition, where architects were asked, in the first instance, for the smallest number of drawings capable of embodying their ideas. The drawings by the French architects were afterwards commented upon. Mr. Hope hailed with pleasure the increased use of mural decorations in our churches, which he considered should be composed of votive offerings from all the arts.

After a lengthened speech, the President resumed his chair. No one responding to his invitation to address the meeting, the formal proceedings terminated.

JOTTINGS FROM PARIS.

THERE seems at present to be somewhat of a lull in the bugle building operations which have so transformed modern Paris. There is, however, plenty of activity, according to English notions, but so many large works have been completed that Baron Hansmann must sigh for fresh worlds to conquer. Could we not tempt him to the banks of the Thames? He might take up, as preliminary trifles, to keep his band in, the Thames Embankment, the Metropolitan District Railway, the new National Gallery, and the new Law Courts. The new Opera House approaches but slowly its completion, but, as the exterior is now exposed to view, a judgment can be formed of its ultimate effect. This can scarcely be pronounced satisfactory. The use of coloured materials and gilding, though profuse enough in parts, is nevertheless so partially applied that unity of general effect appears to be sacrificed to an exuberance of ornaments and decoration, producing an effect which may almost be termed meretricious. A new street is about to be formed in front of the Opera House, leading directly from it to the Tuileries, and crossing diagonally the top of the Rue de la Paix, many houses in which will be destroyed. These are now being cleared out, preparatory to their demolition. When the new street leading directly to the Opera House has been made the want of an adequate central feature in the design of the latter will, we think, be apparent. It is true that there is to be a very depressed domical roof over the auditorium, but this will only be visible at a distance, and will not be prominent enough to possess much importance. It seems to us that the architect would do well to re-consider this portion of his design. It would be very easy so to develop the feature referred to as to confer on it the requisite importance, and the space gained by raising the roof would be useful for many purposes in connexion with such an establishment as the Académie de Musique. The building is grandly placed, with ample thoroughfares all round it. As regards the latter, a word of warn-

ing occurs to us for those who are responsible for laying out our streets at home. Nothing can be more dangerous than the wide crossings used here, especially when approached by carriages at an oblique angle, as in the case of the Place Vendôme. If wide crossings be required, they should be subdivided into narrower spaces by refuges for foot-passengers. They should not be wide enough to tempt coachmen to cross them at an oblique angle to cut off a corner. It is impossible to be fully on guard against carriages approaching from all quarters at once. For similar reasons, the mode in which the corners of the foot-pavements are cut off at the corners of streets is not to be recommended.

Many persons who admire the cheerful cleanliness of the fronts of Paris houses are not aware that this is not more due to the purity of the air than to enforcement by law of the periodical cleansing of every house. We saw a large building on the boulevards being cleaned by steam. A steam-boiler on wheels is placed in the road in front of the house, and flexible steam-pipes convey the steam to platforms suspended at various heights. Each pipe ends with a nozzle and steam-cock, and a workman holding the latter directs the steam against the stonework. Another workman, with a scraper or hard brush, rubs off the dirt as fast as the steam is applied. The latter issues with considerable velocity, and the work appears to be very rapidly and efficiently done. The workmen wear waterproof clothing, similar in appearance to the dress of our divers. We mentioned the application of the process to St. Paul's, Covent-garden, not long ago.

The builders appear to be still kept at bay on the confines of the Luxembourg gardens, and it would seem to be inexcusable to destroy this charming place of recreation for the children and others of that part of Paris who now enjoy it daily. It is very pleasant to see the rising generation playing about by the side of fountains and flower-beds, and sailing their toy-boats in the ornamental basins. By the way, when will English nursemaids emulate the simplicity of costume of the French *bonnes*, with their high white caps? The open squares in many parts of Paris suggest some thoughts of comparison not wholly to our advantage. In London the "squares" are private, reserved for the few, forbidden to the many; in Paris they are open to all, and charmingly kept up at the public expense. A single guardian preserves order, and there are plenty of chairs for the use of weary pedestrians. How is it that you may walk from one end of London to the other without the possibility of a rest, except by entering a house?

ARCHITECTURAL ASSOCIATION.

CONSTRUCTION OF HOSPITALS.

THE usual meeting of members was held at the House, Conduit-street, on Friday evening (the 24th ult.). There was a good attendance. The topic of discussion for the evening was "Hospitals," on which a paper was read by Mr. T. R. Smith.

Mr. Hayward, in moving a vote of thanks to Mr. Smith, observed that one thing in the paper which struck him particularly was the general adoption in modern hospitals of the plan of having the beds placed between the windows,—the only notable exception to this rule, in these modern hospitals, being in the case of St. Thomas's Hospital. It struck him as being at once remarkable and satisfactory that doctors should have arrived at so general an agreement upon this question. In some of the old hospitals with which he was acquainted the arrangement was different. Referring to cottage-hospitals, and their advantages with respect to cheerfulness and comfort, and pointing to the excessive death-rate in our large London hospitals, he said it became a question whether the professional spirit was not carrying us too far with regard to these large institutions. It occurred to him that some of these large institutions might, some years hence, come to be regarded as being far too elaborate to be worked satisfactorily,—far too large, not only for the neighbourhoods in which they are situated, but for their practical and perfect working in a pecuniary point of view. These were institutions generally founded upon a certain amount of endowment, as well as dependent upon voluntary assistance to carry them on; and if the public should come to be of opinion that they were too large, and that they

No. 205, "Design for a School of Architecture," sent in competition to the Ecole des Beaux-Arts, of which the author, Mons. Adolphe Coquet, was the senior pupil of the first department. Some parts are very chaste, and the tinting and general finish are most laborious. Although colour has been washed over the pencil lines, their strength appears to have been little affected by the process.

No. 239, "Study of a Design for the Manchester Town Hall," by T. Roger Smith. An effective group. The body of the tower, although we like to see some plain, honest masonry in a building, is too bare and unbroken, and the angle of main building in the centre of Princess-street wants finish.

No. 242, a drawing by Mr. B. J. Talbert for the same competition is a good specimen of pen-and-ink drawing. The treatment of the light and dark portions is very varied and artistic.

No. 249, 250, and 251 show a design for the same subject by Thomas Allom. The drawings are effective and sparkling. It is worth while to compare these drawings with those in the adjoining room by French architects. We can conceive no greater contrast.

No. 267, "Design for Clock-tower, Leicester," Medland & Edmeston. Decidedly good on the whole, and showing considerable knowledge of Gothic detail. The perspective drawing is done in hold firm lines, but looks hurried. We scarcely like the treatment of the angle canopies over the statues.

No. 271, "Design for a Town Hall," by H. L. Florence; obtained the second prize in the Soane Medallion competition. It is got up in the French style, and we believe was executed in one of the ateliers of Paris. The central tower is graceful, but the roofs over the angle pavilions are a joke.

No. 278, "Premiated Design for the London Orphan Asylum," T. H. Watson. The dining-hall is a manly and successful composition. No. 288, "Design for Stratford Town Hall," J. Johnson. The drawing is very French in style. The central block is novel and good.

No. 291, "Brooks's Bank and Offices in course of erection at Manchester," G. Truefitt. We may have another opportunity to speak of this.

Having so lately reviewed the designs of Messrs. Speakman & Charlesworth, Lee, Salomons, Wortington, & Waterhouse, which will be found in this Exhibition, we may proceed without further comment to examine the remaining drawings.

No. 383, Design in competition for a Church at Yarmouth, by Messrs. Giles & Robinson. Coloured principally in sepia, and drawn in a clear and spirited manner. The chancel arches or screen are peculiarly treated. A lofty central arch of wide span has, on either side, smaller arches with pierced quatrefoils in circles over them. Over these passes an enriched parapet with weathered coping. From this parapet rises a roof-principal with massive curved braces, forming a horse-shoe arch. The roofs over the nave and chancel are of the same altitude, and the principal before alluded to is of the same canting as the others, thus showing that the arches below have no adequate duty to perform—at least, more than what walls, posts, and corbels would have been equal to. The triplet windows in the east gable are very successful, and the tower and spire refined and graceful.

Both sides of two screens are devoted to Sir Charles Barry's drawings for Houses of Parliament, and are most interesting as designs, and as showing the amount of study that each portion of that important building received at his hands.

Numerous sketches, prepared by members of the Architectural Association, session 1866-67, are exhibited. Conspicuous amongst the contributors to this collection are Messrs. Vials, Ewll, Lonsdale, Jones, and Spiers. Some of the conceptions are very vigorous and original.

Photographs of some very capital sculpture by Mr. J. Forsyth will be found on one of the screens.

No. 401 is a photograph of a clever design for the head of a crozier, designed by Mr. W. Burges, in the style of the thirteenth century. Photographs of domestic furniture are exhibited by the same architect.

We cannot conclude our remarks upon this very interesting and instructive collection without expressing a hope that we have succeeded in inducing many of our readers to determine on visiting the Exhibition and examining the drawings for themselves. The rooms of the Society will be open daily till the 13th of July.

were made rather in consideration of the profession than for the cure of the bodily illness of the patients, he was afraid they might find themselves in difficulties. Mr. Hayward next alluded to a sanitarium which he had built for Harrow School, and a view of which had been sent to the Academy Exhibition. It was a peculiar institution, adapted to the requirements of the school. It was not usual for a school of 500 to require anything like a hospital; but there were occasions when great sickness occurred, and it was important then that there should be a hospital of some kind for the patients. In case of infectious disease, or where a patient was seriously ill and required to be kept quiet, it was necessary that there should be beds in separate rooms; but otherwise it was thought best to have the beds together for the sake of cheerfulness, which was a matter of the highest consideration, both as to the internal arrangements and as to the site. Altogether, he thought the plan to which he referred would be found simple and to work well; and it appeared to have met with the approval of the *Lancet*.

Mr. Blasill remarked that a hospital was only a particular and very special form of house. A house, ordinarily speaking, was intended for people under all circumstances of life, a hospital only for people under circumstances special and disagreeable. There were none of these hospitals in the olden times; it was only as the science of medicine advanced that it was thought better to have a large number of sick-rooms together. The leading idea which seemed to have influenced the whole of modern improvement in hospitals was greater ventilation and cleanliness. It seemed rather remarkable that, after all the ideas which had been put forth in old writings on the subject of cleanliness, it was not just in modern times we were beginning to act exclusively upon them. He had often heard people talking of our modern ideas of cleanliness, but they were by no means modern ideas; for in old writings, including the Scriptures, they were to be found in a remarkable degree. People were apt to sneer at these modern improvements, but it was not too late to open one's eyes to their importance, and help them forward. Mr. Blasill went on to say, with reference to Mr. Hayward's remarks as to hospital windows, that he should like to ask Mr. Smith as to the effect on patients of the large amount of window surface and the whitewashing upon the walls. Again, one of the most essential requisites with people when ill was quiet. Not only man, but all animals required quiet particularly, and not too much light, to induce sleep. It seemed to him that modern practice possibly went too far in increasing the ventilation and the light, and that there was not afforded, perhaps, that amount of quiet which was necessary.

Mr. Lundy said that, with regard to the effect of windows on each side of the beds, the light could be, and was, regulated as might be thought necessary by means of curtains, hung so as to keep the light away from the heads of the patients.

Mr. Ridge referred to the Lariboisiere, and observed that, although it had been generally taken as a model for construction, it had been found practically to be not a model in working; for he had read that the deaths there were equally numerous in proportion with the deaths which occurred in the old Medieval buildings used as hospitals in Paris. It was bountifully supplied with windows, but it appeared they were never open, the French doctors thinking it best to depend upon artificial ventilation, which they had ingeniously introduced, and which no doubt was all very good in theory, but which, it appeared, was attended with the unfortunate result that people did not live very well under it. With regard to ventilation, Mr. Ridge went on to argue that if, from their arrangement, the air around one bed was not infected by the air from the bed next to it—which seemed to be admitted—it was impossible that the infection could be such as to infect a bed in the next story, and that therefore if they had air enough for each space. Medieval hospitals, which were better than those of a later period, and came nearer to those of modern times, were extremely high, and well ventilated in the roof. With reference to Mr. Hayward's objection to large or elaborately constructed hospitals, he (Mr. Ridge) thought if they could afford to build such large structures they could also maintain them. At the same time, they ought honestly to keep in view, as was done at St. Thomas's Hospital, that they were building

so many distinct hospitals, with the view of treating the sick for their good, and not with a view to architectural effect.

After a few remarks by Mr. Matthews and others,

Mr. Smith replied to some of the observations. Mr. Hayward had referred to the tendency to build large institutions, and questioned whether they were not getting too elaborate. Perhaps there was a danger of that, but at any rate it was the temper of the present day, and to some extent it was no use going against the tide. Small hospitals might be as useful as complex ones, but the appliances hitherto brought to bear in these large institutions had generally been found conducive to some good end. As to that on the whole a large amount of light was rather beneficial than otherwise; and, as had been shown, it could be modified by means of the curtains, when the patients required shading. On the whole, medical men considered that the balance of advantage was considerably in favour of having the wards well lighted and cheerful. With regard to the whitewashing of the walls, it would of course be more advantageous if the walls could be covered, as was proposed to be done in some of our London hospitals, with pictures. He believed there was a good deal of truth in what had been said as to artificial ventilation in connexion with the Lariboisiere, where it had been resorted to, he believed, almost exclusively. What he advocated was a judicious mixture of artificial with natural ventilation, according as circumstances might require it; but artificial ventilation, for introducing fresh and throwing off vitiated air, was indispensable.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

ACCORDING to the report of the council, which was read at the annual meeting, held May 4th, the Institute now consists of 623 members—viz., 262 fellows, 14 honorary fellows, 10 honorary members, 78 honorary and corresponding members, 236 associates, 11 contributing visitors, 10 students, and 2 temporary students.

The report referred to the re-election of Mr. W. Tite, M.P., as president, after an interval of four years since he held the same office.

"The council regret that his state of health has deprived them and the Institute generally of the benefit which on former occasions was frequently derived from his personal presence and supervision, and which, no doubt, all the other members had anticipated from the able and zealous co-operation he has hitherto afforded in all matters concerning the interests of the profession. They have, however, thankfully to acknowledge that, notwithstanding his absence, they have received most gratifying and practical evidences of his good will and thoughtful liberality. The contents of the library of the Institute are now being enriched by means of a munificent donation of £500, a special vote of thanks was accorded to him by a general meeting of the members."

"There can be little doubt that the collection of architectural works of the Institute promises to surpass any of the kind which exists, and will form a library of reference for the members of the highest value and utility, thus affording a privilege of which it is to be hoped they will avail themselves."

The board of examiners of candidates for certificates of competency to act as district surveyors have, since the last annual report was issued, held three meetings, at which sixteen candidates have been examined, ten of whom, having been recommended to the council by the board, have received certificates of competency.

"The council regret that their efforts to establish voluntary architectural examinations meet with scarcely any response from the younger members and students of the profession, only one candidate having come forward for the ensuing examination. In accordance with the recommendation of the revising examiners, it is intended to hold the examination notwithstanding, it is intended that thanks are justly due to those members who have kindly promised their services as examiners, and moderators, but it is to be regretted that so much zeal and energy should be expended for so inadequate a result. It is advanced thus offered be evinced, it will be impossible to continue the machinery that has been established for the purpose by the Institute with so much care. It may be, therefore, worth reconsideration whether the granting of some certificate would be desirable, in order to attract a greater number of applicants."

DESTRUCTION OF GREYSTOKE CASTLE.—The seat of Mr. Henry Howard, near Ullswater, has been destroyed by fire. The main building is gutted, and many valuable paintings of the Howard and Norfolk family have been destroyed. Some valuable art-treasures have been saved.

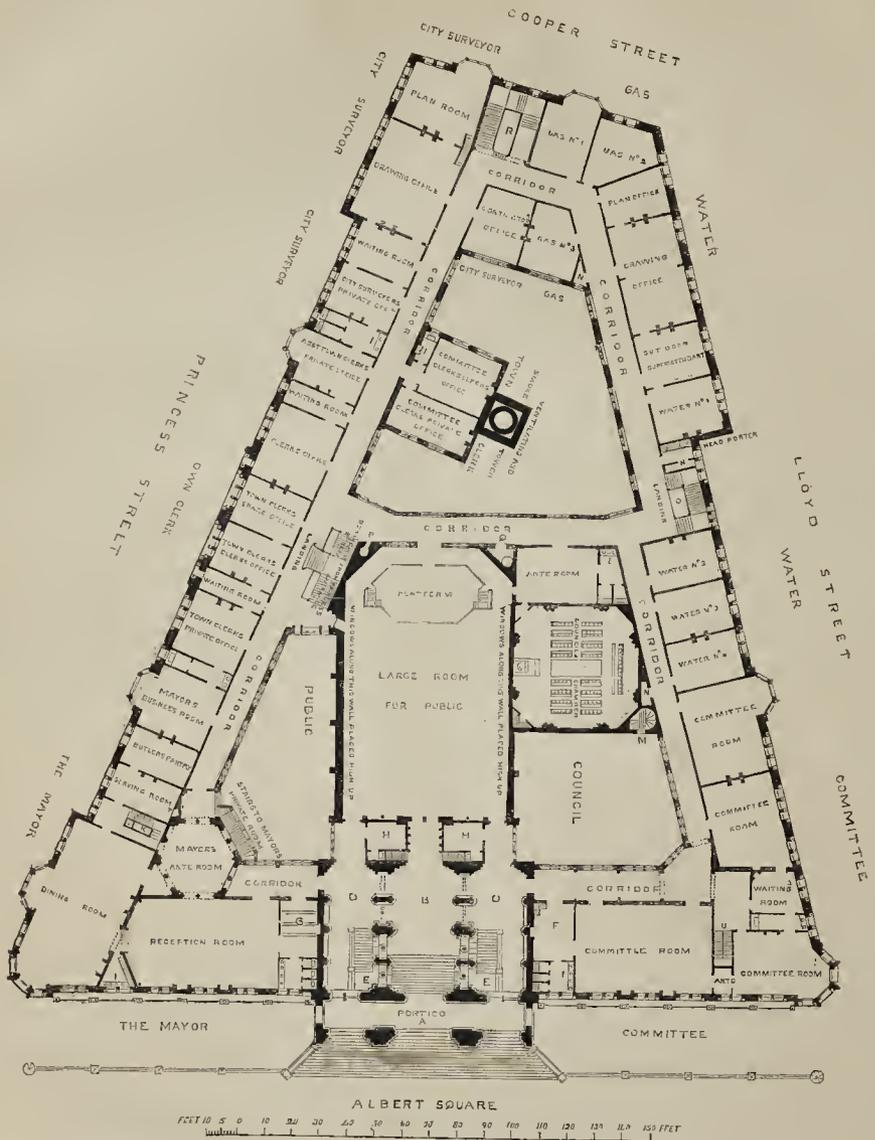
WORKMEN'S READING-ROOMS AS AN AID TO SANITARY IMPROVEMENT.

In a communication on the relative immorality in town and country by a correspondent from Carlisle, the workmen's reading-rooms of that city are set forth as an example for imitation, with the view of promoting sanitary disclosures in towns. After quoting Dr. French's disclosures as to overcrowding and its impurities in Liverpool, the writer says,—"The question naturally divides itself into two others,—firstly, how may popular education in large towns be most readily accomplished? and, secondly, of what shall it consist, so as to be at once acceptable to the recipients and effective for the great object in view—our national welfare, based on the great individual comfort and prosperity? . . . Is Carlisle not in a position to give practical lessons in this matter to much larger towns? May we not with gratification resulting from a twenty years' experience point to our Working Men's Reading Rooms, as by far the most satisfactory solution of this vexed question which has ever yet been afforded? . . . Let Liverpool take the hint we now kindly offer; there is no great difficulty in the way. Let every town in the kingdom adopt the plan so admirably worked out by the working classes in Carlisle. . . . The original Mechanics' Institute founded by Dr. Birkbeck at Glasgow some sixty years ago remained unimitated for twenty years; and having then been copied in Edinburgh, and subsequently in London, whither Dr. Birkbeck had removed, these invaluable societies spread and multiplied rapidly in all directions. But experience having proved that, however great the public benefit is which they have conferred (and this is very great indeed), they nevertheless had unexpectedly and signally failed to do the good intended, the want not supplied being more than ever felt; something was still longed for; and that something did, in 1843, turn up in our Border city. Twenty years have confirmed the good opinion formed, and now we shall be glad to hear that these invaluable libraries and news-rooms for the labouring classes are shortly to be sown broadcast over the land."

A tractate on working men's reading-rooms, by Dr. R. Elliot, of Carlisle, printed at the Victoria Press, Great Cornam-street, London, treats of the principles of, and the benefits derived from, the Workmen's Reading Rooms in Carlisle.

THE TRADES MOVEMENT.

Liverpool.—The Bricklayers' Union has caused a strike at the works of Messrs. Holme & Nicol, builders and contractors, the grounds of dispute being understood to be the refusal of Messrs. Holme & Nicol's foreman to pay a penalty of 5l. towards the expenses of a former strike, and an opposition to a new code of rules of which the master builders had given notice. The Master Builders' Association have intimated that, unless the strike against Messrs. Holme and Nicol be immediately withdrawn, steps will be taken to protect that firm, and that, after the 4th of May the master bricklayers will only employ men who are willing to work under the new code of rules. It is hoped that the men will yield, and that a general strike, which would throw about 4,000 men out of employment, will be averted. In regard to the new rules, the bricklayers contend that no proper notice was given, and that as no mutual discussion of new rules took place, the notice was informal. The masters, on the other hand, say that when the new rules were drawn up the bricklayers were invited to meet the Masters' Association Committee, and refused; that the six months' notice having expired, the Masters' Association determined that the new code of rules should come into force on the 4th of May next. As opposed to this statement, Mr. Loe-Nham, on behalf of the bricklayers, asserts that after an abortive interview in October, the subject lay in abeyance until the society received a note from the masters, dated the 22nd of Jan. next, accompanied by a code of rules drawn up for the consideration of the men; but the masters gave no notice when their rules were to come into effect, and Mr. Lachman emphatically denies that the employers ever sent the society a note regarding "a second interview." He contends that the only "definite notice" given by the masters to the men was dated only the 17th of April, and comes into operation on the 4th of May, which is "quite opposed to the agreement" settled upon.



DESIGN FOR MANCHESTER TOWN HALL.—Plan of Principal Floor.

MANCHESTER TOWN-HALL.

We illustrate in our present number the design for Manchester Town-hall submitted by Messrs. Speakman & Charlesworth, and to which the first place for architecture was assigned by the professional referees.* We have already expressed our opinion of its merits, and described

* See p. 261, ante.

its main features. We add the following references to the plan.

REFERENCES.

- A. Portico. Floor paved with glass and carriage-drive beneath.
- B. Staircase for public from portico.
- C. Staircase from public carriage entrance.
- D. Staircase from mayor's carriage entrance: the three capable of being used as a grand staircase.
- E. Covered carriage entrance.
- F. Gentlemen's retiring-room.

- G. Hat and cloak room.
- H. Ladies' retiring-room.
- I. Lavatory.
- K. Back stairs.
- L. Hoist.
- M. Stairs to gallery.
- N. Housekeeper's closet.
- O. Stairs from Lloyd-street entrance.
- P. Dust shaft.
- Q. Coal shaft.
- R. Staircase from Cooper street entrance.
- S. Stairs to second floor.
- T. Stairs for coals.
- U. Stairs from detective department.

T. L.
U. Stairs.



DESIGN SUBMITTED FOR MANCHESTER TOWN HALL.—By MESSRS. SPEAKMAN & CHARLESWORTH.

THE LIME AND PLATINUM LIGHTS.

A RENEWED endeavour to make the lime or Drummond light available for use instead of gas is being made. With that view improvements have been suggested. Arrangements are being made for supplying Perth barracks with the lime light. The jet of hydrogen being lighted, a separate jet of oxygen will be turned on so as to mix with it at the moment of combustion, when the flame impinges on the lime, which then emits the intense light for which it is noted when white hot. Various towns in Scotland are said to be adopting the light. Another light of an analogous description has been suggested by a Frenchman, M. Bourbouze, who uses common air instead of oxygen, and common gas instead of hydrogen, for the sake of economy. In this case the air and gas are admitted into one common tube; thence they pass through a sheet of metal, perforated with a great many holes, in order to be divided into many small jets: these are delivered through a gauze of platinum wire, when they are lighted. The metal, in being heated, soon becomes red, then white, and thus diffuses a dazzling light. If, as seems to be the case, the air and gas on this plan are previously mixed in the proportions proper for combustion, that is a dangerous element in the proposed light, because such a mixture is explosive. We would suggest, therefore, that the air should be supplied to the gas at the point of combustion. Otherwise, perhaps the platinum light would be less unsuitable for ordinary house illumination than the lime or magnesia light. Has lime ever been tried with a light from street-gas and common air instead of pure or mere hydrogen and oxygen, or gas and oxygen?

REPORT OF THE AMALGAMATED SOCIETY OF CARPENTERS AND JOINERS, 1867.

THE eighth annual report of this Society, by the General Secretary, Mr. Applegarth, has been issued. We have often spoken of the exemplary business-way in which these reports are made up, and of the very prosperous state of the Society, which is a highly important and influential one in the trades movement. The branches are upwards of 200 in number, comprising among them fully 8,000 members; and the accumulated funds of the union actually in hand already exceed 15,000. In 1860 its members were only 600, and its available balance, 320. The depression of trade last year has had its influence on the progress of the Society, but still it has been progressing. The income was 18,245, and the expenditure, 16,144; so that even an unprosperous season added upwards of 2,000 to its capital. Mr. Applegarth advocates "union not only among men against masters, but among masters and men together," and is sanguine as to the practicability of arbitration.

PRIZES FOR ART-WORKMEN.

THE council of the Society of Arts, having first referred the list of prizes to be offered to art-workmen to a committee, consisting of Mr. Hawes (chairman of council), Mr. Redgrave, R.A., Mr. Digby Wyatt, Mr. Godwin, and Mr. Le-Neve Foster (secretary), has issued an entirely fresh programme. It has for its special objects—1. To encourage the revival of the practice of dormant or rarely-used processes of handicraft, by which the field of art-industry may be extended, and art-workmen thereby be, in course of time, more adequately remunerated as a class; and, 2. To exercise the artisan in the practical application, in accordance with recognised principles of good taste, of the art-processes so to be revived, to objects of ordinary use, hitherto for the most part unadorned.

In considering the apportionment of the money prizes to the respective subjects, attention has been paid to the probable expense to which any art-workman must be put in each case who may enter upon the competition.

In the first division, "Specimens of art-workmanship in prescribed processes," the money prizes are in all cases of smaller amount than in the second division, "Specimens of the application to ordinary industry of prescribed art-processes."

The reason for this difference consists in the fact that the council look for minor specimens

in the one case, involving the workman in little expense beyond the risk of the loss of his own time, against which he should set the value of the improvement he may derive from making the effort under any circumstances; while in the other they expect to see a finished article of a more elaborate nature, fit for immediate use by any purchaser.

Art-workmen are earnestly recommended to pay due regard to simplicity and harmony, as well as richness and elaboration, in all their productions, since the judges will estimate no less highly purity of line and good balance of colour, or of plain and enriched surfaces, than they will any merits of mechanical execution.

The taste exercised in the selection of objects for ornamentation will be considered in the adjudication of the prizes.

All the prizes are open to male and female competitors on equal terms; and, in addition, special prizes, on the same scale as to amounts, will be awarded, at the discretion of the judges, among female competitors, although the specimens exhibited by females may not be as good as those exhibited by males, not deemed worthy of reward.

Two or more art-workmen may concur in the production of any article sent in for competition; but in that case the names of, and respective parts taken by, each must be specified when the article is sent in.

We shall hope to hear of a very full response on the part of art-workmen to the offers of the society.

FROM SCOTLAND.

Leith.—The new dock works are in a forward state. All within the entrance is completed, except a very small portion occupied by a line of rails for conveying building materials to the new harbour or basin in course of construction. The excavation is completed, and so are the quay walls, even to the placing of the copestones. At the entrance to the dock the works are in an advanced state. The masons' work, with the exception of the laying of the copestones, is finished, and workmen have begun to erect the gates. The only portion of the works uncompleted where any delay is likely to arise is at the outer harbour or basin, that will occupy a space equal to two superficial acres. There the excavation has been completed to within a short distance of the East Pier, and the builders of the quay walls are close on the excavators; but though this in the case, a tedious piece of work has to be accomplished by Mr. Scott, the contractor.

MODEL FARM BUILDINGS AT AUDLEM.

THE trustees of Lord Newry (the Hon. J. Knox and Lord Alfred Hervey) have recently invested considerable sums in the purchase of landed property in Cheshire and Shropshire, as nearly as may be, contiguous to the family estates. Among others the fine old half-timbered house, "Moss Hall," near Audlem, has fallen into their hands, with the surrounding farm, and on this estate the trustees have lately completed a range of farm buildings on improved principles.

The buildings comprise three sides of a square, with a projecting range on the north side. The range of buildings on the east consists of pig-house and two-stalled hacks' stable, with loft over; implement-house and cart-house (including loose box), with loft over. On the north are drift-house (enclosed with large doors), two loose boxes or hospitals, corn hay, barn, and straw bay; also large root-house, with chopping-room over, from which radiate, south and west, two donkey cow-houses open to the roof, and furnished with Musgrave's patent iron fittings as used in the Government model farms; one house containing forty cows, and the other twenty cows and twenty-two young stock, with houses for calves and yearlings. The ventilation of the cow-houses is by "bonnet" ridge at intervals, and louvre boards at the centre of each range, the centre one being surmounted by a vane with a "fox" indicator. Down the centre of each cow-house there runs a "gangway" for feeding purposes in direct communication with the root-house, straw bay, and an intended "Dutch" hay shed. In the angle formed by the two ranges of cow-houses there is a paved causeway all round, five yards wide, with sunk manure stead in the

centre, which receives the drainage from the cow-house, as also the refuse of the whole of the buildings. The paved yard is about 80 ft. square, with soft-water tank and pump in the centre, into which the rain-water of the building is carried, with watering trough attached.

The piggeries constitute a prominent feature at the area of the "old hall," and have outlets at front and back; the front outlets are divided with iron fence, the walls being of stone, with troughs of the same material. The yard at the back is to be fenced with wooden rails, and is intended for the deposit of straw and litter to be converted into manure.

The whole pile of buildings is of red brick, made on the site of the new building, with arches of blue bricks. The entire cost is about 2,000. The erections are from the designs and under the superintendence of Mr. John Myatt, of Congleton; the builder being Mr. Beckett.

THE INDIA AND FOREIGN OFFICES.

LORD REDESDALE, in the Commons, the other day, moved for a return of the cost of four statues erected against the pilasters at the south-west angle of the India Office, and the cost of the decorative paintings of the interior of the India and Foreign Offices, and asked whether it was intended to allow the east front to be completed on a line which would render the demolition of the front of the present Government offices necessary, or require it to be so constructed as to form a handsome elevation in connexion with those buildings.

In reply, the Earl of Malmesbury said that the cost of the statues of which Lord Redesdale disapproved was only 847. The report would very soon be laid before Parliament, when the whole plan would be announced and explained.

Lord Redesdale said that the statues were positively unsightly, and were contrary to every principle of architecture. He was glad to hear that the design for the buildings for the Whitehall front was to be carried out.

COMPETITION.

It having been decided to erect new schools at Gaddesby, near Leicester, a design by Mr. R. W. Johnson, architect, of Melton and Leicester, has been selected in a limited competition. The building, which will be of red brick with white stone dressings, will be commenced forthwith.

MIASMATIC EMANATIONS.

DR. JULES LEMAIRE, who, for many years past, has been examining the theory of miasma, ferments, virus, &c., according to which theory they are considered to be albuminoid substances modified by oxygen, has arrived at the conclusion that this is an erroneous view of the question, and that its author, Baron Liebig, confounds, under the generic name of ferment, agents of an essentially different nature; that his doctrine contains some contradictions, and is insufficient to explain various known facts, as well as certain new ones due to Dr. Lemaire. *Galignani* thus describes one of his experiments:—

"In one of the rooms in the barracks of the Fort de l'Est, near St. Denis, and inhabited by volunteers of the Garde Impériale, all young and vigorous men, he placed a frigoriferous apparatus of his on a table a metre in height, all the windows and doors being closed as soon as the soldiers were in bed, that is at nine p.m. A similar apparatus was placed in the open air at the same altitude, for the sake of comparison. At four a.m. the water collected in the open air had the taste of the pure element, and presented nothing extraordinary. That collected in the room had the smell of confined air, and the microscope revealed in it a considerable number of transparent spherical, ovoid, and cylindrical bodies, their dimensions in length and breadth varying between two and three thousandths of a millimetre. They were microphytes and microzoaria in a state of incipient development. Six hours after condensation their number was found to have increased; there were thousands of them in a single drop of liquid. There were various bacteria of the termo and punctum species, and numerous vibrios were moving about in every direction. There was also a mould described by Ehrenberg, and which Dr. Lemaire thinks might be the cause of typhus fever."

The importance of ventilation in a hygienic point of view is thus obvious, since these minute creatures, which are so easily generated, are, with some reason, believed to be the cause of many diseases, the origin of which remains otherwise unexplained. We may here add, that

we do not think the importance of certain agents which prevent the formation of microscopic life is fully appreciated. For example, paste, or moist dextrine, will very shortly develop such life, but if it be well spiced with oil of cloves it will keep for months without doing so, or in any way altering or decomposing. If certain diseases are caused by animalcules, the power of such agencies ought to be tested in these cases.

ACCIDENTS.

ST. PAUL'S CHURCH, Little Chester, Derby, has been struck by lightning, which completely shattered the minaret, 14 ft. or 15 ft. high. The stones were thrown in all directions on to the roof and into the churchyard and two neighbouring fields, some of them being carried to a great distance. The roof was damaged in a great many places by the falling of the stones. A portion of the stonework on the opposite side of the tower was torn away, and one of the three small pinnacles injured. Beyond the falling of the stones, the interior of the church has sustained no great injury.

While the workmen of Messrs. W. Beattie & Sons were engaged removing the roof of Morning-side Church, near Edinburgh, which sustained much damage during the gale of January last, another accident occurred to the building by a heavy gale, whereby a considerable portion of the roof was blown down. Happily, none of the men were injured.

By the fall of a gangway at Spittal-street, in the same city, three men have been injured at a house in course of erection. They were engaged in carrying a large stone, weighing some 8 cwt. or 10 cwt., up a gangway, in preparation for the masons commencing work. When they were about half-way up, the piles by which the gangway was retained at the bottom suddenly gave way, the gangway slipped, and the men, six in number, were precipitated to the ground from a height of 8 ft. or 10 ft.

A sad accident occurred at Chicago on Good Friday. The Roman Catholic Cathedral of St. Mary was filled with people, and the weight of the multitude caused a portion of the floor to give way, which, raising a great dust, led some one to cry, "Fire!" A terrible panic ensued, and in the rush that was made for the doors four women were crushed to death, and twenty or more persons were seriously injured, three of them having since died.

A terrible disaster is reported on Lake Michigan. The steamer *Sea Bird* caught fire when about thirty miles from Chicago, and in ten minutes was wrapped in flames. There were about 100 persons on board, all of whom, including the officers, perished, except two persons, who were saved by a schooner which was passing.

THE BELLS OF WESTMINSTER ABBEY.

The north-western tower of the Abbey Church of St. Peter, Westminster, contains a peal of six bells, and a saint's bell. The first and fourth of the peal were made by Thomas Lester in 1743; the second was evidently cast in the fifteenth century; the third and fifth respectively in 1583 and 1598, Gabriel Goodman being then dean. The sixth, or tenor, bears the following inscription:—

"Remember John Whitnell, Isabella his wife, and William Rus, who first gave this bell, 1430. New cast in July, 1599, and in April, 1738. Richard Phelps, T. Lester, fecit."

The comparatively small, or saint's bell, was also made by Thomas Lester.

I do not hesitate to say that the tenor, or largest bell of the peal, is an excellent one, remarkable for dignity and mellowness of tone, its weight being about 36 cwt., and its note D flat. It will be seen that this bell bears the names of Richard Phelps,—founder of the great bell at St. Paul's,—and Thomas Lester. According to the Whitechapel register of hirals, Phelps died in 1738; and I may state that Lester was his foreman and subsequent successor. This will account for both of their names appearing on the bell.

In an opening in the upper part of the gable of the south transept is another comparatively small bell, which was made by Thomas Lester in 1749.

I may here mention, in order to show when

and how the bells are sounded for calling the people to church, that divine service is performed daily in the Abbey at 10 a.m. and 3 p.m., and on Sundays during the summer there is a special service in the nave at 7 p.m.

Half an hour previously to each of these services the fourth and fifth bells of the peal commence chiming, and are continued until five minutes have elapsed, when, if a sermon is to be preached, the fine tenor bell is tolled for about three minutes. At fifteen minutes before 10 a.m. and 3 p.m. the small bell in the gable of the south transept is tolled, and this is continued until the clock in Poet's-corner proclaims the hour. For the special service in the nave on Sunday evening the small bell in the north-western tower is tolled during the last fifteen minutes.

On week days there is also an early service at 7.45, for which the small bell in the south gable is tolled, commencing at 7.30; and on Sundays Holy Communion at 8, for which the same bell is sounded at 7.45 a.m.

This bell is also rung daily at 8.45 and 1.30 for about three minutes, after which forty strokes are given on the tenor bell.

I have said that the tenor or great bell is a remarkably fine one; and I believe it is never tolled for deaths or funerals except for a member of the Royal family. It certainly was not used at the funeral of the late Lord Palmerston.

THOMAS WALESBY.

THE FROG AND LIZARD, ROME.

SIR,—In the *Builder* of the 15th ult. reference is made to the statement of Pliny that two Greek architects placed the figures of a frog and lizard upon the "bases" of the columns of the Portico of Octavia, at Rome, as emblems of their names, Sauros and Batrachos. In the basilica of San Lorenzo is the Ionic capital of a column, which has a lizard and frog in the "volutes," and which is said by Professor Nibby to have been brought from the above portico.

When at Rome a few years ago I sketched the capital, and have it now before me. Of course the above is only interesting as verifying Pliny's statement, the carving and design of the capital being very inferior.

ALFRED PERRY.

STORING RAIN-WATER.

I CAN bear ample testimony to the convenience of storing rain-water. I have an underground cistern containing about 1,500 gallons. It was made ten or twelve years ago, and it has never yet been entirely empty. The water it contains, which comes from a slate roof of a school-room and dwelling-house, is perfectly clear and fit for any domestic purpose.

True, after a heavy shower of rain, succeeding dry weather, it is somewhat discoloured, but that soon passes off. The water not being exposed to the action of light, there is no animal life developed therein, as is the case in tanks or cisterns exposed to light and air. This is the third cistern of the kind I have had made for myself in different houses, and though each house is supplied with water from the town water-works, I consider the rain-water far the more valuable of the two; and, what is more, I have no water-rate to pay for it. There is certainly the expense in the first instance, also the cost of a pump, but the additional comfort afforded far outweighs that.

J. B.

PROPOSED MUSEUM IN LEIGHTON BUZZARD.

It would seem from the following communication to us that the statements that have been made as to the foundation of a Paxton Memorial Institution at Leighton Buzzard, are a little premature. A plain account of the proposal and the steps already taken is as follows:—

In January last an Industrial Exhibition was held in this town, under the management of the "Working Men's Mutual Improvement Society." It was opened by Lord Charles J. Russell. In the course of his lordship's inaugural address, he made an suggestion to the effect that the exhibition should lead, eventually, to the establishment of a museum, to be associated with the name of Sir Joseph Paxton, as a native of this locality.

This idea has been taken up by the working men, and, at their annual meeting on the 15th ult., three resolutions were passed, one approving of Lord Charles Russell's proposal, another specifying in outline the kind of institution deemed desirable, and a third resolving that a memorial address be presented to his lordship, calling upon him, as the originator of the idea, to take the necessary first steps in order to ascertain the practicability of the proposed scheme. The memorial address now only awaits a convenient opportunity for presentation. We have advanced no further than this. It will, therefore, be evident that the statements in the paragraph referred to are premature. We are sanguine enough to hope that the scheme, when fairly before the public, will meet with support, and that the statements which we now feel bound to notice may, at no distant time, be substantially realized.

On behalf of the Working Men's Mutual Improvement Society,

EDWARD W. LEWIS, Treasurer,
WILLIAM ABRAHAM, Secretary.

COMPOUND CHURCHES AND HOUSES.

SIR,—The letter of your correspondent "Progress" induces me to bring forward somewhat similar ideas which I have long entertained.

I propose to group a number of churches of the same or of various denominations around a central dome which would form a grand vestibule to all of them. This arrangement would admit of many modifications. The simplest would consist of each forming a separate church, while the central dome would, if the structure belonged to the Established Church, be used as a baptistery and for the administration of the Holy Communion.

The arrangement may even be carried so far as to have two stories of churches, the lower ones with fireproof domed ceilings, and the upper ones domed. The central dome would, in this case, be surrounded by an arcade, and grand staircases on each side would give access to the upper churches.

A somewhat similar construction to that I propose for churches could, I believe, be adapted with advantage to private dwellings. In these days of Limited Liability Companies it is surely possible to buy a square mile of land, and upon this area to erect sixteen large blocks of buildings, each composed of from six to ten flats surrounding a spacious piazza? If the blocks were, on an average, six stories high, and contained twenty houses on each side of the piazza, the population per square mile would, reckoning five persons to every habitation, be 38,400, which would be swelled to more than 40,000 by the residents in hotels, keepers of public halls, &c.; space for which would be found in the angles of the building, where bath-rooms, washhouses, and public schools could also be located. The basement floor could be used for warehousing, and the ground floor for shops of various kinds.

The entrance to each block could be in the centre of each side; and the enclosed space could, if thought desirable, be in some instances roofed with iron and glass, and converted into a conservatory.

The unoccupied ground, which would be, at least, three-quarters of the whole (since the accommodation above mentioned would not, at most, require each block to be above 600 ft. square) could be laid out into broad streets or walks, bordered with trees and flowers, and adorned with fountains, while ample spaces could be still left, covered with greenward, for the athletic games of the youth of the town. Each block would form a spacious parib or ward, and should be bound to keep in order its own streets and open spaces. The churches might be grouped as above described.

A law built in this manner would afford ample scope for the architect and landscape-gardener to exert their highest powers, and noble results might be reasonably expected were the system to be tried.

W. N. T.

HOW IS THIS?

In the *Builder* of Saturday last there was an intimation from the Architectural Association that, on the same afternoon, "a visit will be paid to the New Smithfield Markets, at which place members are requested to assemble at three o'clock precisely." The notice was signed by both honorary secretaries, and no doubt many persons deemed that there was a treat in store for them. I, myself, was amongst the number, and, expecting to hear the opinions of distinguished people, put off a visit that I intended to the Southern Thames Embankment opening. Of the two affairs I chose what I considered the "superior article," and, at three, "military time," was let into the premises by the small boy in charge at the wicket. Once inside, I naturally looked about for such distinguished members of the engineering and building sciences as I counted upon, but, to my astonishment, I found myself the most distinguished person present. The only other people I could see were a couple of brace of labourers and a ganger; the latter asking me for my name, with all proper respect, adding that "it was Mr. Jones's special desire." I then walked from one end of the building to the other, and from side to side; and, thinking that the gentlemen might all be below, I made for the *facilis descensus* of the regions below, but found it strongly barricaded and covered in with tar-pastin. I listened for voices, but, alas! all was still, save the "Hi!" and the "Ho!" of the labourers, whose privilege it is to work on Saturdays three hours after everybody else has gone for the week!

I began to feel myself the victim of a "sell," and, as I deemed the public opinion of the five working men a matter of importance, I pulled out my "two foot" and began to do something.

Where were the "authorities" who were to receive the Association? Where was even the clerk of the works? Presently, two or three gentlemen came and, seeing me at work, they made up at once, thinking that I was an

official party. We asked one another questions, but could not give one another answers. We then spread ourselves out in skirmishing order to make a reconnaissance, but the country in front was entirely deserted. We were obliged to go back, and with similar results as before. At length, four o'clock having arrived, and no more company putting in an appearance, I thought that it was time to move off.

"How is this?" said one, and "How is this?" said another, before I left the building. I am, sir, but a plain man, and I love fair play, if it is only tossing for pious. I would, therefore, say, in plain terms, that "somebody" put up "sewer-covers" in the hole, and the secretaries have put us "in the hole," and— "How is this?" STYLUS.

"CONCRETE SEWERS."

Sir,—From the earliest times, all who have dared to earn their bread by abstract thought, or have tried to promote the health and comfort, or otherwise improve the condition of their fellow-men, have had to encounter an amount of ignorance, prejudice, and opposition that, when viewed by the light of science, is absolutely astounding.

As a rule, the inventor is ever before the age in which he lives, or rather exists; the offspring of his brain is unacknowledged, or received with indifference, but the *Builder* for the *Times* notices "Nobody's Child," fifty loving fathers claim him at once as their own.

In your impression of the 4th ult. you refer to the construction of concrete sewers at Sidmouth, and again, on the 5th, you publish a letter, written by Mr. John Phillips, on the same subject. This letter will be received as a lesson by many young engineers, and your publication of it will give confidence in the use of a material too long overlooked.

No one will now dare dispute the advantages consequent on good drainage. Not a sewer can be formed, or a pipe laid, without lessening the death-rate of the locality. Yet how many districts remain fever-stricken in consequence of the prohibitory cost of procuring the necessary bricks or large pipes from works far distant, when the very material necessary for good and perfect drainage is to be found under the feet of those whose duty it is to bring consideration to bear upon the appliances within their reach! Charles Swanke has it, "Flowers as sweet bloom at our feet, if we would stoop to find them." I hope in the future that surveyors and engineers will turn to profitable account materials hitherto rejected and carried away at considerable cost.

As one whose whole life has been devoted to experiment,—who has tried in his generation to be useful,—I would ask you in common fairness to record a fact—viz., that in December, 1852, her Majesty granted me Royal letters patent for constructing sewers of concrete. (Here I send you the official copy of the patent.) Sixteen years have passed, and the effort I then made has never been acknowledged, but the value of my conception at that date is proved by the fact of all the sewers and drains in connexion with the late Paris Exhibition being of beton or concrete, with many of which I had to form close acquaintance, but the works entrusted to my care, and in doing so I found them to be more like Portland stone than concrete. I hear also one of the engineers of the Metropolitan Board has, during the past week, been engaged to construct sewers, and Mr. Phillips asserts the sewers of Sidmouth are most satisfactory.

These facts, I think, prove my statement, that "as a rule, the inventor is ever before the age in which he lives, or rather exists;" but I am content if you record the fact that I sixteen years since suggested the use of "concrete for sewers and drains." GEORGE JANINUS.

HORNCASTLE TOWN SEWERAGE TENDERS.

Sir,—My attention has been directed to a letter in the *Builder* of last week, signed by the Rev. W. H. Milner, chairman of the Local Board. By the insertion of my name, the Rev. Mr. Milner indirectly calls upon me to reply to his assertions that the works intended for the subject contained "erroneous" statements; perhaps he does so from the circumstance that my tender was originally the lowest.

As you stated that more than one contractor had supplied information, I think the rev. gentleman somewhat unnecessarily introduces my name, and improperly writes as follows:—"I hope Mr. Frow was not one of those who supplied to you the erroneous statement, because he was in possession of the real facts of the case." Upon the first part of this sentence I wish, through you, to inform the Rev. W. H. Milner, that I was one of those who sent you list of tenders, but the notes at the head and foot were not of my writing. I sent a foot-note, but different from those used; consequently I suppose other of the contractors supplied those notes. However, I can readily to endorse them, and defend them from the charge of being erroneous; in doing so I fear that I shall prove, by extracts from the specification, that the rev. gentleman's statements of the facts of the case, with reference to the assumed mistake in the adopted tender.

The letter sent me by the Clerk of the Board, a copy of which Mr. Milner supplied you, did not reach me until some time after I had sent you a list of tenders, consequently did not influence me. It certainly gives a very plausible explanation of the circumstances alleged to have led the Board to accept an amended tender; but as I have no objection to the facts of the case, it did not change my views upon this case, of the impropriety of Boards admitting amended tenders after the opening day. In this case six of the contractors had been put to a second competition, being requested to supply sample pipes, to see who would supply the best at the proposed tender prices; and in this no preference could be gained by any one. Possibly some gentleman who takes an interest in town chat, who could tell his brother townsmen what was gained, and who galled by this step.

The Rev. Mr. Milner attempts to justify the acts of the Board by those of the Rev. Mr. Frow, in the bill of quantities made of certain castings (? where: not castings, only flings) which the specification showed; the contractor was only to fix, but Mr. Young, not having the specifications before him, introduced the price of the castings (? without having dimensions). Had this been a fact, it

would not have been a sufficient excuse for breaking through the secrecy of the seals of twenty other contractors to favour one; this act stillifies the principle—the very foundation—of contracting by tenders. In Mr. Young's tender several corrections in items are said to have been made; the greatest amount of corrections is admitted to have been under the head of manholes and ventilating shafts, which amounted up to about 20% in some tenders, but Mr. Young made it considerably more. I have been informed that the greatest error appeared at the bottom of these items. As the Rev. Mr. Milner implies, "fixing covers to manholes (what words could a plain man understand than these?) are in the bill of quantities. We do not hear of any other one of the twenty tenders mistaking the purpose of these works, fixing is not providing. However, a loose figure appeared in the adopted tender in this line, of considerable magnitude, whether by accident, or for a "call in" to explain, does not affect the question of culpability of Boards correcting tenders, or allowing corrections after prices have been published.

In the bill of quantities which Mr. Young and all other contractors had, the only reference to the title of castings is contained in the words, "fixing covers to manholes; ditto ventilating shafts." It may have been that Mr. Young did add the cost price of covers without having dimensions; but the error should have been corrected by notes previously to opening of tenders, or the item should have been taken as it stood. Every tender is open to corrections if the rule be allowable. CHARLES FROW.

PLAGUE STONES.

A CORRESPONDENT of the *Builder*, mentioning the discovery of a plague stone at Stockport, wishes for information about plague stones. Harveys his "History and Description of the Ancient City of York," 1818, vol. 1, p. 135, says,— "The plague, which the preceding year had carried off 30,573 persons in London, raged to such an alarming extent here, in 1604, that the markets within the city were prohibited, to prevent the contagion from spreading into the country; and stone crosses were erected in various parts of the vicinity of York, where the country people met the citizens, and sold their wares and commodities. Several of these crosses are yet remaining. The Lord President's Courts were adjourned to Ripon and Durham; many of the inhabitants left the city; the ministers and churchwardens, were both shut up; and the unfortunate subjects of infection were sent to Hob-moor and Horse Fair, where hoots of boards were erected to receive them. No fewer than 3,112 inhabitants of York fell victims to this pestilential disease; though by means of these precautions it was not of long continuance." Drake, in his "History of York," mentions,— "I have noted before that a uniform street once extended from Bootham-bar to a place called Burton Stone, where a stone cross formerly stood; the extent of the city's liberties on this side." p. 268. Now, this old stone called Burton-stone has several holes in its upper surface, evidently meant for the placing of vinegar in as described by your correspondent, or to fumigate. Hoping to see this question answered further, I have sent this as some contribution to the question. YORK.

BRICKWORK IN SWANSEA.

Sir,—Your correspondents "T. U. & J." complain that "all exposed brickwork in Swansea after a short time becomes covered with a white powder or efflorescence, which renders any attempt to produce coloured patterns in that material quite futile; and inquire how it can be prevented or removed."

The facts are not exactly as "T. U. & J." have stated. It is not "all exposed brickwork in these parts" (Swansea) which is so affected; nor is it any peculiarity in the climate which produces the mischief; but it is the fault of the bricks used, which are generally from Bridgwater, or those made on the spot from clay or sand impregnated with salt. C. E.

WORM-EATEN FURNITURE.

Sir,—I have two articles of furniture very much worm-eaten, and I am glad it is likely they will effect the other furniture in the room. Is there anything to prevent it? RICHARD JAMES.

VALUE OF REVERSIONS.

A SALE of absolute reversions, contingent reversions, reversionary life interests, annuities, policies of assurance, &c., the property of the late firm of Overyend, Garney, & Co., took place at the Auction Mart, Tokenhouse-yard, City, under the direction of Messrs. Chinnock, Galsworthy, & Chinnock. The following reversions were sold.—Lot 1. The absolute reversion to a sum of 20,000*l.* 4 per cent. debenture stock of the Great Eastern Railway Company, expectant on the decease of a lady aged sixty, invested in the names of reversionary trustees, subject to succession duty at 1 per cent.—3,150*l.* Lot 2. The life interest, in possession, to a sum of 20,000*l.* invested on mortgage at 4 per cent., thus producing an annuity of 800*l.* per annum, receivable during the life of a gentleman aged seventy-seven—3,610*l.* Lot 3. The life interest, in possession, of a gentleman aged forty-two, in the income arising from the sum of 8,000*l.* at present invested on mortgage at 4 per cent.—3,500*l.* Lot 4. The life interest, in possession of a gentleman aged forty-two, in the income of a 4,000*l.* which is invested partly in a freehold estate at Thorpe, near Norwich, and the remainder in Bank stock—1,810*l.* Lot 5. The life interest of a gentleman aged fifty-two in the sum of 6,874*l.* 19s. Consols, expectant on the decease of his wife, aged fifty-five—500*l.* Lot 6. The absolute reversion, expectant on the decease of a lady aged fifty-four, in a sum of 5,470*l.* 2s. 6d. Consols, and in the proceeds of an estate at Arley, in the county of Stafford, consisting of a residence, cottages, and 192 acres, producing a rental of 300*l.* per annum, a freehold of 5,830*l.* At the same time the Rocks estate, a freehold property in Gloucestershire, within five miles of Bath,

extending over 840 acres of arable, pasture, meadow, and wood land, divided into compact farms, the Elizabethan mansion, the Hunters' Hall public-house, and several cottages, the whole being of the actual rock rental of 1,700*l.* per annum, was sold for 51,000*l.*; the timber and fixtures at a valuation.

BANQUET AT THE ROYAL ACADEMY.

On Saturday last the anniversary dinner of the Royal Academy was held in their rooms in Trafalgar-square, where a numerous and distinguished company assembled.

The president presided, supported by the Prince of Wales, the Duke of Cambridge, Prince Christian, the Duke D'Aumale, the Prince of Teck, and Prince Edward of Saxe-Weimar.

The president, in the course of the evening, referred to the anxiety of the Academy to inaugurate the completion of the first century of the Corporation by holding their next exhibition in the new galleries at Burlington House.

"The Royal Academy (he said) would have no difficulty in getting their buildings suitably advanced for that purpose if they could get access through Burlington House. But I regret to say that the buildings for the learned societies are not yet commenced, in consequence of unforeseen difficulties that have occurred arising from their interfering in some degree with the lights of the Albany. I am glad, however, to learn from the noble lord the First Commissioner of Works that these difficulties are nearly, if not quite, removed. We are, therefore, sanguine in the hope that an object so very desirable not only to the Academy, but to the whole body of artists, to the trustees of the National Gallery, and to the public generally, may yet be accomplished. We even contemplate having an exhibition of a selection of the works of all the members of the Academy since its foundation to the present day, to be opened, if possible, on the 10th of December, to inaugurate the centenary. We feel assured that we shall receive the hearty co-operation of the noble lord the First Commissioner of Works, to whom we are already so much indebted. With regard to the Academy, I think I may say with confidence that it is in a flourishing condition. While we may point with some pride to the many distinguished artists who now belong to it, we recognise with infinite satisfaction the vast amount of rising talent, which leaves no doubt on our minds that the fame of the British school will be maintained, if not surpassed."

CHURCH-BUILDING NEWS.

Swinton (Lancashire).—The chief stone of a new church, dedicated to St. Peter, has been laid here. The edifice, which is now in course of erection, will consist of nave, north and south aisles, chancel and chancel aisles, with organ chamber at the north, and clergy and choir vestries at the south, together with a western tower. The height inside will be 150 ft., and the width about 60 ft. The style of the architecture is the early Decorated. The church will be entered at the west end by two porches, north and south; also by a small porch on the north side adjoining the vestries. The aisles will be lofty, and contain nine windows. There will be no clearstory, the roofs being all gabled. The interior will be open-timbered, and the walls will consist of Dunford-bridge pinnacles, while the walls of the exterior will be composed of dressed stone from Longridge. The whole of the interior will be of stone from the Hollington quarries, the fittings of pitch pine, and the doors of oak. The present contract is for the entire church and tower (the latter up to the open roof only), and amounts to about 10,500*l.* The edifice is to be completed by June, 1869. Its total length will be 144 ft., and the width 60 ft. The nave will seat 473 persons, the north and south aisles will seat 270, and the chancel 140. The height of the tower will be 105 ft. The architect is Mr. Street, of London; the contractor being Mr. Philip Horsman, of Wolverhampton; and the clerk of the works is Mr. J. Smith.

Alton.—The parish church of Alton has been re-opened. The alterations have been effected under the superintendence of Mr. Christian, of London, who has made available the space which in the old church was shut out by high pews and overbadowed by galleries. The pews, which are open, are all of lead wood, stained and varnished. The aisle is laid with Minton's tiles and iron gratings, while attention has been given to the warming of the church by means of hot-water pipes, the boiler being placed under the organ chamber. This chamber, erected on the north side, and given by Mr. W. Dyer and the Misses Dyer, is built on the outside of stone, while the interior consists of brick, leaving a cavity to render the chamber dry. It is roofed with tile, while the ceiling is circular, with moulded ribs, an arch of native stone being formed at its junction with the church. The roof of the church has been cleaned of accumulated coats of ybitewash, its timbers, which are

of oak, varnished, and the tower itself, at first looked upon as a hopeless obstruction, is now utilised as a baptistry, the font, in Caen stone, being placed in it. In the baptistry, Messrs. J. H. and E. Dyer have placed a stained-glass window, representing "Christ's Baptism," and "Blessing Little Children," the artist being Mr. Joseph Bell, of Bristol. The old Norman arches, on which the tower stands, are thrown open, the floor of the belfry having been raised 6 ft. or 7 ft. A turret, with spiral stone stairs, has been built outside the tower, to admit bell-ringers and others to the belfry without entering the church, and the roofs of the porch and vestry have been taken off and new ones substituted. The four Norman pillars and arches which support the tower and spire have been, until lately, almost hidden from observation. Care has been taken not to destroy the ancient character of any portion of the masonry. The east window, which was in a bad state, has been removed, and a new one substituted by Mr. C. Trimmer, at a cost of 75*l*. The lighting of the church is by means of Medieval pendants from the roof. The church will now seat about 1,000 persons, or a few over the number accommodated before the alteration.

Whitby.—A parish church for the suburb of Rnsward, containing 908 sittings, is about to be erected, from designs prepared by Mr. Charles Noel Arnfield, of Whitby, architect. The plan comprises nave, with south-west porch, two bays of a south aisle, semicircular apsidal chancel, and vestry under tower, which latter is on the south side, at the junction of nave and chancel. With the exception of the dressings to arches, windows, doors, &c., the whole of the walls will be plastered on the inside with Martin's fire-proof cement, to which it is proposed to apply a considerable amount of coloured decoration. The walls, which are to be built of brown Bosca Gill wall-stones, hammer-dressed, and fine white sandstone from Blue Bank, random-tooled, for the dressings, will be 2 ft. 3 in. thick, 22 ft. 6 in. high above floor of nave, having buttresses 2 ft. square at intervals of 12 ft., centre and centre. The tower rises to a height of 64 ft., which raises the belfry well above the roof ridges. A spire, 45 ft. high, finishes the tower, making a total height of 110 ft. The whole of the works, except decorative painting, have been let to Mr. Robinson, of Whitby, builder, for 1,846*l*. 16*s*. The architect's estimate was 1,871*l*.—A small mission-school church is shortly to be erected at Sandens, near Whitby, from designs by Mr. C. Noel Arnfield, of Whitby, architect. It will be of Middle Thirteenth-century Gothic, of a rural type, with low walls and high-pitched roof, and will contain 156 sittings, exclusive of choir and clergy; it will consist of a building of one uniform height, the chancel being defined on the exterior by ridge-cresting, and wall treatment slightly differing from that of the nave. In the interior the chancel will be strongly marked by a screen, by the arched principal of the roof, and by a polygonal boarded ceiling. The whole building will be plain, but substantial and ecclesiastical in appearance, both within and without.

Rowley.—The memorial stone of a new church at Blackheath, Rowley, has been laid by the Countess of Dudley, amidst a large assembly of the gentry and inhabitants of the neighbourhood. The intended church has been designed by Mr. Hopkins, architect to the Worcester Archidiaconal Church-building Society, and the building has been entrusted to Messrs. James Wilson & Son, of Birmingham, builders. The estimated cost is 6,400*l*, of which 5,701*l* (including 2,600*l* from the Earl of Dudley and 2,000*l* from "Delta") have been collected. The architect's description of the building shows that the church will, when completed, accommodate 850 persons, and contain a lofty nave, north and south aisles, vestry, organ-chamber, and children's chapel. The church is to be built of bricks. The nave is 80 ft. in length, 29 ft. wide, and 54 ft. high. The tower is very plain, and with buttresses up to the belfry stage, which rises freely above the ridge of the nave roof. The belfry stage has three large adjacent lancets, with louvre-boards on each side, and is surmounted by an octagonal-broached, shingled spire, banded at intervals.

Hailey.—The chief stone of the new church of St. John the Evangelist at Hailey, in the county of Oxford, has been laid by the Duchess of Marlborough. The new edifice will be erected in the style of Thirteenth-century Gothic, from the design of Mr. Clapton C. Rolf, the architect. The building is arranged with a chancel, to accommodate a small surpliced choir; a north aisle to

the nave, and a vestry at the west end of aisle. It will seat 250 persons, and the estimated outlay is about 2,000*l*. Mr. A. Groves is the builder employed.

East Raynham (Norfolk).—The Church of St. Mary, through the liberality of the Marquis of Townshend and the rector (the Rev. R. Phayre), has just been rebuilt and reseated, at a cost of upwards of 5,000*l*. The church, which was recently re-opened, is in the Perpendicular style, and consists of clear-story nave, with north and south aisles, chancel, tower, and north and south porches. The walls are faced with squared flints and Ancaster stone dressings. The chancel floor is of Ketton stone in 2-ft. squares, with Maw's glazed black tiles at intersections. The reredos also improves the general appearance of the building. The tower is lighted by a stained-glass window, the gift of Sir Arthur P. Phayre, C.B., K.C.S. The works have been carried out under the direction of Messrs. Clark & Holland, architects, Newmarket, by Mr. William Hubbard, contractor, East Dereham.

SCHOOL-BUILDING NEWS.

Redcar.—The foundation-stone of the Turner Free School has been laid at Coatham. The schools will be erected in the Gothic style, and will be 103 ft. 6 in. long, 52 ft. wide, and four stories high. There will be accommodation for a number of boarders. The main front of the building will face Coatham-road, and at the gable end there will be a tower. A large dining-ground-floor, immediately over which will be the school-room, with open timber roof, and classrooms in the rear to the south. There will also be a residence for the master. The entire cost of the building will be under 4,000*l*.

Minchinhampton.—These schools have been formally opened. They have been built by Mr. Edward Clayfield, of Horsley, builder, from the designs of Mr. Clissold, of Stroud, at a cost of 1,400*l*. The land was given by Mr. H. D. Ricardo, lord of the manor, who has also been a donor.

Nottingham.—The New Free Grammar School, situated on Nottingham Forest, between the Arboretum and Forest-road, has been formally opened. Mr. T. Simpson was the architect. The school and playground, according to the description in the *Nottingham Guardian*, from which we quote, occupy a piece of land at the back of the Arboretum, containing about 3½ acres, stretching from Arboretum-street to Forest-road. The building is in the Perpendicular style of the Lancastrian period. Its principal front extends east and west, facing Arboretum-street; its classrooms and other offices north and south. The school to the east, and English school to the west. Each is 60 ft. long and 30 ft. wide, and has open-timbered roofs, supported with hammer-beamed, circular-stayed principals, borne by angels bearing shields of the period. These rooms are 21 ft. high to the eave and 39 ft. high to the ridge. The two schools are entered separately by porches right and left of the rear, while the principal entrance is by steps from the terrace to the south. The schools are divided to the south by private rooms for the masters, and beyond, in the centre, by a visitors' room and library, 36 ft. 6 in. long and 10 ft. 2 in. wide, with slide doors at each end, so as to unite the schools with the library at pleasure, thus forming an unbroken vista of 160 ft. long. Leaving the visitors' waiting-room from the front, you pass into the entrance-hall of the schools, which is 28 ft. high and 15 ft. wide, lighted from the top through an open-timbered roof, supported from the walls by enriched corbels. From the entrance-hall stretching north is a covered corridor, 93 ft. long and 8 ft. wide, with an open-timbered roof, boarded right and left by a suite of nine class-rooms, each 17 ft. by 15 ft. To the hall, 44 ft. by 28 ft., and a covered passage leading to the grounds, which completes the contents of the ground-floor. The site of the school is divided north and south, the south portion taking the schools, terraces, and lawn, while the west of the corridor is devoted to play purposes, and is lowered to the level of Forest-road, leaving the school on a high terrace sheltered from the north by a belt of shrubs, the shelter being held by a tennis wall the whole length of the site. An archway under the terrace in the centre of the tennis wall leads by a passage-way to a

well-lighted play-room under the schools, 160 ft. long and 30 ft. wide, so that in the winter or inclement weather the boys may retreat from the playground to a sheltered room. Passing through an arcade to the right of the entrance ball on the ground-floor, a flight of steps leads to the gallery library over the visitors' waiting-room, 16 ft. by 36 ft., in the centre, and a committee-room over the south entrance, having terrace on the front overlooking the lawn, the town, and its suburbs. The gallery library is directed from the schools by traceried windows, from which may be seen the operations of a geometrical staircase leads to the museum and observatory on the third story, lighted on all sides, and surmounted by an octagonal flag-tower. The head-master's house, though detached, is in the same style as the principal block.

STAINED GLASS.

St. Silas's Church, Losells.—The east window of this church, which consists of three lancet-lights, has lately been filled with stained glass, to the memory of the late Rev. Daniel Nathaniel Walton, M.A., the first incumbent of the parish. The subjects chosen for illustration are—in the centre light, in the top group, St. Silas preaching; and in the lower portion, St. Paul and St. Silas being delivered from prison. In a small quatrefoil in the middle of this light, are depicted the emblems of the clerical office, viz.—the Chalice, Bible, and Book of Common Prayer. The two side-lights are filled with two medallions, containing figures of the Evangelists—St. Matthew and St. Mark, in the dexter light, and St. Luke and St. John in the sinister—with their respective emblems introduced at their feet, viz.—the angel, lion, bull, and eagle. The work has been designed and drawn in accordance with the early period of the architecture, viz., of the thirteenth century; and the work has been carried out by Messrs. Hardman & Co.

Church of St. Michael's and All Angels, Basingstoke.—A new stained east window has lately been erected in this church, at a cost of 552*l*, by Messrs. Lavers, Barratt, & Westlake, of Bloomsbury. The ministrations of angels are introduced in every subject. The lower row is taken from Scripture history, of times before our Saviour's birth, and is typical of those in the upper row. The upper part of the window represents the Saviour triumphant in Heaven.

Guildhall, York.—The Fox-Clark memorial window has been completed, and placed at the extreme corner, near to the entrance to the Council Chamber. In the highest light is introduced the White Swan, a favourite badge of King Edward III. In the compartment immediately below, to the left of the spectator, is the shield of the arms of the city of York, surmounted by the cap of maintenance, as in the windows already placed on the south side of the hall. In the corresponding compartment is the monogram on a shield, and the crest of the late alderman. The above and other lesser lights in the tracery are filled with a foliage of oak-leaves. The subject commemorated in this window is the marriage of Edward III. and Philippa of Hainault, in the cathedral at York, on the 24th of January, 1328. The subject occupies the principal portion of the four chief lights of the window.

Bucclerch-street Church, Edinburgh.—A memorial window, executed by Messrs. Ballantine & Son, has been presented by the Marquis of Bute to this church. It has been executed from sketches by the young marquis. There are three lights in the window, and the illustrations are from the 21st and 22nd chapters of the Revelation of St. John. In the central light at the top is the emblem of God the Father—a hand issuing from clouds, and surrounded by an aureole. Beneath this and within a vesica piscis shape, surrounded also by a vesica aureole, is a figure typifying the New Jerusalem descending as a bride adorned for her husband. In the base is a figure of our Lord standing on a mount, from which flows the river of the water of life. Over Christ's head are seen the Alpha and Omega. In the upper portions of side-lights are the figures of St. John and one of the seven angels holding a golden phial and reed; and beneath these, in devotional attitudes, looking towards the centre figure, are a number of Christian saints. The figures are all in white shining drapery. The groundwork is atmospheric blue, studded with silvery stars. Roses of different

shades of crimson mingle with white lilies behind the figures.

Acle Church.—This church has recently had an addition made to it, in the shape of a memorial window. The subject is the Ascension, and the style, in contradistinction to the Gothic, and the close imitation of the old school, Messrs. Boston, Butler, & Bayne, London, were the artists.

Miscellaneous.

RECREATION GROUNDS.—The *South London Press* states that the entire interest of the lord of the manor in Peckham-rye, Goose-green, and Nunhead-green has been purchased by the Camberwell vestry for 1,000*l.* The sale was made on the condition that the Rye and the two Greens should be legally dedicated as recreation grounds, to be kept open for ever, for the benefit of the parishioners, and effectually secured to their use. A space of forty acres has thus been obtained at a nominal cost.

OPENING OF THE THAMES SOUTHERN EMBANKMENT.—The first section of the Embankment was opened to the public on Saturday last. The foundation-stone of the work was laid on the 28th of July, 1866, by Mr. W. Tite, M.P.; Lord John Manners, the first commissioner of works, the Lord Mayor, and the members of the Board of Works being present. The works completed comprise a length of 2,200 ft. of river-wall, between Westminster and Lambeth Bridges, and there is to be a further length of 2,100 ft. from Lambeth Bridge to the site of the London Gas Works.

THE KIRBY UNDERDALE TUMULUS.—During last week the Rev. Canon Greenwell continued his investigations into this remarkable tumulus. The barrow proved to be a great cemetery of Anglo-Saxons, all (with few exceptions) being doubled up, a feature quite exceptional. With the burnt bones there was no relic, but in the soil not far distant was a greenstone axe, some parts of a British drinking-cup, and one flint scraper. The total number of bodies exhumed exceeds sixty, mostly with the heads to the west, only some six or eight being to the north. The chief relics found last week have been necklaces of glass beads, with silver and gold pendants; two bronze boxes, one having in it thread (quite distinct) used by the Anglo-Saxon lady with whom it was interred; several bronze huckles and other ornaments; a silver brooch, set with rubies (or garnets); a bronze bowl; a gold amulet; a variety of bronze and iron articles not easily described or named, and a great number of other relics. One lady wore three silver rings, a necklace of blue, white, and green glass beads with small silver amulet, three bronze rings, a knife, and two large iron articles, mostly resembling exaggerated picklocks, thought, in fact, to be a sort of key. The last named were found at the waist. With the burial was also a long comb of bone, cut remarkably well on both sides.

LANDLORDS AND TENANTS.—A case which came before the borough justices at Doncaster will interest both owners and tenants of houses. Mr. Bacchus appeared for the purpose of obtaining an ejectment warrant against a tenant named William Fletcher, occupying a house, No. 5, South St. James's-street, at a weekly rent, on whom he had served a notice to quit, but he had refused to go out. He then served a second notice on the 30th of March, at half-past eight in the morning, to either go out or appear at the court to explain why he had not left. As Fletcher had neither gone out nor appeared at the court, he asked that he might have a warrant for ejectment, as seven days of twenty-four hours had expired that morning since he gave the second notice. Mr. Fisher said the Act of Parliament required seven "clear" days to be given. The applicant contended that he had complied with the Tenements Act, and had given seven clear days' notice. Mr. Fisher then referred to the interpretation of the word "clear," and also to several cases bearing upon the point, which, on being read, clearly bore out the construction he put upon it, namely, that seven clear days meant seven days exclusive of the day of the service and the day of hearing. The application was accordingly refused, as really only five days had elapsed, and he would, therefore, have to give another notice, and then, if the tenant refused to go out, he might make his application.

CONVERSATION, SOCIETY OF ARTS.—The council have arranged for a *conversations* at the South Kensington Museum, on Wednesday, June 3rd.

STEAM ROAD ROLLER.—We are informed by Messrs. Aveling & Porter that the price of the roller illustrated by us recently (see p. 298, ante) was 750*l.*, not 900*l.*, as mentioned.

THE WHITWORTH SCHOLARSHIPS.—The council of the Institution of Civil Engineers have sent the following to Mr. Whitworth:—

"Resolved unanimously.—That this meeting desires to record, on its own behalf, and on that of the members of all classes of the Institution of Civil Engineers, its grateful recognition of this act of munificence, and its high appreciation of the services which have thereby been rendered to the cause of technical education and national advancement, and of the advantages that may be expected to accrue, alike to the profession and to the community generally."

TUBULAR MASTS.—The great tubular iron lower-masts for the *Monarch*, 6, iron turret-ship, 5,100 tons, now building, exceed in size any yet made for a ship in the royal navy. The aggregate diameter of the masts is but 2 in. less than the diameter of the masts of the *Great Eastern* steam-ship; but the masts of the *Great Eastern* were sent in pieces, while those of the *Monarch* are whole. The weight of the masts is no less than 53 tons. These ponderous masses were lifted by means of a 25-ton steam crane.

STREET MARBLE.—A new use has been discovered for the lime-lias of the neighbourhood of Street, in Somerset. It has hitherto been used almost exclusively for paving, steps, and rough building purposes, but it is found that it may be so prepared as to form a substitute for, if not actually to vie with, fine marble. It is said to be susceptible of a beautiful polish, and when thus finished, is difficult to distinguish from marble, except under very close inspection. Messrs. Seymour & Son, who possess extensive quarries here, are, according to a local paper, now polishing a large number of lion columns for a new church which is in course of erection somewhere in the west of London.

TRAMWAYS FOR SOUTHWARK.—A double tramway is to be laid down in the London-road, Southwark, the vestry of St. George the Martyr having given a unanimous decision to that effect. The tramway to be adopted, according to the *South London Chronicle*, is that planned by Mr. Haworth, and in satisfactory operation in Salford for three or four years past. The rail for the wheels is in the shape of a gutter with slightly curved sides, is made of wrought-iron, and is about 8 in. wide. Vehicles will be able to run on and off at any place without the slightest inconvenience. Running midway between each set of rails for the wheels is a plain 3-in. rail laid down level with the road, which serves as a guide for drivers. The cost, remarks our authority, is an item in favour of its adoption; for while the estimated cost of paving under the old system is 3,093*l.*, the cost of carrying out the new plan will only be about 3,650*l.* It is also estimated that the cost of keeping the roadway in repair will under the new plan be considerably lessened.

SHEFFIELD ARCHITECTURAL AND ARCHAEOLOGICAL SOCIETY.—The members of this society have made their first excursion of the season. Conisborough was the place selected. A party of twenty-four ladies and gentlemen, accompanied by the president (Dr. Aveling), joined the excursion at starting, and were afterwards met by small parties from Rotherham and Wath. Arriving at Conisborough, the party first repaired to the church, which has lately undergone restoration. The Rev. Mr. Wood, the vicar, kindly acting as conductor, pointed out the objects of interest. Some of the party, including several ladies, ascended to the top of the tower, a task by no means easy. After partaking of luncheon the old castle was visited. Here the Rev. J. Stacey read a paper giving a description of the building, illustrating it with a few small diagrams. The party then went over the several stories of the old keep, the chapel and the fireplaces being particularly noticed. Many of the old masons' marks on the walls, both in the church and castle, were examined. The party then took train to Sprotborough, where the rector, the Rev. S. F. Surtees, conducted them over the church. After having been hospitably entertained at the rectory, they returned by train to Conisborough, and, after partaking of tea at the Red Lion hotel reached Sheffield about ten o'clock p.m.

MONUMENT TO LUTHER.—The monument to the memory of Luther at Worms is to be inaugurated on Thursday, the 25th of June. The *fetes* will last three days—the 24th, 25th, and 26th.

LITERARY FUND ANNIVERSARY.—The dinner on Wednesday last, presided over by the Prime Minister, was a very brilliant and successful affair. About 330 gentlemen assisted, and 150 ladies looked on; the result being, besides their enjoyment, the addition of some 1,400*l.* to the funds of this admirable Institution.

RATS AND MICE.—Recent experiments are said to have shown that squills (*Scylla maritima*), the root of which is much used in medicine, is not only a powerful poison for rodents, but also one they are very fond of. The way of preparing it for the desired purpose is thus described:—

"One of the bulbs is cut into slices, hashed and bruised, then done in a pan with fat, which is afterwards strained through a cloth and poured into broken plates and saucers to be placed in cellars and other places infested with rats, mice, &c. To prevent dogs and poultry from eating of this poisonous compound in stables, pigeon-houses, or farmyards, it may be put into a wooden box, about 1½ ft. long, and having a hole at each end. The rat gets in at one end and goes out at the other, after partaking of the noxious food, which soon kills it. Squills may also be reduced to powder for the same purpose by bruising them in a mortar to a pulp, which is afterwards incorporated with as much flour as it will hold. The paste is then rolled out, as they do for a pudding, then cut into sheets, which are left to dry on hurdles or on sheets of paste-board, and are afterwards pounded in a mortar. The powder thus obtained will keep for years, and may be put into boxes or barrels."

The enticement of the rats into traps ought to suffice, whether that which entices them be poisonous or not. We have found phosphoric paste spread upon thin pieces of bread effectual in ridding a house of mice, but of course it required to be laid out of the way of domestic animals.

THE NEW LUNATIC ASYLUM FOR IPSWICH.—At last week's meeting of the town council the town clerk read the report from the Lunatic Asylum Committee, stating that they had received the following tenders for the erection of the asylum according to the plans approved at the last meeting of the council, viz.:

William Root, plumbers, glaziers, &c., work	21,658 0 0
T. Stear & Son, do. do. do.	1,618 0 0
J. Chincock & Co. stonemasons' work	1,430 0 0
D. & E. Hagger, plumbers, &c., work	1,623 15 0
James Freese, stonemasons' work	1,840 17 0
W. G. Cunliffe, the whole work	20,150 0 0
William Kent, London, do.	20,270 0 0
W. C. Penny, Lewisham, Kent do.	20,685 0 0
Henry Laid, do.	19,980 0 0
Edward Gibbons, do.	19,980 0 0
J. C. Lucas, plumbers, &c., work	2,008 18 8
George Hewitt, the whole work	19,700 0 0
Robert Ireland, stonemasons' work	1,110 0 0

The committee held two meetings for the examination of these tenders, and ultimately resolved unanimously that the tender of Mr. Edward Gibbons should be accepted. The adoption of the report was agreed to by the council. The committee have engaged the services of Mr. Edmond Catchpole as clerk of the works, at three guineas a week. At the same meeting, we may here observe, thanks were accorded to the borough surveyor, Mr. W. P. Ribbans, and to Mr. Catchpole, for their services in the erection of the town-hall.

A RAILWAY FROM SCOTLAND TO IRELAND.—Some years since a joke was perpetrated by the London correspondent of the *Liverpool Advertiser* to the effect that it was intended to extend the Giant's Causeway across the Irish Channel; but without any joke a petition has now been presented to Parliament, signed by Mr. J. O'Neale Neale, of Brook Hill, Devon, and of Middle Temple, barrister-at-law, recorder of Walsall, who states in it,—

"That in the summer of the year 1844 your petitioner was retained as counsel to the Fortruis, Coleraine, and Armagh Railway, and deputed to visit the north of Ireland on behalf of that railway company; that in the course of his investigations your petitioner was struck by the feasibility of making a solid causeway from the Mull of Cantyre in Scotland to Tor Point, near Cape Fair, in Ireland, a distance of only 11 miles; that your petitioner found on inquiry that no unusual difficulties existed to prevent a net of one or more railways traversing across such causeway, the traffic over which would pay a fair percentage on the cost thereof, but the railway panic of 1845 rendered it impossible to proceed further in the matter; that your petitioner is convinced such a causeway with railways so uniting the three kingdoms would restore that fresh life and prosperity to Ireland which would greatly tend to heal all religious feuds and extinguish Fanaticism, while to England it would impart additional strength, security, and honour. Your petitioner, therefore, entreats your honourable House to appoint a Select Committee of Inquiry to ascertain the practicability of making such causeway, and to report thereon to your honourable House."

Such a project is certainly not quite so appalling as a railway across the English Channel.

SAFETY IN MINES.—A correspondent, "R. T.," writes,—"I beg to suggest that explosions in coal-mines could be prevented by transmitting every moment to all parts of the mine an electric spark, so that dangerous accumulations would be impossible. The usual ventilation would not impede it; rain, &c., would not quench it; the pendulum of the nearest church-clock would transmit an intense spark every moment night and day, at a very small cost."

LINNEAN SOCIETY.—One of the most remarkable objects shown at the annual soirée held at Burlington House was an actual specimen of the so-called "vegetable sheep" of Australia. It is a flowering plant belonging to the same family as the dandelion and daisy of our meadows, but, when full grown, forms one huge confluent white mass, so closely resembling a sheep that it frequently deceives even the experienced Australian shepherds themselves. A most interesting collection of new and rare living plants, consisting of orchids, lilies, arums, &c., of exquisite beauty, was displayed in one of the smaller rooms. Amongst the pictures and water-colour drawings we specially noticed a large oil-colour picture (but unfinished) of the Mt. Sdgals, by Mr. Baines, the well-known African traveller; a portfolio of excellent sketches of African scenery and natural history objects, by the late Captain Speke; a collection of highly-finished drawings of animals, by Mr. Wolfe; and a collection of nearly 300 water-colour drawings, illustrative of the British hymenoptera, with some of the details of fructification, enlarged 20,000 diameters, by Mr. W. G. Smith, whose drawings often appear in these pages.

LIVERPOOL ARCHITECTURAL SOCIETY.—At the fifteenth meeting of the present session of this society the first business of the evening was the awarding of prizes for the competition drawings for a village church. The chairman remarked on the industry and taste evinced in the drawings. Mr. J. A. Pictou gave a sketch of what he had observed in the way of architecture in a rapid journey from the north to the south of France, and referred to the great alterations and improvements which had been effected in Paris.

These improvements did not, as some supposed, pay for themselves, and they had entailed on the municipality of Paris a debt of about 16,000,000. He noticed the great attention paid to architectural effect in Paris, in the halls, porticoes, and particularly the staircases, and remarked that he felt ashamed when he contrasted the new municipal offices in Liverpool, with their miserable staircase, with the Hôtel de Ville in any of the second or third rate towns in France. We, in England, were quite behind the French in architectural effect. A paper was read by Mr. H. P. Horner on "Fashion in Architecture," which was followed by a brief discussion.

THE SHEFFIELD OUTRAGES.—A portrait and 600 guineas have been presented to Mr. W. Christopher Leng, editor of the *Sheffield Daily Telegraph*, in recognition of his services in bringing about the Trades Union Outrage Commission of Inquiry in that town. Among the subscribers to the testimonial were forty-two peers, thirty-eight members of Parliament, and 150 justices of the peace. The inscription attached to the portrait stated that the testimonial was given to Mr. Leng "as a public acknowledgment of the ability, courage, and steadfast patriotism displayed by him in exposing a system of trade-union outrages which had existed in Sheffield for many years, injuring both the trade and character of the town, and of his successful advocacy of the appointment of a royal commission of inquiry." Lord Wharncliffe presented the testimonial, and, in doing so, denounced the perpetrators of trade outrages as noisy demagogues who shouted for liberty while striving to do away with it. He recognised in trades unions an agency which had saved the working man from being entirely at the mercy of his master, and blamed the employers for not combining to put down the acts of outrage, and the terrorism which had attached such a foul name to their town. It is stated that Lord Wharncliffe has received a threatening letter from Broadhead, of Sheffield outrages notoriety, in consequence of his lordship having, at a late meeting, pronounced him to be "a cowardly scoundrel." In reply to the threat Lord Wharncliffe has gone further, and declares Broadhead to be "a sneaking assassin." Quite right, too. The fellow ought to be drummed out of the country.

TRANSPLANTING A BIG TREE.—We learn that Mr. Barron, of Elvaston Nurseries, Borrowash, Derbyshire, who has had great experience in transplanting, has this week moved a cedar of Lebanon, upwards of 50 ft. in height, with branches some 40 ft. in diameter, and a stem at a foot from the ground 6 ft. 2 in. in circumference, from Horsey to Acton, by means of one of his large transplanting machines.

A FLYING STEAMER.—Mr. J. K. Smythies, of Paddington, barrister-at-law, proposes to introduce a flying steam-engine, fitted with wings, worked by the action of steam. He reduces the ratio of the weight of the engine to its power by using a tubular boiler with very small and thin tubes. He will use liquid fuel, and carry very little water, condensing the steam by a very light condenser, made, like the tail of a bird, to sustain the bird and steady its flight. The arms of the wings are connected with the piston-rod of the engine, so that the apparatus is raised by the strokes of the wings alone, without light gas, heated air, or other contrivance to give it buoyancy. To this engine he attaches seats for one or more passengers. In the realisation of man's dominion over the air, substances combining strength with lightness will, of course, be made use of. Aluminium is likely to be one of these substances; so are fine steel, cane, whalebone, cork, &c.

OPENING OF A NEW PUBLIC PARK AT SOUTHPORT.—A new public park, thirty acres in extent, has been formally opened by the mayor of Southport, amidst the general rejoicings of the inhabitants and visitors. Southport is a very prettily laid out and improving watering-place on the Lancashire coast, about twenty miles to the north of Liverpool. The park has been laid out from the designs of Mr. Kemp, of Birkenhead, and much ingenuity has been displayed in bringing the original sand-hills, and the little green valleys between them, into harmony with the general plan, so as to avoid the heavy expense of completely levelling and reconstructing the ground. The total expense of the preparation of the park will amount to about 15,000*l.*, and it will be maintained by a special rate. The occasion of the park opening was observed as a general holiday; the streets and buildings were dressed with flags; and both inhabitants and visitors devoted themselves thoroughly to enjoyment.

THE NEW GRAVING DOCKS AT CHATHAM.—The foundation stone of the first of the four large new graving docks which, together with three large floating basins, the whole having a water area of nearly 100 acres, are in course of construction at the dockyard, has been laid by Lady Walker, the wife of Sir Baldwin W. Walker, bart., K.C.B., commander-in-chief at the Nore, and in the presence of a number of spectators. The new docks, basins, factories, workshops, and other buildings now in progress for the enlargement of Chatham dockyard will, when completed, cover an area of upwards of 350 acres, in addition to the 97 acres which comprise the area of the existing Dockyard, rendering this establishment about five times larger than the present dockyard, the entire area being rather more than three-fourths of the extent of the entire City of London. The following are the principal dimensions of each of the four new docks, the foundation stone of the first of which was laid on Tuesday last week:—Length at the floor, 430 ft.; length at coping-line, 468 ft. 3 in.; width of entrance at coping, 80 ft.; width at the centre of the dock, 103 ft.; width on the floor, 42 ft. 6 in.; depth from coping of entrance, 37 ft. 6 in.; depth from coping amidships, 41 ft. 6 in.; depth of water over the sill at ordinary spring tide, 31 ft. 6 in.; depth at neap tides, 28 ft. 6 in. For several months past about 800 workmen have been employed in excavating the site of the first of the docks to a depth of 31 ft., some millions of cubic feet of the stiff clay met with having been removed. Two of the docks and the repairing basin will be completed within two years from the present time. The cement and bricks for the works are manufactured on the spot by convicts, about 1,000 of whom are daily employed for that purpose. During the present season it is intended to manufacture twenty millions of bricks. The whole of the operations connected with the extension works are under the direction of Colonel C. Pasley, Royal Engineers, Mr. Gabrielli's contract being superintended by Messrs. C. E. Daniel and H. J. W. Neville, with Mr. J. Carntrons, clerk of the works, representing the Admiralty.

EXCURSION OF THE BEDS ARCHÆOLOGICAL SOCIETY.—This year the Bedfordshire Archæological Society went to Caldicote after the consecration of the memorial church there. The party inspected Caesar's Camp, near the Sandy railway station, and also the Roman Camp, known as Chesterfield. They afterwards visited Northill church, of which the Rev. J. W. Haddock gave a sketch, and then drove to Ickwell Bury, where Lord Arthur Hervey read a memoir of a member of his family, and the party dined there. The new church of All Saints, Upper Caldicote, was then visited, and the party returned to Sandy, where they visited the church and took tea at Sandy-place before returning to Bedford.

TENDERS.

For a house and shop, No. 15, Crown-street, Finsbury, for Colonel Wilson. Messrs. Haywood & Blashill, architects. Quantities supplied by Mr. D. Cubitt Nichol:—

Myers & Sons	£1,322 0 0
Colls & Son	1,227 0 0
Browne & Robison	1,220 0 0
Axford & Whittier	1,195 0 0
Graham & Sons	1,137 0 0
Newman & Mann	1,098 0 0
Beston	1,080 0 0
Tully	1,075 0 0
Hill & Keddell	1,050 0 0

For the erection of workshops, 247, Bethnal Green-road, Messrs. H. & J. D. Mathews, architects:—

Forrest	£485 0 0
Crowe & Robinson	435 0 0
Sewell & Sons	430 0 0
King & Sons	430 0 0
Ennor	476 0 0
Tully	475 0 0
Barrie	656 0 0

For sundry excavations, putting in foundations, &c., 55, Canonial-street. Mr. Henry Fuller, architect:—

Browne & Robison	£325 0 0
Hill & Keddell	305 0 0
Perry	290 0 0
Axford & Whittier	257 0 0
Prichard	250 0 0
Ashby & Sons	215 0 0
Piper & Wheeler	209 0 0
Sewell	200 0 0
Staines	187 0 0
King & Sons	172 0 0
Woodward	163 0 0

For building a public-house in Lordship-lane, Dulwich, exclusive of fittings, for Mr. B. McLeod. Mr. W. A. Murphy, architect:—

Shapley & Webster	£1,192 0 0
Colls & Son	1,099 0 0
Sharpe & Cole	1,050 0 0
Mitchell	1,000 0 0

For the erection of farm buildings, Reading, for Messrs. Sutton & Sons, Messrs. W. & J. T. Broun, architects:—

Barnicot	£287 0 0
Mathews	230 0 0
Woodroffe	790 0 0
Sheppard	749 0 0
Strong	741 0 0
Dunn	734 0 0
Bloomfield	681 0 0

For the erection of a house and shop, Broad-street, Reading, for Mr. Salmon. Messrs. W. & J. T. Broun, architects:—

Mathews	£791 0 0
Barnicot	790 0 0
Elphinstone	787 0 0
Cartier	785 0 0
Kendell	777 0 0
Bloomfield	775 0 0
East	750 0 0

For decorations, Calcot Park, Berks, for Mr. John U. Bisgrave. Messrs. W. & J. T. Broun, architects:—

Gladden	£297 0 0
Green & King	293 0 0

For rebuilding No. 83, Old-street, Goswell-road, for Mr. Harris. Mr. Joseph B. Moxe, architect:—

Barnett	£700 0 0
Walton	630 0 0
Radkin	537 0 0
Glover	493 0 0
Saber (accepted)	475 0 0

For additions and alterations to Leytonstone House, Leytonstone, Essex, for the Guardians of Bethnal-green. Mr. William Mundy, architect. Quantities supplied by the architect:—

Beale	£1,130 5 10
Read & Son	1,124 0 0
F. & F. J. Wood	1,068 0 0
Hill & Keddell	1,068 0 0
Read	1,063 0 0
Arber	1,051 0 0
Rivett	965 0 0
Forrest	967 0 0
Mason	853 0 0
Hodson	815 0 0

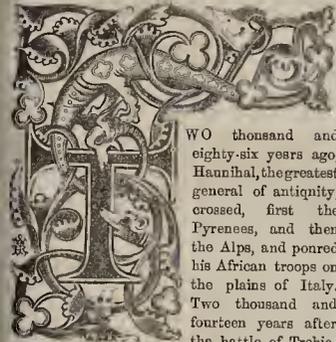
For iron buildings to be erected at Leytonstone, to be used as temporary schools, &c., for the Guardians of Bethnal-green. Mr. William Mundy, architect:—

Cutism & Co.	£14,610 0 0
Tupper & Co.	1,647 5 0
Messers G. & Co.	1,428 0 0
Deuce	1,293 0 0
Griffiths	1,340 0 0
Hemming & Co.	1,300 0 0
Whitford & Co.	1,176 0 0

The Builder.

VOL. XXVI.—No. 1319.

The Engineering of War.



TWO thousand and eighty-six years ago, Hannibal, the greatest general of antiquity, crossed, first the Pyrenees, and then the Alps, and poured his African troops on the plains of Italy. Two thousand and fourteen years after the battle of Trebia, a French artillery officer, by getting a single gun into a position that commanded the fortress of Mont Bard, unlocked the same mountain barrier, and commenced that career of conquest which scarcely paused till it encountered the terrors of a Russian winter, and was only finally checked on the plain of Waterloo. To the master manoeuvre of the greatest general of all time, and to the opening enterprise of the greatest general but one of modern warfare, has now to be added the record of a third not dissimilar adventure—the march of Sir Robert Napier on Magdala.

Viewed in itself, it is the most perfectly conceived and achieved incident in the history of war. We do not say that its accomplishment ranks the successful engineer officer who planned and conducted it on the level of either Hannibal or Napoleon. Times and circumstances must be taken into account, as well as military facts. Neither the Carthaginian nor the French general could dispose at will of the unstinted resources of a mighty empire. The distance which Hannibal had to transport his troops was far less than in our case, but then he had not the aid of a bridge of steam. The troops of General Bonaparte had but to cross the frontiers of their own country, but they were for the most part a starved, ragged, shoeless mob. It was the genius and the glory of the two great invaders of the Valley of the Po to forge their own weapons—to form their own army. England and India have lent their treasure, their skill, and their blood to form the well-ordered and triumphant force commanded by Sir Robert Napier.

It is curious to mark the reappearance of one of the arms of the Punic war. When Captain Dugald Selgaty was so overcome by the ridiculous ideas which he associated with the employment of bows and arrows as somewhat to endanger the cure of his wound, what would he have said if elephants had been proposed as beasts of military burden? Careful students, indeed, have been apt to remark that additions of great bulk and weight to the ordinary impedimenta of marching troops were involved by the use of elephants in the Punic and Pyrrhic wars, in the same way as by cannon in modern warfare. But the combination of the two, and that at the present time,—an Armstrong gun on the back of an elephant, marching over the mountains of Abyssinia in the year 1868,—could

anything have seemed more wildly incongruous a few years since?

The passage of the natural barrier, however, was not a campaign, but the opening of a campaign. With Bonaparte there was no halt till Campo Formio. Rome was declared French at the Treaty of Tolentino. Rome was taken by the French in the following year. The victor of Thrasymene and of Cannæ stopped at Capua. The fatal luxury of Campania demoralised his army. It is always a question among military writers how far the pause of Hannibal was compulsory—a question not likely now to be solved, unless Pompeii yields us further literary treasures. As far as one can decide at such a distance of time and of scene, it seems all but certain that the rapid advance of Hannibal on Rome after the battle of Cannæ, that of Henry of Navarre on Paris after the battle of Ivry, or that of Charles Stuart on London after penetrating as far as Derby, would have changed the course of human history.

Then, again, we do not forget the illimitable resources at the command of the victor of Magdala. But resources, though much, are not all. The man who can rightly dispose of vast resources is apt to be a man of the same stamp as he who can create resources in case of need. And Sir Robert Napier found his main element of delay in the very wealth and abundance of his supplies. He had not the fertile valleys and plains of Lombardy, of Apulia, and of Campagna, from which to draw the food of his troops. He even had to carry hay for his horses, for mules, and elephants. In the protection of his long line of communications, Sir Robert had a difficulty to contend with that was unknown to the great Italian conquerors to whom we have referred. Their advance, in point of fact, was that of a movable column, relying for its support on the contributions it could exact from the country. His was that of an army of invasion. It is true that he had not to fight for every step of his way: had such been the case, the capture of Magdala would have been impossible to ten times the number of troops; but he had to take military precaution against surprise. The *auri sacra flammæ*, the instinct of mankind to pilfer, is as strong among the Abyssinian Christians as it is in any civilised state. Our dusky neighbours would have felt no more "delicacy" than did an honourable Englishman lately referred to in our columns, in helping themselves to all and every article in our baggage-train, if we had only encouraged them by proceeding upon the principle advocated by some of our friends of the Peace Society. We were not fighting our way through an enemy's country, but we were making a military movement of extreme delicacy and magnitude, and one in which no military precaution could be safely—or was in fact—neglected.

This borne in mind, the gallantry, the rapidity, and the crushing success of the blow—a blow dealt with such a long arm—is without precedent in military history. The echo will ring through India and through Africa like that of the tramp of doom itself. Not an Englishman is engaged out of England, in any of those occupations in which it is of importance to him to let his English citizenship be known and respected, who will not feel a couple of inches taller when he reads the tale of the storm of Magdala. Nor is the heroic element wanting on either side. Our men—we (one feels proud to use the pronoun)—fought chiefly against nature. The human foes were as nothing to the hostility of those pathless wilds and those lofty scarpes. The fire of Theodore's troops did little more than serve the purpose of military music to raise the English mettle to that heat at which it is wont to go anywhere or to do anything. But it was different with the barbarian monarch, the descendant of Solomon and the

Queen of Sheba. Savage as he was, he faced Death like a king of men. He turned not from those terrible and utterly astounding steel shells—a projectile that would have been apt to show a point in the character of Agamemnon or of Ulysses that was not suspected by Homer. The *feu d'enfer* opened upon him, but he faced the *feu d'enfer* with as unblenching resolution as if it had been a shower of *bon-bons*. He died a king, to his honour be it spoken—a king, though a savage; and he is entitled to a vote of thanks from the House of Commons for so doing, if it were of any service to him (it might have been more agreeable to certain members to vote it than it seems to have been to do so for our own officers and men); for by his heroic death he has added the only stamp and seal which could render our triumph unquestioned. His fall cannot now be explained away. Sir Robert Napier has carried off his *spolia optima*.

The point of view from which this brilliant and prudently ordered campaign is chiefly interesting to our readers is that from which we have had occasion to deal with all such subjects as those of artillery, fortification, military engineering, and military education. They are subjects germane to our pages. And the great lesson, to us, of the Abyssinian campaign is this: it enforces, not by the voice of calamity, but by the shout of triumph, the truth of that which we have long endeavoured, patiently and modestly, to insist on—the fact that war is changing, not in its nature, but in its method, and that the conduct of war is passing into the hands of the engineer. It is not the fearless and dashing cavalry officer—the *beau sabreur* like Murat,—it is not the unflinching head of squares and of columns, if he have all the courage of Ney,—it is the artilleryist, like Napoleon, or the engineer, like Napier, who will be the general of the future.

For the first time in our history the independent command of a large force has been entrusted to an officer of Engineers. It will not be for the last.

Up to the time of the storm, and with the further exception of the military patrolling or guard of the stores and communications, the invasion of Abyssinia was an engineering task. The laying of the Bordeaux and Bayonne Railway across the desolate Landes bordering on the Bay of Biscay, by an English engineer and by English workmen, was, at a very modest distance, an operation of the same kind. Pioneers were not mere pickets of advance; the whole force had to work as pioneers; they had to make the road over which to go. The enormous military facilities of the railway system were not lost sight of. It seems to us that a little more civil practice and experience would have placed at the command of the general of the forces a longer and more serviceable railway. Considering what can now be done by properly constructed engines for surmounting inclines, considering how much less labour is requisite to excavate, to form, or to embank the narrow track which alone is absolutely necessary for a single line of rails, of perhaps 3 ft. 6 in. gauge, like some of our modern light railways, than to complete a good military road available for the transport of stores and of guns, as well as of cavalry, infantry, and elephants, we think the railway communication might have been more rapidly pushed ahead, to the immense reduction of all the contingent difficulties of the case. Barlow's rails, requiring no sleepers, and requiring, in the season we have just passed through, no ballast, would have been eminently suited for the service of a temporary military railway. Unless in face of very serious obstacles, experience teaches us that such a line might have been run ahead at the rate of more than a mile a day.

It may in this respect he said in reply that it is easy to be wise after the event, and that, in

presence of so brilliant a success, it is becoming to grumble. But there is one point on which we must express surprise—and we rejoice that we are able to do so in the tone of *Fluelen* rather than in that of *Cassandra*.

The intelligence of the fate of *Theodore* reached us in about a fortnight from the date of the event. The preceding intelligence, for some time, had occupied three weeks in transmission. The difference between the two periods may be accounted for partly by military reasons. It must have arisen in *Abyssinia* itself. But, making all allowances for the fact that it was probably the conviction on the part of the commander of the forces that no number of patrols at his disposal would enable him certainly to protect the wires of a field telegraph from the eager pillaging of the natives,—remembering how one of the inhabitants of this quarter of the world endeavoured to welcome Sir S. Baker by making off with his tent from over his head at a first interview,—we can conceive of no adequate reason for the absence of direct communication between the ministerial offices in London and the point of debarkation in the Red Sea. Why was not a special wire arranged for, and, when necessary, laid? What would have been the expense, as a mere matter of pounds, shillings, and pence, compared with the advantage to be secured? With an expenditure going on at the rate of 20,000*l.* per diem, what would have been the commercial value of a saving of some three weeks in every exchange of communication, backwards and forwards, between the general commanding the forces and the minister under whose orders he acted, on the one hand, and his subsidiary base of operations at *Bombay* on the other? Had the telegraph been abandoned when it had conveyed to Westminster the intelligence of the re-embarkation of the last English soldier on the Red Sea, the expense would have been a very wise economy.

But no such expense need have been actually incurred. It would have been only a first outlay, an outlay to be recouped in part, or almost wholly. The disgraceful state of our telegraphic communication with *India* is but too notorious. Independently of the solution of that great industrial question of the day, the centralisation of our telegraphic communications under the control of the authorities of the Post Office, it is clear that we must have more lines of cable to *India*.

The urgent need of instant communication with a half-way point was just one of those occasions of which a great minister would have been prompt to avail himself. We must provide, he would have said, a telegraphic communication, the best possible at short notice, by the time that our troops land. We can make use of the wires hereafter for expediting our despatches to *India*.

The overlooking a provision from the want of which, we may now safely and truthfully say, the whole cost of the expedition might have been douched by the delay of its object for another year, is the more remarkable from the lesson on the subject which we received in 1866. The needle-gun was the arm which decided the battle of *Sadowa*. That was our declaration at the time. A little later it was rather thought to be an exaggeration. Subsequent research has confirmed the truth of the opinion, and all the military writers who have treated the subject now admit that it was the case. But while the needle-gun was the arm used in the actual crisis, the electric telegraph was the instrument which made that crisis possible. The double parallel march through the giant mountains, an extreme effort of military daring, was only rendered possible by the instant, uninterrupted communication of the commanders of the separated *corps d'armée* with the Minister of War at *Berlin*, and thus with one another. As it was, the success is inexplicable,—not the success in the field of the well-armed, well-shod, well-educated Prussian troops against the unprepared and ill-provided *personnelle* that crowded under the Eagle of the Kaiser, but inexplicable that any man with the least knowledge of the art of war, and with the merest handful of troops under his command, should not have endeavoured to strangle the heads of the long-drawn columns before they debouched from those difficult passes. Thus the service rendered to Prussia by the field telegraph is fully equal to that which she exacted from the needle-gun. The two are complements of one another. With increase of precision of range, and of repetition or rapidity of firing in the arm, increase of

rapidity in the conveyance of intelligence is a consistent necessity.

If it should occur—which God avert—which we have to draw the sword in *Europe*, we cannot lay this great lesson too closely to heart. It is a double lesson. We see how the military nations of the Continent go to war; we see how we have done so ourselves: comparing our men, our artillery, our small arms with those of our neighbors, we have no reason for discontent. We are not resting on our oars; we are still making experiments and improvements at unostentatious expense; but in our last great and noble essay we have neglected that powerful instrument by which the armies of the Continent are linked together as by the famous chain of the Saracenic guard, so long borne in the arms of *Albret* and of *Navarre*. It was all very well to deploy before the stronghold of *Theodore* unprovided with a telegraph, but what would have been the result if *Magdala* had contained a *Von Roon*?

Again, for our brilliant advance through *Eastern Africa* we chose our own time. We were absolute masters of the situation in this respect—to stay away or to go—to advance or to retreat. If we should have to fight, or even to stand in armed and grim neutrality, in *Europe*, this will not be the case. To those who are deaf to the warning sounds that issue from every camp and arsenal under the command of *Marshall Niel*, there will be very few hours of delay given to make preparations for a European war. Disarmament or war is becoming a positive alternative; and disarmament—if it takes the tone, “*Yon put down that stick or I'll make yon*”—is a natural pretext for, and ingress into, war. Even in that case we may avoid the vortex. Truly so—and God grant that we may—but the impunity with which we can afford to look on will depend absolutely on the evident power which we possess to make our neutrality respected. And it is now the fact—and we shall do well to take heed of it—that our most brilliant success, a success which has attracted the admiration of our most habitual detractors, has not been unaccompanied by a signal neglect of one of the most valuable instrumentalities which the man of science has ever placed at the service of the statesman.

THE PUBLIC HEALTH GOOD.

THE Registrar-General's quarterly return for the three months ending the 31st of March last gives us the pleasing intelligence that on only two occasions since 1838, when a systematic registration of deaths first rendered statistics of mortality available, has *England* been so healthy during the first quarter of the year, as in that portion of the present year. The annual death-rate in those three months was 22.3 per 1,000 persons estimated to be living, while the average rate in the thirty years 1838-67 exceeded 25 per 1,000. In round numbers, the difference of the death-rate signifies that 15,000 fewer deaths occurred during the first quarter of this year than would have taken place if the average death-rate of the same period in the preceding thirty years had prevailed. The two exceptions above alluded to were the first quarters of 1846 and 1856, when the death-rates were so low as 21.6 and 21.8. In 1850 and 1857 the rate was respectively 22.6 and 23.0; and in the remaining twenty-six seasons of the period above alluded to the rate ranged between 23.5 and 29.1. The average rate of the last ten corresponding quarters, 1858-67, was 25.3.

The popular conviction of the influence of weather upon health has a larger proportion of truth for its basis than many other popular impressions. The thermometer during the winter season is almost as nerving an index of the rate of mortality, as of the temperature. The past winter has been almost unprecedentedly mild;—not that the mean temperature of the three months under notice, although in excess, was so far above the average, but there was an entire absence of continued frosts. Those who notice the weekly returns of deaths in *London*, for instance, may have remarked that whereas in open weather the numbers would range between 1,200 and 1,400, a week or two of hard frost generally sends them up to between 1,700 and 2,000. An improvement in the intelligence and material condition of the working classes, and a more general acquaintance with the best means of protection against severe cold adopted in those countries where low temperatures are regularly

expected, may some day render us more independent of the influence of weather: till then it appears that continued frosts must produce high death-rates.

The mean temperature of last quarter, at the Royal Observatory, *Greenwich*, was 41.4° or nearly three degrees above the average of the same period in ninety-seven years. The rainfall was 6½ in., and nearly 1½ in. in excess of the average of fifty-three years, the whole of the excess occurring in *January*. The weather was somewhat cold during the first fortnight of the quarter, but during the remaining eleven weeks the excess of temperature was almost constant; it was greatest, however, in *February*. There was more than the average amount of movement in the air, but easterly winds were considerably less frequent during *February* and *March* than is usual in those months. These combined meteorological conditions doubtless exercised a very considerable influence upon the mortality.

The total number of deaths registered in *England* and *Wales* during the quarter was 126,095, showing a decrease of 14,000 upon the same period of 1867, and of 18,000 upon 1866. The decrease of deaths is apparent in nearly every part of *England*, the counties of *Leicester* and *Westmoreland* being almost the only exceptions. In rather more than half the whole population of the country living in large towns, the death-rate last quarter was 2.40 per 1,000, against 27.6, the average rate in the ten quarters 1858-67; while in the smaller half, inhabiting the rural districts and small towns and villages, the rate was 20.1, against 23.5 in the same period of 1858-67. It thus appears that the improvement in the health of the country was almost as great in the rural as in the urban districts.

In the eleven large towns of *England* furnishing weekly returns of mortality, comprising nearly all the largest, the death-rate last quarter averaged 2.49 per 1,000. Of these towns *Bradford* and *Hull* enjoyed the lowest rates, 2.20, and 2.21 per 1,000. *London*, with its more than three millions of inhabitants, stands next, with 23.3. The rates in the other towns, ranged in order from the lowest, were as follow:—*Sheffield*, 23.4; *Leeds*, 24.0; *Birmingham*, 24.2; *Bristol*, 25.6; *Newcastle*, 25.8; *Salford*, 28.2; *Liverpool*, 30.0; and the highest rate during the quarter, 31.3, in the city of *Manchester*. Perhaps the most important point connected with these rates is the remarkable improvement in the health of all the *Yorkshire* towns, but especially in *Leeds* and *Sheffield*. *Newcastle* has also been far healthier than in recent years. The rates in *Birmingham*, *Bristol*, and *Liverpool* do not exhibit the same extent of reduction upon recent corresponding quarters, owing to the prevalence, and more or less fatality, of the infantile zymotic diseases, measles, whooping cough, and scarlatina. *Manchester* is conspicuous for its high death-rate; in that city during the first three months of this year more than 800 deaths were recorded which would not have occurred had the death-rate not exceeded that in *London*. The excess of deaths was principally due to the fatality of measles, scarlatina, whooping-cough, and the different forms of fever within the city. Even the most strenuous opponents to the appointment of a medical officer of health for that city will scarcely refuse to acknowledge that this step has not been taken too soon.

The Registrar-General's returns for the first time, a table of the rates of mortality prevailing during last quarter in forty-six large towns, other than those for which weekly returns are published, and containing a population of about 50,000 persons and upwards. Leaving out a few exceptional cases (in which the estimate of population, based upon the rate of increase between the census of 1851 and that of 1861, appears to be unreliable), the rates of mortality in these forty-six towns have a very wide range, between 16 per 1,000 in *Coventry*, and 17 in *Ipswich*; and 32 in *Bolton* and *Ashton-under-Lyne*, and 34 in *Stockport*. In each of the two latter towns the deaths registered in the quarter exceeded the number of births. The publication of these statistics will doubtless excite a little more sanitary activity in many of those towns which have hitherto raised the average rate of mortality in our total urban population without the consequences of a systematic apathy in such matters being brought home to them. We have only to point to the steadily declining death-rates of *Liverpool*, *Leeds*, *Hull*, and of other of our large towns, to show the effect of an awakened interest in their sanitary

condition which has been shown in those towns, in a great measure through the publicity which was given to the waste of life therein prevailing but a very few years ago.

It is beyond question that a more general appreciation of the influence of sanitary supervision upon public health is daily growing, not only in large towns, but in villages and in purely rural districts. It is impossible to estimate to what extent this has already influenced the rates of mortality; but evidence from all parts of the country testifies that in some measure the improved health of last quarter is due to a better outward sanitary condition of the people, as well as to the favourable temperature of last winter.

Infantile zymotics, however, were very fatal in many parts of England during last quarter; measles especially so in Leicester, Hinckley, Whitwick, Stockport, and Liverpool; scarlatina throughout the county of Durham, in Lyncouth, Manchester, and in many of the Lancashire towns. Measles caused 452 deaths in London, against 239 in the same quarter of 1867; and scarlatina, 368, against 339. The fatal cases of smallpox had, however, declined from 526 in 1867 to 280 in last quarter. It is naturally to diseases of the respiratory organs that we must look for the greatest reduction in the deaths last quarter; and of this class those from bronchitis had fallen most. The deaths from bronchitis in London, which had been 3,144 in the first three months of 1867, were only 2,282 in the same period of 1868.

On the whole, the present return must be considered most satisfactory; and, as the death-rate in the first quarter of the year usually furnishes a reliable index of the rate for the whole year, we may fairly hope that, with continued and increasing sanitary intelligence and activity, the year 1868 may prove one of the very healthiest on record.

ON THE UTILIZATION OF SEWAGE BY IRRIGATION.*

Drainage Basins and Conservancy Boards.

ONE of the most formidable of the obstacles which impede the sewage question is the complication arising from the fact that, while most of our principal streams receive in their course the drainage of many towns which have no other outlet, each of these towns has a separate and distinct system of sanitary administration, formed for the purpose of furthering its own peculiar interests, the whole having no more unity or cohesion than the particles forming a rope of sand. From this lamentable feature in the principles of our district government, endless evils originate; for without unity of purpose or will it too often happens that any step in the right direction made by one district is immediately neutralised by the inaction of its nearest neighbour, which, governed by the maxims of the old school, views every innovation as a direct attack upon its exchequer. Isolated and independent local government is doubtless an excellent thing, where such government has no bearing upon the interests of its neighbours, as, for instance, what can it matter to an adjacent community whether the bye-laws of a district insist on a twelve or a nine-inch partition-wall between contiguous buildings? But where broad questions arise, in which the common interests of a multitude of districts are directly concerned, such independent action on the part of each district becomes a curse, and instead of all policies for the common good being fused, they are forced into abeyance by the antagonism of Boards, whose powers for good are thus made impotent. To condemn the vices of independent and irresponsible local government in this respect is but to reiterate the fable of the quarrel between the various members of the human body; without the provident control of the head to keep watch over the combined necessities of the whole structure, it must speedily shrink into a dry and shrivelled anatomy.

The following extract from one of a series of valuable reports that are being issued by the Rivers Pollution Commissioners gives a faithful exemplification of the results of local government in a populous manufacturing district:—

"The rivers Aire and Calder, throughout their whole course, are abused, obstructed, and pol-

luted (to an extent scarcely conceivable by other than eye-witnesses) from Skipton, on the Aire, from Todmorden, on the Calder, down to Castleford. Our inspection was corroborated by incontrovertible and overwhelming evidence; by the engineers to the Aire and Calder Navigation, as also by the men employed in dredging. Pollution by solids—ashes, mud, and other 'pows'—is increasing, and will yearly become worse and worse, unless some remedial measure be rigidly enforced.

It is impossible to treat quite separately the questions of obstruction and pollution. In many cases, where solids are carried into a stream, both injuries are of course inflicted upon it.

The rivers Aire and Calder, and their tributaries, are abused by passing into them hundreds of thousands of tons per annum of ashes, slag, and cinders from boiler furnaces, iron works, and domestic fires; by their being made the receptacles, to a vast extent, of broken pottery and worn-out utensils of metal, refuse brick from brick-yards and old buildings, earth, stone, and clay from quarries and excavations, road scrapings, street sweepings, &c. &c.; by spent dyewoods and other solids used in the treatment of worsted and woollens; by hundreds of carcasses of animals, as dogs, cats, pigs, &c., which are allowed to float on the surface of the streams or putrefy on their banks; and by the flowing in, to the amount of very many millions of gallons per day, of water poisoned, corrupted, and clogged by refuse from mines, chemical works, dyeing, scouring, and fulling, worsted and woollen stuffs, skin-cleaning and tanning, slaughter-house garbage, and the sewage of towns and houses.

The practice of periodically flushing out into the streams the mud which must, under any circumstances, accumulate in goits, culverts, mill reservoirs, or 'lodges,' and canals, is also a palpable abuse."

The amount of annoyance, loss, and danger to public health occasioned by this complication of abuses is beyond calculation. High death-rates prevail; manufactures have been transferred to localities less abused; residential proprietors have been compelled to abandon and let their dwellings; and the beauties of river scenery have undergone a fatal transformation. Although the law professes to give distinct rights to the community in respect of the purity of streams, the vastness of the pollution takes away even the slightest hope of making them good. For an individual proprietor to attempt such legal rectification would be to ruin himself to no purpose, while for a community or a town to attempt it would only be less ruinous and absurd. The former has not only to encounter single-handed the doubtful process of common law, or the filing of a Bill in Chancery, but he must make up his mind to the creation of enemies on every hand, and to be viewed by all his neighbours as a public nuisance,—a consideration which generally imposes an effectual check upon all remedial proceedings on the part of the aggrieved. In the latter case, corporate bodies may indeed deal with their own nuisances as they think proper; but, as the river nuisances created within their own jurisdiction are usually insignificant, compared with those whose effects they suffer, and as the selfishness of mankind cannot ensure the following of such an example, much benefit cannot result; and, therefore, we find that in such cases nothing is done. At Wakefield, for instance, we have an example of river pollution. Before it reaches that town, the river Calder receives the sewage of an area containing 400,000 inhabitants, and the manifold impurities discharged from 1,200 manufactories. This water is drunk by the people of Wakefield after filtration, and so possessed are they of the impossibility of much further defilement that they do not scruple to add to it their own sewage and excrementitious matter before pumping it on to their filter beds."

It is apparent, then, that a stringent law of prohibition is the only method of dealing with the pollution of rivers; and if the multitude of powerful communities whose health, pleasure, and means are daily assailed by this evil, consider themselves mocked by the present statutes, it remains for them to have these swept away, and such a prohibitive measure introduced. It is a grave omission in legislation which places a safeguard over the interests of the proprietors of streams and waters in wild and thinly populated districts, and which yet leaves the rivers of districts abounding with vast and hasty popu-

lations, entirely at the mercy of those who in every conceivable form combine to render them odious to the sight and dangerous to the health of the community at large.

Some portion of this neglect may doubtless be attributed to a drowsy—instinctive in a manufacturing population—of interfering in any degree with the supposed interests of its various industries. Thus, in the northern coal-fields of England, a prejudice has long existed in favour of smoke. "Where there's reek there's brass" is a proverb in these districts, and much disfavour has been shown towards the Smoke Act. The presence of dense black volumes of smoke, issuing from tall chimneys, has become identified with the creation of wealth. But it has been proved, and the proof is now spreading, that "reek" is really an item of waste; and as this idea gains ground the consumption of smoke becomes general.

So in respect of the pollution of rivers, there is still a feeling amongst manufacturers that they should be left undisturbed by legislative prohibitions. But much of this feeling has subsided since the visit of the Rivers Commission to the Yorkshire and Lancashire coal districts. It was clearly proved during the sittings of that Commission that the most noxious portion of manufacturing refuse might be kept out of the rivers by the exercise of care, at a very slight cost, and that in some cases the value of the ingredients regained would leave a profit upon the process of clarification. It was also proved that some branches of the fine woollen and calico trade were migrating from the West Riding of Yorkshire, from no other cause than the scarcity of pure or clear water. The Commissioners pointedly state that in the Aire and Calder districts "the abuses and pollutions of running waters have become almost intolerable, and even trade is seriously injured in consequence."

The forcible interference of legislation is accordingly no longer viewed with such extreme jealousy, and amongst the more scientific and enlightened of the manufacturers such a course is considered absolutely imperative.

It is with a view to the amendment of this disorganised state of affairs that certain Catchment and Watershed Areas of Conservancy have been proposed, whereby the basin of every important stream shall be divided into convenient districts, generally separated by lines of watershed. Over these districts it is proposed that certain Boards of Control, exercising comprehensive powers, shall preside. The duty of such Boards will be to prevent the pollution of running waters by any matter whatsoever interdicted by statute, full powers being given them to pursue the offending party at law, to act in concert with each other, and to act in perfect independence of local interest and prejudice. It is justly argued that until an Act providing for the construction of such Boards be passed no progress in the utilisation of sewage, or the purification of river waters, can be made in the manufacturing parts of Great Britain. It is because this policy was neglected in the interminable discussions on the metropolitan drainage question that the vast and magnificent labours of the Board of Works have not been attended by such perfect results as were anticipated, a neglect which has been tardily amended by the Act relating to the Valley of the Thames.

Mr. W. J. Ffounel, late inspector of the fisheries of England, has recorded his opinion, that there should be a central authority in London, with deputies in the districts, having separate control over separate basins, but with unity of action, and all subject to supreme authority; and also that there should be definite power given to this authority to prevent the pollution of rivers.† It was asked during the sitting of the Committee upon Metropolitan Sewage that if local Boards were put under the jurisdiction of the Home Office, or the General Board of Health, which should in either case have the power to issue a *mandamus* to compel the enforcement of the law, such a course would not be better than to have a central Board in London. But Mr. S. H. Gael, a gentleman profoundly experienced in the preparing of bills relating to the public health, did not approve of the plan suggested, and said it would involve nearly the whole machinery of a central authority, as well as that of a district authority. He also cited the analogous nature of the salmon fisheries legislation, and counselled a similar mode of treatment in respect of

* See pp. 146, 168, 202, 222, 239, 250, and 313, ante.
† Third report, vol. 1, p. 2.

* Rivers Pollution Commission. Third Rep., vol. 1, p. 46.

* Third Rep. p. 54.

† Rep. Met. Sewage, 1864: 2, 994-6.

sewage. Under the Salmon Fisheries Act, the Commissioners assign districts to the Boards, who are to carry out the law locally on the salmon rivers and their tributaries, and who have power to prosecute traders and manufacturers whose works pollute the streams.*

Touching the inconvenience which such prohibitory powers over water-courses would effect towards manufacturers, sufficient has been learnt on this subject of late years to show that in most cases it would be merely temporarily. A letter addressed to Mr. Ferrand, M.P., by Mr. Edward Townsend, of Cullingworth Mills, near Bingley, shows what has been done in this regard. The writer says,† "The main feature of the principle we have adopted for the filtration of the dye and soapy waters from our works is, the passing those waters through a bed, 15 ft. to 20 ft. thick, of engine ashes, leaving the solid matters as a crust at the bottom of the tanks, formed of engine ashes; the crust, of course, having to be taken from inside the tanks regularly at stated periods,—say twice or three times per month. This crust makes excellent manure, and we spread it at once on grass and arable land. With especial reference to the sopsends, they go from our wool-warehouses into tanks, very strongly made, and lined with double bricks walled in cement. The suds are then boiled in these tanks and broken with acid. The magma, or thick creamy part, rises to the top. The thin watery part below is run off into the engine-ash filters, percolating through them into the bed, and thus escapes in quite a clear state. The thick part left in the brick tanks is then run into filters made of cocoa-nut matting lined with canvas, and when of the consistency of, say, cream cheese, is wrapped in canvas bags, to be pressed in a steam press, whereby the grease is pressed out, of which we make about 30 cwt. per week, besides a large quantity of solid manure, in the form of oil-cake, which is periodically taken on to the land, and makes very excellent manure. This system of purification is readily done in moderate-sized works. The grease we extract from the soap is now worth 17s. per ton, and is sold to candle and soap manufacturers."

Mr. Rawlinson, late chairman of the Rivers Pollution Commission, has thus expressed his views in a letter to Lord Robert Montague:—

"With respect to Boards to manage drainage areas, I fear any plan of representation embracing even one member from each separate local Board will not prove to be practicable, on account of numbers. Take, for instance, the Aire and Calder drainage area, which is about 800 square miles. There are at present seventy-one local Boards, and will be more. Each such local Board may require to be rated for river improvements, and controlled with respect to outfall sewage; but a Drainage Area Board with only seventy-one members—one from each Board—would be cumbersome for work. There must, however (if representation is to rule the formation of such Boards), be canal, river, land, and mill representatives. I must confess that I do not see the way to purely local Boards for drainage or river areas. The machinery must be in some other form. Rivers require to be improved and preserved from injury, irrespective of county, parish, township, or private boundaries. Permissive power will only mean power to do nothing, as at present. Those who abuse will, for the most part, govern; and, as in the case of the Smoke Act, any Act of a similar kind will, like this, be a dead letter. Of what use is a Smoke Act in Manchester, Salford, Wigan, and other manufacturing towns, where the members of the several corporations are smoke makers? Suppose the factory owners had been required to appoint and pay factory inspectors, how much useful inspection would have been done?"

"I do not like advocating Government interference in river preservation, but I do not see my way without it. Any Board, to be useful, must consist of working members, with ample powers to devise and execute works, to purchase and remove mill-dams, to embank, to drain, and to prevent all forms of abuse on rivers. A drainage-area rate would have to be laid and collected, superintendence should be regular, and an annual report ought to be published. Machinery such as is sketched out will be difficult to establish."

Mr. Rawlinson speaks here with admirable force and justness, which are perhaps somewhat

qualified by the terms of the concluding sentence. With equal force, and divested of all doubt as to the practicability of their suggestions, the Rivers Commission, in their Third Report, reiterate these arguments, the interval of three years' close and exhaustive investigation having but served to strengthen their opinions into immutable conviction. After making a comprehensive sketch of the progress of the woollen and worsted manufactures in the West Riding of Yorkshire, so far as regards the basins of the Aire and Calder, and reporting the evidence taken during the sitting of the Commission, the Report proceeds to state that, "in order to prevent the pollution, and legally control the management of rivers, their basins or watersheds must be placed under supervision, irrespective of any arbitrary division of county, parish, township, parliamentary, municipal, or local Government Act boundaries, or, indeed, of any artificially-established division. Running if the upland waters are polluted by town sewage and by refuse discharged from manufactories, as in the West Riding of Yorkshire, the entire length of a river is necessarily polluted. Towns situated midway, as Leeds, Manchester, Salford, and many other places, will establish and carry out local improvements, and would clarify their sewage and other refuse fluid to little practical purpose, if the towns, villages, and manufactories on the same river with themselves and its tributaries, are not placed under restriction against sending down pollution. Thus, for instance, the corporation of Salford, which occupies one side of the river Irwell, opposite Manchester, entertained the idea of intercepting sewers. Plans were prepared and estimates made, and the project was discussed, but was abandoned on the plea that money expended in Salford alone on such works would not accomplish the purification of the River Irwell, so long as Manchester, and all the great manufacturing towns and mills of Lancashire situated on the river and its tributaries, continued to pollute the running waters of their respective districts. Pollution caused by sewage, and by trades and manufactures, ought, in our opinion, to be prevented at the cost of the community, and persons causing such pollutions. At Croydon, at South Norwood, and at some other towns it has been forbidden by injunction for the local authorities to pass town sewage into running waters below a defined standard of purity, and the result has been, after the failure of all other systems, a clarification of such sewage by irrigation, which not only proves successful for the purpose desired,—namely, to prevent river pollution,—but in its operation is a source of profit to the ratepayers. However that may be, the question of profit or loss in abating nuisances . . . ought not too closely to be taken into account. . . . Towns can as well afford to pay for the means and appliances necessary to render sewage innocuous to running water as they can to pay for the sewers and drains which are necessary to their sanitary well-doing. . . . Every witness we examined admitted the existence of many great evils, and remedial measures are in the evidence over and over again suggested, the reiterated stipulations being that such measures shall be as general as the trades to be affected by them, and that their enforcement shall be by Government authority.

"One conclusion, therefore, forces itself upon any one who honestly deliberates upon the existing state of things in regard to the rivers we have visited, with a view to its permanent improvement. A stronger power than has hitherto been available must be brought to bear, if the present abuse and pollution of streams is to be arrested, and Government supervision and inspection must enforce and strengthen the action of local authorities.

"As previously mentioned, there is plenty of land in the Aire and Calder district suitable for sewage irrigation, and we have no experience of any town or locality where the application of that system would be impracticable. . . . All refuse from dyeworks, mills, factories, tanneries, breweries, malt-houses, slaughter-houses, and the like, should be prevented from being cast into and polluting running waters. No ashes, cinders, slag, waste earth, mud from canals, goiters, and reservoirs, road-scrappings, broken pottery and utensils, bricks and building rubbish, or any other solid calculated to impede the flow of water, raise the bed of the stream, and cause impurity, should be permitted to be cast in, or so to be disposed of on the banks of a river as to be carried in by its water. Sewage interception is always

practicable. Where it can be applied fresh to the land there is least nuisance and least cost to the ratepayers. Where the solids are extracted by mechanical deposition there is pecuniary loss on the operation, and running streams receiving the effluent water are still polluted, the pollution being greater as the volume in the stream is relatively small. No arrangements for treating sewage are satisfactory except its direct application to land for agricultural purposes."

"It is for the interest of manufacturers, as well as of riparian owners, and the community at large, that a preventive law should be equitably but rigidly applied. For such legislation, the successful operation of Lord Derby's Act, which has abolished the nuisance from alkali works, affords a fitting and encouraging precedent.

"Our experience of the weakness inherent in unaided and uncontrolled local authorities, as at present constituted, convinces us that a central Board, appointed by a State department, is necessary to the efficient protection of running waters. For instance, under the Local Government Act, 1858, a local Board may be established, and, after having executed works on borrowed money, the ratepayers may decline to elect a Board; or the members of such local Board, after election, may decline to act, there being no power at the Home Office to compel them to do so. Such power, however, will be absolutely necessary in any conservancy Act to enforce the prevention of river pollution.

"Economy in the work of a central Board for the conservancy of rivers might be probably obtained by enabling it to avail itself of such parts as may be applicable of the existing system of Government inspection, as of factories, mines, alkali works, fisheries, land drainage, &c."

The Commissioners then go on to observe:—
"The duties of such central and district conservancy Boards might be—

1. To aid the Salmon Fisheries Commissioners.
2. To prevent the obstruction of rivers and running waters by casting in of solids or flushing in of mud, as also all forms of river pollution.
3. To take cognizance of all existing weirs, mills, dams, river-walls, embankments, reservoirs, goits, culverts, drains, &c., and of any new works proposed which may affect streams.
4. To hear appeals in cases of local disputes as to works of any character affecting the condition and free flow of rivers."

Sundry geological and other plans accompanying the Report, showing the different basins of the West Riding—those of the Aire and Calder as appertained into sub-conservancy districts.

M. P.

ON BUILDINGS FOR EUROPEAN OCCUPATION IN TROPICAL CLIMATES, ESPECIALLY INDIA.†

The structural difficulties mainly to be anticipated can be, I think, summed up in one word,—want of appliances. There is in India, at least, no want of hands. Labour is plentiful and cheap there, and a surprising degree of some sorts of skill still exists in plenty also, and this is probably more or less true of every place within the tropics where buildings of importance are likely to be needed by Europeans; but any appliances beyond the rudest for raising weights, putting materials in their place, fitting together unwieldy portions of a structure, or even building a scaffold or boisting a block of stone, may be expected to be scarce. In a peculiarly un-English method many sorts of works are well carried on by the natives, who seem to retain, along with the ruder ways of common building, some lingering traditions of arts long almost disused in the cities chiefly occupied by Europeans. A building in progress is, however, a curiously uncouth sight to unaccustomed European eyes. The scaffolding, so irregular and insecure in its appearance, seems only fitted to fall, yet it does its work; vast crowds of half-naked workpeople, those carrying burdens being mostly women, each bearing on her head a light load of what has to be transported; the mason squatting on the stone he has to dress, holding his chisel in the tips of his fingers, and dealing dainty taps with a small hammer, as though he were a sculptor finishing off a marble statue; the smith squatting over his fire, as though his feet must be among the sparks and cinders, as well as his iron; and among them all the dusky overseer with long white robes, and perhaps an

* Rep. Met. Sewage, 1864: 3, 167—3, 207.

† Rep. Met. Sewage, 1864: p. 27, App.

‡ Rep. Act. Sewage, 1864: p. 273, App.

* Third Rep. vol. i. pp. 63-66.

† Jy Mr. T. Roger Smith. See p. 311, ante.

monous red turban, perhaps a tall gilded cap, and on his brow bearing the distinctive mark of his favourite idol, advances with the most obsequious of bows, his posture intended to convey the idea of an entire devotion to your service—not always carried out by his conduct. On such a work as this, busy and active though it be, an iron bolt or a clamp or a joggle, not to mention a powerful crane or a crab, which here it would be the simplest possible thing to have, would be something of a difficulty even in such a city as Bombay; elsewhere it might prove a formidable undertaking, perhaps even an impossibility. Nor is sending things over from this country always a safe and complete resource, although it has to be largely practised. Every one knows how often when such things as ironwork, metal-fittings, &c., are sent on to a building at home, there is something wrong. Bolts going somewhere where a spanner cannot be got on to turn the nuts; things that refuse to match or to fit their place, are serious hindrances even here; but when the original foundry is four thousand miles off, so that either a clumsy makeebiff made on the spot here to be adopted, or a delay of six months has to be endured, before a casting sent in error or broken in transit can be replaced, it is obvious that every complicated appliance ought to be avoided where possible; and where not, that everything of the sort should be put together in this country completely before shipping, and that duplicates of everything liable to damage or loss ought to be provided in abundance. In reference to breakage I may, by the bye, remark that more of it occurs in landing than on the voyage. Castings will travel excellently well if stowed along with plenty of small coal, but their dismemberment should be especially superintended. The necessity of hoisting a large weight or fixing a difficult piece of masonry may prove an insurmountable obstacle; and the employment of anything that would be considered even moderately difficult in this country ought to be avoided, unless the architect have previously ascertained that the means of carrying out his intentions exist at the locality where his building is to stand, as in part they do in the larger cities and most active colonies. In short, in designing for the tropics the architect should suppose that his work is going to be carried out much as Medæval work was done, and without any modern appliances whatever; and how lightly such a limitation need act on a true artist may be easily understood by recollecting how grand and how perfect were the buildings which our predecessors erected in an age when steam-cranes, travellers, and railways were unknown, before iron had been introduced into buildings, and when roads were bad and hoisting little understood.

The materials obtainable in any tropical locality will be sure to differ somewhat from those at home. As a specimen, I will give an account of what is obtainable in Bombay; and here let me say that Bombay must be taken as on the whole a very favourable specimen of an Indian city. It is the capital of Western India, fast becoming the greatest commercial emporium of India; is a city of great wealth, and has a population of about a million, rapidly increasing; and has one of the finest harbours in the world. Whatever, therefore, is wanting in Bombay will not be likely to be better supplied elsewhere.

This island is volcanic, and no stratified stone seems procurable there or for many miles round. The ordinary building stone is a very hard, rough, slate-coloured basaltic trap, quarried with difficulty, all having to be blasted, chiefly used in stones of small size, as rubble, laid with plenty of mortar, and plastered externally. It will make good but rough rubble work if squared up, but much of it proves to be perishable when placed in a building. For dressings and ashlar there is a scanty supply of one or two varieties of yellowish trap stone, called Coorla stone, of a hard, unyielding nature, very difficult to procure in large blocks. A brownish granular limestone, closely resembling the worst qualities of Bath stone, and known as Porehunder stone, is imported by sea from the coasts of Katiwar, a distance of some 300 miles. This is the best available material for masons' work in dressings or architectural features, but it is liable to discolour after being some years in a building. It is often defective, and it is so costly that, on any large work, it would probably be a saving to import Bath or Caen stone from Europe. Native bricks are very dear and small, being thin, like Roman bricks. They are mostly defective, but are available for internal use. Bricks of Eng-

lish pattern are brought to Bombay some thirty miles, from Callian, but are even dearer than native bricks, and not very satisfactory; and I know of one instance, at least, where the facing bricks of a large proposed building have gone from England to Bombay. The fact is that good material and fuel for brickmaking are both equally scarce. A coarse, spongy conglomerate, known as kurliel, is occasionally used for filling-in and internal walling. I believe it to be a species of coral, and it is probable that some coralline material may in many tropical localities be obtained of a serviceable quality. Gravel there is none: for sand there is only sea sand, which at Bombay is not silicious, but ground-up basalt, rounded by action of water. Of course this would be different in many localities. Laminated stone there is none, so that any thin paving stone has to be imported from Europe. A rough paving of the local trap is in use, but is very expensive. Lime and timber are the two materials which alone can be described as really excellent of their kind. The lime is known as chunam, and is obtained mostly from Kunker, a nodulose limestone found in the neighbourhood of Bombay, a small supply of the best quality coming from shells. Where cement is required it has to be imported from England. For some purposes which are served by cement with us,—such as fillets and hips,—a kind of temporary expedient called dammer is made use of. This is a sort of coarse resin mixed with oil, melted, and paid on hot, like pitch, with or without the addition of strips of canvas among it to make it hold better.

Flat terraçed roofs are not so common in Bombay, for the buildings either of Europeans or of natives, as they are elsewhere in the tropics. Where they are used they are ordinarily of chunam, and very thick.

For all carpentry and joinery, Bombay, like other parts of India, has recourse all but exclusively to one material—teak timber. This wood is extremely tough and strong, and can be got in great scantlings. It is hard to work, but has the three cardinal virtues, that the ants do not eat it, the rainy season does not rot it, and, when seasoned in India, the Indian sun does not warp it. Wherever teak is procurable the designer of buildings for the East will do well to employ it alone, unless he is sure that any substitute he proposes will fulfil all three of the above conditions. Timber is often used by the native builders, for such purposes as joists and rafters, in the form of unseasoned round poles, or some other rough shape. The best teak is from Calicut, the next quality from Moulmein. Black wood, which rivals teak in its indestructibility, is only used for furniture. There is plenty of rough timber to be procured for ordinary and temporary purposes, but not proof against the white ant.

The native tiles are an exceedingly bad roof covering; and nothing but the extreme difficulty of obtaining those substitutes which would be an improvement has caused them to be retained in European use. They are of very thin red porous tile, almost semi-cylindrical in section, and about 9 in. or 10 in. long. They are laid course, are laid quite loose on the roofs, and are consequently so easily decayed and damaged that a relaying of them, called tile-turning, is an annual part of the preparation for the wet season. Galvanised corrugated iron has been imported to some extent from England, and is sometimes used as a roof covering; it is not altogether well suited to the climate, but is an improvement on the tiles. Where used for roofing, it ought to be employed double, with an air space of 10 in. or 12 in., with free access for ingress and egress of air between the two skins, and then it is found to form a tolerably cool roof.

All ironmongery has to be of brass to withstand the damp of the monsoon time, and if it is to act at all as Europeans like hinges and latches to act it must come from Europe; so must window glass, and marble or tile pavements. The ordinary material available for floors is a filthy pulp of cow dung, laid by native women, who spread it about with their hands, often jewelled, with great unconcern. I must admit that this unsavoury mess quickly hardens into a good and inoffensive floor; but it requires renewing with fresh applications of the material almost fortnightly. The floors, or chunam floors, are of course preferred by Europeans, but they are disliked by the native servants, all of whom go barefoot, as cold to the feet.

Window glass is, I believe, obtained solely

from Europe, and till lately came only in small panes. Rolled iron joists, to be used in a flooring similar to that of Fox and Barret's patent, are to some extent imported; but the excellence of teak as a material for joists leaves room to doubt whether the ordinary floor, which is constructed with a sort of concrete filling-in between teak joists, is not quite as good. Dennett's arch, perhaps used in connexion with Phillip's girder, and Ransome's artificial stone seem both of them appropriate inventions for use in cities within the tropics, but less available in Bombay than elsewhere, owing to the absence of good sand or gravel, or of any fair substitute. Terra-cotta as a substitute for stone dressings has been to some little extent introduced, and promises to be very serviceable. Lathe are not forthcoming; the split bamboo, which is the best substitute, is liable to be eaten by the white ant, and this, I presume, the chief reason why plastered ceilings are very unusual. Their place is usually filled by boarded, and often by canvas ceilings. Plastering in chunam on walls is coarse and soft. As papering is unsuitable (it would harbour insects), the ordinary finish is an inferior kind of distemper. The saltiness of the sand renders the walls hygroscopic, but if damage from damp could be guarded against, a treatment like the interiors of Pompeii would be the proper internal finish. There is a very superior sort of chunam plastering known as Madras chunam. It very closely resembles fine Parian cement, but is so expensive as not to be often employed.

Plumbers' work is all but unknown in Bombay, except occasionally for water-pipes. Gas-fitting is, however, now in use there, as gas has been lately introduced, and would have now to be provided for in arranging buildings for that city.

I have, I think, in this list, said enough to show that a building intended for Bombay, even if designed in accordance with the climate, but requiring for its erection large blocks of stone, landings, or even much ironwork, or such things as slate slabs, panes of plate glass, or flat tiles for floors or roofs, would have to be modified on the spot, in respect at least of those parts—unless all required was sent out from England; and though, perhaps, some of the localities for which the service of an English designer may be required will be better off than Bombay in some one or two particulars, it is more than likely that they will be worse off in others, so that an acquaintance with the material resources of the place, and the utmost anxiety not to overtax them, is required of every architect of a building for tropical climates.

The administrative difficulty is, however, likely to be greater than the constructive in any case that may probably have to be encountered by any of us, and is much more likely to be overlooked or misunderstood by an architect who has never travelled beyond the limits of Europe.

The available modes of carrying out a building abroad, as at home, are of course either through contractors, or by engaging labour and buying materials. Native contractors of some sort will be found in most large Asiatic towns; and in many places, where there is an extensive European settlement, English or American contractors are to be met with. Where it is probable that the work will be carried on by them, it is important that the documents sent out to explain the architect's intentions should be in such a form as they will understand. Here it may be worth while to add that, at least in India, the documents need not be translated into any foreign language; simple good English will be thoroughly well understood by those natives engaged. Specifications should be clear, distinct, and full, and, above all things, free from such technical words as are not known to be in use in the place where the work is to be done. Drawings should be very full and clear, and should bear on their face written directions as to what is intended by any difficult, or unusual, or intricate arrangement or construction. Simple hills of quantities will ordinarily be valuable, but they should not be taken in much detail. They should also afford more means of tracing on the plans the work which they describe than is usual in England; and where much work has been done under the Royal Engineers, so that the contractors are accustomed to their routine, it may be advisable to throw the bills into the shape ordinarily employed by them, and which are taken very much in the gross, and are arranged to exhibit on the same page the dimensions as well as the result of each of the few measure-

ments made use of. This will be not only advisable, but probably necessary, if the work is under any colonial Government.

In many instances it will not be possible for work in the tropics to be contracted for, and it will be done by day labour. If the English architect has to find some one to take charge of such an undertaking, it will be most desirable to get a superintendent, not only familiar with the work, but also acclimatised to the country, and used to dealing with natives. If these points are neglected, or any one of them, the work will run a great risk of being entirely stopped. Upon the risks due to ignorance of the work I need not enlarge, but it is as well to note that if the superintendent be unfamiliar with the climate and imprudent there is every risk of his being seized with fever, or sunstroke, or some other violent ailment, such as heats a hot climate, especially where there is exposure, and so laid aside; or, if this be escaped, the work may be equally hindered by the superintendent being imposed upon by the craftiness of the natives, or by his blundering through ignorance upon something distasteful to the natives engaged; as, for instance, I have heard of a very extreme case of an entire work being deserted by all the men engaged upon it, owing to the European superintendent having laid his hands on one of the workmen, whose notions of caste were thereby outraged. Such a thing as this may seldom occur, and the narrative may have been exaggerated, but the unwary agent will be extremely likely to be overreached by the craft or overpowered by the caste combinations of natives, which last are quite as formidable as our own trades unions, and even more unanimous in action.

If the work be for any colonial Government, the probability is very great that it will be handed over to an officer of Royal Engineers to carry out by day labour; or, as it is officially termed in India, departmentally. Large numbers of plain buildings, such as barracks, are executed by the officers of this body from their own designs, according to plans and estimates prepared by themselves, they purchasing the materials and employing labour; and their system for doing this work appears to me admirably well organised for this purpose; but any one who has had experience of it will fully understand that neither architecture nor building is the proper function of military engineers, and that as an executive this corps is not suited to the requirements of work of high architectural pretensions, and that it hardly seems giving military officers their proper position to employ them upon the carrying out of any work except from designs prepared by the officer engaged. At the same time that I make these remarks, I must add that this corps contains individual officers who have distinguished themselves in India as architects by their designs and executed works; and that they have been pioneers in the work of constructing in that country buildings for European use. They have excellent facilities for procuring from England such articles of European manufacture as they want, but perhaps have been themselves led by this very facility, and by their example have led others, to neglect the cultivation of the resources of the country. If the proposed work be Government work, it will in some way, probably in every way, be under the Public Works Department, wherever, as in India, such a department exists, and taken in hand by the military engineers of that department; and the great evil which, in that case, the architect has to fear, and if possible to guard against, is his work being wholly or in part modified, set aside, or superseded. To prevent this, the precaution should first of all be taken of being quite sure: that there is nothing which will require necessarily to be set aside,—nothing manifestly unsuited to the climate, to the materials of the locality, or to rude and imperfect workmanship and means of execution. The architect should, secondly, be quite sure that there is nothing which will require necessarily to be added; his drawings, while as little voluminous as he can make them, should be so comprehensive and complete as to furnish every detail, anticipate every question, and supply all needed information. Thirdly, he should be quite sure, that all his documents are regularly in the form customarily used and understood by the engineers, especially his detailed estimate; to use a homely phrase, he should send out the whole thing out and dried. Lastly, he should omit no opportunity of getting any official sanction and mark in the shape of seals or signatures on the drawings, or official and thoroughly formal

minutes and memoranda in their favour, as he can by hook or by crook obtain from any one in authority. The reason of this last suggestion is, that in India, and more or less in all colonies, very frequent changes in administration occur; so that if the official sanction of an officer be not obtained early to anything which he has agreed to and ought to sanction, there is a great risk that he may be suddenly promoted or transferred, and the matter fall into the hands of a successor, who, if not bound by the official action of his predecessor, may take some totally different view, and upset all that has been done. This labour, you will perceive, is greatly in excess of what is required upon an English building up to the time of sending away plans, and it requires to be well remunerated. It is considered, by those best qualified to judge, that if thoroughly well done, the work on a proper set of plans, &c., of this sort, equals all that is wanted here up to the time of making contract, with the addition of about half that which is subsequently done by the architect here during the time of his superintendence of the building.

I may add that the Government of Bombay has officially recognised the scale of professional charges issued by this Institute. It is, however, quite possible that, at least in the case of architects residing and practising in India, these rates ought in fairness to be increased, for it is, I believe, customary for the members of other professions to charge double the English fee for their services. At least, this is understood to be the practice of physicians, solicitors, engineers, &c., at Bombay, and probably therefore will be the rule in other parts of India.

But to return to the agency for executing works. There can be little doubt that in the case of any very large work, the employment of an European contractor of energy and skill furnishes the best guarantee for the good and rapid execution of the work; and any members of this Institute who have heavy works in tropical climates will do well to urge on their clients the great advantage, almost the necessity, for employing the best English contractor who can be found, making liberal terms with him, and stipulating for his sending a representative to be with natives, and already accustomed to a tropical climate. It will, however, only seldom happen that a work is important enough to tempt a good contractor from England, and European contractors settled abroad, or the native contractors, will usually be the agency best to employ; and of these probably native contractors will as often as not be found the most useful; but in either case it cannot be too much impressed on the architect whose designs are to be carried out by hands used mainly to different work, and certainly need to him, that the instructions conveyed by his plans and documents should be very full, very clear, and very unmistakable, and that simplicity should regulate and pervade all his contrivances and arrangements.

There still remains the ultimate question, and the most purely architectural question of all. What aspect, as works of art, shall we, as artists, strive to impress upon the buildings whose arrangement and construction we have been considering? I shall not attempt to examine this question at all in detail, but cannot forbear raising it; for the art of any building is undoubtedly the one element, whatever value we may put upon it, which concerns us architects peculiarly and almost exclusively. All classes of builders require to understand materials and construction. Many non-professional men require to comprehend the arrangement of buildings and organisation of works. Professional men in other branches of the great building art are called on both to comprehend and carry out all these; but it is our special honour that to us is committed the charge of those works which it is desirable to render, not merely serviceable as structures, but impressive as monuments; that of us is expected, indeed, not merely a work of skill, but also a work of art. I hold that the solution of the question lies first in the adoption of a type essentially European; and secondly, in the retention and blending with it of such admissible features as are to be found in the best styles of architecture that have been elaborated already in tropical climates.

Had we a distinctive modern English style, we ought, unquestionably, to use it in our colonies as the Roman did in his colonies, with such changes as local circumstances made necessary. But though this is unhappily denied us, there are in existence distinctive European styles; and I

hold very strongly that as our administration exhibits European justice, order, love of law, energy, and honour, so our buildings ought to hold up a high standard of European art. They ought to be European, both as a rallying-point for ourselves, and as raising a distinctive mark of our presence, always to be beheld by the natives of the country.

As far as I have seen it, most of our building work in the East is not creditable to our taste though it bears witness to our energy and vigour. It is unmistakably European, but of a very bad type. Now, the proper characteristic is not, I hold, the direct imitation of Asiatic types, but the adoption of those European styles which have grown up in sunshiny regions. Such styles are ancient Roman, or even Greek (when good enough materials and workmanship are procurable), or the Renaissance and Gothic of Southern Italy or Spain, or the Early Gothic of Southern France. In treating any of these styles, and still more in treating any more northerly modifications, a leaning towards the peculiarities of the best Oriental styles is desirable. Among these peculiarities, the following may be enumerated as frequently found:—Walls of ample thickness, often covered with a profusion of delicate surface-ornament, frequently beautifully coloured; an absence of such vertical breaks as buttresses, and a prevalence of horizontal cornices and level projections; openings, usually wide and frequent, artistically grouped, often filled in with exquisite pierced patterns; mouldings infrequent balconies and various sorts of corbellings covered usually with carving; roofs of low pitch, flat, or domical walls, often replaced entirely by lines of piers or columns; for the most part, and with some notable exceptions, moderate height, but usually great extent and elaborate surroundings. The whole have an aspect of breadth, richness, shade.

In concluding, I should like to throw out the hint that these peculiarities may be found worked out in the most perfect manner, and with complete adaptation to the exigencies of a fiery climate, in the best of the Mahometan buildings, which mark, as I should like ours to do, the residence in India of a conquering race,—a race, alas! far more artistic than we, and whose works are nobler monuments of art than it can be hoped ours may be. Many of the finest of those fast-decaying and ill-protected works—those at Ahmedabad—are partly represented by means of photography, and so available for study; and if, in addition to affording such information as at least a few of our members may find useful and interesting, I shall have succeeded, by again pointing out these works, which have been already described here, in inducing architectural students to dig in this hitherto almost unexplored mine, I shall have the gratification of knowing that this paper has not been quite barren of results.

COMPETITIONS.

New "Yorkshire Club," York.—The members of the Yorkshire Club, that has been established since 1839, having found that the increase in their numbers necessitated better accommodation than could be obtained in their present home in St. Leonard's-place, and having procured the freehold site now occupied by the house and garden of the Rev. Thos. Richardson (of which the north front faces the Lendal, the west Museum-street leading direct to the Minster, and the south the River Ouse at the point where it is crossed by the Lendal bridge), invited designs in competition from several architects, from which they selected three, and requested their authors to re-compete, as they had somewhat altered the position the erection should occupy on the ground. Of the three second sets of designs the choice fell on that submitted by Mr. G. J. Parwell, of London, who is entrusted with the execution of the works, Messrs. Habershon & Pitt obtaining the premium for the second, and Messrs. Deane & Yeoman that for the third.

Agricultural Hall Company.—The directors of this company having determined to erect a new hall for concerts, dramatic entertainments, and so on, invited a limited number of architects to compete for the design, and the following is the result:—Mr. Peck, the original architect of the hall, to have the work, under certain restrictions; first premium to Mr. Knightley; second, to Mr. Giles.

THE HERALDS' COLLEGE, LONDON.

CONSEQUENT on the formation of the proposed new street from the Thames Embankment to the Mansion House, a small portion of Heralds' College (not the whole, as erroneously supposed), has been taken down, and a new front to it is now being formed. In doing this, the Lion and Unicorn that had long done duty there were placed upon the ground. The accidental position given to them shown by the sketch, led to the following *jeu d'esprit* by one whose initials will be recognized beyond heraldic circles. The writer terms it—

UNSUPPORTED SUPPORTERS.

The Lion and the Unicorn,
Who deign'd, till very lately,
The Heralds' College to adorn,
On pillars tall and stately,

Unceremoniously, one day,
Were hoisted from their stations,
And on the pavement left to stay,
Pending the alterations.

The Lion sadly wanted or,
The Unicorn lack'd argent;
Clearly they 'd ne'er been thus before
"Depicted in the margin."

It therefore seem'd of the offence
A serious aggravation
That folks with arms of less pretence
Obtained full compensation,

While they, supporters of the Crown
For centuries, unaided,
Who had graced standards of renown,
Were to vile flags degraded.

The Unicorn, in language strong,
The Lion laid the blame on:
"Without a growl to bear this wrong
A blot will be your fame on.

If of ns quadrupeds you were
The king, or e'en the regent,
You would be rampant, not beg there,
Like a tame poodle—*sejant!*

As *dexter* 'tis your right to make
Them equal justice minister;
If I should up the matter take,
They'd call the motive sinister.

The British Lion, you! My brain
Whirls round, it so provokes me!
For half-a-crown I'd break my chain—
My collar another chokes me!

'*Dieu et mon Droit*,' no longer may
You boast as your proud motto;
'*Adeu, mon droit*,' you'd better say,
And join Parkins & Gotto.*

So saying, like a vicious colt,
To cut the matter shorter,
He made a sort of demi-roll,
And rump'd his co-supporter.

The Lion winced at the last sneer,
But only gave a whistle,
And said, "My ancient friend, I fear
You've trod upon your thistle."

The motto you to England brought—
Excuse me, comrade, if I sigh
To find you set it now at nought—
Was 'BEAT PARSIVUS.'

Prithce don't let the Herald see
Us, thus 'addressed,' good brother,
When we in every sense should be
'*Respecting one another.*'

In youth I'm willing to admit
More 'combattant' was I, sir;
But then I'd much more pluck than wit—
I'm older now and wiser.

I can complacently repose
Beneath my well-won laurels;
And mean no more to poke my nose
In everybody's quarrels.

Nor does it suit my present views
To roar for every trifle;
I've got—and can, if need be, use—
But won't strain my new rifle.

You seem to have forgotten quite
The world's in constant movement;
And neither King's nor Lion's might
Can long repel improvement.

* *Sol-didant* "sunders" of arms.



London of a new street had need,
And heralds by profession
Were bound to lead, and not impede,
A grand public procession.

The posts we held were on the go,
And fallen soon had seen us,
We had nothing to support, you know—
Not one poor coat between us.

But re-installed in the new court,
And gay with paint and gilding,
We shall our dignity support
With that of the whole huldung.

Facing a street so broad and fine—
When to our seats we've vaulted—
My crown will out a greater shine,
Your horn will be exalted.

So blazon not a long dull roll
Of hickering and bereavements,
Display the power of self-control—
The greatest of achievements."

'Twas all in vain: the Unicorn
Was deaf to explanation,
And, with a toss up of his horn,
Declined more conversation.

J. R. P.

SOCIETY OF PAINTERS IN WATER COLOURS.

THE sixty-fourth exhibition by this Society consists of 297 works, and, as usual, a large proportion of them are very charming. It cannot, however, be called one of their best. The figure subjects are even fewer than usual, and none of the members are at their highest. We are not surprised therefore to hear that the sales, though numerous, are not at present up to the average. Let us note a few of the pictures. 8, "Sans Peur et Sans Reproche," John Gilbert, is a spirited Medieval group, but does not tell its story. The foot of the knight, with full remembrance of what armour is, is obtrusively large. 12, "Wild Fowl, a Flight—Winter," Frederick Taylor. The fowl are full of life and movement, but the aspect of the scene is hardly that of winter. 20, "Rahab (miscalled in catalogue Rachel) Awaiting the Coming of Joshua," F. T. Shields, is the picture of deepest interest in the room. The head, a little too masculine, perhaps, is full of anxious thought: the holding to her of the "line of scarlet thread" cleverly tells what is going on in her mind. 41, "Secondary Colours," G. Rosenberg, a marvellous representation of plums, apricots (the latter a little too yellow), and mossy rocks. In 166, "September," this artist gives another remarkable example of his power of representation. 48, "Monte Rosa from the Rifel," W. Collingwood: a rosy mountain indeed, but for all that an occasional truth. 57, "The Return from Fairy Land," T. R. Lamont. The Ettrick Shepherd's

"Kilmeny, Kilmeny, where have you been?" will be remembered. The mother opens the door; the father stays from chopping wood at the angle; the maiden, with her lap full of roses, is entering. The figure of Kilmeny is so charm-

ingly pretty that one omits to look at weaker parts of the picture. 61, "The Wanderer," Margaret Gillies, has none of the sickly sentimentality that is to be found in many of this clever lady's pictures: it is an excellent work. 64, "Hush!" Walter Goodall: the baby charmingly portrayed. 68, "Harvest Time at Stoke Fleming, South Devon, looking over Slapton Sands to the Start Point," Collingwood Smith: a capital landscape. The same may be said of 78, "The Mull of Cantire," Francis Powell (the ripples tipped by the setting sun), 93, "A Towered City" (solemn and grand), Sammel Palmer; 96, "Laid Up for the Night—on the Thames," J. J. Jenkins. 107, "Morning," Thomas Danhy; 114, "Buttermere—Sunrise," S. P. Jackson; 139, "Over the Hills and Far Away" (with its winding hedge-bordered road), F. Smallfield; "Salzburg" (beautiful Salzburg), Sam. T. G. Evans; and Mr. Newton's large drawing, notwithstanding some commonness in the foreground; 144, "Denbigh Castle," David Cox, jun., and 171 by the same. 163, "Interior of St. Stephen's, Vienna," Sammel Read, looking west, must have special praise; it is one of the finest works of its kind that has been seen for some time. 189, "Oxen Harrowing—Sussex," Basil Bradley. Eight long-horned bestials are pulling a little harrow over mild furrows, a large apparatus for small work. An eminent agriculturist, standing by, maintains that the majority of the oxen must be one hundred years old: it is a clever picture nevertheless. 219, "Fair Daffodils," F. Smallfield: a sweet human face, though the soft blue eyes do not both look quite the same way. 162, "Ave Maria," Walter Goodall; 248, "The Ship's Model," J. D. Watson; and 213, "Well-Sinkers," Frederick Walker,—all call for mention, especially the latter, which is an exquisite drawing.

ST. THOMAS'S HOSPITAL, WESTMINSTER BRIDGE.

THE first stone of the new hospital which is about to rise on the southern side of the Thames, opposite the Palace of Parliament and adjoining the end of Westminster Bridge, was laid on Wednesday last by her Gracious Majesty the Queen. A brilliant sun contributed to success. The road from Buckingham Palace to Stangate was lined with a loving people; and in a very commodious, well-ventilated, and handsome pavilion, erected over the site of what will be the chapel of the hospital, some 3,000 of the more distinguished of them received her Majesty with long-continued plaudits, and watched with interest the short but interesting ceremony. We may say briefly that the interior of the pavilion was planned somewhat after the model of a theatre, with that part which would be occupied by the stage screened off as a reception-room. That portion of the interior space which, in a theatre, might have been the orchestra, pit-stalls, and pit was reserved for the ceremony. All this enclosed space was of one crimson hue. The tall barricade that swept round the arena was painted of that colour, the same to a shade as the crimson carpet and the crimson hangings of the long screen, against which was the crimson-covered dais. Four crimson poles, converging to an apex which was crowned with a cluster of flags, stood in the centre of the floor; and from their midst depended the square and polished block shortly to be lowered on a base, which was covered as to its sides with crimson cloth, while two crimson pedestals were at hand, to support the trowel, mallet, plumb-level, and other implements. On the crimson dais was spread a Persian carpet; and gilt chairs with crimson seats were ranged for the royal party, a throne being in the centre. Above was suspended a blue canopy, surmounted by a gilt crown, and having the same emblem repeated in flat gold hroidery round the border, at intervals with the letters "V. R." Banks of flowers were ranged round the arena, and the embellishment was completed by a pair of royal standards, of long lozenge form, one on either side the canopy. [The canopy was arranged by Mr. J. G. Crace, and with his usual good taste.] It is unnecessary for us to describe the ceremony, but we may say that to an address that was read by Sir John Musgrave, as President of the Hospital, the Queen returned, but did not read, this reply:—

"It is with sincere pleasure that I lay the first stone of the noble buildings which you are about to dedicate to the use of the sick and suffering poor. The hospital of

St. Thomas, founded by my royal predecessor, Edward VI., from the services which it rendered to humanity, naturally attracted the attention of my beloved husband, whose heart and mind were ever interested in institutions of so beneficial a character. It is a solace to me to follow his example in promoting the objects which you have in view, and to trust that your hospital, upon its new site, by the various improvements which experience and sanitary skill may suggest, will secure increased benefits to its suffering inmates, and provide an admirable school for nurses, and for the promotion of medical and surgical science. I thank you for the loyal and sympathising expression of your feeling on the late attempt to take away the life of my dear son the Duke of Edinburgh, and join in your prayers that the same good Providence which preserved him from the assassin will soon restore him in health and safety to his family and country.*

The trowel used was made for the occasion by Messrs. Howell, James, & Co. The handle is of carved rock-crystal, inlaid with scrolls of gold and turquoises, surmounted by the Imperial Crown, in chased gold, set with precious stones, the arched diadems being jewelled with pearls. The blade is silver, with elaborately engraved and gilt arabesques of Italian ornament, and bears the following inscription:—

"This Trowel was used by her Most Gracious Majesty the Queen in laying the first stone of St. Thomas's Hospital, May 13th, 1868."

[The "stone" is a polished block of granite from the Dalbeattie quarries, N.B.]

Mr. Tite, M.P., was prominent amongst the acting governors of the hospital.

The building, as our readers know, is to be erected from the designs of Mr. Henry Currey. A view of it, with plans and descriptive particulars, will be found in our volume for 1865.* The contractors for the works are Mr. Webster and Mr. Perry. The clerk of the works is Mr. Andrew Cleland.

MORRAT HOSPITAL, ST. THOMAS!

MR. PARKER IN ROME.

A LECTURE was given by Mr. J. H. Parker at a late meeting of the British Archaeological Society in Rome, on the Direction and Extant Remains of the Servian Walls. It might be considered as sequel to another on the Construction of Ancient Roman Buildings, given some time previously by the same gentleman on a similar occasion. Mr. Parker holds some theories that are novel, and opposed to those hitherto accepted by Italian archaeologists. An excursion, with the object of visiting *in situ* the antiquities referred to in the lecture, was arranged for the following day, and participated in by a numerous party, who enjoyed the advantage of receiving explanations at the several spots they were conducted to from the lecturer. We may report, briefly, the experiences of that pleasant and instructive day, dedicated to such studies among ruins of remarkable character, but by no means among those most generally visited, or understood, by tourists at Rome.

Important and picturesque remains of the Servian fortifications have been brought to light within recent years, and in most instances as it were accidentally, through works undertaken without any antiquarian purpose. Ancient historians differ in their accounts of the circumstances of the city by that cincture of walls to be attributed to Servius Tullius, and which formed the sole fortification around the earlier inhabited regions during about 800 years—namely, till Aurelianus raised the much more extensive circuit, A.D. 271, which, as restored, and perhaps amplified, by Honorius, A.D. 403, forms the actual girdle of defences to this city, in many parts, indeed, rebuilt by the Popes, to whom is due the entire cincture on the Transiberine or right bank of the river. Dionysius states that the Quirinal hill was first annexed by Numa, the Viminal and Esquiline by Servius; so also Strabo; but Livy ascribes to the latter king the fortifications that included first the Quirinal, afterwards the Viminal, and finally the Esquiline; the project of which works had been originated by his immediate predecessor, Tarquinius Priscus, who was prevented from accomplishing it by the wars with the Latins and Sabines; a second time undertook it, but in vain, shortly before he was cut off by violent death (Liv. l. 1, c. 36, 38). It is possible to reconcile statements that seem contradictory (and for the argument on this subject see Nibby, "Roma Antica," by assuming that Numa annexed some portion only of the Quirinal, Servius the remainder of that hill, and that

Tarquinius Priscus commenced the works completed by his successor, though one writer, Anselmus Victor, ascribes the whole to the former king, except that Agger, with its system of fosses, which all (Pliny alone excepted, who calls it the Agger of Tarquinius) agree in ascribing to Servius. Dionysius, the fullest in describing what he had seen when he visited Rome, about the year 30 B.C., observes how insignificant was the extent of these walls compared with that of the then inhabited city under Augustus, adding that it was difficult to trace their complete circuit, concealed, as they then were in many parts, by other buildings, and that the entire circumference seemed to him not much greater than that of the walls of Athens—namely, 63 stadia, or 7½ Roman miles—a few hundred feet less than the ascertainable measure of these Servian defences.

The first spot visited by the party under Mr. Parker's guidance was the Barberini vineyard, on the northern slope of the Quirinal, and in the valley between that hill and the Pincian, site of the beautiful gardens of Sallust, which eventually became a more important centre, chosen for imperial residence, the favourite seat of several emperors, especially of Aurelian. Here, on the steep hillside, are seen a few courses of antique masonry in lithoid tufa, partly hidden by vegetation, but recognisable as of early Roman work; and from the highest ground we discern the elevation of the Agger, extending southwards, in part overgrown by trees, at one point cut off by the Via di Porta Pia on the Quirinal, its course now traceable through private properties. The ruins next visited are in what was formerly the gardens of the Villa Negroni (where dwelt Alfieri), now the premises of the railway station. Here, in the course of railway works, were found some years ago, the massive substructures of walls in square-hewn blocks, the same lithoid tufa, some of the length of 2·70 metres, the direction oblique, the whole having been buried under a steep bank, evidently a part of the earthworks by which the Agger was supported on the inner side. At the same time were discovered the remains of a gateway, with jambs of ponderous masonry, at once identified as the Porta Viminalis, but which, with strange neglect, was allowed to be demolished—one of the instances of that Vandalism which has not totally ceased in modern Rome! A pleasant spot, notwithstanding utilitarian appropriations, and on every side commanding fine views of city and country, is that estate once of the Negroni Villa. Here, too, are other antiquities, brought to light within late years,—chambers of ruined mansions, built against the bank of the Agger, and on their inner walls are seen, in colouring still fresh, paintings that remind of Pompeian decoration. Those courses of ancient stonework have been numbered, so that each block may be distinguished, and plunder rendered impossible without detection. From hence we proceeded along the little-frequented region between the Viminal and Colian hills to the lower level, where stands S. Clemente, beneath which church, when the more ancient, now subterranean to the more modern building, was re-opened, an extent of walls in square-hewn blocks of lithoid tufa, with a kind of cornice in travertine of still larger masses, was found beneath the chancel of the primitive church, flanking a narrow passage, the opposite side of which is formed by the regular brickwork of a Roman mansion, believed to be the house of the Pope St. Clement III, successor to St. Peter. If, as seems inferable from their character, these walls be indeed a part of the Servian, that cincture must have taken a direction bending inwards from the south-eastern side, and advancing into the Sabura (where S. Clemente stands), which no theorists have hitherto assumed, the accepted maps of the ancient city placing the line far from this spot, and nearer to the Lateran basilica. The southern slopes of the Colian were next visited, and from a solitary road along which rise the picturesque ruinous arcades of the Neronian Aqueduct, we struck off into vineyards and gardens, amidst which it is almost certain that the Servian walls must have passed, though no traces of them be now visible. But other ruins, picturesque and noticeable, little known because not seen from any highway, will here repay the trouble of exploring: the most conspicuous, those of a mansion popularly called "House of Seneca," and in masonry resembling that of the time of Nero, the principal portion, a vaulted chamber in well-preserved *opus reticulatum*, intermixed

with layers of laterial work; near this, close to a garden-house, a vaulted recess, into which we look down from the shelving back that now obstructs the entrance; and further off (in another estate) an edifice, against the hillside, called the "Nymphæum of Alexander Severus," a good deal like that misnamed "Grotto of Egeria" which is such a favourite with tourists and sketchers in spite of all to be said against its pretensions; this building having its lateral walls adorned with niches, no doubt for statuary, and its fountain from a stream of crystal waters still visible in a conduit, with a ruinous opening and vault on the hillside; that fountain no longer gushing into its marble basin, but left to flow in darkness; the vaulted roof no more protecting the desolate hall; the inlaid pavement torn off, weeds and long grass growing in its place, nothing spared by time but what is left, still beautiful in decay, and sufficing to give an idea of the attractiveness of such a retreat on this Colian declivity, whence is enjoyed one of those views never to be forgotten by those who have loved and been familiar with the fascinating scenes of Rome! Still more than at the pretended Egerian Grotto has Nature here fulfilled, by her own reclaiming power, the wish of Juvenal in regard to that haunt of the enamoured goddess:—

"Quanto præstantius esset
Nomen sagæ, viridi at margine clauderet undas
Herba, nec ingratum violenter marmore topium."

The labours still in progress at S. Angelo in Piccaria, the modernised church built under the portico of Octavia, have not only uncovered much that had been hidden of this classic ruin, but also made accessible several remnants, in a cleft, of the Servian structures, not only in different low courses of the usual stonework, but more conspicuous elevations, and beyond the subterranean story of the church, the other within it, under the chancel, and here describing the segment of a wide semicircle; these two more considerable portions of the same walls being on parallel lines at some distance, that may have been connected by some certain of masonry at an angle with both, and suggest the idea of a tower or projecting bastion.

From these grounds we descended to the level of the Appian Way, and, at a point nearly opposite to the Antonino Therma, entered gardens at the southern side of the Colian, below the height crowned by the pleasant Villa Mattei, one of the ascertained directions of the Servian walls, near the Porta Capena, being on this line. No Servian structures are seen here; but such antiquities as we found on these cultivated depositories are indeed curious; and most interesting is it to consider, with Mr. Parker, that a ruin with walls at two sides of an angle, in *opus reticulatum*, thrown up against the hill, may be no other than the Temple of the Gamete, near the Valley and Grotto of Egeria, the real site of which we may confidently place in these low grounds under the Colian, at a short distance from the Capena Gate. Another remarkable structure here, on the same hillside, has been for the first time brought before public notice by Mr. Parker, who identifies it as a portion of the Appian Aqueduct,—an arched conduit, partly excavated, partly built, the masonry of brick and reticulated work mixed, into which we could enter at the cost of not easy scrambling over heaps of soil and debris, and beyond the outer compartment could reach three inner cells, now quite dry, but showing the action of water in petrifications on the vaulted roof.

Much more imposing is another specimen of the Servian walls, accidentally discovered in a vineyard of the Jesuite (now of Prince Torlonia), on the highest level of the Aventine, in 1851. Entering these grounds from a solitary road opposite S. Prisca, we find two elevations of the same massive masonry, in square-hewn stone courses, both of considerable height, and one locked down upon, as if in a wall, from the level of the cultivated soil under which it had been so long buried. At about the centre of the more conspicuous portion is an ample archway of travertine, in front of which advances a curtain of similar masonry, blocking up the egress by what must have been a portal of later addition, and which Mr. Parker assumes may be as ancient as the time of Camillus, about B.C. 360. The other fragment seems to belong to a massive square tower projecting from the cincture. On another part of the Aventine, in the gardens of the S. Sabina Convent, were found, some years ago, not inconsiderable remains of those walls, built up in the chambers of a mansion (probably patrician), which we saw soon after the dis-

covery, but which are now again withdrawn from view, the Dominican friars having wanted means to continue the excavations, and therefore allowed this interesting relic of Rome under her kings to be lost to modern citizens and students.

A stupendous structure of peperino in regularly-hewn blocks, divided by cornices of travertine into three stories, and in its highest part rising 90 ft., in its extent between walls well up, and another still open, but half buried in the ground, called *Arcs de Pontani*, has been hitherto considered nothing else than the massive enclosure to Augustus's Forum, preserved only on this the eastern side, near the base of the Viminal, and the beautiful ruin of a colonnade, which abuts against this building, passes for the Temple of Mars Ultor, the principal edifice in that Forum.* But Mr. Parker maintains that these very imposing walls also belong to the Servian enclosure, and that the half-buried *arcs* is, in fact, one of the city gates; nor, indeed, can it be disputed that the character of fortification manifestly appears in those immense ruins beneath the Viminal. The different dates of their origin must be inferred when we observe one side, at an angle, only seen in a narrow court behind a *caffè*, where the upper part presents a surface so worn by time as to resemble rugged rocks rather than masonry; but the lower, in similar stonework, is compact, smooth, and well-preserved, like a building comparatively modern; thus, we may suppose, being a restoration of the older structure. The same origin is assumed by the learned archaeologist for some other remains, of similar stonework, now built up in two sides of the ponderous brick tower, a huge unsightly pile, that rises in gloomy decay not far from the above-named walls, and which is all left of the once extensive castle of the Conti, built for the family (or, according to some writers, restored from an original of the ninth century) in the latter years of the twelfth century by Innocent III, the most illustrious son of that house. Canina referred those ruins within the Conti tower to the Temple of the Sun and Moon; others to that of Tellus; but, seeing the fortress-like character both of these and the ruins of the Augustan Forum, we must avow a disposition to agree with Mr. Parker in fully endorsing his opinion. A similar structure, referred by German writers to the Forum of Julius Cæsar, forms a curtain-wall behind the half-buried columns and beautifully-sculptured entablature of the Pallas temple in the "Forum Transitorium," begun by Domitian and completed by Nerva, a singular detail being the archway, filled up with corresponding stonework, placed at a point not central between the columns that flank it, and therefore evidently foreign to the plan of the later-raised portico that surrounded Minerva's temple. In this example, also, Mr. Parker points out a recognisable remnant of the Servian structures. Another undoubtedly of the same origin, but much less conspicuous, which we believe Mr. Parker has been the first antiquary to notice, is found near the Tiber bank, at the foot of the Aventine, within enclosed ground between the river and the archway called *Arcs della Salara*, supposed to represent in modern form the Porta Trigemina. Less picturesquely situated, though on the classic ground of the Tarpeian Rock, is another relic of the old king's works for defence, in a few courses of quadrate peperino blocks, now encased in brickwork, on one side of a dark corridor leading to a wash-house off the *Via di Monte Tarpeia*, on the highest level above that now disappointingly insignificant precipice,

"whence the traitor's leap
Cured all ambition."

It may be problematical, but is admitted by authorities, that some buttresses of lithoid tufa beneath an upper story of brickwork against the steep of the Quirinal in the Colonna gardens are also to be referred to Servius; and we cannot doubt that some other similar stone courses laid bare in the recent levelling for the ascent to the Papal palace on that hill, but soon afterwards swept away, were likewise of Servian origin,—their loss, therefore, to be regretted. We have

* We are inclined to agree with Nibby in rejecting this popular notion, and considering those Corinthian columns as the Temple of Nerva, dedicated to his adoptive father by Trajan, the church of S. Martina, near the arch of Septimius Severus, having better title to occupy the site at least of the temple of the Avenging Mars, which is represented on medals as circular. The Roman archaeologist above named is contented to observe the obviously higher antiquity of those contiguous walls, without determining their date.

now completed our survey, in an exploration none can have made without hearing away things to remain in memory, and not only to delight the antiquary, but also the lover of nature—indeed, all who have eyes for admiring so solemnly beautiful scenes of ruin and landscape as the Eternal City abounds in.

THE AMERICAN SOCIETY OF CIVIL ENGINEERS, NEW YORK.

SOME ten or a dozen years ago a charter of incorporation was granted by the legislature of the state of New York for the formation of the "American Society of Civil Engineers." Mr. James G. Laurie, the first president, had the credit of its origination, and many of the most noted engineers in the country were enrolled among its members. Lack of funds, however, prevented the society from establishing permanent head-quarters; and interest in its proceedings gradually failed, until finally the society existed merely in name, and in the memory of its members. Last fall, however, some of the old members revived the old society on a new basis. The first meeting was held last December, and Mr. James P. Kirkwood was elected president, with Col. Julius W. Adams as vice; while Mr. James O. Morse, the original secretary of the old organisation was still kept in office. At this meeting the president dwelt especially upon the importance of professional papers and communications, as being essential to keeping up an interest and life among its members. It is hoped to do much by means of this society towards educating the American public in the idea that engineering is not a trade, but a learned profession, practised by gentlemen. At the January meeting a full attendance showed the interest felt, and a paper was read by Mr. Craven, "On the Breakage of some of the enormous 10-ft. Mains of the Croton Aqueduct." A communication was read by the secretary, Mr. Morse, from Mr. McAlpine, upon the subject of corrosion of cast iron immersed in sea-water. He is of opinion that cast-iron piles are not subject to any corrosion whatever, if the ore from which the iron is made is properly selected.

PARR & STRONG'S CELLULAR FIREPROOF CONSTRUCTION.

We have illustrated in our present issue an entirely new mode of building which has been invented and patented by two architects, Mr. Samuel Parr and Mr. Alfred Strong. Its friends say it is Strong and above Parr; and we hope it will turn out to be so.

In this system of building, short tubes are substituted for bricks,—tubes made of clay, terra-cotta, metal, or any other suitable material. They may be of any shape, but the hexagon shape is best adapted for general use. The tubes are laid transversely in the wall, and the thickness of the wall is made up of tubes all one length. In external walls, the tubes are partially filled at one end with concrete made of Portland cement and ballast; and the concrete may be faced with plain Portland cement or pieces of stone, iron slag, flint, &c.

An ornament of cement, terra-cotta, or metal may be fixed to the end of the tube, and hacked up with concrete if necessary.

The other end of the tube forming the internal surface of the wall is covered with a plain tile of hexagon shape, the same size as the tube, and with a rim fitting the inside; or the internal surface may be formed by fixing a tile inside the tube, and covering it with concrete or plastering, according to the surface intended to be formed.

In all external walls it is intended to leave a cavity or air-cell between the materials forming the internal and external ends. For the internal walls and partitions surfaces may be formed, as above described, for the internal surface, leaving the tube quite hollow, or the tube may be partially filled or the whole tube may be filled with concrete. In the sides of the tubes it is proposed to make holes for the insertion of dowels or rods to unite the tubes vertically, horizontally, or diagonally.

The patentees propose further to construct roofs and floors with tubes, hexagon in shape. The tubes for this purpose are laid with their sides at right angles to the surface of the roof or floor, and are united with cement and dowels where necessary. The surfaces are formed by

covering the tubes with flat or spherical covers united with cement, and the spaces between the covers are filled in with cement; or an entire surface is formed over the whole of the ends of the tubes with concrete.

The patentees point out the value of the cavity or air-cell in the tubes as making the wall weather-proof, and claim, amongst other advantages, that the work, when united with dowels, rods, or tie-holts, is very strong; that the tubes being perfectly dry when built in the work, the walls are dry when finished, so that the joiners' work may be fixed without delay; that the tubes being made of equal lengths and the internal surface true, a thin coat of plastering is all that is required to complete it; that walls can be built very rapidly, and have the same solidity as masonry; that, the joints being all equal, no irregular settlements can take place, and no rubbish can be built in the wall; that hacking to stone walls can be executed without staining the stone, and the internal surface will be dry when the wall is finished; that alterations can be made in the walls and openings formed with safety without shoring or needling; and that arches can be formed with the tubes without cutting or waste.

Where great strength is required, as in the case of warehouse walls, a system of solid piers and arches can be formed in the work by filling the tubes with concrete, and the piers and arches may be further strengthened by the introduction of iron dowels, rods, or bolts. King-and-queen post-trusses can be formed in the walls with cast-iron hexagons and wrought-iron bolts, thus avoiding the necessity for iron girders.

Embankment walls can be built with rapidity, and without injury by the wash of the tide. Vertical bolts being fixed in the walls, the land-ties are concealed and secured from injury.

Saving of space may be effected by the adoption of thin walls.

For half-timbered houses it is proposed to fill the framing with short tubes and line the inside with tiles (flat), leaving a cavity at the back of all timbers to allow for shrinkage, &c.

With reference to cost, it is stated that, taking all things into consideration, this mode of construction is cheaper than brickwork.

The area occupied by each tube inclusive of joint is 1 ft. superficial, thus greatly facilitating the task of calculating the number required for any given wall-surface.

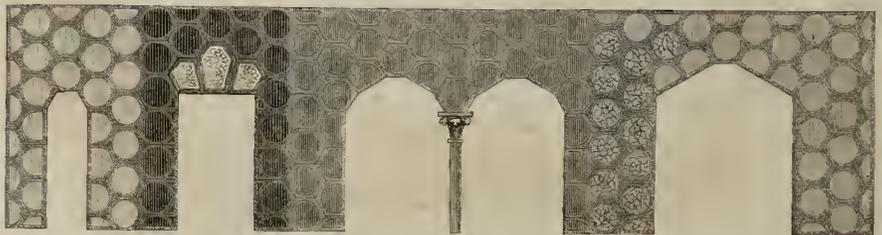
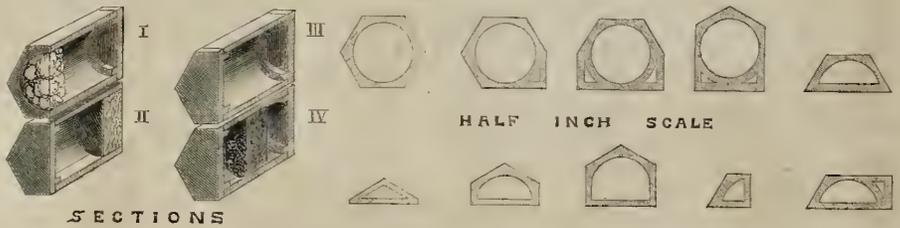
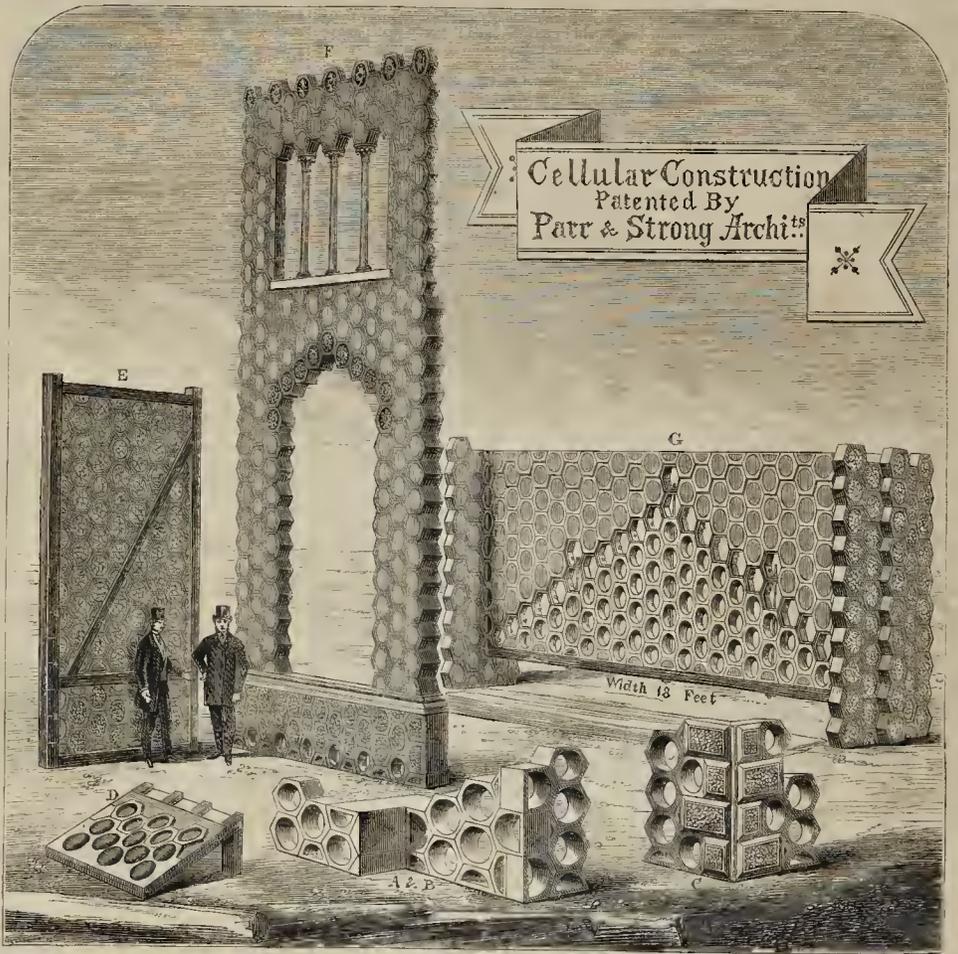
The illustrations show some details of the construction above described. The upper half of the page gives a view of some experimental works in the unfinished hall of the Strand Hotel Company. Figs. A and B show the method of forming breaks and exterior angles where it is not desirable to use brick, stone, or concrete quoins. Fig. C shows an exterior angle of terra-cotta or stone, and the method of uniting them with the hexagonal tubes. Fig. D represents a portion of a roof in its various stages of construction, the rafters, the lathing or rough boarding, the hexagonal tubes, and, lastly, the spherical covers. Fig. E exhibits a portion of half-timbered work, the tubes in the lower panel being filled with flint, those in the upper panels with granite. Fig. F stands 27 ft. high, and is built in three thicknesses. The plinth is 14 in. thick, the piers on either side of the arch are 9 in., and the remainder is of 4-in. tubes. The first row has been left empty, to show the strength of the tubes, whilst the others are filled with about 4 in. of concrete.

Fig. G is a truss with a clear space of 18 ft. between the piers, one of which is 6 in., the other 9 in. thick. These piers were erected (of tubes), by one man, at the rate of 1,700 bricks a day (9-in. work). The truss itself is composed of cast-iron hexagons, bolted together, and the king and queen posts are of wrought-iron, and pass through the ordinary tubes, which are 4 in. thick.

The lower half of our illustrations shows sections of various modes of forming the ends. In figs. 1 and 2, concrete and cap are used; in fig. 3 caps only; and fig. 4 shows two cells, divided by a wall of concrete. The next ten figures exhibit the chief forms necessary in this system of construction, the chief form being of course the hexagon, whilst the others are required only occasionally.

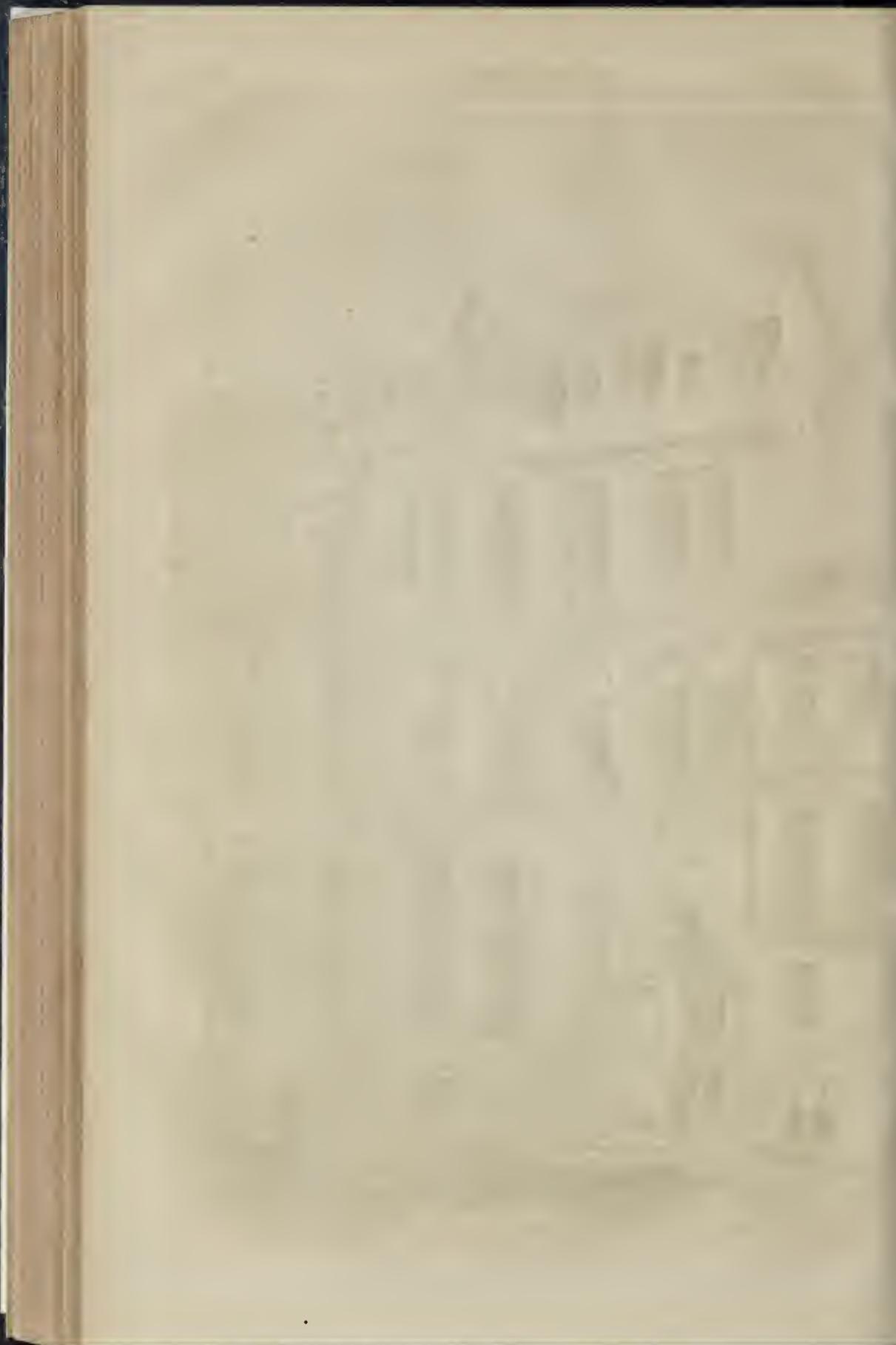
The bottom row of window openings shows the effect of *massing*, the capability for architectural treatment, and the ease with which any required width may be obtained.

A visit to the locality we have indicated will well repay those interested in new methods of construction.





NEW UNIVERSITY CLUB. ST. JAMES'S STREET FRONT.—MR. WATERHOUSE, ARCHITECT.



THE NEW UNIVERSITY CLUB,
LONDON.

The New University Club was founded in the year 1864 by various members of the Universities of Oxford and Cambridge, who, finding at that time it was necessary for a candidate's name to have been from eight to ten years the hooks of the two older University Clubs before he could expect to come on for ballot, thought that the establishment of a new club, which would absorb the numerous members of the two Universities who were then waiting and desirous to get into the older clubs, would meet with success. The result seems to have justified the expectation. The New University Club opened in St. James's-street in May, 1864, with 100 members. This number has now increased to 950. Early in 1865 it was determined to build a new club-house, capable of accommodating 1,000 members, and to that end the leases at the back of the St. James's-street property, having a frontage in Arlington-street, were purchased, and as soon afterwards as practicable the whole site was cleared and the new house commenced. The works are now nearly completed, and it is intended to open the building on the 25th inst.

The St. James's-street front, which we illustrate in our present number, is constructed wholly of Portland stone. Between the double-line courses at the level of the first and second floors shields are carved, bearing the names of all the colleges and halls of both Universities.

The Arlington-street front is built of white Portland stone, and has only a basement entrance for tradesmen.

The principal rooms in the building, looking on to St. James's-street, are the morning-room, somewhat octagonal on plan, about 40 ft. by 30 ft., and 22 ft. high, with a large bay window on the ground floor; the drawing-room, about 32 ft. by 32 ft., having a bay window also, occupying the whole of the frontage on the 1st floor; the smoking-room, over the drawing-room, and about the same size, having an open covered balcony in continuation of the windows of the rooms below.

Looking towards Arlington-street, there are, on the ground floor, two coffee-rooms, the larger 48 ft. by 27 ft., and the smaller 27 ft. by 17 ft.; above the larger coffee-room the library, and above that two billiard-rooms.

The staircase, and the retiring-rooms, lavatories, dressing and bath rooms, serving-rooms (one on each floor), are arranged in the centre of the building; as also the strangers' dining-room, on the ground floor, 27 ft. by 20 ft.; secretary and clerk's office, first floor; and card or committee room, 19 ft. by 15 ft., on the second floor. A well-lighted corridor, 10 ft. wide, on each floor connects the rooms looking into St. James's-street with those fronting Arlington-street.

The attic floor is appropriated for the servants' bedrooms, and the basement for the numerous offices.

The building is "fireproof" throughout, the walls being constructed with Phillips's wrought-iron joists and laths filled in with concrete, and lined up by wrought-iron girders, the soffits of which are visible in the various rooms.

The Portland stone staircase is carried on wrought-iron girders, the whole of which are visible.

The principal rooms are lighted by sun-lights.

The general contractor is Mr. W. Brass. The decoration has been executed by Messrs. Heaton, Butler, & Bayne. Mr. Boyd has carried out a system of iron flue-plate ventilation, and supplied kitchen apparatus and grates generally. The new carving has been done by Messrs. Farmer Brindley. The cost will somewhat exceed £100,000. Mr. Waterhouse is the architect.

SHEFFIELD ARCHITECTURAL SOCIETY. — On Friday last week, the monthly meeting of the members of this society was held at the School of Art, when the Rev. J. Stacey exhibited some ancient celts or rude spear-heads of flint and stone, a bronze javelin-head, a rapier-blade, and sword, and several cells of the same metal. They were all found in Limerick and other parts of Ireland. The rev. gentleman gave a detailed account of the various uses of the several objects. Mr. Fawcett read a paper on "St. Peter of Knaresborough," giving an account of his cell and rock-cut chapel.

THE DISINTEGRATION OF ROCK
FOUNDATIONS.

JERUSALEM.

In the course of the discussion at the Institute of Architects, after the reading of Mr. Grove's paper "On the Exploration of Jerusalem," a question was raised to which increased publicity may be usefully given.

Mr. C. Barry said: Mr. Grove has interested us very much by the details of these explorations which he has brought before us, and I have no doubt the effect of his paper will be to add to the number of subscribers among the members of this Institute, as well as to the interest which he seeks to excite in these proceedings. But in order that it may be done intelligently, I think it would be very desirable that he should give us some of that practical information which we want in dealing with money. He has given us a description of what has been already done, and he has told us the amount of funds he has in hand; he has also intimated that in the course of ten or twelve months that fund will be exhausted; but he has not told us how much the expenditure has been in making the series of discoveries which has been described, nor has he given us any idea of his own and Mr. Warren's anticipations to what extent the present funds will carry them, assuming they go on so satisfactorily as they have begun. It would be interesting to know whether they can form any idea of the amount that may be required, and the time over which the explorations may last if they are carried to a sufficient extent for the perfect elucidation of the Temple area. I think some definite information with regard to the amount which had been spent upon the work, as far as it has yet been carried out, will give some encouragement to the subscriptions, which I hope will receive some additions from the large meeting which we have this evening.

Mr. Grove.—I am much obliged to Mr. Barry for putting this question. The cost of the explorations which I have mentioned to-night, up to this time, has been about 1,700*l.*, including the expenses of sending Lieut. Warren and two assistants to Palestine, and their pay. What further expense may be incurred is a question of how much is to be done. The present expenditure is about 200*l.*, but we might advance from that to 500*l.* per month with great profit and advantage. What I should like to do with regard to this fund would be to rescue it from its present temporary and spasmodic condition, and put it on the footing of regular yearly subscriptions. I am about to propose to the committee of the fund a plan by means of which we may obtain a regular yearly income with which to go on exploring, not only Jerusalem, but other parts of the country also. I do not wish to leave out of sight that there are other departments to be explored besides the architecture and topography of Jerusalem. The geology and natural history are but very imperfectly known, and they are highly interesting and important. All I can say regarding that department which affects the Institute is, that the old city appears to be lying there beneath the modern nearly intact,—only waiting for the removal of the debris which presses it down.

Mr. Seddon referred to the picture painted by his late brother, Thomas Seddon, which was purchased for the nation, and is now exhibited at South Kensington. He said: It happens to represent the very locality which has been mainly referred to in the lecture, and to give the present aspect of the valley with the utmost accuracy. The character and colouring of the vast accumulation of debris which overlies the apparently original slope of the precipice is therein shown as having exactly the aspect of the tips from mines and quarries with which we are familiar in this country. Nevertheless, the depth of the ravine and the steepness of its banks are sufficiently striking, and from it may be gained some idea of the stupendous grandeur which must have characterized the effect, if the Temple walls were ever visible to the full extent of the amazing height which has been described, and the depth of the valley was as great as the section exhibited by Mr. Grove would appear to prove it once to have been.

Mr. Dight Wyatt.—Mr. Grove's passing reference to the fact that the illustration of the ethnology of the country is one amongst the contemplated objects of the society, opens out interesting prospects of what it may be enabled to effect in the future. The most casual observers of museums, and the most superficial students in

archæology, cannot fail to be struck in contrasting the yield of the Holy Land in remains of antiquity with those art-treasures of all kinds which have teemed upon the soil of Egypt, Greece, Nineveh, Rome, and other places. On those historic sites illustrations of the mode of life, of the manners and customs, and of the peculiarities of successive dominant races seem to turn up with every square yard of virgin soil in which excavations are made; while, on the contrary, in the Holy Land, no indication whatever appears to have been as yet discovered in a tangible shape of the nature of the technical arts of the country. Hitherto no success has, it is believed, rewarded research by former explorers in this particular; and I should therefore be glad to hear in detail,—firstly, whether in the investigation of tombs, or in any of their excavations, any fragments illustrating the technical arts of the country have been discovered by the Palestine Exploration Society; and, secondly, whether those who practically conduct the work have the intention to extend their examinations over a considerable area. In going to such a great depth as that in which, judging by the diagrams, the main shafts have as yet been sunk, the sewers, the old water channels, and probably certain subterranean passages connected with the ancient defences of the city may be perfectly well investigated; but it is scarcely to be anticipated that many relics will be discovered which will throw light upon the arts and habits of the people.

Mr. Grove said.—Mr. Wyatt is quite right in his remarks. Not a single weapon, not a coin, not a piece of metal-work of any kind has been discovered. It is almost as if no people of any race or kind had existed in the country. Going down to the great depth which this shaft of 87 ft. indicates, it is natural to expect that at the foot of a wall which must have been tenanted by soldiers and others for many years, some coins or other articles would have been dropped. The only things Mr. Warren has found are some small pottery vessels and two little glass bottles, and those were found, not at the foot of the wall, but in the subterranean passage from the Virgin's Fountain, and they have been pronounced by competent judges to be of a date not later than the fifteenth century.

The Rev. Mr. Smyth inquired whether the filling up of the Kedron Valley was from debris of rock or from natural soil.

Mr. Grove replied that Mr. Warren reported it was all composed of stone chippings. It might be either the fragments from the dressings of the stones of the wall, or the debris which had been tipped over during the many successive demolitions of the place. Looking from the Mount of Olives, the whole of the side of the valley next to and below the wall appeared like one enormous "tip." It had exactly that form, and also was of a grey limy colour, like destroyed masonry.

Professor Ansted said: I should be glad to add to the stock of information on this subject more directly than I am able to do, and there are many points of geology which might have been enlarged upon, but this would not be a fit place to introduce them; but with regard to the extraordinary appearance of the chipping of stone alluded to, from what I have seen in that part of the world—though I have never been at Jerusalem—I can perhaps explain them. Those who have visited Greece, and countries where the rock is chiefly brittle limestone, readily acted upon by the weather, and have noticed the result of time on walls or buildings, will be prepared to recognise a similar result on naked rock. In many places where scarcely any buildings remain, and where there is no evidence of former civilization, one sees heaped together a vast amount of angular stones. The traveller's faucies he sees the ruins of an ancient city which must have existed for centuries; but when he looks with a geological eye, with a view to make out how the result has really been produced, it is clear that all these fragments of rock are nothing but the result of the action of the weather on the great mass of the limestone itself exposed at the surface. A large portion of the buildings of Greece have been built originally of rock brought from no great distance; the old walls and buildings have served afterwards as quarries, and the result is a vast confused heap, partly derived from old buildings and partly from sub-aerial denudation. In the valley near Jerusalem there may have been fragments thrown down, and an enormous extent of artificial as well as natural destruction of this kind; but in the instance before us I think a large pro-

for at the age of twenty he entered a convent, and, except once, for a brief visit to Rome by command of the Pontiff, he never left it till his death. His fervent devotion found utterance in his pencil, and his days were industriously passed in the production of works each of which may be regarded as a superb hymn of praise, conforming in all things to the rule of his order. He received commissions through his superior only, and the proceeds became the property of the convent. It was "the passionate energy" that Masaccio threw into the study of art, and the contempt of all common pleasures and frivolous pursuits that he exhibited, that first drew the notice of Cosmo de' Medici. Benozzo, the favourite pupil of Fra Angelico, was also an excellent man, pious, and a good Christian. Signorelli, we are told, was "a man of great learning and industry, as well as original genius; of irreproachable life and amiable manners; courteous and helpful to those who needed his assistance; to his numerous scholars kind and communicative, as became a great and generous artist."

Domenico Corradi, says Vasari, was the delight of the age in which he lived. Mantegna, one of the hundred and thirty-seven pupils of Squarcione, was another honourable man, and it seems a fitting crown to his just life that he was able to return to Mantua, after he had been employed at Rome, and build himself a magnificent house, which, with his own hand, he embellished with paintings, both on the exterior and in the interior, and in which he ended his praiseworthy days. Il Francia was a man of exemplary morals, amiability, and cheerfulness—so witty, so wise, so agreeable, deposes Vasari, that "the saddest man" would have felt happy in his company; and his family, fellow-citizens, strangers, and princes loved and venerated him. Fra Bartolomeo was enthusiastic, devout, and affectionate: accordingly Mrs. Jameson sees the greatest tenderness and softest regular beauty in his female heads, and a sweet, mild dignity in his suits; for just such qualities as an artist possesses can he depict. Leonardo da Vinci was "the miracle" of the age of miracles in which he lived. "Ardent and versatile as youth; patient and persevering as age; a most profound and original thinker; the greatest mathematician and most ingenious mechanic of his age; architect, chemist, engineer, musician, poet, painter,"—no wonder that in our day Hallam has looked upon his acquirements as revelations calculated "to strike us with something like the awe of preternatural knowledge." Not only men, but "the very brutes," we are told, loved Raffaello. Giulio Romano, too, was a man of generous moods. Tintoretto must have had lovable qualities, for his daughter, whose pictures had won her so much celebrity, that both the Kings of France and Spain invited her to their courts with tempting promises, would never leave him. Paul Veronese lived an amiable, liberal, generous, pious, domestic life, asking but very small prices for his pictures when he painted for churches or convents, and educating his sons and other relatives in his atelier. And of Bassano, whose pictures are compared to handfuls of rubies and emeralds, it is written, "nothing could tempt him from the little native town where he flourished, grew rich, and brought up a numerous family." In fine, all these gifted men were good; it is impossible not to deduct the inference from the evidence placed so lucidly before us that the purer one lives the better our work will be: the hand and brain cannot set forth virtue or truth in glowing colours if the heart be clouded with vice.

The unwary are warned by our authoress that they must not accept as genuine all the paintings referred to the various masters. In some instances two painters have wrought on the same canvas, and it is now impossible to identify their respective styles. We have just cited the case of Titian and his son. The pupil's work is often scarcely distinguishable from that of the master. The brothers Dossi, who unfortunately by no means agreed in their lifetimes, are now inextricably merged in one, all writers finding it scarcely possible to distinguish their works. Not one-third of the pictures attributed to Leonardo da Vinci were the production of his own hand, though it is allowed they may have been executed under his direction and from his cartoons. Of the paintings ascribed to Giorgione especially, few are genuine. The greater number of them were painted by the Venetian, Pietro della Vecchia, a clever imitator of his mode of execution, style of colour, and everything but the feeling that Giorgione threw into his work. Titian's picture of the "Four Ages"

is, however, the only one that should have imposed upon skilled judges. This, painted when he was in daily communion with him, doubtless reflects much that he gained from his companionship. With subtle dexterity does the biographer teach her readers to look below the surface for the full meaning of things. In every respect we consider she accomplished the aim she set before herself, which was to suggest to young students of art comparative and discriminating reflections.

MONUMENTAL.

Statue of Lord Palmerston.—At a recent meeting of the town council of Southampton the mayor announced that he had received a letter from the sculptor of the statue to be erected in the town to the memory of Lord Palmerston, to the effect that it was now on view in the Royal Academy, and would be ready for erection in July. It would be necessary for the council to provide a site for its erection, and to prepare the foundations and erect the pedestal and sub-plinth for it. The statue, they would remember, was raised by public subscription, but all the money had not been promised, and if they were not prepared with a site for its erection it would probably be a long time before they came into possession of it. Some part of what he had asked for would have to be provided by the subscribers, but the foundation certainly would not, and as the corporation had the power under the Marsh and Markets Act to erect statuary and to place other ornaments in the parks, he recommended that the Marsh and Markets Committee be empowered to do the work he had asked, and added that it would be gratifying to reflect that Mr. Sharp, the sculptor, was closely connected with one of the leading families in the town, and that no doubt the work would possess much interest as well as be an ornament to the town. A resolution in accordance with the mayor's suggestion was agreed to; the cost of the foundation, pedestal, and sub-plinth not to exceed 50*l.*

Memorial of the late Earl of Carlisle.—The Carlisle Memorial Chapel, attached to the Castle Howard Reformatory, has been publicly opened for service. The chapel is intended as a place for divine worship during bad weather and the winter months for the inmates of the Reformatory, and is also intended to serve as a school-room. The building has been paid for by subscription of those friends and admirers of the late Earl of Carlisle who, while subscribing to the county memorial, now in course of erection, dissented from the view that a purely ornamental erection should be adopted. The building was designed by Mr. J. L. Pearson, of London, and combines the ecclesiastical with the domestic in style.

THE WESTERN PENNSYLVANIA HOSPITAL.

THE great State hospital of Western Pennsylvania at Dixmont is now far advanced towards completion. The central buildings were completed in 1861. The western wing has since been erected; and now the eastern is in progress. In the last report of the architect, Mr. J. W. Kerr, to the Board of Managers, he gives an account of the whole building, from which we glean the following particulars:—

The main buildings of the hospital will consist—when the eastern extension, now commenced, is completed—of a central building of 61 ft. front by 131 ft. deep, having on each side of a wing of 345 ft. front by a minimum depth of 38 ft., making the whole 751 ft. front, the central part and portions of the wings being four, and the remainder three stories in height. These buildings being arranged in a cluster of connected parts for the purpose of facilitating ventilation, would, if all were placed end to end in a straight line, make a front of 1,150 ft., or about one-fourth of a mile.

The first, second, and third stories are each 12 ft. high in the clear, and the fourth stories 15 ft. high.

The central building contains a chapel 50 ft. by 57 ft. on the floor, and 27 ft. high in the story; three stairways, corridors, or halls, 17 ft. wide; and the offices, parlours, and chambers of the medical superintendent and his assistants;

one kitchen, 19 ft. by 27 ft., and another of 17 ft. by 19 ft.; and pantries, closets, and bath-rooms.

The wings contain 250 private rooms for patients, the smallest room being 8 ft. by 10 ft.; twelve dining-rooms, eight parlours or day-rooms, twelve bath-rooms, and other closets; store and drying rooms; laving halls or corridors 12 ft. wide running through the middle of each wing.

The buildings are lighted with gas made in a detached building, and are warmed throughout by steam from radiators placed in the cellar story, the warmed air being carried to each room and the corridors, through tin-lined flues in the partition walls, and the vitiated air being carried off by other flues leading to the attic, where they connect with ventilators on the roof.

All parts of the buildings are supplied with hot and cold water, conveyed in galvanised iron pipe, and all waste is carried off through ventilated drains of cast-iron pipe.

In the erection of the buildings, including laundry and various other outbuildings, there have been used 8,300 perches of stone, 4,000,000 bricks, 46,000 ft. of roofing, and 52,000 yards of plastering, over ten acres, and the gas, water, and steam pipe used amounts to over nine miles in length. The floor surface of the hospital buildings amounts to three acres in extent.

The whole work has been designed more for utility than show.

ART AND ARCHITECTURE IN ABYSSINIA.

In a recent number of the *Builder* (p. 257) allusion was made to Abyssinian notions of fine art, as they have been described to us by English newspaper correspondents. Some of the letters from the land of the late King Theodore are full of the most curious and interesting information regarding the works of Abyssinian artists, and they also give us an idea of the capabilities of—we suppose we may be allowed to call him so—the ecclesiastical architect of Abyssinia. The efforts of hoth, as might be expected, are of a very rude and crude kind, showing an extremely primitive condition of art. It may, however, be presumed that these native works are an advance on the efforts of many kindred barbarian tribes. One of the camping places of the English expedition was at a place named Antalo or Booyeah. Among Abyssinian towns this is one of the most considerable and important. What may be the number of its inhabitants we are not, however, told. By the way, it would be a rather difficult thing, one would imagine, for a *white registrar* to take the census of a large black population, and to be certain that he had taken it correctly! It could only be effected, we presume, on the instinctive knowledge principle by which shepherds, it is said, are enabled to recognise each individual sheep, not only by its presence, but by its absence from the fold. Antalo, we are told, has at first sight a picturesque effect, being built of red sandstone, which the trees surrounding its three churches relieve. One of these churches is the cathedral which is dedicated to St. George. It stands by the river side, embosomed in a grove of lofty cypress-trees. The cathedral is a circular building one story high, and roofed with thatch. It is built in three concentric circles. The innermost, or most central, is the most holy place where the ark is kept, where priests alone may enter. The second is ornamented with rude frescoes, which cover the whole of the wall space. A large number of wooden doors, and windows having wooden shutters, gives communication between the outer and inner passages.* There are upwards of a hundred pictures; and, as the church is dedicated to St. George, his triumphs have, of course, great prominence in the subjects chosen. Other designs represent the Madonna and Child, the Crucifixion, the Stoning of St. Peter, our Lord walking and St. Peter half-sinking in the sea, with other incidents of New Testament history. Those pictures which it would seem are held in the greatest reverence are the Virgin Mary, which is life-size and encased in metal in Russian style, and a large fresco of St. George on a white horse, killing the dragon. There are also

* These peculiar arrangements of the Abyssinian highlanders are in singular accordance with explanatory suggestions as to the concentric circles and central cups of the rock symbols of the high lands of England, Scotland, and other countries, treated of in a series of articles in the *Builder* some years since.

life-size portraits of the Archangels Michael and Raphael. None of the paintings, according to one correspondent, are executed with the slightest regard to perspective, and all seem to be but rude imitations of the religious paintings of the Early Medieval period. This opinion is borne out by the *fac-simile* of two pages of an Abyssinian Bible published the other week in the *Illustrated London News*. One page represents the Creation of Adam and Eve, and the Crucifixion in another compartment. The other exhibits the figures of St. Theodore and of St. George and the Dragon. Nothing could be more grotesque than these pictures. They resemble the crude pencillings with which an English urchin of about four years of age is in the habit of decorating his slate. This Bible has been forwarded, along with other curiosities, to the British Museum by the representatives of that institution sent out to Abyssinia on a collecting mission.

FROM SCOTLAND.

Fountainbridge (Edinburgh).—At a recent meeting of the Chalmers Working Men's Hall and Institute, Fountainbridge, it was stated that a property had been acquired in Ponton-street as a site for the institute, and, after paying all expenses, there remained a sum of 366l. 9s. 3d. towards the building fund. Mr. Patrick Wilson had examined the site, and had prepared a plan, which the trustees recommended for adoption. The cost would be about 1,000l., and the trustees hoped to raise at least as much money as they had in hand, and they knew where the remainder could be had on loan. It was thought there should be no difficulty in raising that sum. Mr. Wilson submitted the plans he has prepared. The institute is to be a plain building of two stories, with a frontage to Ponton-street. On the ground-floor are two large rooms, 27 ft. by 16 ft., which it is proposed to fit up for games, and also as reading-rooms. On the second floor there is a hall, 57 ft. by 38 ft. It is intended to erect a gallery in one end of the hall, which will then be capable of seating 330 people. Committee-rooms, or rooms where silent games could be carried on, are also provided on this floor. The plan has been prepared with the view of leaving room for further erections, without interfering with the original building. Resolutions approving of the plans for the institute, of the constitution of the association, and of the trustees appointed were thereafter put to the meeting and carried.

THE OTTOMAN RAILWAYS.

LAMARTINE, in his work on the East, says,—“Let us congratulate ourselves on having found a living people among a people supposed to be dead.”

When H. H. Abdul Aziz was invited by the Emperor of the French to the World's Fair, one who, by a happy presage, exhibited his marvellous works at the Champ de Mars, we could foresee the birth of a movement of progress.

Carried away in the whirlwinds of Western civilisation, which annihilate distance, quitting his vast empire, which the difficulty of communication separates from the family of European nations, the first thought of the Sultan was necessarily directed to the miracles of modern ingenuity. Also, he could compare and judge of the degree of advancement of Western nations, the prosperity of which is in a great part due to the magnificent lines of communication established in all directions. Thus, no sooner had the Sultan returned to his states than, convinced of the utility of this means of transport, he conceded to strangers the right, not inscribed in the Koran, to possess landed property in the Ottoman empire, and he granted thus many important concessions.

In fact, by a happy coincidence, for two years already, serious negotiations have been opened with the Divan by four Frenchmen, M. E. G. Piet, Toucas at Constantinople, the Comte Paul de Saint-Alais, Paris, and J. B. Saaron, French vice-consul at Odessa, for the purpose of obtaining the concession of the Ottoman group of railways for large contractors of Brussels, to whom they were formally engaged.

On the departure of the Sultan nothing had been decided, but the line was marked out: as soon as he returned, M. Toucas obtained, on the 1st of October, 1867, the ratification of the bases of the treaty, and, on the 31st of March, 1868, the

firm of C. & L. Van der Elst, Brothers, & Cie., represented by M. Cyrin Van der Elst, received from the Sultan the firmen of the concessions of the following lines of the Ottoman group, going from—

Constantinople to Adrianople,
Adrianople to Tatar-Bazardjik,
Tatar-Bazardjik to the frontier,
Salonica to Uskiap,
Uskiap to Nisch, and
Enos to Adrianople.

THE NUISANCE AT TATTERSALL'S.

STEPS ought to be taken at once, and before it be too late, to mitigate the nuisance and inconvenience caused by the proceedings at Tattersall's in Knightsbridge, chiefly on Mondays. The roadway, there very narrow, is obstructed by the standing of vehicles, and round about the gateways a vast crowd of hicklegs and their victims gather and remain. For a time after the passing of a recent Act the police prevented this to a considerable extent, but matters now go on just as badly as before. On Monday last, in the afternoon, there were from 300 to 400 persons of the disreputable classes alluded to congregated near the entrances. The parish authorities ought to move at once, and nip this monstrous and demoralising nuisance in the bud.

WATER SUPPLY AND FEVER AT BALSALL HEATH, BIRMINGHAM.

At a recent meeting of the Balsall-Heath Local Board some very interesting facts were disclosed by Mr. Scofield as to water supply. This gentleman stated, says the *Birmingham Journal*, that, having procured water from various wells in the district which had been affected by disease, he found that the supply which came from wells serving houses in which fever had raged most severely contained the largest admixture of organic matter, while water from the opposite side of the street, where fever had not prevailed, contained the least proportion of organic pollution. He further stated that the wells from which the greatest amount of organic matter had been derived were more or less surrounded by pigsties, ashpits, or privies. The inference seems perfectly clear: surface drainage has polluted the wells, and polluted wells have given origin to fever. Such being the case, it is very satisfactory to learn that a remedy is being applied. A firm of manufacturers having endeavoured to sink a well in the district, found the attempt frustrated by the falling in of earth. To avoid this difficulty, they determined to make trial of the American tube pump. This has completely answered their purpose, being found to throw up 300 gallons of water per hour. Some others of these tube pumps have since been fixed, at various depths, from 10 ft. to 17 ft., and in almost all cases good water has been obtained. Here, then, is a way out of one part of the trouble. By the use of tube pumps, instead of wells, the freedom of water from surface consumption may be secured, and that alone is a considerable step towards the eradication of the fever.

DURSLEY CHURCH, GLOUCESTERSHIRE.

This fine church was re-opened on the 16th ult., after restoration. It was formerly in a very dilapidated and unsafe condition: the outer walls and the great nave arcades were very much out of the perpendicular, in some places leaning as much as 14 in. The foundations were from the first constructed without footings, and of no great depth; and they had in recent times been undermined by vaults and graves in a way which would have endangered the stability of a far stronger fabric; and the piers and columns had been cut away and hollowed out in many places for the purpose of fixing monuments, and that in a manner seriously to weaken them. Huge galleries encumbered the western end of the nave and aisles, and the floor was covered with high square pews of deal panelling. The chancel was a modern building, small, and of no architectural character. The roofs of the north and south aisles were of chestnut, and very hard-wood, and dated from the fifteenth century.

The work just completed consists in the re-

storation of the body of the church to a sound condition, in the enlargement of the church by a new chancel, vestry, and organ-chamber, and in adding of a clearstory to the nave. In order to bring the fabric into a safe and satisfactory state, it was considered necessary to take down and rebuild both the nave, arcades, and the north aisle. Care has, however, been taken to retain everything of architectural or antiquarian interest that was possible, and so to make the work bear the character rather of restoration than of renovation.

The foundations have been carried down to the solid rock in nearly every case, and in some places have gone nearly 12 ft. deep. The concrete on which the piers are built is in no instance less than 6 ft. thick. The walls of this part of the church are faced with Puff stone, a sort of alatacote found at Dursley, which has a very picturesque effect. The new buildings are of Knackerby stone, with dressings of Bath stone. The vestry is on the south side of the chancel, with an organ-chamber above, opening into the chancel with a wide arch. The old organ is for the present retained, but it is hoped soon to replace it by a larger instrument. The old roofs of the aisles have been restored, and the nave roof has been completed to a similar design internally, but raised to a higher pitch externally. The new clearstory consists of eight three-light windows on each side. The windows, new and old, have been glazed with quarry-lights in lead, re-arranged in geometrical patterns in the beads and tracery. The chancel has been paved with a mixture of plain and encaustic tiles and marble.

The cost of the whole work has been rather more than 5,000l.

Something still remains to be done in the way of substantial repair. The fine groined porch and the south-west angle of the church are in a state which requires serious attention. The carving, tiled floors in nave and aisles, stained glass in east window, &c., also remain for the present incomplete for want of funds.

The architect of the whole work is Mr. T. G. Jackson, M.A., London. Mr. R. Futcher was the contractor for the fabric, Messrs. Whitfield & Sons executed the seats in the body of the church, Messrs. Farmer & Brindley the chancel seats, and Mr. W. Godwin the chancel pavements, the marble being supplied by Messrs. Farmer & Brindley.

THE DESIGNS FOR THE NATIONAL GALLERY AND LAW COURTS.

In the House of Lords, on Tuesday last, in reply to Viscount Hardinge, who asked what steps the Government proposed to take with respect to the preparation of designs and plans for the New National Gallery,—

The Earl of Malmesbury said, on receiving the report of the committee of which the noble viscount was himself the chairman, if his recollection rightly, the Government communicated with the trustees of the National Gallery, and from the trustees, who also furnished a report, the Government received a succinct set of suggestions, giving a complete account of the space required, and giving also some very valuable suggestions. The Government was now waiting in consequence of that report. His noble friend the First Commissioner of Works had not yet decided who the architect should be. The plans were ready to be submitted to the architect as soon as he was selected, but the report sent to the Government by the committee gave rise to the impression that none of the plans suggested were such as ought to be adopted.

The Duke of Rutland hoped that in a short time an architect would be found who would be able to design a satisfactory plan for the new building for the national collection of pictures.

On the same day, in reply to Lord Denman, The Lord Chancellor said as to the Law Courts,—A competition was invited, which was responded to by a certain number of architects—eight or nine—who sent in plans, which were publicly exhibited. Before they were sent in a memorandum was drawn up of the terms on which the exhibition was to be held, and it was, that referees should be appointed by the Treasury, who were to determine to which of the plans exhibited the award of superior execution ought to be given. The referees who were charged with this duty were unable to agree that any one of the plans exhibited in competition was the best, but

they selected two, and made an award that they thought the interior plan of one of the competitors and the exterior plan of another were the best. That award having been made, some of the unsuccessful competitors objected to it as being beyond the power of the referees. They said, "We entered into competition each one against every other, but not into competition with the joint production of two others." In the memorandum of the terms of competition it was stated that any matter in dispute should be referred to the decision of the Attorney-General. That has been done, and I believe the reference is still going on, and until it is concluded it will not be in the power of the commissioners for the erection of the Palace of Justice to take any steps in regard to the selection of any plan. I hope that before long the reference will be terminated, and that the commissioners will then be allowed to proceed with the erection of the building.

"THE ART SEASON."

At a meeting of the Society for the Encouragement of the Fine Arts, on Thursday evening, the 8th inst., Mr. H. Otley delivered a discourse "On the Art Season." The speaker took a rapid survey of the art-history of the year, including points of interest connected with public works, and the products of art as displayed at the exhibitions of the season, and in the print-sellers' windows. Speaking of the 100th exhibition of the Royal Academy, now opened, Mr. Otley said that, whether considered as a whole or in its parts, it did not warrant the title of being "fully up to the average of former years." On the contrary, he considered that it was a bad exhibition, beyond any precedent within his memory, and one discreditable to the arts of the country. He did not think there was a picture in the whole range of it which the country would be prepared to put forward, whether at home or abroad, as fairly representing the status of our art. This was a sad reflection; and on this 100th anniversary of the foundation of the Academy the question thrust itself upon the mind how far that institution would have to be held responsible for the result as it stood before them. The votaries of art amongst the community had increased a thousandfold in number and intensity of appreciative feeling during this eventful century. The artists as a body had also greatly increased in point of numbers during the same period; but had the number of artists of first-rate merit increased amongst us in anything like the same proportion? He thought not. Certainly there were not three artists amongst us at the present day to compare with Reynolds, Gainsborough, and Hogarth—a grand triumvirate of the last century—neither of whom owed anything to academic instruction.

CONNEMARA MARBLE.

Two or three years ago I was applied to, on the part of the Baron de Triqueti, through Mr. Trenham Reeks, for blocks of the above substance, to complete the ornamentation of the Royal Family Memorial in Wolsey's Chapel at Windsor. We had not then entered on the examination of the district containing the stone known as Connemara marble; and, after vain endeavours to induce any of the Dublin stone-masons who had it to part with any of it, I was obliged to cause two large blocks that I heard of as lying in a mason's yard in Galway to be transmitted to Paris, in order that Baron de Triqueti should have the pieces that suited his purpose cut out from them. The old quarry at Ballyhinch being then closed, I was informed that no other quarry was open, but that blocks were got from masses scattered over the surface where the rock lay in the ground.

A year or two ago, when making a preliminary examination of the ground near Westport, Mr. G. H. Kinahan (senior geologist of this Survey) showed me a cutting through this rock in the railroad a mile and a half to the south-east of the town. I subsequently crossed a broad band of it running along the rocky hills to the south of the town; and have just examined, with Mr. R. C. Symes, who is now geologically surveying the district, the northern slope of Croagh Patrick, on which we find two, if not three, broad bands of the stone. It strikes

steadily from east-north-east to west-south-west for about six miles, dipping northerly at a high angle, the widest band being about 300 ft. in width.

In places the stones appear to be beautifully mottled with various shades of green, and occasionally with reddish tints. Large crags occur in it, which are much jointed near the surface, and part of the rock seems very brittle and splintery. It would, however, doubtless be more massive and solid "in depth."

The bands on the northern slope of Croagh Patrick, just south of Murrisk Abbey, are hardly two miles from Westport Bay, with a gentle slope for a tramway the whole distance, and about six miles from the railway station at Westport, to which there is a good road.

Should there be a demand in the architectural world for this ornamental stone sufficient to make it worth any one's while to open a quarry in it, I could hardly conceive a more convenient place for it than that now mentioned; and I therefore, with the sanction of Sir R. I. Murchison, the Director-General of the Survey, beg leave to make its existence known through your columns, should you think this announcement worthy of a place in them. J. BETTE JUKES.

H. M. Geological Survey, Ireland.

P.S.—I have since heard that the old quarry has been re-opened within the last twelve months.

THE ALBERT MEMORIAL MUSEUM, EXETER.

WITH reference to a paragraph noting the opening of the Albert Memorial Museum in Exeter, that appeared in our impression of the 2nd inst., Mr. John Hayward writes,—

"Three-fifths only of the whole design are at present completed, at a cost of about 6,500*l.*, exclusive of the site. A further sum of 3,000*l.* is needed for the erection of the south wing, to complete the design; and it was in aid of the building fund that the recent fancy fair and other festivities have taken place, as well as to celebrate the opening of the building. The result of the enterprise is very satisfactory, inasmuch as 2,700*l.* have been raised, clear of expenses, sufficient, not merely to pay off a heavy debt on the portion of the work at present completed, but also to furnish a handsome sum towards the expense of building the remainder. The design of the building has been considerably altered from that which appeared in your columns, the principal difference being the omission of the central tower, much to the detriment of the building, owing to the strict enforcement of a stipulation imposed on the committee by the gentleman who gave part of the site, that the height should not exceed a certain limit. The plans are substantially the same."

THE ARCHITECTURAL MUSEUM.

ACCORDING to the report laid before the members, nine tenders were sent, in reply to the invitations for building tenders, for the new Museum at Westminster, and the lowest (for 2,970*l.*, by Mr. R. E. Roberts) was accepted. The works have so far progressed that the building will be shortly roofed in. The building fund at the disposal of the council now amounts to about 2,000*l.* A further sum of 1,000*l.*, in addition to the many kind gifts of material, &c., hereafter enumerated, will be wanted to defray the cost of the building alone, exclusive of the legal charges for the lease, and of the many incidental expenses unavoidably incurred from the time of clearing the site to that of the removal of the collection to its new home.

The council therefore appeal with renewed earnestness to all former friends of the Museum, and to all who care for its objects, whether or not previously subscribers, for their kind and prompt co-operation in raising at least a portion of the 1,000*l.* still needed.

The following offers of materials, &c., have been made:—

"Messrs. Clark & Co. have undertaken to fit up the two ground-floor front windows with their patent steel-revolving shutters, and Messrs. Bunnets & Co., in acknowledgment of their employment by most of the chief members of the architectural profession during the last thirty years, volunteered similarly valuable assistance on their hearing of the proposed removal of the collection. The six iron principals for the roof are a gift from Messrs. Kelk & Lucas; Messrs. Bart & Potts promise iron casements for most of the windows; Messrs. Roward contribute the Caen stone required for the interior of the building;

Messrs. Rust & Co. offer glass and mosaic material; Mr. Godwin, of Lingardine, in addition to 20*l.*, will make some ornamental tiles, specially designed for the front of the building; Mr. Fabricotti's promise carved Carrara marble of the value of 60*l.*; Messrs. Strode & Co. add to a donation of ten guineas a present of one of their patent gas sun-brainers, fixed free of charge; Mr. Charles Hudson undertakes some coloured decoration; Mr. Robert Chapman (art-workman) is willing to make a piece of furniture; Mr. E. Whitehead (art-workman) offers to execute some carving; and Mr. N. Thwaites has contributed a model of the Museum front."

On the completion of the building, the valuable collection of about 200 Classical and Mediæval casts, formerly exhibited at the Royal Institute of British Architects, and now transferred to the care of the council of the Architectural Museum, will be displayed.

CHELTEMHAM DRAINAGE.

MANY of the landowners and occupiers who live below the town of Cheltenham have for some time past felt themselves aggrieved, in consequence of the continued flow of the sewage into the river Chelt and Hatherley Brook, which, they allege, so fouls the streams as to create an intolerable nuisance, injurious to property, dangerous to the health of the inhabitants, and hurtful to the cattle pastured in the vicinity. A meeting of the adjacent landowners and occupiers has recently been held, when it was resolved "to take such measures as will compel the Local Board of Health of the borough of Cheltenham to abate the nuisance forthwith." The following resolution was afterwards unanimously adopted by the meeting:—"That should the Local Board determine to abate the nuisance by an irrigation scheme, we, the undersigned, are willing to take the flow of sewage over the number of acres attached to our names, for such time, and on the payment of such reasonable sums to the Local Board as may be agreed upon." (Here follow the names of twenty-nine owners and occupiers of some 2,000 acres of land, all of whom are willing to take the sewage on their land.) Mr. Bateman, C.E., has advised them to discontinue the present treatment of the sewage by deodorisation, in favour of the system of irrigation. The cost of the deodorising agents is some 800*l.* or 1,000*l.* per annum, and yet the plan is said to be so ineffectual that the authorities are in constant dread of being dragged into Chancery at the suit of adjoining landowners.

ART-MASTERS' REPORTS ON THE PARIS EXHIBITION.

SIR,—Some twelvemonth ago the Science and Art Department offered to the masters of schools of art a contribution towards the expenses of their visit to the Paris Exhibition, a further sum if they wrote reports on it if they were published, and three prizes for the three best reports so written. I read in several art and other periodicals some suggestive remarks from art-masters, and have been looking ever since for an award of these prizes. Never seeing anything as to the award either for art or science, I have spoken to a friend of mine who wrote a report upon the Exhibition, and his explanation is rather extraordinary. He says that very valuable reports both for the art and science divisions were written by science and art teachers, and published in the local and other papers, and formally sent in in 1867 for competition. Since then nothing has been heard of them. There were something under twenty reports in each division, and a fair judge could have awarded the prizes in a week, and, as far as reading goes, could have read them in a day, for almost all were short and terse. He says that part of the sum guaranteed towards expenses has been withheld, and that, for anything that can be known, the contract has been broken. Upon inquiring why he did not write to know for certain about this, my friend replied that, since the Parliamentary Commission on Schools of Art, when the authorities were compelled to keep the votes for the Museum at Kensington and the schools distinct, they have lost no opportunity of snubbing the art-masters who caused that commission to be held, and in so doing have produced rather an odd complication. One regulation they started was that art-masters should not be allowed to write to the authorities, or, if they did write, no notice should be taken of any communication they might desire to make; so that my friend re-

marked, "We receive letters from Kensington, and other communications, but can write none to it; we have information in abundance about immaterial matters, but have no means of getting the slightest information on vital points; and if I asked the entity called 'my Lords' why it had failed in its contract to me about these Paris Exhibition reports, the entity would act upon the regulation in the directory, and take no notice of my inquiry; for art-masters have some little spirit left, even after the nation has repudiated all its obligations to them, and will not send letters through the secretaries of their schools, suppressing their own names, which dignified hide-and-seek complication is what the state most recently approves of." I confess to being amused at this perfect development of red tape, and suggested that a letter should be written by my friend to the *Builder*, asking through its pages for some information. "Yes," he answered; "that is the only resource left; but I cannot afford to draw down upon myself a personal grudge. Like the historical eels, though we don't like it, we are getting used to being skinned alive, and have been made dumb beforehand, to smother our cries of complaint."

"Well," I replied, "we live in a free country, and I am at least unconnected with the authorities, and what you say shall be made known to solvent England, who shall be asked by me whether any department of its Government is insolvent to the extent of twenty shillings in the pound." AN AMUSED OUTSIDER.

Berwick-upon-Tweed.

* * * We have reason to believe that the payments are in course of being made.—Ed.

REBUILDING OF HER MAJESTY'S THEATRE.

The following is a list of the tenders, just now received, for rebuilding Her Majesty's Theatre, in the Haymarket. The "quantities" were furnished:—

Smith & Taylor	£35,674 0 0
Cullitt	35,318 0 0
Myers	31,586 0 0
Lanson	29,800 0 0
Piper & Wheeler	29,500 0 0
Holland & Hannen	28,439 0 0
Trollope	27,767 0 0
Foster	26,770 0 0

The above do not include the stage, machinery, fittings, fixtures, gas-fittings, fire-mains, warming, and decorations; but they include all iron-work.

SUGGESTIONS ON THE SUBJECT OF EDUCATION.

Sir,—The question of technical education, in my mind, greatly resolves itself into mechanical education. Inasmuch as Britain's greatest wealth exists in her manufactures, principally constructed of the produce of foreign countries and her colonies, and when we find that foreign countries are making such rapid strides in the march of arts, commerce, and manufactures, it therefore becomes Britain to take immediate action in the education of the mechanical population of the British Isles.

When I look at the wondrous mechanical structures of the First Great Mechanic, especially the construction of the human body, where is there a machine constructed by human ingenuity of such splendid action and durability, although the materials are of so delicate a composition? If the human body had been constructed as the most delicate piece of machinery ever erected by man, how ungraceful would have been the demagogue! But we can extend or contract the muscles, and move many of the joints in various positions, at will. Seeing at a glance the great superiority of the movements of the human body over anything designed by man, what must be the mechanism of the soul, which is infinitely of greater value than the body? I think that ought to be the first and grand centre of attraction in mechanical education.

As it is necessary to adapt the routine mechanical education to the existing laws of the country—as they cannot be set aside nor declared null and void without an Act of Parliament, which cannot be passed without a period of time elapsing—we ought to make the best use of those means that are within our reach that will prove effective agencies when adopted, whatever code of law exists.

The only agencies which, I think, can be of efficacy are silent ones: let them speak for themselves. On entering the class-rooms of our seminaries, and taking a glance at the walls, we find that they are either bare or have a geographical map hanging upon them, which is very appropriate for imparting a knowledge of the earth's surface. Next, the cabinet containing fossil remains, different strata of the earth, &c., are useful for instruction in geology. But as the sons of Britain cannot all be geologists or geographers, nor is it there that the wealth of the British Isles exists, but in her mechanical productions,—as maps are beneficial for instruction in geography, specimens of fossils and dendritic markings for imparting a knowledge of geology,—it therefore follows that drawings and models of mechanical structures exhibited on the walls and convenient spaces would be of great utility for imparting mechanical education.

These might be obtained by application to many of our

copies of Scripture paintings. Many artists, professional and amateur, would gladly hail the opportunity of displaying their productions by donations to the cause. In order to obtain drawings and models of mechanical structures by application to engineers, architects, draughtsmen, artists, and schools of art. I think from these sources there would be obtained by donations more designs than would be requisite for the use of seminaries, &c., for the mechanical population of Great Britain and Ireland. These representations should not be exposed to view at all times, as they would become wearisome to the eyes of the student, by simple mechanical arrangements they might be exposed or concealed from view at the controller's pleasure, who should be a man of disinterested.

ALEX. KAY, Working Man.

VISIT TO THE NEW SMITHFIELD MARKETS.

Sir,—My attention has been called by Mr. Horace Jones to a letter which appears in the *Builder* of last week, signed "Stylus." I much regret that the Association, but more particularly the honorary secretary, should have been the innocent cause of depriving one of the members of an anticipated pleasure, but I am quite unable to reconcile the statements made by "Stylus" with the facts of the case.

Permit me to say that every arrangement was made to direct members to the place of meeting (viz., the model-shed, at the end of the masons' yard), where we remained until twenty minutes past three, Mr. Jones in the meanwhile explaining the general plan and design of the buildings. From this, as our starting point, we perambulated the building internally, and to a great extent externally.

In reply to the queries given, the President and about thirty-five members found out the place of meeting, and under the conduct of the City Architect, inspected every part of the buildings, accompanied by the clerk of the works. I am not surprised that a building of this magnitude it was possible that two or three gentlemen might escape notice; but how they overlooked a body of thirty-five or forty men who remained in the building for upwards of an hour, is a mystery I cannot solve. I have regretted that the ganger referred to, and also the other labourers, had directions from me to send all gentlemen to the place of meeting. J. DOUGLASS MATTHEWS, Hon. Sec.

CASEMENT WINDOWS FOR COTTAGES.

Sir,—It may be interesting to some of your readers to know that I have given the plan of opening sliding casement windows, suggested in my hook on "Cottage Construction and Design," a thorough trial, since that was written, and that I find it to be certainly by far the best manner of fitting sliding casements, and appears to me entirely to get over the few little objections to this form of window, which, even with the defects of the common manner of fitting it, I have always considered to be the best form of window for cottages. The little brass fittings have been made for me, and may be procured from Messrs. Hareourt & Sons, Atlas Works, Moseley-street, Birmingham. C. W. STRICKLAND.

EFFLORESCENCE ON NEW BRICKWORK.

Sir,—Your correspondent "G. E.," in last week's issue, has really not answered the question of "T. U. & J.," of Swansea. The formation of the white frosty-looking growth on new brickwork is very annoying to the owner, architect, and builder, and any method of preventing it would, I believe, be gladly adopted. In London my experience has taught me that bricks from a field where I have inspected their make, and where neither the clay nor sand used in the manufacture has been impregnated with salt, will at times become covered over most hideously with efflorescence when built up. Has the lime in the mortar anything to do with the matter? I have separated the stuff of the new walls and tested it, and cannot detect any saline flavour. I wish some of your chemical readers would gather a quantity, analyse it, and communicate the result. J. KRATZOV.

SPEAKING TUBES.

Will one of your numerous readers give me the size of tube best suited for the conveyance of messages between two offices 100 yards apart, with three or four right angles in the length? T. C.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

Sir,—At the present juncture I wish to draw the attention of the donors and subscribers to our institution, and those of our own class in particular, to the position of the institution, and I trust you will allow me to trespass a few lines upon your valuable space.

It is the wish of the committee of the advertisement on the front page, convening a special meeting of the friends of the institution on Monday evening next, and trust that they will find the subject sufficiently interesting to induce their attendance in large numbers on that occasion. For some time the committee have been empowered to grant temporary relief, but from the absence of claimants such has not been done.

It is the wish of the committee that all subscribers and donors should be aware of this fact; for with the power they desire to find a use, and it is possible that, from ignorance of the fact, they who are not subscribers would be glad of, the assistance may be deterred from applying. The same committee, who for more than two years have given their time and trouble to this good work, solely for the purpose of assisting a helping hand to those of their own class whose necessities demand it, would rejoice to see that they have not laboured in vain.

Some short time since a case was brought before them, a clerk who died suddenly, leaving a widow and large family in adverse circumstances. It is an old, old story, but mournful enough to move the hearts of all

acquainted with the facts. In the present case the committee are most anxious to assist the family, and somewhat alleviate their distress; and the question has arisen, "Can a present use be made of the Orphan Asylum Fund to purchase one or more life presentations in an existing asylum?" The special meeting is convened to decide that question; and I hope I do not appeal to the kind hearts of our friends in vain, to show their appreciation of the objects and labours of the committee, and give them encouragement for the future, by favouring them with their presence and opinion at this coming meeting.

I cannot close this without appealing to those who have not yet given us the powerful assistance of their names, and the encouragement of their subscriptions, to do so at once. F. T. MULLETT, Secretary.

GRINDING MONEY.

Tuckett v. Warskitt.—This was an action, in Whitechapel County Court, brought to recover the sum of eightpence, for "one hour's grinding money," plaintiff being a joiner, formerly employed by defendant, a builder in Cannon-street-road.

It appeared that plaintiff had entered into Mr. Warskitt's employ for the hour, and on a certain day he received an intimation that his services were no longer required, as he was paid for one hour beyond the time of working, as "grinding money." He claimed two hours, which he alleged was the custom of the trade, and rights and equitable.

The defendant denied the custom, which he said he had always set his face against, and he defended the action for this insignificant sum only to protest against what he regarded as an injustice. The facts of the case were admitted on both sides, and, after hearing the arguments,

The Judge said he should require a great deal of evidence to prove the existence of a custom so opposed to what he considered equitable. A man engaged himself by the hour, with the right to cease work at the end of the hour, as one of the conditions of the mode of hiring he consented to; and he had no right to claim two hours' grinding money, when the engagement was terminated on the other side.

Judgment for defendant.

CASES UNDER METROPOLITAN BUILDING ACT.

At the Marylebone Police-court on Friday, Mr. Benjamin Taylor answered a summons taken out against him by Mr. Henry Baker, district surveyor of St. Pancras, for that "he, the said Benjamin Taylor, having recently erected the 'Lichfield Ais Stores,' Frederick-street, Hampstead-road, which was hitherto in but one occupation (viz., that of himself), did divide the same into two or more separate tenements, each having a separate entrance and staircase, or a separate entrance from one entry, contrary to the 27th section of the Metropolitan Building Act.

The District Surveyor presented in person; Mr. Taylor was represented by Mr. Yarde, solicitor, assisted by Mr. W. F. Potter, architect.

Mr. Yarde said this was a case never contemplated by the Act of Parliament, which intended that no building should be divided into separate buildings except by proper party walls. This case more properly came under the second clause of the 27th section as to the separation of a building into "sets of chambers or rooms tenanted by different persons," and, as the building did not exceed 3,600 square feet in area, the Act had not been infringed. Moreover, the building had never been in one occupation, as contemplated by the Act in the 3rd clause of the 27th section, but had always been in the joint occupation of Messrs. Taylor, and Parish, and Arnot, as offices or chambers.

Mr. P. Eyncourt, after a lengthened hearing, dismissed the case.

CHURCH-BUILDING NEWS.

Sutton Veny (South Wilts).—The new church erected here at the cost of Mrs. Everett and family has been consecrated by the Bishop of Sodor and Man, for the Bishop of Salisbury. The new church is dedicated to St. John the Evangelist. It is built in the Geometrical style, and consists of a nave and side aisles, north and south transepts, a tower supporting a spire, which rises from the junction of the cross, an entrance porch on the south side, and a vestry on the north side. The chancel is built of Frome and local stone, with Barb dressings, and the roofs are of Staffordshire tiles, and are terminated with ornamental cresting. The spire, which is 151 ft. 9 in. in height, rises within the parapet of the tower. The tower has on each side two two-light windows, with trifoliate heads, and at the four angles below the battlements are gargoyles with ornamental iron work. At the south-east angle of the tower is a turret containing a staircase, which leads to the ringing and bell chambers. The nave is divided from the side aisles by three arches resting on circular piers, with capitals of Early Decorated architecture, from which spring transverse arches supporting the roof-timbers of the aisles. The roof of the nave is of open timber-work, the beams resting on stone corbels. The west window has five lights, with large open tracery in the head. There are six windows in the north and four in the south side, and there is a window at the west end of each aisle. There is one stained-glass window in the north aisle, which was given by Mrs. Fowle, mother-in-law of Colonel Everett

and two of her daughters. In this window is depicted one of our Lord's miracles, the healing of the sick girl. It is intended to fill all the other windows on the north side of the nave with representations of the miracles of our Saviour. In the south aisle are four windows, three of which are filled with stained glass. In the head of the easternmost window is an angel bearing a scroll, and beneath are two subjects from the parable of the Prodigal Son. The next window also has in the head an angel and scroll, and below are two subjects from the parable of the Good Samaritan. The next window has in the head an angel bearing a scroll, and beneath are two subjects from the parable of the Unjust Steward. The glass in the windows is of cathedral tint, but it is intended ultimately to fill all the windows with stained glass. The church, which is 114 ft. long, will hold about 600 people, and there are at present sittings for over 400. The whole of the internal walls are of Bath stone, and the steps throughout are of Portland stone. The church is heated with a warming apparatus, furnished by Mr. Haden, of Trowbridge. There are six bells in the tower, which were brought from the old church. The architect was Mr. J. L. Pearson, of London, and Messrs. Rogers & Booth, of Gosport, carried out their contract. Mr. A. Harrison, of Wilton, officiated as clerk of the works; and the whole of the windows were supplied by Messrs. Clayton & Bell, of London, who executed the painting of the font, the pulpit, the reredos, and the walls of the chancel. The building has cost upwards of 7,000*l.*, exclusive of the churchyard, which has cost 1,000*l.*

Preston.—The foundation-stone of Emmanuel Church, Preston, has been laid by Sir Thomas G. Fernor Heskeb, bart., M.P. for Preston, in the presence of a numerous company. The proposed edifice will be built of brick interspersed with strings and bands of coloured and moulded brick, with stone weatherings and dressings. The style may be termed Geometrical Gothic, and the building will accommodate 632 on the ground-floor, and 334 in the galleries. At the west end there will be an outside porch, in which will be the steps to the church; also an inner porch or vestibule, close to which is a baptistry. There will be four entrances, exclusive of that to the vestry, which will be on the north side of the chancel. There is to be a gallery on the west end, which will accommodate about 150 persons. At the south-west corner of the church will be the tower, which is to be an approach to the west gallery, and which forms a prominent feature in the design. The tower is intended to be surmounted by four stone pinnacles at the angles, each terminating with a *flèche de lis*. The belfry, which is to be 12 ft. square inside, will contain six bells. The extreme length of the edifice over all is 125 ft.; the extreme breadth over the transepts is 86 ft.; the internal breadth of the nave, 40 ft.; the chancel, 20 ft.; the transepts, 25 ft. 6 in.; the length of the nave, including the vestibule, 86 ft. 6 in.; the chancel, 27 ft.; the organ chamber, 18 ft. by 11 ft.; the height of the tower from the ground level to the top of the spire, 96 ft.—from the foundation, 105 ft. The roof will be an open timber one, boarded diagonally on the spars. The benches will be without doors, with pitch pine ends. The chancel seats are to be of pitch pine, and have a tracery front, the ends of the benches having carved arm-rests. The church will be warmed with hot water, the heating apparatus being in a fire-proof chamber under the vestry. The architects are Messrs. Myers, Vewers, & Myers, of Preston. Mr. Bamber is the builder; and the contract signed by him stipulates that the erection shall be completed by next April. Mr. Pownall has been appointed clerk of the works; and Messrs. Clark & Charney are the iron-founders. The work is let altogether for about 5,200*l.*

Books Received.

"NOTABLE Things of our own Time." By John Timbs, F.S.A., &c. London: Lockwood & Co. There are many notable things in each issue of Mr. Timbs's "Year-Book of Facts;" but in the book under notice he has not restricted to limit himself to the notable things which may turn up in any one year, the only limit being "our own time." This is a supplementary volume to the author's "Things not Generally Known," and it contains many notable and interesting things.—*Fraser's Magazine* for May (Longmans, Green, & Co.) contains a suggestive

paper on Australia, in connexion with which another in it on Political Economy and Emigration may be read by those interested in such subjects. Of the working of the educational system, free from clerical trammels, there is some account in the paper on Australia.—"Thoughts and Suggestions on Mission Chapels, Rooms, &c." By the Rev. J. Brame, M.A., organising secretary of the Additional Curates' Society. London: Skeffington. Notwithstanding the astonishing activity of church building and church restoration, throughout the country, it would appear that "the Church of England is in a missionary position with regard to three-fifths of the population of the towns," so that there is a no less extraordinary want of mission chapels, of a small and inexpensive description, suitable to the poorest localities in towns; and to urge the extension of these, either by the conversion of rooms into chapels or otherwise, is one of the chief purposes of the issue of this pamphlet. The question of cost and working expenses is also treated of.—"Catalogue of the Exhibition of Portraits on Loan in the New Galleries of Art at Glasgow." This is the authenticated catalogue of the exhibition opened under the auspices of the Lord Provost, magistrates, and town council of Glasgow, in the lately-formed galleries in Sauchiehall-street. The collection consists of 392 pictures in oil, 26 in water-colours, 15 in crayons, and 26 busts or medallions. Of these, 250 have been lent by residents in Glasgow, and all the others come from other places in Scotland, except three from London. The artists are chiefly of the Scottish school, but some are English.—"The Accounts of Building Societies: a Letter to Mr. J. Tidd Pratt, F.S.A., Registrar of Friendly Societies." By Astrop Cariss. Kent & Co., Paternoster-row. The author of this pamphlet states, with reference to Liverpool building societies at least, that "under the system in general use any society can effectually conceal its true position." It is well that the particulars should be brought under Mr. Pratt's notice. This was done by Mr. Cariss in the *Leader* of February 1, 1868, and this is a reprint of the article.—The *Church Builder* for April contains accounts of several churches, as usual, with illustrations; an abstract of a paper of ours on the Sculptured Stones of co. Angus, in Scotland; and other matter of interest.—Hardwicke's *Scientific Gossip* for May contains, as usual, much interesting matter, including papers on Vegetable Hairs, Animals that never Die, Reptiles and Fish, Remains from the Coal Measures, Spiders' Webs, &c.

Miscellanea.

CONTRACTS.—Some time ago the road trustees for the county of Berwickshire contracted with Mr. John Dickson, Galashiels, for the building of a new bridge over Bowmont Water, near Yetholm. It was a condition that the contractor was bound to uphold the bridge for one year. When finished, the work was taken off Dickson's hands by the trustees' inspector as finished, in terms of the contract. In a few days afterwards the bridge was carried away by a flood, and the trustees sued the builder for its re-erection. Proof was laid before the sheriff by both parties, and it was contended for the builder that the plan was faulty, and that he was not to blame. The sheriff has given effect to this plea.

CONSTANT WATER SUPPLY WITHOUT WASTE.—An improved system of water supply to the poor of East London has been effected through the instrumentality of the local authorities. Mr. Liddle, medical officer of health for the parishes comprised in the Whitechapel district, has made a report to the local board of works, in which he states that in the poorer parts of the district, where a few years ago there were about seventy courts badly supplied with water on the intermittent system, by means of a stand-tap only, there are at the present time fifty-three courts supplied with water direct from the main, and the inhabitants of these places can have pure water at all times of the day or night. While there is an abundance of water, it is, by the use of "waste preventers," without waste. The New River Company and the East London Water Company have both expressed their desire to extend the system of constant supply on the single condition of provision being made against needless loss by the use of the "waste-preventing apparatus."

A SCHOOL OF ART FOR LEWES.—A Government school of art has been established at Lewes. The classes will be held in the Fitzroy Memorial Library, under the superintendence of a teacher certified by Government. Evening classes will also be held in the building of the West-street Lecture-room.

TENDERS FOR NEW ASSIZE COURTS, BRISTOL.—The tender for building the new Assize Courts, in Small-street, by Messrs. Wilkins & Son, for 11,850*l.*, has been accepted, being the lowest. There were several other tenders, the next nearest being that of Mr. Foster, for 12,463*l.* The others were from 1,000*l.* to 1,200*l.* above the successful tender. The architects are Messrs. Pope & Bindon.

FALL OF A FEUDAL CASTLE.—Thurles Castle walls have suddenly given way, after standing for centuries. Four of the inhabited houses near the west gate were entombed, with all their contents, in the pile of ruins; but it appears that only a horse was killed. One side of the castle is still standing, but there is every reason, according to the *Nenagh Guardian*, to think that it is destined speedily to follow what has already fallen.

INSTITUTION OF MECHANICAL ENGINEERS.—The general meeting of the members of this institution was held on the 30th of April, in the Lecture Theatre of the Midland Institute, Birmingham, Mr. Thomas Hawksley, vice-president, in the chair. An adjourned discussion took place upon a paper read at the previous meeting, "On the Allen Engine and Governor," by Mr. Charles T. Porter, of Manchester. The next paper was a "Description of the American Dovetailing Machine," by Mr. John Robinson, of Rookdale. This machine, the invention of Mr. T. S. Armstrong, of New York, was shown at work at the recent Paris Exhibition; and it is constructed so as to cut out the dovetail joints in woodwork by means of the continuous rotation of compound circular saws of peculiar form, which finish the joints completely, without the use of any chisels or cutters.

ACCIDENTS.—An architect met his death in town recently in a very sudden and shocking manner. Mr. William Barnes, of Doric Lodge, Bromley, was on his way from the Bank by omnibus to Bromley, along with his wife, and got on the top "to oblige a lady." He had complained of giddiness, but was quite sober. He leant over to look at another passenger who was picking up some money he had let fall, and overbalanced himself, came straight down on his head, and was instantly killed by a fearful wound on his left temple, which fractured his skull.—A decorator in the employ of Messrs. Clayton & Bell, last week fell from a height of 50 ft., while doing tracery work in the interior of the dome of the New Foreign Office, Downing-street. He was picked up from the marble pavement and conveyed to the hospital, where he said he had fallen from the top of the scaffold. He expired two hours after his admission. It was found that the skull was fractured at the base from side to side, and there was a second fracture at the anterior part of the skull.

ARTISTS' BENEVOLENT FUND.—The fifty-ninth anniversary dinner of this charity was held on Saturday evening, last week, at the Freemasons' Tavern; Sir Francis Grant, president of the Royal Academy, in the chair. The report of the fund shows that since its establishment the sum of 28,689*l.* has been distributed by it in relieving the widows and orphans of artists. During the past year fifty-two widows received annuities, amounting to 847*l.*, and five orphans were assisted with the sum of 23*l.* Sir Francis Grant (the chairman), in proposing the toast of "The Queen," referred to the fact that her Majesty had from her own private resources given an aggregate of not less than 3,000 guineas to the society. Her Majesty had also still further shown her interest in art by permitting her daughter, the Princess Louise, to send to the Royal Academy a bust of her brother, Prince Arthur, executed by her Royal Highness's own hand. He had no hesitation in saying that, as a work of art, this bust of the prince was beautifully executed, and it was a most admirable likeness of the young prince. The opinion which he had formed respecting this interesting work was shared by all the members of the Royal Academy to whom he had spoken on the subject. A subscription-list, including receipts of 800*l.*, was read in the course of the evening.

CHURCH FOR DEAF AND DUMB.—It has been determined to erect a church in London for the deaf and dumb. The site is intended to be in the western central district.

TRAMWAYS FOR LIVERPOOL.—The select committee of the House of Commons to which the Liverpool Tramway Bill was referred has passed the preamble of the Bill. The line passes from north to south of the borough, and it is to be hoped that the Bill will pass both Houses, so that the experiment of street tramways may be fairly tried.

PAPER BELTING.—The experiment of making belting from paper has proved a success in the hands of Crane & Co., at Dalton, Mass., and the article is now used in all their own mills, and several other manufacturing establishments. The belting resembles the genuine oak-tanned leather, and serves alike well in a dry or damp atmosphere.

TESTIMONIAL TO EMPLOYERS.—On Saturday, at the Carriage Manufactory, Victoria-street, Messrs. Hooper were presented by the artisans in their employ with a vote of thanks for their liberality in sending representatives from each branch of the business to the Paris Universal Exhibition of 1867, and also presenting each person in their employ with a copy of the first published reports of artisans appointed by the council of the Society of Arts. The vote of thanks was engrossed on vellum, and richly illuminated.

RAILWAY SUPERFLUOUS LAND.—Before a railway company can, under the 127th section of the Lands Clauses Consolidation Act, sell superfluous lands, they are bound to offer them to all the owners of adjacent lands, whether owners in fee or merely leasees. The Master of the Rolls thus held, in the case of Coventry v. the London, Brighton, and South Coast Railway Company, which was a suit instituted against the company to restrain them from selling as superfluous lands certain pieces of land taken by the company under their Act, but which were not required for the purposes of their undertaking, without first giving to the plaintiffs the option of exercising the right of pre-emption which they claimed as adjoining owners under the 128th section of the Lands Clauses Consolidation Act, 1865.

OPENING OF DRINKING FOUNTAINS AT BRIERLEY-HILL.—Three drinking fountains have been opened at Brierley-hill. Two of them were raised by subscriptions contributed by the commissioners of the local Board of Health and the ladies of the district; the third was presented by Mr. Frederick Smith, M.A., the Earl of Dudley's principal agent. The first fountain opened stands at the police-station. The base is of Yorkshire stone, the basin of Italian marble. Two columns rise from the latter, and a water-god, adorned with leaves of water plants. The Ladies' Fountain is situated in a wall surrounding the premises of The Laurels. Mr. Smith's fountain is of iron, and of the pillar form. It stands over 7 ft. high, and is surmounted by two dolphins and a trident.

EXHIBITION OF ART IN LANCAIRESHIRE.—The Marquis of Hartington, M.P., has inaugurated an exhibition of works of art and industry that has been for some months in preparation at Over Darwen. The occasion was one of great rejoicing in the neighbourhood. In Darwen the day was a general holiday, all the mills were gaily decorated with flags, and the streets were crowded with operatives in their best attire. The exhibition was opened with considerable ceremony. As many as 2,000 season tickets had been disposed of. The portion of the building allotted to the fine-art department consists of a nave, 170 ft. by 45 ft.; transept, 90 ft. by 50 ft.; four galleries for oil paintings, each 60 ft. by 22 ft.; two galleries for water-colour drawings, each 90 ft. by 22 ft.; two galleries for photographs and chromo-lithographs, each 80 ft. by 22 ft.; and an extensive gallery for engravings, 60 ft. by 45 ft. The private collections of the Duke of Devonshire, Colonel Wilson Patten, M.P., and many local residents have furnished to the exhibition some of its most interesting and valuable features. The arrangements of the exhibition have been carried out by Mr. George Hayes, artist, Manchester. A mechanical department is added to the exhibition, and a refreshment-room. Musical attractions are also provided.

DEATH OF AN ARTIST.—Mr. Meanness Massey O'Keefe, of Cork, has died, at a comparatively early age. In the art of illuminating manuscripts after the manner of the ancient Irish he is said to have excelled. Mr. O'Keefe's productions are described as approaching nearly to the perfection attained by the early ecclesiastics. A few friends, commiserating the helpless condition of his aged mother, now appeal to the public of his native city for contributions, however small; they will be received and acknowledged by Mr. John Mahony, at the School of Art, Cork.

INDEX TO CAMDEN SOCIETY'S VOLUMES.—An Index, of a valuable character, for literary use, is about to be published—an Index to the hundred volumes issued by the Camden Society during the last thirty years. 500l. have been voted for the purpose, and Mr. Henry Cough has been appointed to compile the work. The Indexes to the *Archæologia*, to the *Edinburgh and Quarterly Reviews*, to the *Gentleman's Magazine*, and more recently to the *Scientific Papers* by the Royal Society, with the Index now announced, supply a series of valuable keys to masses of literary and scientific facts.

THE BIRMINGHAM WORKHOUSE SCHOOLS.—In a letter from the Poor Law Board, read at a recent meeting of the local Guardians, the secretary of the Board says,—"With reference to the plans which you state the Guardians are prepared [with?] for the erection of a school for boys ('on the same land [on?] which the schools for children were intended to be erected'), at a cost not exceeding 7,500l., I am directed to state that the Board are not prepared to entertain any proposal for the erection of schools that are not entirely detached from the workhouse, and placed under a separate management." A deputation, according to the local *Gazette*, has been appointed to wait upon the Board with power to "concede" the separation of the new school from the workhouse. We are glad to hear it.

TENDERS.

For a house for Mr. D. T. Morgan, at Walthamstow, Essex. Mr. John T. Bressay, architect:—
 Arber 2,378 0 0
 Rivet 2,298 0 0
 Mundy & Hutchinson 2,268 0 0
 Piper & Wheeler 2,190 0 0
 Perry & Co. 2,135 0 0
 Reed 1,941 0 0

For addition to Southfields-villa, Wandsworth. Mr. G. Low, architect. Quantities not supplied:—
 McKee 4,400 0 0
 Strong (accepted) 395 0 0

For erecting a detached residence near Rhayader, Radnorshire, for the Rev. J. Williams, including stabling and lodge. Mr. E. H. Lingen Barker, architect. Quantities supplied by Mr. W. Paice. The estimates are exclusive of excavation, water supply, and walling stone:—
 Jones 2,288 0 0
 Evans 2,898 10 6
 Morgan 2,837 0 0
 Evans 2,714 5 0
 Roberts & Son (accepted) 2,657 9 0
 Mason 2,355 5 0

For alterations and repairs at No. 15, New-street, Smithfield. Mr. Robert Parris, architect:—
 Dent £392 0 0
 Hemmings 285 0 0
 Sherman 285 0 0
 Miles 283 0 0
 Plicher 260 0 0
 West 259 0 0
 Abraham 250 0 0
 Wretton 238 0 0
 Esleman 235 0 0
 Blackman & Hargy 229 0 0
 Smith 229 0 0
 Burtwell 216 0 0
 White 209 0 0
 Marshall 209 0 0
 Taylor 205 0 0
 Scofield 185 0 0
 Culitt 185 0 0
 Porten 172 0 0
 Mans 165 0 0
 Penny 148 0 0
 Warne 138 0 0

For additions and alterations to house, College-green, Gloucester, for Mrs. Hemp. Mr. H. James, architect:—
 Clutterbuck (accepted) £335 12 0

For alterations to the Devonshire Arms, Kentish Town-road, for Mr. A. Weatherly. Mr. R. Washington Hart, architect:—
 Langnesad & Way £459 0 0
 Lawrence & Bangh 490 0 0
 Kelly, Bros. 467 0 0
 Knight (accepted) 357 0 0

For alterations and additions to the Norfolk Arms, Bethnal-green, for Messrs. Truman, Hanbury, & Co. Mr. R. Washington Hart, architect:—
 Gray £740 0 0
 Marr 739 0 0
 Kelly, Bros. 664 0 0
 Langnesad & Way (accepted) 655 0 0

For House, Putney-hill, for Mr. C. Lee. Messrs. Lee, Bros., & Pain, architects:—
 Atiss & Son (accepted) 22,712 0 0

For alterations and additions to houses on South Parade, Newark, for Mr. W. Wallis. Mr. Charles Baily, architect. Fretwell (accepted) 2210 0 0

For three houses and shops at Forest-hill, Kent. Mr. George Low, architect. Quantities supplied by Mr. F. Johnsons:—
 Beeton 22,777 0 0
 Burchell 2,756 0 0
 Colls & Son (accepted) 2,680 0 0

For the erection of residence on the London-road, Newark, for Mr. Charles Baily, architect:—
 Bricklayers, Masons, Plasterers, &c. Work 3,413 0 0
 Fretwell 1,588 0 0
 Carpenters and Joiners' Work 436 0 0
 Henderson 147 12 0
 Plumbers and Glaziers' Work 147 12 0
 Bousfield 14 0 0
 Painters' Work 14 0 0
 Crossley 14 0 0

For the erection of Yeargare House, at Sutton-upon-Trent, for the Rev. A. C. Graystone. Mr. Charles Baily, architect:—
 Lane 21,845 0 0
 Henderson 1,633 0 0
 Mackenzie 1,698 0 0
 Fretwell 1,598 0 0
 Bennett & Co. (accepted) 1,500 0 0
 Dennett & Co. (accepted) 1,250 0 0

For the erection of a new Station Inn and stable buildings, at Hildenborough, on the New Town direct line, Messrs. Wadmore & Baker, architects. Quantities supplied:—
 Whiltshire 21,760 0 0
 Payne & Balding 1,735 0 0
 Whealey 1,589 0 0
 Dove 1,683 0 0
 Mansfield & Price 1,530 0 0
 Funnell 1,243 0 0

For the erection of Mostyn-road Wesleyan Chapel, Britton. Mr. John Farring, architect:—
 Kirk 29,730 0 0
 Hobson 9,589 17 5
 Browne & Robinson 9,325 0 0
 Hill & Sons 9,175 0 0
 Brascher & Son 9,095 0 0
 Henshaw 8,800 0 0
 Jackson & Shaw 8,965 0 0
 Newman & Mann 8,768 0 0
 Higgs 8,614 0 0
 Thompson 8,465 0 0
 Sandlers 8,400 0 0
 Myers & Son (accepted) 8,263 0 0

For taking down house and the erection of a pair of villas, at Bezenwell, Eritis, for Mr. Creed. Mr. F. Cushing, architect:—
 Thompson 2545 0 0
 Chorhill 447 0 0
 Archibald 398 10 0
 Dowsett 387 10 0

For the erection of four cottages and public-house, at Entford. Mr. Mr. F. Cushing, architect:—
 Holbert (accepted) 2759 0 0

For Sir John Powell's almshouses, Enlham. Mr. J. P. Seddon, architect:—
 Helbach 27,200 0 0
 Hall 5,945 0 0
 Grover 4,350 0 0
 Williams & Co. 4,126 0 0
 Muspratt 3,168 0 0
 Pitts & Son 4,060 0 0
 Avis & Son 3,950 0 0
 Ebdine 3,540 0 0
 Henderson 3,618 0 0
 Wigmore (accepted) 3,368 0 0
 Lacey & Co. 2,490 0 0

TO CORRESPONDENTS.

A. M. (Watson, of Glasgow).—A. H. W. (write to the honorary secretary).—E. L. G. (next week).—Mr. J.—Mr. B.—R. W. H.—J. T.—W. R.—W. & R.—H. M.—E. C. W.—H. S. G.—S. S. & Co.—A. R.—W. S.—M. S.—T. C. H.—H. J. & Co.—F. W.—Sir A. C.—B. E.—W. I. S.—T. R. S.—M. M.—A. W.—C.—P. C.—R. H.—J. N.—J. K.—W. C.—J. W.

NOTE.—Architects who are unwilling (as we are) that their names should not accompany lists of tenders with which they are concerned may prevent the omission by sending lists themselves. We cannot repeat lists on the ground of such omission.

We are compelled to decline publishing out books and giving addresses.

At statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

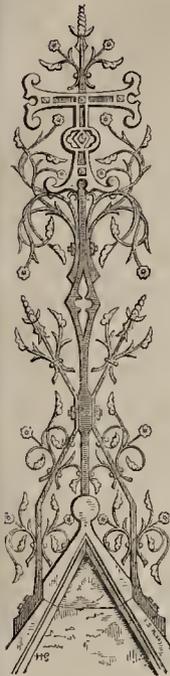
NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

CHURCH, TURRET, AND STABLE CLOCKS.
 J. W. BENSON, having erected steam-power and improved machinery for clock-making, at the Manufactory, Lindgate-hill, will be glad to furnish to clergymen, architects, and committees, Estimate and Specifications of every description of Horological Machine, especially cathedral and public clocks, chiming tunes on any number of bells. A descriptive pamphlet on Church Clocks post free for one stamp. Watch and Clock Maker by Warrant of Appointment to H.R.H. the Prince of Wales, and maker of the great clock for the Exhibition, 1862. 25, Old Bond-street, and 33 & 34, Lindgate-hill, E.C. Established 1749.

The Builder.

VOL. XXVI.—No. 1320.

The Art-Exhibition in Leeds.



HE long-expected and carefully-prepared Exhibition of Works of Fine Art in the new Infirmary, Leeds, was opened by the Prince of Wales on Tuesday last with great éclat, his Royal Highness fulfilling his part of the duty with an ease and earnestness that gratified and delighted all concerned. The day was regarded as a general holiday, crowds filled the streets, and banners waved in all directions. The Infirmary, it will be remembered, has been erected from the designs of Professor G. G. Scott. It is a red brick and stone building, in the style that may be called nineteenth century Anglo-Italian Gothic. Illustrations and descriptive particulars of it will be found in our

volume for 1864.* It is, of course, founded on the pavilion plan, the general adoption of which we take the credit of having materially contributed to bring about. The building is situated between the Town-hall and St. George's Church, and covers an area of 17,300 superficial yards. It is built to accommodate 300 patients, and has cost upwards of 110,000*l.* On March 29th, 1864, Mr. Alderman Kitson, as chairman of the Building Committee, laid the foundation-stone, and, with the exception of a few interruptions consequent on trade disputes, the work continued to progress till the close of last year, when, so far as hospital purposes were concerned, it may be said to have been completed. From south to north the building measures about 390 ft., and from east to west about 240 ft. There are five pavilions, with two wards in each, one over the other. Owing to the nature of the site, there is an extra story in the front portion of the building to what there is at the back, room being only found at the back or northern end for two floors in each pavilion, while at the south the pavilions have three floors, the ground one being used for offices and other purposes. The pavilions are so disposed that three stretch northwards, and two, forming wings as it were to the central building, where is the principal entrance, stretch towards the south. The wards are lighted by double windows on both sides, and are 27 ft. wide, and from 16 ft. to 19 ft. high. The south wards are 122 ft. long; those at the north are 10 ft. shorter.

It is unnecessary now to go into many particulars, nor shall we here inquire into the merits

and demerits of the structure as a hospital, many of the temporary arrangements for the exhibition interfering considerably to prevent a proper judgment in this respect. We may add briefly, that the principal porch is carried out from the main building on either side upon a bold arch, and that it consists of three arches towards the front. The arches rest upon marble shafting, with carved caps, and the spandrels are filled in with Minton's encaustic tiles, the tiles surrounding carved medallions executed in floriated work. A balcony, which is formed by the top of the portico, rests on groining, executed in red and white bricks, with stone ribs, and is ornamented with an open balustrade. The entrance-hall has a panelled ceiling, the beams being supported on carved stone corbels. Three moulded arches, supported on Derbyshire marble columns, form the end of the hall, out of which passage is obtained from the right and left to a number of the apartments necessary to the work of the Infirmary, and from the immediate centre to the corridor leading to the grand staircase. This corridor is 52 ft. long by 14 ft. wide, and is lighted from the roof. The visitor passes into it under a semicircular arch, resting upon marble columns. The roof is here of open timber, and the ribs rest upon marble wall-shafting, with carved brackets and shafts, rich in representations of plants having known medicinal qualities. Another corridor—33 ft. by 22 ft.—is passed before the main staircase is reached. The staircase is lighted by a central three-light window and by small two-lights. The architectural combinations here form several pretty pictures. The staircase leads to a corridor which goes round the interior of the building, and gives access to all the pavilions, as well as to the central hall, and to other parts of the building. The chapel has stained glass in the three two-light windows in the apse, the gift of the mayor and the mayoress, and Dr. Heaton.

The buildings were originally designed around an open court, about 150 ft. long and 65 ft. wide. For the purposes of the exhibition it was at first proposed to cover this temporarily; but, as it was soon seen that such a covered area might be made to serve with good effect as a winter garden and place of general resort for convalescent patients, a more permanent roof of iron and glass was determined on, and has been executed by Messrs. Handyside from a design by Mr. Ordish, at a cost, including flooring and other contingencies, of nearly 4,000*l.*, the Exhibition Committee making themselves liable for half this amount, and the Infirmary Committee for the other half. We may say, *en passant*, that opinions differ in Leeds very considerably as to the wisdom of making the Infirmary so large and costly as it is. The Infirmary Committee, of course, look hopefully to the result of this Exhibition. It is anticipated that the profit will be 20,000*l.* If this be the case it is proposed, we understand, that the sum of 12,000*l.* shall first be paid out of the profits in the name of rent for the use of the Infirmary building, to be divided between the Infirmary and the Mechanics' Institution in the proportions agreed upon, being one-fifth (but not exceeding 2,000*l.* altogether) to the latter, and the rest to the Infirmary. One-half of the remaining profits are to be paid over to the Infirmary, and the other half applied for the establishment of a permanent gallery of art in Leeds.

Passing by, however, the question of finance, it was in this winter garden, filled with handsomely-dressed persons, and adorned with flowers, shrubs, statues, and flags, that the Prince, after some very fair musical performances, received addresses, made replies clearly and genially, and ultimately declared, in the name of her Majesty the Queen, the Exhibition open.

The catalogue has been compiled by Mr. R. N. James, and includes biographical notices of all

the artists whose works are exhibited. The Exhibition may be described as consisting of,—

1. A collection of paintings in oil by the old masters, from the fifteenth to the eighteenth century.
2. A series of works in oil by British artists, down to the present day.
3. A series of paintings by modern foreign artists.
4. A collection of water-colour drawings by British artists, deceased and living.
5. Engravings and etchings.
6. Drawings and sketches by the old masters.
7. A collection of miniatures in the same gallery.
8. A portrait-gallery of Yorkshire worthies, contained in the corridors round the central court.
9. A museum of ornamental art, consisting of works from the earliest period to the present century, arranged in the chapel and adjoining rooms.
- And 10. An Oriental museum.

The works of the old masters have been selected, and the collection formed by the Chief Commissioner (Mr. J. B. Waring), and by Mr. Redford, the Assistant Commissioner, by whom the pictures of the Italian, Spanish, and French Schools have been arranged. The galleries, containing paintings by British artists, have been formed under the superintendence of Mr. R. C. Sanders. The gallery of pictures by modern foreign artists has been formed under the superintendence of Mr. L. Lefèvre. The engravings and etchings have been collected and arranged by the Honorary Superintendent, Mr. W. Smith, F.S.A. The gallery of Yorkshire worthies has been entirely formed by the Honorary Superintendent, Mr. Hailstone. The museum of ornamental art has been collected and classified by the Superintendent of the Museum, Mr. W. Chaffers.

The Indian Museum has been entrusted to Dr. J. Forbes Watson, who seems to have a monopoly in this direction. The very interesting collection of lace and embroidery has been formed by Mrs. Hailstone. For the floral decorations, with the statues and trophies, we will praise Mr. H. C. Brandling, and add a word for Mr. Metcalfe for a well-designed set of pensons.

The following, we are told, gives the number of works in the Exhibition:—

Old Masters (Italian, Spanish, and French) ..	424
(German, Flemish, Dutch, &c.) ..	492
British Deceased Painters in Oil ..	291
British Living Painters in Oil ..	183
Modern Foreign Artists ..	232
British Water Colours ..	363
Drawings by the Old Masters ..	273
Etchings and Engravings ..	187
Museum of Ornamental Art ..	2,900
Miniatures ..	336
The Dudley Gallery ..	28
Yorkshire Worthies ..	273
Indian Museum ..	390
Total ..	5,904

Commencing in Gallery A the visitor may study the infancy of modern art in the religious works of the Florentine painters, and trace it from this beginning in the early part of the fourteenth century as displayed in "the Coronation of the Virgin," by Orcagna, to its culmination in the more perfectly developed Roman school of Raffaele, as seen in his "Holy Family," No. 246, Gallery B. It is interesting to note the general prevalence of religious thought among the early painters, and no better mode of comparing the styles of the several artists, or estimating the progress of art, can be adopted by the general observer, than in noticing the distinct treatments which that subject of so many of the pictures, the Holy Family, has met with. Conventionally treated at first, with purely conventional accessories, such as the gold background, adopted from the more humble department of decorative art, we see these conventionalities gradually disappearing before the

* Vol. xxii., pp. 116-117, 152-153.

matured experience of the later masters, and eventually, as in the marvellous masterpieces of Raffaele, Leonardo, and Lini, becoming all that consummate power in art and the most reverent and cultured imaginations could portray. In these two galleries, containing the Italian, Spanish, and French pictures, which have a definite historical connexion, the student of art will see each great school represented by its greatest of masters—the Italian, with its numerous sub-divisions, of the Florentine, Roman, Venetian, Bolognese, Lombardic, and Neapolitan schools, displaying a constellation of genius so brilliant that no other country may ever hope to rival it, nor the world to see its like again; the Spanish school, with its crowning glories of Murillo and Velasquez; and the French school, whose representatives, such as the Poussins, Claude, Vermet, Watteau, and Greuze, are so distinctly national in type and characteristic in their originality of treatment.

In Gallery C the same historical progress in the works of the German, Flemish, and Dutch masters may be noted. The first picture, No. 501, is a most interesting work on account of its subject and the author of it, "The Installation of Thomas à Becket," by John Van Eyck, the inventor of the process of oil painting, and the founder of the Flemish school. This and the two important pictures by Albert Durer, (505 and 506), will show the cradle of the Flemish and German schools, as the early works in Gallery A indicated the beginning of the Italian. Let the visitor regard well the refinement and delicacy of these early works, comparing them with the productions of the schools founded by these artists. "The Crucifixion," by Albert Durer, No. 505, is a marvellous production.

Mr. Waring says justly, in his introductory notices, that however desirable it might have been, it was not possible to form in the present Exhibition a complete series of works illustrative of the art of oil painting in Europe. "The earlier productions of the great masters in Italy, Germany, and Flanders are well known, and are preserved in certain localities, which the student of art must visit before he can form an adequate idea of their value. In the present instance, we have collected such pictures as will serve to illustrate the rise of oil painting in Europe, and give the visitor an idea of the characters of the various Schools from the fifteenth century onwards. For this purpose a certain degree of chronological arrangement has been kept, but our principal object has been to render the collections attractive and interesting."

The earliest paintings in oil are executed on wood panel, and the use of prepared canvas did not become general till the close of the fifteenth century, but in every instance, until within a comparatively late date, when the making of colours became a separate manufacture, the artist prepared his own colours, or employed an assistant to do so for him, under his own guidance. The purity of the material, and the care taken in the process, led in a great measure to the excellent preservation in which old paintings are generally found, unless roughly treated, whilst many of our modern productions fade away or crack to pieces even during the lifetime of the artist, who, regardless of chemical experience or ignorant of the nature of the material he employs, especially in the unfortunate use of asphaltum, produces very perishable works, to his own vexation and the purchaser's loss.

Various good examples of the three great masters of English art—Hogarth, Reynolds, and Gainsborough—will be noticed in gallery D. George Morland, a purely English painter of great natural ability, is also well illustrated; and the diploma pictures from the Royal Academy, or pictures presented by artists on their election as Royal Academicians, serve to show the progress of art from the early part of the century almost to the present day.

There is much to admire, nevertheless, in the French and Belgian pictures here brought together, and from their novelty to the general public, arising from their difference in subject and feeling from our own pictures, as well as from their variety in technical treatment, we shall expect the Foreign Gallery to become a general favourite with the public. The delicate work and exquisite finish of Edouard Fieé, the refined drawing and elegance of composition of Ary Scheffer, if not representing the power of the French school in historical art, displays most attractively its sentiment; and Rosa Bonheur, in her water-colour drawings of Highland cattle, appeals to us in language such as we are ever ready to hear. The animal pictures of Verboeck-

hoven will be subjects of interest also, from their own intrinsic excellence, and from the fact that the artist is, in his own country, what we Englishmen, with a beautiful mixture of simplicity and patriotism, call the Belgian Landseer; just as, when the brilliant advent of Rosa Bonheur set the British world of art in motion, we showed our great love and appreciation of her productions by immediately calling her the French Landseer.

In the water-colour collection some of our best men are well represented. Hunt shows us the poetry of common nature, just precisely that poetry which we do not look for, and which sweetens existence to those who can see it. With Lewis we visit the East, not as, in our youth, the Arabian Nights led us there, but to see a literal transcript of the life of the people, recorded with such art as only John Van Eyck or Albert Durer could have attempted. Let those who have time stand before the Frank encampment of Lewis, not for a passing moment, but for many moments, regarding it first as a monument of the art of the 19th century, and afterwards inch by inch to see the perfect attainment of art power. Do not neglect to see whatever magnifying help you have at hand, for there is not the surface of a pabbie, the feather of a bird, or an inch of the canvas tent that is not a realisation. Who is there, also, that cannot appreciate, or hesitate to love the works of Birket Foster? Wherever bright-eyed children exist and primroses grow, he will find his appreciators, as he has already found his subjects; and as long as English people love their country and delight in its simple beauties of bedgerow and bank, and seacoast and bright sky, so long will the lovely epics of this artist be most keenly enjoyed.

The collection of engravings is an interesting though not exhaustive one, and Mr. W. Smith has prefaced the list with some pertinent notes on the history of the art. One of the earliest specimens of wood-engraving is the well-known representation of St. Christopher carrying the infant Saviour, the only impression being in Lord Spencer's Collection, which bears the date of 1423. The first productions were rude, ill-drawn, and little more than outline. Towards the end of that century renowned painters, especially Albert Durer and Lucas Cranach, adopted the process, and by their hands, or under their personal direction, were executed those works which still excite universal admiration. In fact, the former artist may be fairly considered the founder of the art as it is now practised.

Scarcely any attempt in line engraving seems to have been made as far as this country is concerned, till about the middle of the sixteenth century, when certain foreigners, chiefly Flemings, obtained employment in London in engraving portraits, frontispieces, and illustrations to books. In the following century, William Faithorne, a native of London (1620—1691), having, from his adherence to the cause of Charles I., been compelled to live for some time in Paris, and having probably worked with some of the great engravers before mentioned, attained remarkable excellence. His plates are executed with consummate skill, and have a brilliant and powerful effect. Several years later, Hogarth (1698—1764) again introduced the practice of the painter engraving his own works; and the English school reached its highest position when Strange, Woollett, and Sharp preceded their well-known works, which, especially in the landscapes engraved by the second, are still unrivalled.

In the present collection etchings have been placed first, on account of their being the nearest approach to original drawings. The increase in the pecuniary value of works of art of this description during the last few years is enormous. An impression of Rembrandt's Christ Healing the Sick in the Temple, called the Hundred Guilder Piece, on account of its being traditionally stated that he once sold an impression for that sum (*little more than eight pounds*), corresponding in every respect with No. 13 in this collection, was sold by auction in London, in 1867, for 1,180*l.* In 1788, one exactly similar sold at the Hague for 84 guineers (*seven pounds*), and there is good reason for believing it to be the one now in this Exhibition.

The Museum of Ornamental Art contains a series of works remarkable for their artistic merit, from the time of the ancient Egyptians, or some thousands of years before the commencement of our era, down to the present century. An extraordinary amount of ingenious

and clever adaptation of natural modes to the purposes of industrial art, and a wonderful power and delicacy of manipulation, are to be remarked in the earliest, equally with the latest, productions of man's hands; and it is a noticeable fact that, for purity and simplicity of style, for a high and keen appreciation of natural beauty, the ancient Greeks have still the advantage over us of the present day. It is hoped that the artisan, especially, will carefully note the more remarkable examples of that class in which he may be personally interested; and carry away with him, not only many valuable ideas, but an increased sense of the estimation in which the best specimens of artistic industry are held by all educated persons, as affording a high idea of the genius of the people who were able to produce them.

We may have an opportunity to go more into detail hereafter, and to say something on the remarkable improvement that is going on in Leeds, one of the most rapidly-growing towns in the country. It has increased from 38,017 houses and 172,258 inhabitants in 1851, to 46,168 houses and 207,138 inhabitants in 1861; while now it is estimated that there are about 55,000 houses and upwards of 240,000 people in the borough. While this has been going on, changes equally noticeable have been taking place in the appearance of the streets and buildings. With very few exceptions, the previous to the erection of the Town Hall, there was scarcely a public building that could lay any claim to architectural beauty. Of the buildings that have been reared my length of time, only two or three had any pretensions to architectural merits, while even their merits were of a very shadowy description. As the inhabitants, however, gradually realised the beauty and symmetry of their hall, they erected the new and handsome buildings which now adorn what was at one time one of the most prosaic and ill-built towns in the country. Not only have the voluntary subscriptions of the public being generously given during the past ten years to provide buildings better adapted to the growing wants of the hospitals, more in accordance with the teaching of science, and calculated, while alleviating suffering and distress, to contribute to the adornment of the town, but they have been as freely extended to agencies whose chief object is the cultivation of man's mental powers. The destroyer of all external beauty in the town is smoke; but as we do not desire to end these remarks with a grumble, we will take some other occasion to issue our counter-blast.

GEDAR AND ITS RELATIONS.

THERE are certain material objects in this world which possess, in our opinion, more inherent interest—more poetry and even philosophy—than can possibly be extracted from the study of numerous families of the human race. A good deal, of course, lies in the association. That metallic substance which we call gold is, for instance, far greater human interest—particularly regarding the subjects with which it may be correlated—than the anthropology of the Zulu Caffres or the dusky natives of the Gold Coast. And we are quite sure that most people would prefer a practical acquaintance with the history of the mineral to that of the men. It is upon this principle that we have chosen this week to give our readers a disquisition upon a well-known tree, rather than excite any discussion, which at one time we felt tempted to do, concerning the aboriginal savages whose skulls are said to be imbedded in the glacial drift.

And the tree which we have chosen for our subject is the Cedar,—the very name of which recalls the most vivid impressions of the grandeur and glory of the chosen people of the Lord. Certainly, the cedar is of all trees the most renowned of Scriptural history. It bears the same relation to Syria and Palestine that the oak does to the British empire. Who has not heard of the cedars of Lebanon? Who does not know of the exquisitely beautiful and solemn passages of Hebrew poetry to which they supply the metaphors? When the sacred historian of the kings of Israel wishes to convey to his readers an adequate impression of the wisdom of Solomon he is not satisfied with the simple assertion that his wisdom excelled that of all the children of Egypt; that he was wiser than all men—than Ethan the Ezrahite, for example, and the sons of Mahol; that he spake three

thousand proverbs and a thousand songs; but he adds, by way of a crowning illustration, that "the spake of trees from the cedar tree that is in Lebanon even unto the byssop that springeth out of the wall."*

Similarly, the Prophet Isaiah, in threatening confusion to the kings and nobles of their backsliding people, does so under the similitude of levelling with the dust the cedar of Lebanon and the oaks of Bashan.† "Behold!" says Ezekiel, in his denunciatory comparison of Pharaoh to the late Assyrian empire; "the Assyrian was a cedar in Lebanon," &c.‡ In short, we may sum up the symbolism of the cedar in the poetry of the Old Testament by saying that it was used in its strength as an emblem of wisdom, power, dominion, and prosperity; in its fall as a fitting illustration of portentous calamity and desolation.

It must not, however, be supposed from what we have written that cedar is the most important tree in Syria in an economical point of view. We must not overlook the olive (*Olea europæa*). The palm and the olive are almost indispensable to the comfort and even the existence of the mass of the community. Bread, oil for cooking, oil for lamps, paper, soap, are the produce of the olive. Indeed, the olive is to the modern Arab what the fish-oil is to the Esquimaux,—it is his all in all. Hence the general lamentation over a failure of the olive harvest; and hence the expression of the prophet who says, "Although the labour of the olive shall fail . . . yet I will rejoice in the Lord" (Hab. iii. 17, 18). Nor should we pass by without a single allusion to the Oriental or Syrian sycamore.§ The Syrian sycamore, indeed, is the true type of the platan, as contrasted with cedar, which is the best type of the mountain trees of Palestine. It is easily propagated. It strikes out roots with great rapidity and to a vast depth. Its ample girth, its wide-spread arms branching off from the parent trunk only a few feet from the ground, and its enormous roots (it has no tendrils) are in every respect suitable to the light, porous, sandy soil, and the variable, often tempestuous climate. The natives say the sycamore bears seven crops of figs in the year. But it varies in this respect. The wood is soft and of little value. This is implied in various passages of Scripture. Thus in Isaiah (ix. 10) it is said, "The sycamores are cut down, but we will change them into cedars;" and in the days of Solomon it is also said, "He made cedars to be in Jerusalem as the sycamores trees that are in the valleys for abundance."¶ It is a tender tree, and flourishes immensely in sandy plains and warm vales; but cannot bear the hard cold mountain. A sharp frost will kill them, which agrees with the fact that they were killed by the frost in Egypt. (Ps. lxxviii. 43-47.) Of these three trees, however,—the olive, the sycamore, and the cedar,—there can be no question but the greatest historical and ecclesiastical interest belongs to the cedar.

The cedars of Lebanon have been celebrated from the very dawn of history for their beauty and magnificence, as well as the excellence and durability of their timber. The dark natural evergreen hue has obviously given rise to the names (*L. Cedrus*; Gr. *Kédros*; Heb., *Kedar*, literally, "to be dark"). Gesenius seems to indicate that the Hebrew root signifies also "coiled," or "compressed," that, in fact, the term is expressive of a mighty and deeply-rooted tree. Both etymologies, it may be conceded, are correct; and its splendid foliage, and the rich perfume of its timber, are the qualities upon which it depends for the universal and long-continued estimation in which it has been held. It belongs to the natural order *Coniferae*, the *Pinus cedrus* of the older botanists, but it is now ranked by modern phytologists in the genus *Abies* (fir); or in the genus *Larix* (larch), by that school, who make *Larix* a distinct genus from *Abies*; or, finally, it is held by some to be the type of a genus *Cedrus*—distinguished from *Larix* by its evergreen leaves and carpsels separating from the axis—which has received the appropriate name of *Cedrus Libani*. Although in foliage, and to some extent in its physiological character, the cedar resembles the common larch, it differs extremely in form and habit. Its stem bears almost in form and habit, where the trunk frequently splits into quarters, irregularly placed branches, often

of prodigious size and expanse, which again divide irregularly into branchlets. The cones are erect, oval, and rounded at both ends in a semicircle, about 4 in. long by 3 in. in diameter, requiring two years to come to maturity; and clinging to the parent tree for years before their scales fall off and the seeds are set free. But we need not pursue the technical description. We shall only add here, that on its native mountains cedar is often found at the base of the highest peaks, at an altitude sometimes of 8,000 ft. above the level of the sea.

It is, indeed, on the loftier ranges of Lebanon, we are told by a recent traveller,* that the true Scriptural cedar flourishes; and he has repeatedly followed the wildest of the routes, with or without a path, clinging to the shelving declivities with a wilderness of rocks and ravines sinking away westward down to the sea. The plateau where the cedars grow is more than 6,000 ft. above the level of the Mediterranean; and above and around are gathered the very loftiest and greyest peaks of the Lebanon mountains. The forest is not large, containing not more than 500 trees, great and small, grouped irregularly on the sides of shallow ravines, which mark the birthplace or fountain of the Kadisha, or the Holy River. But, although the space covered by the trees is not large, yet whenever one gets fairly within the grove, and beneath the giant arms of those old patriarchs of a hundred generations, there comes a solemn hush upon the soul like an enchantment. "Climb into one, and you are delighted with a succession of verdant floors spread around the trunk, and gradually narrowing as you ascend. The beautiful cones seem to stand upon or rise out of this green flooring. I have gathered hundreds of these cones for friends in Europe and America; and you will see them in private cabinets more frequently than any other memento of the Holy Land."

There is much discrepancy in the statements of different authorities with regard to the number, variety, and age of the trees, as well as the extent of ground which the grove embraces. Dr. Thomson, whom we have just quoted, says, about half a dozen acres; others say, three-quarters of a square mile. Again, some travellers suppose that most of the trees in the grove may be 200 years old; several between the ages of 400 and 800 years; and twelve trees in particular, whose age is incalculable; seven standing very near each other; three more a little farther on, merely in a line with them; and two on the northern edge, not observed by any recent travellers, excepting Lord Lindsay, who says these are respectively 63 ft. and 45 ft. in circumference. On this head Dr. Thomson remarks that it is not easy to draw any such line of demarcation. The girth of the largest is more than 41 ft.; the height of the highest may be more than 100 ft. There is, in point of fact, a complete gradation of small and comparatively young trees to the very oldest patriarchs of the forest. "I counted 443, great and small, and this cannot be far from the true number." Even this group, however, is not uniform. Some are struck down by lightning; some are broken by enormous loads of snow; some are torn to fragments by the terrific tempests that sweep over Lebanon like a tornado; and finally, even the sacrilegious axe is often lifted up against them. But, on the other hand, young trees are constantly springing up from the roots of the old ones, and from the seed of ripe cones infant cedars in thousands may be seen springing from the soil. As the grove is wholly unprotected, and greatly frequented both by men and animals, these are, of course, quickly destroyed. But this simple fact demonstrates the possibility of increasing the propagation to any extent, and undoubtedly the whole of the upper terraces of Lebanon might be covered, as of old, with groves of this noble tree; and might again furnish the timber for other temples and other "houses of the forest of Lebanon!"

Upon the whole, then, it may be stated with regard to those celebrated trees which once flourished in the forest of Lebanon, that only a very few now remain. They are also more remarkable for their girth than their stature, and their age cannot be accurately determined. The rules by which botanists determine the age of trees are not applicable to these ancient cedars; for their stems have ceased to grow in regular concentric rings, and they owe their prolonged existence to the superior vitality of a portion of

their bark which has survived the decay of the rest. Russeger, a well-known German botanist, is inclined to suppose that the age of these Scriptural trees may possibly number 2,000 years,—a term, we may add, that would not carry us back even to the era of the last of the Old Testament prophets. As to their dimensions, there are at this moment larger trees every way, and much taller, on the banks of the Ohio; and the loftiest of the present cedars in Lebanon might take shelter under the lowest branches of the Californian pines.

Maundrell, who visited them on Sunday, the 9th of May, 1697, observes in his valuable book, which is too little known by modern commentators,—*

"Despairing of any other opportunity, I made another attempt this day to see the cedars and Caspines. Having gone for three hours across the plain of Tripoli, I arrived at the foot of Libanus, and from thence continually ascending, not without great fatigue, I came in four hours and a half to a small village called Edon, and in two hours and a half more to the cedars. These noble trees grow among the snow near the highest parts of Lebanon, and are remarkable as well for their age and largeness as for those frequent allusions made to them in the Word of God. There are some of them very old, and of a prodigious bulk; and others, younger, of a smaller size. Of the former I could only reckon up sixteen; but the latter are very numerous. I measured one of the largest, and found it 12 yards 6 in. in girth, and yet sound, and 37 yards in the spread of its boughs [diametrically?]. At about five or six yards from the ground it was divided into five limbs, each of which was equal to a great tree."

In addition to this, Mr. Hartwell Horne,† tells us, that in the year 1550 the old Scriptural cedars are stated to have been twenty-eight in number; in 1575, twenty-four; in 1600, twenty-three; in 1738, fifteen; in 1810, twelve; and finally, in the year 1818, when they were visited by Mr. Rae Wilson, they were reduced to seven! This traveller described the few which he observed as being about 15 ft. in height, and twisted together; and moreover, that instead of spreading out their branches with a natural irregularity, their outline was confined to one uniform pyramidal cone (p. 88).

Before proceeding to describe the applications of cedar, we may say a few words with regard to the soil and climate of Lebanon. In the first place, the name Lebanon itself signifies white, and was applied either on account of the snow which during a great part of the year covers its whole summit (Tacitus, Hist., v. 6), or on account of the white colour of its limestone cliffs and peaks. It is the "White Mountain," the *Mont Blanc* of Palestine,—an appellation which seems to be given, in one form or another, to the highest mountains in all the countries of the Old World.‡ Such a geological tract of mountainous country has, of course, its corresponding picturesque scenery and variable climate. With regard to the soil, we can only say that, in whatever soils, altitudes, and climates, whether in a natural or cultivated state, the pine tribe, when in luxuriant growth and perfect health, will be found to be indigenous. The soil must be more or less rich in natural humus,—that is, vegetable mould combined with aluvial and rocky debris, which have throughout a series of ages been pulverising, decomposing, and accumulating, and so prepared in nature's laboratory as *pine food*. When found in their greatest beauty it is generally in mountainous countries; but almost any description of soil will suit them, excepting a soft peat or spongy marsh. Such a soil as they require is abundantly supplied by the decomposition of the mountains of Lebanon; and so fertile is this sacred ground in pine food that it produces with equal luxuriance the cedar and the Scotch fir.

All modern travellers in the East, from Lamartine to Lord Lindsay, concur in lamenting the decay of the cedars of Lebanon. We have already pointed out what a source of national income it might prove were the valleys protected and the young trees suffered to arrive at maturity. But unless a wiser and more provident Government control the country, such a result could hardly be realised; and, indeed, the whole forest will gradually die out under the wasteful negligence of the Turk and the Arab. Let us hope that the Sultan will, among other reforms in his interesting dominions, see to the protection of the cedars of Lebanon.

Still, even in the case of their dying out, which we shall never contemplate, the tree will not be lost. It has been propagated by the nut or

* 1 Kings, iv. 33-36.

† Isaiah ii. 13.

‡ Ezek. xxii. 3.

§ This tree must by no means be confounded with the so-called sycamore of Europe, which is a species of maple. The Syrian sycamore (*Ficus sycamora*), is a fig-tree, and allied to the india-rubber plants of our greenhouses.

* Dr. Thomson, an American writer. Vide "The Land and the Book," &c. Edinburgh: Nelson. 1856.

* "Journey from Aleppo to Jerusalem," p. 142. Ed. 1707.

† Vide his "Landscape Illustrations of Scripture," vol. i. p. 89.

‡ See "Dict. of the Bible," edited by Dr. Smith, art. "Lebanon."

seed in many of the noblest parks of Europe. Indeed, there are more cedars within fifty miles of London than there are on the mountains of Syria taken together. The celebrated tree at Sion House is now 8 ft. in diameter above the ground. Even in the Highlands of Invernesshire it succeeds so well that trees planted at Beaufort Castle, the seat of Lord Lovat, in the year 1753, are now 3 ft. or 4 ft. in diameter. We all know how the great Lord Chatham conceived a passion for cedars, and what an expense he was at to gratify it.* Indeed, it must be admitted that there is something singularly attractive in the very name. When Miss Braddon, in her best novel, chooses for her scene of action a villa named "The Cedars," we can all understand the motive which influenced the authoress. The oaks, the lilies, the beech-woods, the laurel-groves, have had their day; but the cedar blooms fresh as a perennial spring flower.

We have thus briefly and imperfectly sketched the outlines of the most interesting portions of the natural history and associations of the cedar. In another article we shall describe some of its leading economical applications.

DOMESTIC ARCHITECTURE OF MEXICO.†

THERE are two or three descriptions of town houses erected in the Mexican cities: there is the town residence or casa grande of the broad-nosed Mexican don, erected of large capacity, with ground-floor and floor above; another house of equal area, of one floor only, used for a similar purpose; and another of similar space, that is converted into one or more residences for a lower class of the population,—clerks, shopmen, and others; and stores, or "tiendas," are sometimes made in the corner rooms or the front rooms of the building.

We will now proceed to describe the latter. The ground plan is generally square or rectangular; the outer part of the area of the plot is built upon, and the inner part is left open for the purposes of a yard. The entrance is through a gateway in the middle of the front, though there are accesses through the store; and the part of the building that is not occupied by the proprietor of the store is divided into a series of apartments that are rented by others; and the one room serves for living-room and bedroom, a cot being fixed in the corner of the room.

These are generally erected of the usual substantial style,—thick rubble walls, covered with an overhanging roof and red tiles; large windows opening down to the ground, protected by iron guards and shutters; and the inside is white-washed, and but rarely ornamented.

The whole aspect of the building is bare and comfortless; but as the Mexican spends little of his time in his casa, that does not disturb his complacency; he can ride out and do a little bridleage, or attend the store, or while away his spare hours in the fascinations of the billiard-room, or at the card-table, and win his pools of dazzling dollars.

There is a kitchen common to all the occupants of the casa, in which their coffee, tortillas, and frijoles may be cooked; but they do not trouble it very frequently, as they breakfast about 10 a.m. and dine late in the evening, and these two meals a day are generally made to suffice for the wants of nature. About middle day cakes and sweetmeats are carried round to the houses, in which the Mexicans freely indulge; and this, we suppose, is intended for their luncheon.

The "casa medio" is a building of somewhat more pretension than the one just described; it is likewise built on a square plan, the outer space being covered and the inner area open to the heavens; the yard is usually approached through a gateway in the centre of the building, closed in with a good substantial gate.

The walls are thick and strong, and roofed in with overhanging eaves, the outer eaves being used to cover the sidepath, and the inner one made wider, supported on pillars, to form a

* He then sold Hayes and took possession of a villa at Hampstead, where he again began to purchase houses to the right and left. In expense, indeed, he vied during this part of his life with the wealthiest of the conquerors of Bengal and Tanjore. At Burton Eyusset he ordered a great extent of ground to be planted with cedars. Cedars enough for the purpose were not to be found in Somersetshire. They were, therefore, collected in London, and sent down by land-carriage. Relays of labourers were hired, and the work went on all night by torchlight.—*Vide Macarty's "Critical and Historical Essays;" "The Earl of Chatham."*

† See pp. 7 and 292, ante.

covered corridor round the inner side of the building, and an approach to the rooms.

The walls are smoothly finished, and coloured in some delicate tint, and the exterior is frequently ornamented with grotesque figures, or figures of animals, painted in prominent places upon them, and also to imitate pilasters, string-courses, cornices, &c.

The principal apartments occupy the front of the buildings, and the wings form the chambers, which are lighted by windows opening into the corridor; the windows in front are large, and open down to the ground, and are protected outside by an iron guard railing, sometimes plain, and at others elaborately ornamented, and the inside is closed in with shutters.

Of course, the shutters being open during the day, the air circulates freely through the apartments. The inside rooms are sometimes white-washed, and sometimes coloured with colours of a delicate tint, and a few of them are occasionally left plain, while others are highly ornamented with wreaths or scrolls of flowers, formed in imitation of the beautiful indigenous flowers, or other designs, which has a very pleasing, chaste, and even elegant appearance, and forms a striking contrast to many of our rudely-designed and roughly-executed paper-hangings, with which we delight to cover the walls of our houses, but even these begin to show symptoms of improvement in that respect. The dexterity of these colourers or plasterers display in the colouring and finishing off an apartment is something to be wondered at, considering the natural indolence of the Mexican. The stencil plates are cleverly and nicely cut out of cardboard, and are well and correctly applied, representing the different colours of flowers, fruits, or animals, with considerable accuracy and artistic effect.

The floors of the houses are usually covered with red quarry tiles, also the corridor, and the yards are generally paved with small boulder paving-stones; but in many instances small gardens are formed in the centre of the open space, planted with the beautiful evergreens and flowers that flourish in the country, and adding a redeeming feature of peculiar interest and delight to the otherwise rather poor and meagre aspect of the place.

The rear part of the block of building is usually occupied as the kitchen, scullery, stables, &c., as previously described in the case of the hacienda.

But the principal buildings of a Mexican city, after the cathedral, churches, and nurseries are described, is undoubtedly the town mansion, or "casa grande," of the Senor Don of Mexico, and there are many of them of considerable extent and pretensions to architectural display.

The ground-floor of these houses are similar to those above described, but there is another story or floor above it; and the approach to the upper floor is effected by means of staircases from the inner corridor of the buildings.

The fronts of these buildings are supported on arches and pillars, which support a gallery or corridor above, and form a covered way beneath similar to the rows in Chester; and these pillars and arches are continued to the story above to support the usual overhanging roof, which in this case is made much wider, and the spaces between the pillars on the ground-floor are left open to the street, but above ornamental balustrades are fixed between the pillars as a protection to the gallery, and for architectural and artistic effect.

There is also some architectural display at their gateways; on each side are ornamental pillars, with suitable bases and capitals, connected together with a well-turned arch, and above the archway is erected a pediment giving a finish and an effect to the whole, and a strong, well-executed gate closes in the main entrance. The window openings are also highly ornamented with well-designed and sometimes rich iron railings, and the windows have usually the luxury of glass, and are closed in with large and massive shutters.

In the interior of the area or courtyard is rather an elaborate and imposing display of pillared and arched arcades, tier upon tier, connected together with tastefully designed and ornamental balustrades to protect the gallery and the openings to the staircases; this elevation is surmounted with an ornamental eave-board.

The pillars of many of the buildings are decorated with well-executed bases and ornamental capitals, and the arches of these arcades on the upper floor are sometimes partially or wholly filled in with trellis work, in which are trained

and entwined the beautiful creeping plants that flourish in that glowing clime: there is suspended in graceful festoons the many coloured convolvulus, the chastely white clematis and jessamine, the bright Virginian creepers, and others of Nature's floral gems that revel in wild luxuriance and magnificence in the recesses of their forests, and are very properly brought forth, and beautifully and usefully applied to minister to the luxury, the refinement, and happiness of man.

The upper floors of these "casa grandes" are used as drawing, dining, and general reception rooms, in the front part; the sides and ends are used as chambers, and the lower apartments are used as domestic offices, servants' apartments, kitchens, stables, coachhouses; in fact, to accommodate the whole of the servants of the establishment.

The open inner area, as in all Mexican houses, is nicely paved over, except the centre part, which is devoted to a pretty and picturesque garden, in which are cultivated all the choice and beautiful flowers and plants of the tropics, and even some of those of European origin, the graceful evergreen trees and endless blooming flowers giving it at all times a bright and pleasing appearance, and forming one of the most delightful and interesting objects connected with the domestic architecture of Mexico.

In the centre of the area that is devoted to the flower-garden is erected a fountain, throwing out cool and refreshing jets of sparkling water; these are conveniently fixed and arranged for watering the plants, to cool the heated atmosphere of the enclosed area, and to afford at all times a supply of water to the house, and also to the horses, mules, and other animals kept at the establishment.

The decoration of the exterior of these buildings is generally of an elaborate and costly character, but of the same style as previously described; and the interiors of the apartments and galleries are also profusely ornamented according to the taste and character of the occupant, and the means he has at his command, which are now in many cases much reduced from the effects of the unsettled state of the country, and the anarchy and commotion that have so long prevailed there; but still, there are isolated cases of better fortune.

In the fronts of those large houses where the pillared and arched plan is not adopted they are frequently architecturally decorated with elaborately designed and tastefully ornamented iron balconies, sometimes extending the whole length of the front of the upper floor, at others made separately for each window, and ornamental iron bronze-work railing is used to protect the lower windows that open down to the ground. These designs are evidently the handiwork of intellectual minds, well skilled in the manipulation of iron and the fine arts, as established and cultivated in Spain, particularly in Biscay, which had a world-wide reputation.

The interiors of some of the Mexican residences are elegantly fitted up and sumptuously furnished, the produce of the skilled hands of the civilized capitals of Europe; and elaborately carved and decorated furniture, *recherche* mirrors and lustres, ormolu, gold, and silver ornaments, and statuary of exquisite design and taste, adorn their saloons and principal apartments. And when this is said it cannot be thought that all the wealth of Mexico had dissolved away, or been entirely dissipated by their intestinal strife and perpetual war, as it is upon record that when one of the Senor Dons of Mexico resident in the capital visited Paris, he was invited with his Signora Donna to one of the Emperor's state halls at the Tuileries; the Signora was most splendidly and elegantly attired in costly Parisian toilet; and her display of diamonds was most gorgeous and profuse, so much so as to be the observed of all observers, and throwing into the shade and eclipsing even the Empress's toilet, and that of her elegantly attired suite, and the other splendidly dressed ladies that usually grace those magnificent assemblies. But we suppose it is in Mexico as in other countries, there are all classes, rich and poor, very rich and very poor, as the poet observes,—

"Some are and must be greater than the rest,
More rich."

And we know in the case alluded to there is great wealth, comprising thousands of broad acres of rich and fertile land, and mines of untold wealth, with many "haciendas," besides sundry "casa grandes" in the cities, and a magnificent one in the city of Mexico, redolent

with wealth, and adorned with every imaginable luxury.

It is not usual in warm and tropical climates to use carpets, as the bare floors are cooler and more agreeable, although tastily designed and well-executed matting is sometimes used; but in some of the Mexican mansions, Turkey and other rich carpets are profusely spread, and, as if wealth could not supply articles rich and costly enough to adorn their apartments and embellish their *casas*, they lavish it away in these all but useless articles.

In the "casa medio" small pieces of carpet are used, and sometimes gay heart-rings are placed on the floors opposite the windows, bounded on each side with a row of rocking or easy chairs, as previously mentioned, where the family and friends assemble in the evening, as round our own firesides, chat over the current subjects of the day; and, as they smoke their much-loved cigars and cigarettes, they swallow the smoke and pass it out through their nostrils, and thus mingle the graceful curls of the fumes as they arise in blissful indolence, so dear to the true Mexican.

It is no uncommon thing in the open inner areas of these *casas grandes* to erect theatres and concert-rooms by throwing a temporary roof or awning over the uncovered space; and very good theatrical performances and concerts take place there, and the performances are sometimes thrown open to the public; but, if the proprietor chooses to provide such an entertainment for his friends, the space is well adapted at a trifling expense to provide the necessary accommodation, and these entertainments are usually given on a Sunday. It strikes an Englishman as remarkable that, after making their marketings in the morning, afterwards attending their religious observances, they wind up the events of the day by attending theatres, concerts, and even billiard-rooms, in the evening.

Truly they must be a happy and self-contented people, that can make their religious duties fit on and chime in so easily with their ordinary worldly affairs, as to traffic in the morning, attend with lowly brow and bended knee their noon-day prayers and evening vespers, and indulge in full-dress costume theatrical and musical performances, and even gambling, in the evening: this is their custom, but it is one more honoured in the breach than in the observance.

The stores or "tiendas" of the city are numerous, and they vie with each other in making a good display of their wares and merchandise; but it is a kind of mongrel trade they carry on: for instance, at a drapery establishment you can purchase ironmongery, cutlery, tools, stationery, shoes, &c.; at a grocery establishment, a similar medley; at a druggist's, all kinds of drugs and oils; and one "Simon Pure" having purchased a quantity of petroleum from the United States, advertised the sale of it as "gas!" brilliant gas! and the poor benighted Mexicans absolutely bought it as the veritable gas, and were much annoyed to find they were deceived.

The butchers' shops are situated in several parts of the city, and are not, in hot climates, very desirable as neighbours; the cattle they kill the previous evening, and cut them up in the night, ready for the early morning's market.

The cattle are caught on the prairie by means of the lasso, and are brought to the place where they are to be slaughtered, and which is set apart for the purpose; and this place may be easily discovered by the villanous-looking and stinking black vultures congregating together in the locality, watching for the opportunity to carry away the offal and filth left by the butchers, and which they do most diligently, and thereby discharge a very urgent and important sanitary duty as effectual scavengers.

In the manipulation of gold and silver ornaments, particularly the latter, required for the saddles and bridles, the Mexicans considerably excel, and the work they turn out is very neatly and skilfully executed, and would bear comparison with that of more highly civilized nations; but the metal they use is not always of the purest character, as they employ a considerable amount of alloy, which does not much affect its appearance, but materially lessens its intrinsic value.

In saddlery and ornamental leather-work they also considerably excel. Their saddlery is highly ornamented and well executed, and other leather work is equally good, cases for boxes, and other articles; but the leather is not very strong or well tanned, and is carried a brown colour.

The fashionable hours of shopping are in the cool shade of evening, when the shops are

brilliantly lighted up with "Mexican gas." At those times you may see the dark-eyed and bewitching signoritas tripping gracefully along, gaily attired in handsome lace or other shawls of thin material, fastened usually to a gold comb at the back of the head, and falling in graceful folds over the figure; and with the handsome and indispensable fan, with which they make a peculiar noise to attract attention, and they flirt it about in the public promenades, the stores, and places of amusement. In the Plaza one of the principal houses was selected by the French army as an hospital, the plan and arrangement of the building being very well adapted for it, and the writer was informed it acted very beneficially in the interest of the army, by quickly restoring the sickly and wounded soldiers to the ranks. The arrangement of the hock of buildings, with windows opened on each side, so as to promote a current of air through them, and approached by the covered corridors on the inner sides with the large open court-yard and the wide gallery in the front on the first floor, served as a place of exercise for the convalescents: the whole building was so well arranged as if it had been absolutely built for such purposes, closely approximating to the pavilion principle, but an improvement upon it, as there is a wider space between the hocks of buildings than is usually adopted on the pavilion plan.

The selection of this building, and other army arrangements, fully convinced the writer that the distinguished men in command of the French army left no arrangement incomplete, no commissariat service neglected, or sanitary regulation unfulfilled, though many valuable lives were sacrificed during the Mexican campaign from the harassing duties they had to undergo, the marches and counter-marches often in the dead of night over very bad roads, the deadly hostility of the inhabitants, and the constant attacks of the guerillas, and the numerous places they had to capture by assault, which produced but little effect upon them, and proved the pluck, gallant bearing, and enduring materials their soldiers are composed of, such as any nation might be justly proud of, and fully sustain the reputation established by their army when, at the terrific slaughter of Waterloo, the old Imperial Guard when conquered, overpowered, and surrounded, cried out, "The Guard dies, but never surrenders."

We venture this passing complimentary allusion to the French army, from whom we received many courtesies, and being in a fortified city we had the opportunity of witnessing the dexterity with which the accomplished sappers of that army constructed their barricades, as one was fixed opposite the writer's casa, for the inner line of defence, and to protect the approach to the Plaza, as the French were much annoyed by attacks of mounted guerilla.

The barricades were placed across the streets, and were made with earthen (clay) works, faced with "fascines" on both sides, formed of the tough wood of the adjoining forests. The height of the barricade was 5 ft. and 6 ft. wide, the inner slope $\frac{1}{2}$ to 1, outer 1 to 1. The works were as closely inspected by the engineer officers as by the writer, who took great interest in the whole operation, although he did not much relish the position they had chosen for their line of defence.

The barricades, we suppose, were a necessity in a military point of view; but they interfered with and incommoded the streets, and were a great nuisance to the inhabitants.

In addition to the many other sanitary advantages enjoyed at an early period by the Mexican people, we must not omit to mention that intramural internment had been abandoned for a long period, much earlier than has been adopted by more highly-civilized nations. About a mile from the city a spacious and well-arranged cemetery was laid out, in which are many interesting monuments erected; but, we fear, none to record the last resting-place of the many French soldiers who were taken to that bourne whence no traveller returns, and whose bones lie rotting in that distant and inhospitable land.

In drawing this article to a conclusion, we believe we have remarked on all the salient features of Mexican architecture, its constructive details, and its sanitary arrangements and appliances, in which we have endeavoured to show most of its relative points of interest and advantages; and as the original design and laying out of these cities possess merits which few of our towns can boast (notwithstanding our vaunted standard of superiority and

the eminence we flatter ourselves we have attained in the constructive arts and sciences), and which we might most advantageously and worthily follow without derogating from our national status or prestige; and we trust we have awakened a feeling of interest and anxiety to know something more of the remarkable works of this far distant country, as soon as the spirits of peace and concord shall have paved the way by shedding their benign influence on the unsettled and predatory race that now holds sway over the extensive territory of one of the richest and most fertile countries in the habitable globe.

THE SCIENCE OF MAN.

Of late years the science of humanity, under the full-sounding designation of anthropology, has been gradually coming to the front. "Men admire the heights of the mountain, the mighty waves of the sea, the high rush of the waters, the extent of the ocean, and the tracks of the stars, and neglect admiring themselves," said St. Augustine, hundreds of years ago; and the same may be said of the great mass of mankind still: nevertheless, there is a section that has taken up the study of man as the grandest, most beautiful and most wonderful in the world; and by its ability and earnestness, a large circle is gradually widening out, in which its investigations, inductions, collections of facts, are viewed with great interest. There is now an Anthropological Society in London, and another in Paris; Frankfort-on-the-Maine has commenced an anthropological journal; and Cologne, Aix-la-Chapelle, Essen, Elberfeld, and Crefeld, have just heard a course of thirty lectures on the newly recognised science. Leipzig, Dresden, Hamburg, Brunswick, Hanover, Berlin, are likewise under instruction. A French savant, M. E. Godard, dying in Jaffa, bequeathed in his will 5,000 francs to the Parisian Society, the interest of which is to constitute a biennial prize for the best memoir on any subject relating to man. An international congress was held at La Spezia in 1865, at Neuchâtel in 1866, and in Paris last year. The most prominent members of the London Society are exerting themselves to have anthropology permanently and duly acknowledged in the British Association for the Advancement of Social Science, contending that a scientific body without this science is, in the apt words of Dr. James Hunt, like an arch without a keystone; more than one elemental work has recently been published on the subject by its ablest exponents, for the information of those who are not already acquainted with its breadth and bearings; in fine, man, in his natural history relations, his physical, intellectual, and moral aspect, is now on the eve of due study by the million.

Anthropology must not be confounded with ethnology. Pervert followers of the former science, indeed, affirm there is no such thing as the latter; though less exclusive zealots agree that it is a branch of the superior study. Ethnology used to be defined as the science of races, and as it is held that there are no such things in nature, from a scientific point of view, as "races," the first deem it is time that the word was obsolete. The term ethnography is considered more fitting to represent descriptions of existing varieties of mankind. This, then, and all its kindred subjects, historical and comparative philology, mythology, &c., are looked upon as branches only of one of the great divisions of anthropology. The origin and destiny of man are the Alpha and Omega of this science. Whence came we, and whither are we going? The latter query is of the most practical importance, but as man's experience shows that he cannot get to the top of any ladder without beginning at the foot of it, we are forced to take the first into our gravest consideration. Between these two questions, however, are numbers of facts bearing upon them from very different directions; great voids that we have yet to fill up, and contradictory evidence that has yet to be reconciled.

People only dreaming of country consins as the kin with whom they may be unacquainted will be surprised at the number of undreamt-of relations the anthropologist will produce for them. Man has zoological, geographical, functional, historical, geological, genetic, and progressive relations, all waiting to be recognised; in other words, man is literally kin to all the world. We are scarcely able, at first, to grasp the comprehensiveness of all this; but by

examining each claim, one by one, we come to a realization, according to our individual gifts, of the scope and sublimity of the science of man. To "ink in" such a vast subject, even in outline, would be to step too far, perhaps, out of the art-world; but a glance at some of the most recent ponderings of scientific men in some of the departments may be suggestive.

A novel question has arisen among anthropologists as to the effect of soil on character. In our own immediate walk we have seen the theory of relationship of man to the soil applied to the solution of the mystery of the limited powers for ill of cholera in some localities in the immediate neighbourhood of districts in which the epidemic was as singularly fatal. We have seen, too, the peculiar nature of Irish soil given as the secret of its capabilities for horse-breeding. Now, the question is asked whether, for example, the character of the Scotch is an expression of the soil of Scotland? Mr. Cleghorn advances an opinion that it is. He finds, that wherever the boulder clay exists in Gathness there are the best men, the best cattle, and the best cereals; and where it is absent these are all of a miserable description. Proceeding to a larger field of observation, he shows that the area of the boulder clay divides Scotland into two well-marked regions, an eastern and a western, the former being that of the desirable soil. The man of eastern Scotland is taller and bigger-headed than the man of the west. The death-rate is lower in the east than in the west, as is the birth-rate, in accordance with the law that gives to poor communities increase, and causes luxury to be barren. Aberdeenshire, our exponent argues, has turned out more senior wranglers than all the west—perhaps all the rest—of Scotland, and the east has three universities for the one in the west. All religious revolutions have arisen in the east, most individualism exists in the east, most men eliminating for themselves their beliefs; whereas, in the west the opinions of their teachers are generally accepted. The contour of the east and west coasts is the result of the action of the prevalent wave-producing wind, which thus determines the soil of the country. He sums up, as his opinion, that the soil has determined the food, the food has made the race, determined its birth-rate, legitimate as well as illegitimate,—its marriage-rate and death-rate, its language and religion; therefore that it must be allowed that the character of the Scotch is the expression of the soil of Scotland.

It has been said, jestingly, "What is mind? No matter. What is matter? Never mind." The anthropologist treats of the first question as one of the most vital importance. Among the ancients, as is well known, the blood and the heart were successively believed to be the presence chamber of the mind or soul. Then Galen adopted the brain as its seat. Eventually, helped by the suggestions of Albrecht, Bishop of Regensburg, Gall and Spurzheim evolved the scheme of craniology known as phrenology. This last tenet is as likely to be discarded in its turn as its predecessors. Mr. W. C. Dendy, at the last meeting of the London Society, cited two cases in which life existed and the mental faculties were present after very severe mutilation of the brain. One patient, whose skull was cracked by a fall on a pier of Waterloo Bridge, lived for several days after the bone was trephined, when a basinful of brain was removed; and another lived for months with his mind in good working order after the total destruction of the left parietal bone and hemispheres. He also instanced cases of deformed skulls in which magnificent minds had worked. Those of Cicero, Bichat, and Curran, for instance, were remarkably different from the lofty fronts of other gifted men; and that of Sir Walter Scott was singularly pyramidal. He infers that the quality of the brain, "its firmness, comparative weight, and the complexity of its convolutions, and their secondary gyri," is of more consequence than the form of the case into which it is packed. Proceeding with his anatomy of the intellect, he thinks the non-correspondence of the two hemispheres likely to be the cause of much of the eccentric mental phenomena that is so puzzling to the physician, judge, and others. The opposition of the two hemispheres to one another may account for indecision of character; for the power some writers have possessed to scribble virtue while they were acting vice; as well as for the degree of rationality some insane persons enjoy.

With regard to the antiquity of man the anthropologist finds traces of his existence and industry, as well as remains of his body, in

geological strata, the age of which is beyond computation. Dr. Bruce, secretary to the Paris society, writes,—"He has lived in epochs when the flora and fauna considerably differed from those at present existing; he was the contemporary of a number of species now only existing in a fossil state; and whatsoever has formed an idea of the slowness of such changes effected on our globe will easily convince himself that six thousand years constitute but a short moment in the life of humanity." So, instead of looking upon man as a being degenerated from some former excellence, he regards him as he is bound to regard the proprietor of the rude tools and weapons we find among his relics. The golden age of mythology tones down before actual facts and finds into the Stone age,—the dark and distant period when man made shift to live without the use of metals. To this succeeded what is now known as the Bronze age, when he had succeeded in making an alloy of copper and tin, which he fashioned into implements; and then he raised himself still higher by the discovery and application of iron—"that hard metal which, in the language of the ancient poets, symbolised human perversity, characteristics, on the contrary, in the eyes of modern science, the third age of industry, security, stability, and true civilization. It was thus by an extremely slow process that man gradually rose from a savage to a barbarous state, from barbarism to civilization." The origin of man is a much more complicated question. Taking the author quoted above as a fitting representative of modern anthropological opinion, we find he considers the investigation of origin beyond science, save by concatenation of idea; "for beyond observed facts and beyond more remote facts discovered by way of induction, and still more remote ones which are only approached by hypothesis, there still remain, and ever will remain, primordial facts in the presence of which hypothesis remains dumb and powerless." Citing the Darwinian hypothesis as the holdest on record, he states that it carries us back only to the spariation of the first Monad: not to his origin. The Monogenists incline to the belief that all human races were derived either from a single couple or a certain number of primitive men resembling each other; the Polygenists aver that, human types being only liable to slight modifications, the diversity actually existing among them must have arisen from the multiplicity of their origin. The modifications to which human types are liable is of itself an important subject, too lengthy to be more than passingly indicated. How far man is altered by centuries of exposure to climate, experience of different modes of life, mechanical mutilation, and deformation, is only to be seen by inspection of an immense amount of evidence. We have, on the part of permanence of type, the Egyptian sculpture showing Negroes, Jews, Greeks, Mongols, and Hindoos with the same characteristics these people present at the present day; and we have the still more astounding evidence of retention of type in the celebrated cranium of New Orleans, identical with that of the present Redskins, found in a bed beneath a series of cypress forests successively submerged by the alluvia of the Mississippi, indicating a period not less removed than 15,000 years; and again we have the case of the Gipsies who, under every condition of climate, preserve their type, presenting the same peculiarities in Persia and other Asiatic climes as they do round the snow-bound foot of Cheviot; as well as that of the Jews. On the other hand, there is the possibility that we ought to count by millions of years; when, perhaps, we might arrive at universal brotherhood. Language has scarcely less permanence of type than physical characters. The information it gives us concerning European races is to the effect that a primitive people prospering in a region to the north of Persia, established colonies and extended branches to the borders of the Ganges on the one side, and the shores of the Atlantic on the other, much in the same way as we have colonised the New World and Australia in these latter days. We quote our Parisian anthropologist:—"At the time when the Indo-European peoples first set foot in Europe, they did not find that region altogether deserted; it had been occupied before their arrival by an autochthonous population. There are still found, at the two extreme ends of Europe, the Basques and the Fins, whose languages are unquestionably derived from these autochthones, but elsewhere there remains, neither in the language nor in the traditions, any trace, any remembrance, of a people prior

to the arrival of the Indo-European, so that the existence of these primitive peoples might be doubted, if their crania had not been discovered in the turf-pits, in the graves of the Stone period, in the ossiferous caves, and in the diluvium. This decisive testimony supplies the silence of history." Hypotheses are often opposed to each other; and facts often accrue that destroy both. It is admitted, for instance, on the one hand, that civilization, with its regular subsistence and abundant alimentation, increases both the height and strength of man; while, on the other, it is contended that civilization, being unnatural, weakens the body, though it may improve the mind, and under its influence man becomes of less stature and diminished physical powers. The Græco-Latin people are shorter than the Germans, Scandinavians, and Slavonians, notwithstanding the latter were civilized long after them; and the Bas-Bretons are shorter than the Belgians, Normans, and Provençals, who were civilized long before them. Thus the variation of stature must be explained from further scrutiny; as, indeed, must that of complexion, cephalic differences, and aptitudes, all facts for which we are able to account but unsatisfactorily at the present time.

As further proof of the increased interest in the study of man, we may mention that anthropological tours are not now uncommon. Word arrives at the London and Parisian centres, frequently of journeys and finds of objects relating to the subject from the uttermost corners of the earth. Thus we hear of a human skull recently found in California, at a depth of 130 ft., in the plicose, that far outreaches the antiquity of the flint-makers of Abbeville and Amiens; of arrow-heads and other primitive weapons found in Peru in such relation to the bone of the mastodon as to imply that the animals had been slain by the hand of man; of rude objects of art, notably a wooden idol, found on the guano islands below the deposits of guano, which was so completely saturated with their salts as to have acquired the specific gravity of marble, &c.; and we are led to expect discoveries of value from the present journeys of well-known anthropologists on the Mosquito Coast and among the races south of the Zambesi.

When we remind our readers that the International Congress of Anthropology and Pre-Historic Archaeology will be held this year in this country, this slight indication of the channels of thought in which some of its members have been recently travelling may be found useful.

THE HONESTY OF MASONRY.

We have paid tribute, recently, to the majesty and magnificence of masonry; we have acknowledged its poetry; we have indicated its occasional association with magic; we now step a few paces nearer to examine its honesty.

On the sandy plains of Egypt we find an example that we will take for our first. In the huge plainness, sameness, and paucity of idea, as to everything except quantity and size, exhibited in the form and manner of the Pyramids, we may see masonry recording the fact that only one man, say, in ten thousand, possessed the power of mental creation when they were built. One mind, they tell us, conceived the idea of a monument for future ages to admire. Contemporary minds, at the rate, we have roughly hazarded, of one in ten thousand, had developed the pre-historic idea of setting up a stone as a testimony, into the obelisk; and the author of the design of the Pyramids, elaborating the idea still further, devised the huge monuments in question, preserving the monolithic sentiment, but bringing his vast resources in the way of labour and material to bear upon its extension. We must observe there was no division of artistic labour possible. The one man with creative faculty could not say to another, "Carve me two winged lions for this entrance," and to another, "Model me an embodiment of the Nile to place in the centre of the court;" he could only say to his ten thousand, literally, draughtmen, "Bring stones here of this size, and pile them up upon one another in this fashion." The masonry thus formed tells us this honestly.

Turn to Greece. Note the brown sward, the wood-clad mountains, the deep rocky gorges, the patches of hline and white water-lilies on the winding waters, the sweet soft breeze, the calm full blue sky, and then look at the monuments of ancient Greece. There they lie on the slopes' on the plains, overturned and neglected it is

true. But what do they not tell us of the incalculable honesty and the cultivated taste of those who built them? The gangs of men who dragged the stones of the Pyramids to their arid places could not have carved you capital, now lying on the ground like a white blossom from an acacia-tree,—could not have dreamt of you crowded frieze,—could not have read your inscription. These fragments of sculptured masonry tell us more, however, than the degree of intelligence and cultivation of those who fashioned them. Among the overturned columns, is there one that is marble without and an inferior stone within? Among the friezes, is there one of plaster when it purports to be stone? Among the inscriptions, is there one that is painted when it purports to be incised? Not one. These builders were honest artists, and dealt honestly with the world. Look at Rome. Look over the wan, fluted, modern bousetops, in the mean streets, at the mighty sky-vaunted Colosseum. Recognise the bold determination of nothing less than the firmament for the crown of the dome of the ringed Pantheon. Compare our puny "pillars" with Trajan's Column, 120 ft. high, composed of thirty-five blocks of marble, sculptured with 2,500 human figures, besides fortresses, bridges, horses, and other objects. Think of the other amphitheatres, temples, and columns, the triumphal arches, the basilicas, the forums, baths, aqueducts, tombs, and columbaria, and decide whether the masonry of ancient Rome does not grandly, unsurpassingly, and honestly represent the vigour, integrity, skill, and wealth of its great people. It gives back that which was given to it,—honesty. If the Romans built as Strawberry-hill was built, or as we are building much of London, their masonry could not have borne this testimony.

One more example of honest evidence in stones before we come to the corresponding necessity of honesty in modern workmanship,—our cathedrals. These tell us of artistic skill cultivated in different branches by great numbers of men. Reversing the position of one man deciding how thousands of men should accomplish his idea, these buildings testify that the principal undertaking them, or superintending them, divided the work into departments and portions, and distributed the latter to men who had especially devoted themselves to the description of labour allotted them. We cannot believe that the same band that formed the bold branching tracery of the windows, chiselled the lace-like canopies over some of the exquisite figures, any more than we can credit that the band that sculptured these transcendent figures was the same that placed the plain ashlar work close by or the paving stones below. It is clear that there were multiplicity and degrees of skill in the masonry work as it is that William the painter was not requested to perform the work of Johannes the smith, nor Gualterus the plumber to execute the task of Thomas the joiner. Thus masonry gives evidence according to the truth, for or against us, as the case may be.

Consider much of our modern masonry. Directly there occurs a gale of wind of extra force down come tumbling many of our chimney-stacks, like home-made aerolites, dealing death and destruction to all and everything sufficiently near to be affected by the catastrophe. Away go our slates, as though they were meant to come on and off as often as our bats. Occasionally, too, down comes a gable-end; and still more occasionally, fortunately, we have to record the fall of a house. Take a walk down a new street and look at the heads of the window-openings and count how many show traces of settlements. In the older of modern streets these cracks are filled up, and are therefore not perceptible, but they are there in far too many cases. A cracked house may be a very good substitute for a whole house; but why should we not have the latter? It was not in this frail manner that our Tudor, Jacobean, and Hanoverian brick mansions were erected; neither was it in this way that castles were built in the days of the Normans and Plantagenets. Here is a bricklayer at work on a piece of walling. Let us watch his mode of operation. He lays a line of bricks at the inner edge of the wall, and another at the outer one. This he repeats till there is a hollow recess some half-dozen bricks deep between the two surfaces of the wall. Into this recess he throws some broken brick-bats, and when these level it up to the outer edges, in a rough kind of way, he throws over all a few courses of really proper solid brickwork. Then he repeats the hollow cavity for a similar height; and finally com-

pletes the wall in these alternate courses. Is this honest? Is he not aiming at making the world believe his wall is solid and strong, when in reality it is hollow and weak? Is not this a deception made with bricks?

Here is a stonemason at work building a wall. Like the bricklayer, he is making his wall all glories without, but hollow within. As he goes on he throws loose rubble into the fissure between his two surfaces, and occasionally he pours a pail of grout into it as well. Where are the bond-stones? Either left out altogether, or put so far apart as to be of very little use. Is this honest? Ought not the rubble to be well packed together, and the grout poured in till it is on a precise level with the edges of the outer surfaces? Every contrivance or omission short of this is therefore dishonesty of workmanship.

All the arguments and ordinances applied to design may, with equal pertinence, be made use of with reference to workmanship. Everything should be what it aims at being thought; that is, nothing should pretend to be what it is not, in the way of workmanship as in design. There are few people now, we may presume, who would contend that it is right to build a cottage to look like a small castle, or a stable to look like a large studio. The same principle applies to the workmanship, which, to be honest, should be what it seems to be. A mason ought to be able to say at every turn of his hand, "I helped to build that piece of masonry, and the children of my great grandfathers will find it as sound as I leave it;" not, "Well, that's the easiest and cheapest way it is possible to do it, and I should think it will last my time, at any rate." We hear sometimes of master builders complaining that they cannot get walling properly executed; that the mason will even set an ordinary stone to stand out as though it was a bonding-stone, rather than lift the real bond into its place. This shows that the mason's apprentice must first be taught to take pride in the bonesty of his work. Then perhaps, as a man, he will practise it from choice. If not, he must be forced to do so by public taste and opinion.

Honest masonry has had its triumphs in the history of the world, as dishonest masonry has had its tragedies. Consider our Medieval remains; how many of them have been "peppered" with cannon-balls, fired, stripped, left open to the weather, cattle, and worse; and yet how few there are but in them some matchless indestructible piece of masonry still stands, as an awakening sample of the whole! If false construction sometimes leads to loss of life, a strong tower has likewise saved life. Masonry has, too, its legends and its literature. A volume would scarcely contain the beautiful things that have been said and written about true masonry,—not of the miserable workmanship we have decreed, but of the sort true men have reared as the best that it was possible for them to do, according to their gifts. The ancient poets, the Medieval poets, the modern poets, have all traced the sweetest pictures about masonry. The "columned town," with

"The high slant street, that lengthen'd on and on,
And up and up, until it touch'd the sun,"

and "the chief relics of almighty Rome" have been painted in cadences, as well as the more variegated graces of Medieval buildings.

"Castles shall be seen afar,
The works of the minds of giants
That are on this earth,"

sang an old Saxon poet, when he wished to prophesy there was a "good time coming," feeling, doubtless, somewhat of the power, endurance, beauty, and honesty of masonry; and there have been but few great poets since his dreamy prophetic eyes closed that have not left us exquisite building pieces. Sir Walter Scott, Byron, and Wordsworth must, however, have especial mention for their unsurpassing "bits" of masonry. They seem to have revelled in stonework. But from the hermitage to the cathedral, with its porch full of kings and saints, from the solitary watch-tower to the strength-proud castle, from the cottage near a wood, or otherwise, to the

"quaint old gable-ended house,
With oriel windows, diamond paned,
And rich oak panelings within,"

masonry has been identified by song. In like manner it has been seized and carressed by pictorial art. What does the most genial and rejoicing of painters make more of than a piece of lichen-kissed walling ripening like corn in the sun? It behoves us, then, to let our work be worthy of the appreciation that has been so bountifully awarded to that of our predecessors,

that, in due time, it may render back testimony of us that will not put us to shame. When King David thought to himself, "Solomon, my son, is young and tender, and the house that is to be builded for the Lord must be exceeding magnificent, of fame and glory throughout all countries, I will therefore now make preparation for it," the first thing he did was to "set masons to hew wrought stones."

HUMIDITY AND DECAY.

THE INSTITUTION OF CIVIL ENGINEERS.

ON May 12, the paper read on "The Durability of Materials," by Mr. Edwin Clark. The author expressed the opinion that a series of papers devoted, not so much to the special application of these philosophical principles which formed the basis of practice, as to the consideration of the principles themselves, would be of great interest; as numerous questions occurred which could be more effectually discussed in their abstract capacity, than in connexion with the practical applications of which they arose. Well-established fundamental principles had been arrived at on many subjects, which it was advisable should be definitely recorded.

The list of materials used by the engineer was small. It included stone and timber among natural productions, and bricks and cement and the metals among artificial products. It was difficult to state, even approximately, the positive life of either of these articles. The durability of any material depended, not only on its own inherent properties, but principally on the agencies to which it was exposed; as, for instance, the effects due to climate.

On examining all the facts, and seeking some common characteristic, it was found that among all the causes of decay, humidity held the first rank. The decaying influence of humidity was evidently dependent on other coincident circumstances. The mere pressure of water, or even of a saturated atmosphere, was not sufficient to induce rapid decay, which appeared to be caused by humidity only under peculiar conditions. One of these conditions was well known by the popular title of dampness. The decay caused by dampness, as in the case of dry-rot, was as effectually prevented by the presence of water as by a constant current of air, whether perfectly dry, or saturated to any degree of humidity. Damp, therefore, was not the mere presence of moisture in the ordinary form in which it was held in solution by the atmosphere. If a hygrometer were placed in a damp situation it would simply indicate perfect saturation; no evaporation took place, but the cotton covering of the wet bulb was speedily covered by a peculiar mould, well known by its fungus-like odour, and in a short time it was converted into an impalpable powder, or ash. Under similar circumstances, timber, leather, paper, and all like materials, underwent the same rapid decomposition; vegetable gums and oils, that were insoluble in water, and even dry hard paints and varnish, became soluble and liquid. Massive timbers were rapidly disintegrated to the core, entirely losing their weight, though still retaining their form; and they were often totally free from apparent moisture, although at times dotted externally by drops of brilliant water. Damp spots were, moreover, peculiarly hygrometric, indicating atmospheric changes with remarkable precision, and temporary desiccation in no way disturbed this process. The peculiar odour which always accompanied this condition was one of the best tests of its existence; and the expression that a room smelt damp was strictly correct. The effects were, within certain limits, intensified by increase of temperature and absence of light, and arrested by poisons destructive to vegetable life. If this phenomenon of decay were more closely examined, the process would be found to resemble, in many respects, a slow combustion. The ultimate results of combustion and decay were strikingly similar: the union with oxygen was slowly effected, and the residue was more or less diluted with foreign substances; but whether the bodies were burnt, or decayed, the remains in the ashes were substantially identical. Decay might thus, to a great extent, be looked upon as a decomposition, resulting from the slow chemical combination of oxygen with the matters decomposed. Now, if slow combustion were the cause of decay, and that particular state called dampness were so

important an accessory, the inquiry naturally suggested itself, what connexion existed between those agencies, or in what way could damp promote the absorption of oxygen? In the case of organic substances, the presence of vegetation in the form of fungus, or mould, was an invariable characteristic of decay, and the decomposing effect of all vegetable growth was beyond question. It might be said that the vegetable growth alluded to was the effect rather than the cause of decay. Doubtless the spores of microscopic fungi followed the law of all other seeds in vegetating only under the peculiar conditions of soil, light, and moisture which were adapted to their growth: dampness and partial darkness, absolute quietude, and even decay, might be essential to their existence; and therefore it was only under such conditions that they appeared at all. But, nevertheless, when they did appear, their presence rapidly accelerated the decay, and they furnished a vital medium, capable of accomplishing the observed effect—combustion, or slow union with oxygen, of the substances on which they thrive. It was probably by some such chemical vital action, the fact could be explained, that even the hardest rocks were rapidly decomposed by the growth of lichens, or that decay should be arrested by poisons which could exert no other influence than the prevention of vegetation. It was equally remarkable, that in the putrefaction, or rapid chemical decomposition, of animal and vegetable substances, the same profusion of the lower forms of animal, as well as vegetable, organisms characterized the phenomenon.

Whatever might be the cause of decay, moisture was an indispensable element. Dry air was incapable of decomposition. Water was a carrier of oxygen in a potent form; and it was only from water, and more especially when in the form of vapour, that the oxygen necessary for decay could be obtained. The durability of tin and iron roofs in Geneva and St. Petersburg was due to the absence of moisture; and the importance of some shelter for timber, and of thorough ventilation wherever it was employed in this moist climaté, was a necessary corollary.

TESSELLATED PAVEMENT, CANTERBURY.

A SHORT time since, in carrying out some extensive drainage works in this city, a fine specimen of Roman tessellated work was found in Burgate-street. It lay about 7 ft. below the surface of the present road; and, from the evidence of burnt materials immediately above it, it probably owed its preservation, through fifteen or sixteen centuries, to the fact that the fire which destroyed the dwelling of the Roman citizen, whether accidental, or designedly occasioned by the hands of barbarian invaders, had, by the falling in of the roof and walls, caused the preservation of the pavement, and secured it from all subsequent injury.

When first opened to view by the labourers' spade, the colours were particularly vivid. The internal and more elaborate portion was bordered by red tessera, within which was a rectangular border about 6 in. wide, having, in red and white, alternate diamond-shaped figures and right-angled designs. Within this was a thin border of black or dark purple layers of tile, about 1 in. wide, forming a second square. To this a smaller circle or border succeeded, the space between the two borders being ornamented with scroll-like designs of small tessera of red, yellow, white, and black. On a white ground, within this, on an oval field about 16 in. in diameter, was designed a two-handled goblet or vase. This object was evidently taken from some silver or metallic type, as it has no resemblance to any glass or earthen vessel of Roman workmanship; indeed, an attempt had evidently been made to show a metallic lustre or reflexion by the artist, in the manner in which he had designed a streak of white tiles on the surface of the goblet.

Its other component parts were red, yellow, and black tessera. The high arched handles were of black; the stand was also composed of black tessera. The square containing the central figure was 2 ft. 8 in. in width.

Stepping off this pavement about a foot lower down, lay a portion of another, of less elaborate design; the tiles being of white and black only, of a kind of lozenge pattern; it might have formed the entrance to a hall or part of the hypocaust of the Roman house. Some time

was spent in making further search, which was, however, much impeded by the neighbourhood of one of the main sewers of the city.

It is intended to restore and preserve this pavement for the Canterbury Museum, being the only relic almost, from the extensive drainage works now nearly completed, which has a chance of being obtained for the city.

Thanks are due to the Mayor of Canterbury for the readiness with which he seconded the exertions made to secure this ancient work, and also to Mr. G. W. Piddick and Mr. John Hall, surveyor of the city, for their personal exertions in rescuing and preserving these interesting remains of the Roman occupation of Canterbury.

JOHN BRENT, F.S.A.

SANITARY MATTERS.

Fever among the Irish in Southwark.—Mr. Edwards, inspector of nuisances to the St. George's District Board of Works, has appeared before the Police Magistrate for an order to remove several poor persons attacked with fever, from their lodgings in Brent's-court, High-street, to the workhouse (*pro forma* on their way to the Fever Hospital). Applicant stated that a few days before fever broke out in Brent's-court, which consists of a number of small houses, densely populated with Irish families, there being as many as six or seven persons in each room. About a week before one of them died in the Fever Hospital, and the relatives had the corpse brought back to No. 19, Brent's-court, for the "wake" to take place. It was kept there some days, and visited by scores of Irish, the result of which was an alarming spread of fever in the locality. Several were in a very bad state, and unless removed at once the calamity would be very serious. The order was granted.

The Epping Drainage Question.—A largely attended meeting of ratepayers interested in the new district, formed for sanitary purposes, has been held at Epping Police Station for the purpose of electing a committee, delegating certain powers to such committee, and electing an officer to act under the direction of the committee. After a long discussion a committee was appointed.

Witham Drainage and Water Supply.—A numerous attended meeting of ratepayers has been held at Witham, for the purpose of meeting Mr. Rawlinson, the Government engineer, who had been sent down by the Home Office to hold a semi-official inquiry on the important subjects of drainage and water supply. The plans of the Local Board had been inspected by Mr. Rawlinson, and reported upon by him to the Home Secretary. Mr. Rawlinson said the two plans under consideration would go before the General Board of Health, who would, probably, send them to him to report upon, and he should then go into the details, and send his report to the Home Secretary, who would, no doubt, forward a copy to Witham.

Malvern Link Sewage.—A report by the committee on this sewage was some time since presented at a public meeting, held in the Link Hotel. It stated that, until the local authority was clearly ascertained, it would be premature to take any action in the matter, and then the cost would come under consideration. The committee advised that prompt measures should be taken to divert the sewage which now flows from the lower sewer into Newland Brook (and which has given rise to Earl Beauchamp's actions), and that every precaution should be taken to prevent the streams from being polluted throughout the district. The committee regretted that Earl Beauchamp had not yet thought fit to accept an invitation of the ratepayers to nominate a gentleman to represent him on this committee. The committee offered the suggestions in their report for the consideration of their neighbours, in order that the question might be fully discussed and any plans fully matured before expenses were incurred, and in the hope that some united action might forthwith be taken, to save the neighbourhood from being involved in litigation with Earl Beauchamp.

Gloucester Waterworks: the New Works at Witcomb.—Minutes presented at a recent meeting of council showed that the waterworks committee had been busy examining and inquiring as to the sixteen tenders received for the construction of the new reservoir and the other works at Wit-

comb. The mayor remarked that they were doing their best to secure a contractor who would perform the work properly, and that he hoped shortly to be able to give some definite information on the point. Mr. Ward complained that people in the street could name the contractors, and knew all about the matter, while the members of the corporation were kept in ignorance. The Mayor answered that he did not know how the people got the names, for that he had given them to nobody; and Ald. Nicks observed, "I've tried everywhere to get the list of names with the amounts, and haven't succeeded till I got into this room this morning." The council then went into committee on the Witcomb matter.

PARIS.

WE mentioned about two years ago that there were, over a doorway in the Rue du Four Saint Germain, No. 63, and at No. 6, Rue aux Fèves, two bas-reliefs of stone of the sixteenth century, representing Susanna at the fountain; the houses have been now cleared away for the Rue de Rennes.

Some of the old sign-boards,—or, rather, engravings,—were very quaint, especially in this quarter; Rue des Canettes, a bas-relief in stone representing "annes" (wild ducks) swimming in a pond. Rue du Cherche-Midi, a person drawing a sun-dial, bas-relief. Rue de la Harpe, corner of the Place Saint Michel, King David singing and accompanying himself on the instrument after which this street was called. In the Rue du Dragon, No. 24, a furnished hotel took for a sign a remarkable dish, by Bernard de Palissy, representing the victory of Samson over the lion. Near there is a dragon sculptured over the entrance to the Passage du Dragon. This passage now leading from the Rue de Rennes to the Rue du Dragon is not doomed to destruction, and seems to date from the seventeenth century. In it is established a colony of blacksmiths and iron founders, particularly of stoves. In passing through we have often remarked park-gates and wrought balcony railings of excellent workmanship and design. Iron bedsteads are also manufactured there in great numbers.

The new Hôtel Dieu is appearing above ground level. Our readers are aware of the depth to which the foundations are carried, so as to insure a firm footing for the masonry, which is of the most massive character and well laid. The Palais de Justice is nearly completed. We have often remarked an excellently well sculptured arch over the Rue de Nazareth, which established a communication between the Hôtel des Comptes and the Gallery of Archives. The arch and the whole soffit rest upon eight consoles, four of which are ornamented with heads of satyrs, and the others with female heads, bearing each a crescent on the forehead. Panels and heads of angels fill up the spaces between the consoles. On the keystones of the arch on each side there are masks and laurel branches; on the spandrels, four small figures, holding palm branches. An attic story, with Ionic pilasters, was erected on this arch in the sixteenth century. A stone, on which is inscribed in Gothic characters, that one of the buildings of the ancient domain was erected in 1486, may be seen embedded in the wall of the grand staircase of the Palais of the Cour des Comptes, where they now reside. This was probably the date of the arch in question.

A very melancholy event took place a few days ago near Nantes. We all remember the little steam pleasure-boat which M. Ariol brought to the Paris Exhibition last year, and the many pleasant trips he gave to his friends between the Pont Royale and the Champ de Mars. The sad occurrence happened as follows. M. du Chalard, engineer-in-chief of the French navy; M. Marin, lieutenant de vaisseau, chief of the traffic of the port; and M. Ariol, were making experiments in the small steam-yacht when the boiler blew up, near Roche-Manrice. M. Du Chalard was killed and thrown into the water. The boat sank at once, leaving MM. Marin and Ariol to swim for their lives; fortunately they gained the river bank. The news spreading at once to Nantes, M. Broca, captain of the port, at once proceeded, with proper apparatus, to the rescue of the party. MM. Marin and Ariol being placed in safety, the boat was raised, also the engine, beside which the body of M. Du Chalard was found.

SCHOOLS OF ART.

The Gloucester and Stroud Schools.—The results of the examinations conducted by the committees of these schools in March last have been communicated to them by the Government Department of Science and Art. They are such as are extremely creditable to the schools. At Gloucester, of forty students who sat for examination thirty-one were successful. In freehand drawing, of twenty-eight who sat, twenty-three were successful; in model drawing, of eight who sat, seven were successful; in geometry, of five who sat, three were successful; but in perspective, of four who sat, only one was successful. At Stroud, of the thirty-five candidates who sat, twenty-two were successful. In freehand drawing, of twenty-five who sat, twenty-two were successful. In model drawing, of seventeen who sat, ten were successful; and in geometry, of five who sat, four were successful.

The Dorchester School.—The results of the first examination of students belonging to this institution, which took place at the Town-hall in December last, simultaneously with the other schools in connexion with the South Kensington Science and Art Department, have just been received by the hon. secretary, the Rev. B. L. Watson. Out of the forty candidates who entered for competition, nineteen have fulfilled the Government requirements in freehand drawing, and are entitled to receive certificates of merit. Of this number the specimens sent up by six of the pupils have been pronounced "excellent," or above par, which entitles the competitors to receive the awards offered in addition to the certificates. In geometrical drawing two have passed, and one in perspective, whilst in drawing from the model five have passed, one of whom, in addition, earns an award. Amongst the successful candidates it is satisfactory to find there are four artisans. The progress which has been made in this first year of the school's existence may be judged from the fact that many who have passed the examination never had a lesson in drawing until they came under Mr. Dewar Campbell's able instruction. At present the pupils are engaged in competing for local prizes, given for painting in water-colours and crayons, for pencil outline and mechanical drawing with instruments; and the prizes and certificates which have been won in connexion with the late general examinations will be distributed at a public meeting, which it is proposed to hold when the school re-opens after the vacation. There is still a deficiency of about 40l. in the amount originally proposed for carrying on the school.

The Oxford School.—The annual general meeting of this school was held in the school at the Randolph Galleries. The meeting was not very numerously attended. The report of the Managing Committee was laid before the meeting, and after some discussion it was adopted. Some of the classes have now as many pupils as can be conveniently accommodated. The committee hope to repeat the exhibition this year as soon after the long vacation as possible, when the results of this year's examination are made known. The balance-sheet presents the least satisfactory portion of the report; but it must be remembered that considerable expense was necessarily incurred in making the change of abode, and this at a time when the number of pupils and the sum paid in fees had from various causes sunk to a very low ebb. In the last quarter there were 197 pupils, and if this attendance can be kept up (and there is every reason to hope it will be increased), the fees paid, helped by a few subscriptions, will very soon be sufficient to clear off the debt.

AUSTRALIAN NEWS.

FROM MELBOURNE, VICTORIA.

The memorial stone of an asylum and school for the blind was laid in St. Kilda-road on the 25th of January. Messrs. Crouch & Wilson are the architects, and Mr. Thomas Newton the builder. The amount of the contract is 4,600l.; but, to complete the whole of the buildings according to the original design, the committee would have to enter into another contract to the extent of 1,500l., making the total cost of the buildings 6,100l. The edifice, which is already partly completed, is in the Italian style, and, when finished, will match with the Deaf and Dumb Asylum, Wesley College only being be-

tween the two institutions. The site comprises three acres granted by Government, and three-quarters of an acre adjoining, which the committee have purchased on account of its giving them a frontage to the St. Kilda-road. It was expected that the Duke of Edinburgh would have laid the memorial stone, but at the last moment it was discovered that he had not time to do so.

The centre of the building will be of three stories, with a tower in the middle rising to the height of 80 ft. The wings on each side of the centre will be two stories high. The frontage occupied will be 96 ft. The design on which it is being built was selected by the committee out of thirteen sent in for competition. The building will be capable of holding 100 pupils, besides furnishing quarters for the officers and teachers. In the centre portion in front will be the offices and committee-room, and behind these a large dining-room, workshops, &c. In each wing on the ground floor there is to be a school-room, 60 ft. long, 22 ft. wide, and 14 ft. high, one of which is intended for boys and the other for girls. The upper stories will be composed of dormitories for the boys and girls, lavatories, &c. The side wings can be extended 50 ft. on either side.

The City Council have adopted plans and specifications for the new cattle markets, and resolved to call for tenders for the execution of the works.

The city surveyor has been instructed to stop or remove all drains communicating with closets and cesspools and the public streets.

Messrs. Hughes & Simot are now erecting a new dock opposite the Australian Wharf. When the works are entirely completed, the dock will be capable of receiving the largest ship which can navigate the river. It will be 230 ft. in length, 44 ft. in width, and 12 ft. 6 in. in depth. When a vessel has been placed in the dock the caissons will be closed, and by a centrifugal pump the water will be pumped back into the river at the rate of between 5,000 and 6,000 gallons per minute. The pump is 20 in. in diameter, and is the largest of the kind ever erected in Australia. It is worked by a high-pressure horizontal engine, with a multitubular boiler.

We are glad to notice that the subject of preserving meat for export to England, of which we not long since spoke, is exciting attention at Melbourne, as well as Sydney. Papers on the subject have been read to an association in Melbourne, who are interesting themselves in the subject; and we observe that among samples of meat preserved in various forms exhibited at their meetings was spiced mutton, which we suggested while writing on the subject, and of which a committee of the association say it is "the safest and cheapest method of sending large quantities of mutton to Europe."

The influence of spices in preserving both animal and vegetable substances, is remarkable, and has not yet been thoroughly investigated. No doubt the ancient Egyptians well knew how to preserve their food as well as their mummies in a spicy form.

Within a day's journey of the metropolis of Victoria there grow the loftiest trees of Australia, and perhaps of the world. In the hick gullies of Dandenong, on the Black Spur, and near the sources of the La Trobe river, as well as in some of the remotest valleys of the Upper Yarra, a kind of eucalyptus, botanically known as *eucalyptus amygdalina*, attains such a marvellous height as to rival, at least in this respect, the Wellingtonia pines of California. The stems rise as straight as masts, but with a height far exceeding the masts of any naval structure. The height of the loftiest ranges from 400 to 500 ft. A fallen tree on the Black Spur measured 480 ft. in length. Another in Dandenong showed a height of 295 ft. to the first branch, the height then extending 70 ft. further in ramifications to the broken top branch, which here still measured 3 ft. across. A still larger tree at Berwick measured 81 ft. in circumference, at a distance of 4 ft. from the ground. The stems, with exception of the base, are beautifully smooth, and of an ashy colour. The wood is excellent for shingles, and splits with facility. Like many other eucalypti, this huge species grows with celerity, far more so than the Californian Wellingtonia, and the minute seeds germinate with the utmost facility. *Eucalyptus amygdalina* is restricted to Victoria, New South Wales, and Tasmania.

FROM LAUNCESTON, TASMANIA.

Although Tasmania, the old Van Diemen's Land, is divided from Australia by a strait of the sea, we may include it here under head of news from Australia.

The new Wesleyan church in Patterson-street, Launceston, of which the *Illustrated Australian News* gives an engraving, has been opened for worship. The site adjoins the old Centenary chapel. Messrs. Crouch & Wilson, of Melbourne, were the architects. The structure is of brick, on a stone foundation, measuring 52 ft. by 90 ft. within the walls, and is capable of seating over 700 persons. There is also a vestry and organ-loft at the rear, and a gallery capable of holding from 250 to 300 children across the front. Ample means of egress has been provided for the congregation by not less than six spacious doors. The lobbies and tower are all paved, and the floor of the church is laid with seasoned Tasmanian hardwood. The height of the walls at eaves is 21 ft. from the floor-line; the height of the mid-ceiling, 40 ft.; the height to the ridge being about 54 ft. from the ground. The roof is framed of Tasmanian blackwood. The covering of roofs is of slates with ornamental bands. The tower at the S. E. angle is 16 ft. square at base, 58 ft. high to the broach, and 132 ft. to the top of vane. The weatherings to buttresses, tracery, &c., of windows and other dressings are either of Hobart Town freestone or pressed cement.

The principal windows, front and rear, are fitted with stained glass, by Messrs. Ferguson & Urie, of Melbourne. It was intended to have framed the pulpit and seats of Tasmanian myrtle, a handsome wood taking a very high polish, but in consequence of difficulties Sydney cedar was used. The total cost of the whole works is nearly 7,000l.

FROM ADELAIDE, SOUTH AUSTRALIA.

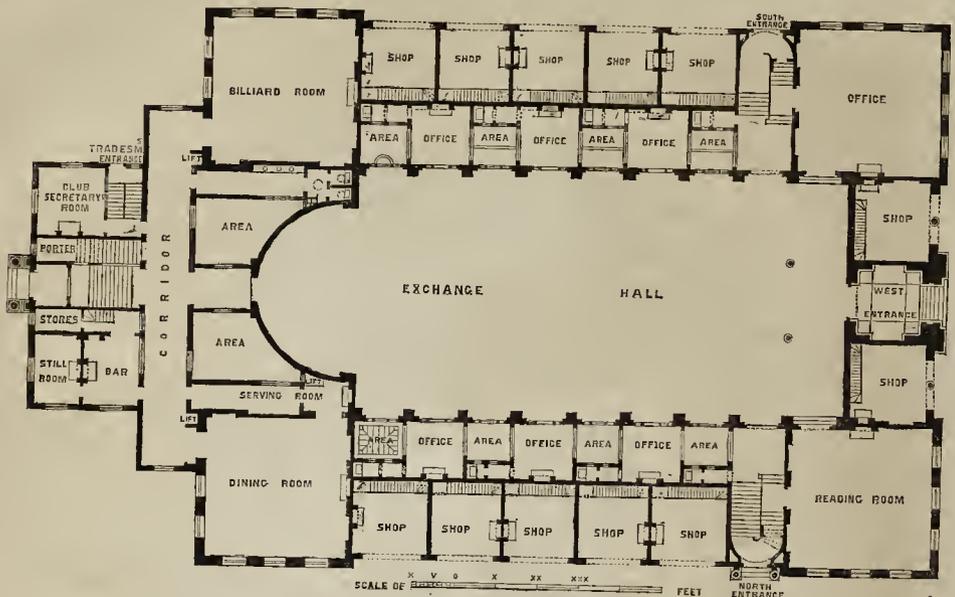
The new General Post-office walls are now some 4 ft. out of the ground, and the works are proceeding rapidly in the hands of the contractors, Messrs. Brown & Thompson. On the completion of the greater portion of the foundations, the superintendance of the works was transferred to the Public Works Office. A fulfilment of the original design was at the same time directed, the clerk's residence and the new telegraph office being left for a future period, and the whole building reduced in height. The Post-office will be one of the handsomest of the public buildings, and the stone-facing used is the finest yet quarried in South Australia. The foundation-stone of the Victoria Tower which forms the south-western corner of the structure was laid by the Duke of Edinburgh.

The new Local and Insolvent Courts, on the south side of Victoria-square are approaching completion, and the east-side fronts are now partially cleared of scaffolding. The style of the building is of Anglo-Italian character, and it has frontages both to Victoria-square and King William-street. The plans were prepared in the Colonial Architect's office, and the works have been so far carried out by Messrs. Brown & Thompson, of this city. The total cost will be about 13,600l.

The adjoining building—the new police-court and station—has been completed for some months, and is in daily use. The court-room is lofty, commodious, and of good acoustic properties. The adjoining offices for the commissioner and the inspector's residence, it is said, meet all that is required. The work has been carried out by Messrs. Crocker & Lawson, the contractors. The requisite cells, &c., have also been added, at a cost of between 700l. and 800l.

The only other Government building of any magnitude completed during the past year is the new Government printing-office, erected under the supervision of the Colonial Architect, Mr. R. G. Thomas. It fronts the road leading to North Adelaide and near the Parliament House. It is a large building of three floors, constructed of Glen Osmond stone, with dressings partly of freestone and partly of cement. The style is Romanesque, and the four elevations are of bold character, presenting a good appearance in the prominent position the structure occupies. The interior is simply a warehouse, and can be fitted up in any manner required for the use of the office. The building was carried out by Messrs. Brown & Thompson for 4,800l.

A new drill-shed and parade-ground have been constructed opposite the police-barracks at North-terrace. The drill-shed is constructed of galvanised iron, and was used temporarily



EXCHANGE AND CLUB BUILDINGS, MIDDLESBROUGH-ON-TEES.—Plan.

as stables for H.R.H. the Duke of Edinburgh's horses during his visit to this province.

The Exhibition building, on the park lands, was much enlarged and raised in height for the purpose of holding the Great Exhibition, opened by the Duke, and forms now about the largest room in the Australian colonies. The works of enlargement were planned and carried out in a month by Messrs. Brown & Thompson, under the direction of the officers of the Colonial Architect's department.

At the Lunatic Asylum the increase of inmates necessitated some additions, pending the completion of the new asylum. Extra men's and women's wards have accordingly been erected.

The east wing to the Adelaide Hospital has just been completed, being a counterpart to that on the west, containing four wards, two on the first and two on the second floor, with a large hall for convalescent patients, besides the requisite surgeons' rooms and other adjuncts. The contractor was Mr. McMullen.

During the past year there has been commenced and completed a building to be used for the purpose of Turkish baths. It is from designs by Mr. James Macgeorge, and is to form part of a general plan, by which it is intended eventually to do away with the old building, at the rear of which it has been erected. The walls are of Glen Osmond stone, blue-pointed, and the quoins and strings are in brick. The entrance door and coupled windows are arched in the Moorish style in ornamental brick, and this being supported by the style of internal decoration reminds the visitor of the Oriental derivation of the bath. The frigidarium, or cooling room, is 30 ft. long, 23 ft. wide, and 21 ft. high, from which there is an entrance to the lavatorium, also provided with a lobby and doors, to exclude draughts of cold air from the penetralia of the bath. This apartment is of the same loftiness as the frigidarium, 28 ft. long and 12 ft. wide, and next to it is the tepidarium, 25 ft. long and 16 ft. wide, adjoining which is the callidarium, the two latter being heated by means of a boiler. The floors of the hot rooms throughout are composed of cement trowelled smooth, and lined into ornamental patterns; the walls are also lined into diamonds, which it is intended to ornament with coloured stencilling, and the Moorish arch is used throughout for internal window and door openings. The builder is Mr. William Pink.

FROM SYDNEY, NEW SOUTH WALES.

Botany Bay was a fitting sphere for the atrocious Fenian who shot Prince Alfred in the back. When insane scoundrels had a penchant for firing at her Majesty, the passing of the Lash Law put a stop to it like magic. An immediate and liberal extension of this law to Fenians would, no doubt, have the same salutary influence as it has already had in that case and on garotters. Mr. Disraeli, inconsiderately we think, placed the Fenian Thugs on a level with the had eminence of the Vengerichters, but the insensate wretches called Fenians have not even the merit of murdering only those who oppose or punish them: the innocent, whether men, women, or children, are their victims, as those of the utterly insane so generally are.

The Sydney people, notwithstanding the few O'Farrells amongst them, were most loyal, and vied with the other Australian colonies in their triumphal arches and other modes of manifesting their good feeling. At the Prince's landing-place, near the Custom House, a triumphal arch was erected under the superintendence of the colonial architect. It consisted of one grand central opening of a depth of 30 ft., and 25 ft. wide, with wing openings 11 ft. wide, capped with three gold-painted domes on pediments, with crown pediments; the central dome rising 79 ft., and the wing domes 40 ft. each, with flagstaffs. The structure was ornamented in various ways, and the central dome, with 12 openings for illuminating the Prince's name, was surmounted by the Royal Standard.

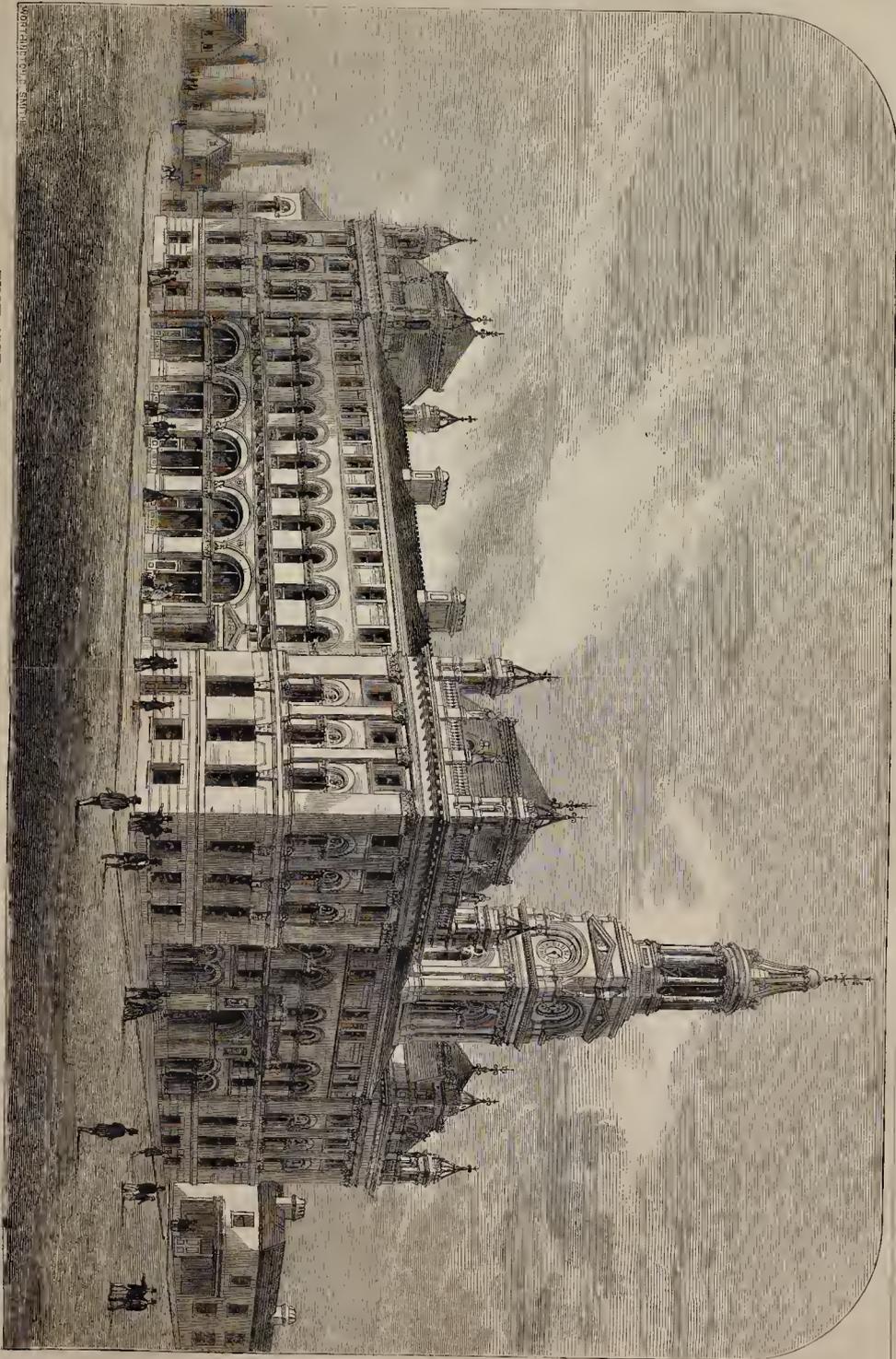
EXCHANGE AND CLUB BUILDINGS, MIDDLESBROUGH.

The new Exchange and Club Buildings at Middlesbrough-on-Tees, of which we give a view and plan, are now fast approaching completion. They are being erected by a limited company upon their freehold land. Mr. Charles J. Adams, of Stockton-on-Tees, is their architect, and Mr. Jones secretary. The site is close to the railway station, and is surrounded by streets. Designs for this building were sent in competition, January, 1865, and those now carried out were selected. The contract for the principal portion of the works was let to Mr. Bellerby, of York; the iron-work to Messrs. Head, Wrightson, & Co., South Stockton.

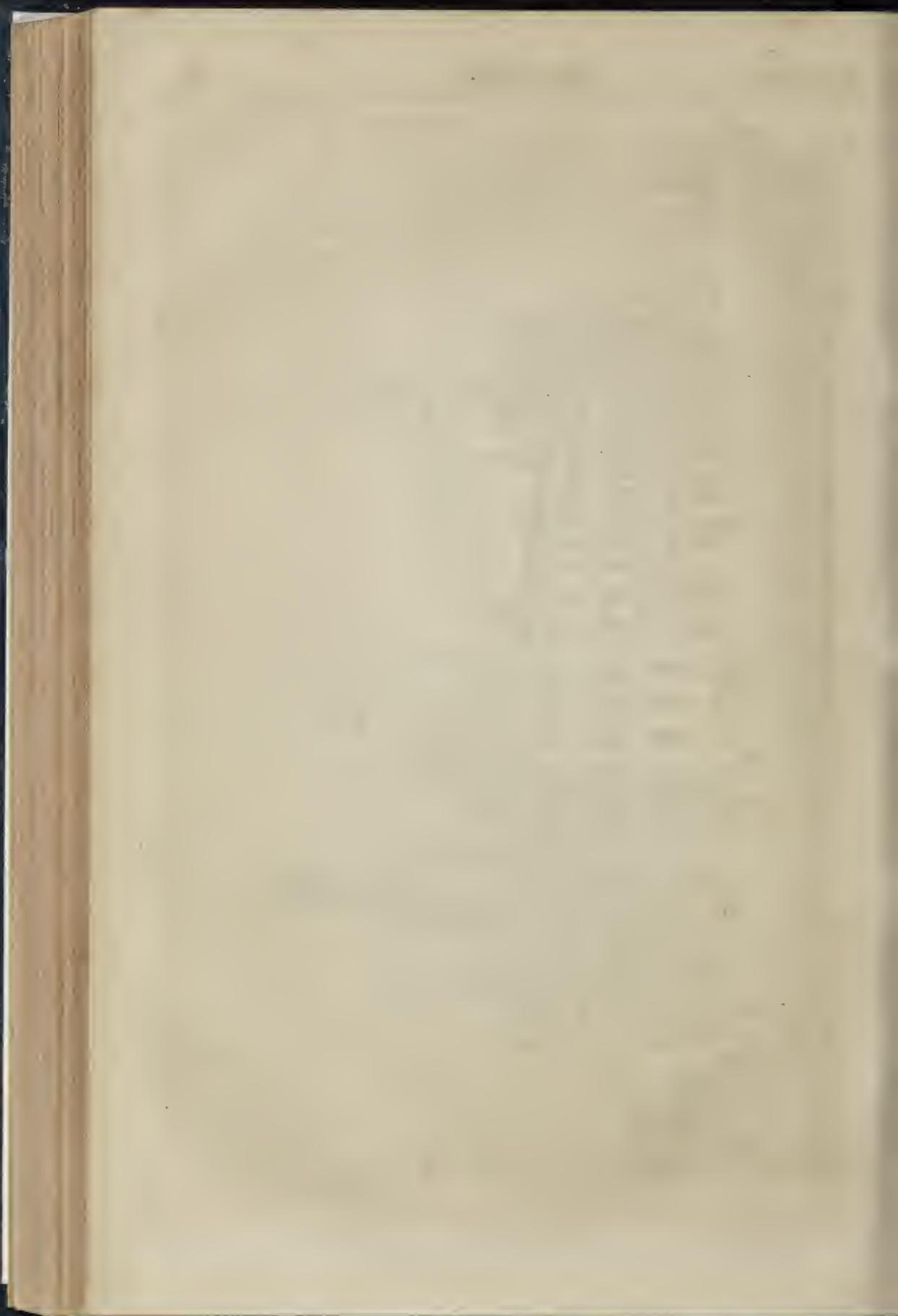
The general arrangement of the buildings comprises in the ground-floor, exchange-hall, about 120 ft. by 60 ft., with a semi-circular end, 20 ft. deep. The hall has offices on each side, and is approached by large entrances from the north and south fronts, and also by west front under tower. On the outside, towards the above street, shops have been constructed, with a mezzanine story above them, to be used as show-rooms. The club buildings are situated at the east end of the building, and comprise the rooms shown upon the plan. The first, second, and third stories are devoted to the purposes of the club. The upper stories over the shops all around the exchange-hall are planned out in offices; the whole of which have been for some time past let at high rentals. It is estimated that the cost of the works will amount to about 30,000l.

The several elevations are being executed in red pressed bricks, stone, and terra cotta, which is being manufactured by Messrs. Blanchard, of London. The buildings will be warmed and ventilated by Lewis & Adams's (air) patent. The carving is being executed by Mr. Borrowdale, of Darlington, under the architect's directions, Mr. Sturday acting as clerk of works. We shall give a view of the interior of the hall on another occasion.

The offices are almost exclusively taken by firms connected with the iron trade of the Cleveland district, and, with one or two exceptions, all the iron-making firms will be represented in the building. It is proposed to connect the Exchange with the several works by private telegraph lines. The iron trade of Cleveland has been vastly increased and developed during the last few years. Last year, 1867, the production of pig-iron was estimated at 1,147,000 tons; or more, we believe, than any iron-producing district in Great Britain. The district also contains extensive rolling-mills for rails, plates, shipbuilding and general merchant iron, foundries, engineering establishments, shipbuilding yards, hot and nat works; and is calculated to become, before long, one of the most important industrial centres in the country. Hence the necessity for such a building as the new Exchange is apparent, and it has been designed on a scale likely to prove suitable to the wants of the locality for a long time to come. The weekly iron market now held in the Middlesbrough town-hall, will be transferred to the Exchange when it is completed.



EXCHANGE AND CLUB BUILDINGS, MIDDLEBOROUGH-ON-TERRIS.—MR. CHARLES J. ADAMS, ARCHITECT.



MR. WHITWORTH'S SCHOLARSHIPS.

A PAPER has been issued containing documents additional to those already published respecting Mr. Whitworth's scholarships for promoting mechanical science. The first is a minute by the Committee of Council on Education, in which reference is made to a letter and memorandum from Mr. Whitworth. Their lordships state that they have great pleasure in acceding to the request made by Mr. Whitworth that the Science and Art Department may conduct the necessary examinations and correspondence. Their lordships will also give every assistance in their power to secure the success of the scheme which Mr. Whitworth supports with such patriotic munificence. The second and third documents are the letter and the memorandum referred to in the minute. There are two important paragraphs in the letter. The first suggests, for the consideration of the Committee of Council on Education, whether honours in the nature of degrees might not be conferred by some competent authority on successful students each year, thus creating a faculty of industry analogous to the existing faculties of Divinity, Law, and Medicine. Mr. Whitworth is of opinion that such honours would be a great incentive to exertion, and would tend in a considerable degree to promote the object he has in view. In the other paragraph referred to, the writer expresses a hope that the Government will provide the necessary funds for endowing a sufficient number of professors of mechanics throughout the United Kingdom. In the memorandum accompanying the letter Mr. Whitworth describes the general arrangements of the first competition for the scholarships, which he proposes should take place in May, 1869. These arrangements have been so devised that, while requiring a practical acquaintance with a few simple tools as a *sine qua non*, they shall render the competition accessible on perfectly equal terms to the student who combines some practice with his theory, and to the artisan who combines some theoretical knowledge with perfection of workmanship. As the scholarships scheme can only come into full operation by degrees, Mr. Whitworth proposes to create at once, from the fund ultimately available for the scheme, sixty exhibitions or premiums, of the value of 25*l.* each, tenable until April, 1869, and to place them at the absolute disposal of the governing bodies of several educational institutions and towns which he names, in order that they may award them to youths under twenty-two years of age, who may be thus aided to qualify themselves, and must undertake to compete for the scholarships of 100*l.* in May, 1869.

Mr. H. Cole, we observe, has written to the local authorities of various towns, inclosing the minute of Council, and announcing the distribution of thirty scholarships at 100*l.* each, and sixty exhibitions of 25*l.* each, to the respective towns.

NORTHERN ARCHITECTURAL ASSOCIATION.

An ordinary meeting of the members of the Northern Architectural Association was held on Wednesday, the 13th inst., at the Old Castle, Newcastle, Mr. R. J. Johnson presiding. The chairman, Mr. T. Oliver, and Mr. F. Charlton, were appointed delegates to the Architectural Alliance Meeting, to be held in London on the 28th inst. Messrs. W. H. Hoskins, Darlington, J. B. Tilby, Sunderland, and George Connell, Newcastle, were elected associates. The secretary drew attention to the question of concrete houses, as a subject that was attracting attention, and a discussion ensued on the aesthetic and constructional qualities of concrete.

BRITISH ARCHAEOLOGICAL ASSOCIATION.

At the annual general meeting on Wednesday, May 13th, Lord Houghton, vice-president, in the chair, the annual report was read, together with the balance-sheet, by which it appeared that on December 31st, 1867, the balance in hand was 367*l.* 15*s.* 10*d.* after paying all liabilities. There were twenty-seven members elected within the year, and twenty had been lost by death and retirement. Of the former, Mr. Nathaniel Gould, F.S.A., was mentioned as having been one of the

original members, and whose loss was deplored by all.

An alteration in the bye-laws was recommended by the Council, and was adopted. Its effect is to place all past presidents *ex officio* in the list of vice-presidents.

The following were elected officers for the ensuing year:—

President: The Earl Bathurst. Vice-presidents: The Earl of Eillingham; Sir J. Gardner Wilkinson, D.C.L., F.R.S.; H. Syer Cuming, F.S.A. Scotland; John Evans, F.R.S., F.S.A.; George Godwin, F.R.S., F.S.A.; Joseph Mayer, F.S.A.; J. R. Planché, *Somerset Herald*; Rev. Prebendary Scarth, M.A.; Rev. W. S. Simpson, M.A.; F.S.A.; Thomas Wright, M.A., F.S.A. Treasurer; Gordon M. Hills. Secretaries: E. Leven, M.A., F.S.A.; E. Roberts, F.S.A. Secretary for Foreign Correspondence: Thomas Wright, M.A., F.S.A. Palmographer; Clarence Hopper. Curator and Librarian: George R. Wright, F.S.A. Draughtsman: G. F. Teniswood. Council: G. G. Adams; G. Ads; W. E. Allen; T. Blashill; H. H. Burrell, F.S.A.; Josiah Cato; J. Copland, M.D., F.R.S.; A. Goldsmid, F.S.A.; J. W. Grover; J. G. Halliwell, F.R.S., F.S.A.; H. P. Holt; G. V. Irving, F.S.A. Scotland; W. C. Marshall, R.A.; Rev. S. M. Mayhew, F.S.A.; R. N. Phillips, F.S.A.; J. W. Previtte; Cecil Brent, F.S.A. Auditors: C. H. Luxmore, F.S.A.; George Patrick.

The Congress is fixed for the first week in August, at Cirencester. Thanks having been given to the officers of the past year, and to the chairman for his conduct in the chair, the meeting adjourned.

MANCHESTER ARCHITECTURAL ASSOCIATION.

The concluding meeting of the session was held on Tuesday evening, May 5th, when the following gentlemen were elected office-bearers for the ensuing year:—

President, Mr. Isaac Blackwell; Vice-President, Charles Clay, M.D.; Hon. Secretary, Alfred Darbyshire; Council, Messrs. Booth, Redford, Battyne, and Ward.

The following gentlemen were elected delegates to the forthcoming Alliance meeting:—

Mr. Booth, Mr. Darbyshire, and Mr. Alley, jun.

A paper, entitled "A Walk through the City of Glasgow," was read by Mr. P. B. Alley, jun., illustrated by numerous sketches. A conversation ensued.

ELY CATHEDRAL.

At a recent meeting of the Cambridge Architectural Society, a communication was read from the Dean of Ely on the "repairs now in progress to the buttresses on the south side of the choir at the cathedral."

About two years ago, his lordship said, cracks were observed in the groining of the choir, and careful examination was made by Mr. Scott and his assistant, Mr. Burlison, as to the cause of the same. The result showed conclusively that the defect was at the foundation, and that some slight settlement of the buttresses had manifested itself in the manner described. It has accordingly been resolved by the Dean and Chapter to make the whole system of buttress support from foundation to roof sound if possible. This involves necessarily two works, first, the underpinning of the buttresses at the foundation; secondly, the restoration of the flying buttresses above, some of which are crippled. We began by an elaborate shoring of the buttresses which most in fault. On examining the foundation we found the wall very defective. The buttress rested indeed upon the solid rock, which was right; but the masonry, if masonry it can be called, between the rock and the ground level, was of the most unsatisfactory kind, consisting of little more than rubble with not very good cement mixed up with it. We have cleared away all the old weak foundation, and have replaced it with large slabs of Yorkshire stone, which take a wider footing upon the rock, and are also incapable of crushing or giving. The first of these operations is nearly accomplished; I mean that one buttress is nearly underpinned. Our next step will be to rebuild the flying buttresses which, as I have stated, are crippled. I think we shall probably introduce some iron ties, and make some other minor improvements. The buttresses of the Early English portion of the choir have evidently been troublesome for centuries. The architect has not made them quite so wide as was desirable, and as I now find he was not sufficiently careful about the strength of his foundations. Alan de Walsingham managed his work better,

and there is no appearance of weakness in his work. The reason why the cracks manifested themselves at the time at which they did so appears to me to be found in the fact of an exceptionally dry summer, which had probably had an injurious effect upon the imperfect foundations of the buttresses.

THE ARCHITECTURAL RELICS OF INDIA.

It has been resolved by the Government of India to require the insertion, in every annual Administration Report, of a separate chapter on the Archaeology of India, under which heading the local Governments and Administration are requested to notice the condition of works of art. Petty repairs and measures for the preservation of structures are also to be dealt with by the local Governments; operations on any large scale to be referred for consideration to the Department of Public Works. Casts and photographs of the most important works of ancient architecture in India are to be taken. Men are to be instructed in the art, or modellers engaged. They will take complete sets of models of large buildings. A party of ten or twelve, for example, may be employed upon such a building as the Sanchi Tope, to make casts of all that it may be deemed desirable to reproduce. Each party will be placed under the immediate superintendence of some intelligent subordinate of the Public Works Department, to be resident on the spot, and seeing to the carrying out of the orders of the superintending officer. The moulds or casts will be transmitted to the headquarters of the general superintendant, and from these the requisite number of casts will be prepared and sent to Europe. The subordinate will also take accurate plans and measurements of buildings, and photographers will take views indicated by the superintending officers. Written descriptions will be obtained from competent persons for publication in England, with illustrations from the plans and photographs of details taken from the casts. One or two of such memoirs for each party during the year, it is thought, will suffice for the present. Four working parties will be appointed, one in Madras, one in Bombay, one for Lower Bengal and Behar, and another for the North-Western and Central Provinces, at a cost for all of Rs. 52,000 per annum.

It is suggested, according to the *Bombay Builder*, that the local Governments might allow the experiment to be carried on at first under the charge of the principals of the schools of art and design at the Presidencies. The name of Lieut. Cole, R.E., is suggested for the North-Western Provinces.

Gypsum or plaster of Paris is said to exist in various parts of India; so that it might not require, as heretofore, to be imported from Europe.

POLLUTION OF RIVERS COMMISSION.

The new Commissioners have met at Liverpool in the Council-chamber of the Town-hall, for the purpose of making arrangements for the preliminary inspection of the basin of the Mersey, which was broken off by the resignation of Mr. Rawlinson. The new commissioners are Sir William Denison, K.C.B., R.E.; Dr. Edward Frankland, F.R.S.; and Mr. John Chalmers Morton; Mr. S. J. Smith being their secretary. The mayor, several members of the council, the medical officer of health, and other officials were present.

Sir W. Denison stated briefly the course the commissioners intended to take. They would prefer, he said, to receive information in writing. They were too apt, if they began to examine a person, to cross-examine him with regard to their own opinions, and to try to draw from him admissions which would serve to support foregone conclusions in the minds of the commissioners. Therefore their object was to get as much written information as they could from persons who were qualified to give it; and then, when they had carefully collated it, they would come down again into the district and examine evidence with reference to those particular matters, and so they proposed to get as clear and definite opinions as possible, not only with reference to the causes of the impurities, but the best mode of getting rid of them and doing as little injury as possible to the industry of the

district, having regard to the character of the evils which arose from the pollution of the water. The new commissioners next inspected the Liverpool sewerage system; and next day, accompanied by the principal officials of the corporation, they inspected the eight sewer outlets into the Mersey. They also inspected the manure wharfs, and some of the most crowded and poorest districts of the town, paying special attention to the water-closet revolution in progress. The commissioners will resume their investigation on an early day. They made, meanwhile, a similar inspection of the sewerage system at Birkenhead. They will next visit Manchester, and then Warrington, and other places.

MONUMENTAL.

A FULL-LENGTH statue of the late Sir Peter Fairbairn, mayor of Leeds in 1857-8, and the father of the present mayor, has been displayed in that town. The statue, which was obtained by a voluntary subscription, is the work of Mr. Nohle, the sculptor. It has been erected on a suitable site in Caledonian-road, not very far from the Town-hall, in a westerly direction. The statue, which is in bronze, mounted on a polished granite pedestal, has cost 1,000l.

A wish having been expressed by several influential persons connected with the Ward of Bishopsgate that some permanent memorial should be raised in that locality to record the general respect and esteem for the late Alderman William Taylor Copeland, it has been suggested that the west window of St. Helen's Church, lately restored—to which the late alderman had recently contributed—should be filled with an appropriate subject in stained glass, to accord with the east window. A committee is being formed in order to take such steps as may be deemed advisable to carry the proposition into effect.

About a year ago the executive committee of the New York Shakspeare Monument Fund selected a design out of several models which had been submitted to them. It was then, however, in an unfinished condition, but is now completed. The statue of Shakspeare is expected to be finished and erected in Central Park (upon the foundation where its corner-stone was laid with appropriate ceremonies four years since), on the 23rd day of April, 1869, which will be the 305th anniversary of Shakspeare's birth.

VOTES IN SUPPLY FOR PUBLIC BUILDINGS.

UPON the vote of 25,000l. being taken for new wings to Burlington House, Mr. Monk asked if the blank wall in front was to be removed; but no direct reply appears to have been given to this question. Mr. C. Bentinck suggested that the architects should be requested to improve the plans for the new buildings, and that the gateway might be preserved and set up elsewhere. Mr. Cowper thought Burlington House should be superseded by a new building altogether, and Mr. Layard and others seemed to be much of the same opinion. Lord J. Manners said in reply that nothing was asked for alterations of Burlington House proper, and that the Royal Academy had already executed their part of the contract. The vote was agreed to.

On the vote of 22,000l. being taken towards the expense of erecting the building for the University of London, Mr. Layard asked if Vigo-street would be opened for carriage traffic, and Lord J. Manners replied that all street improvements had been handed over to the local authorities. Mr. Cowper said Vigo-street was so narrow that its opening was of small importance; and Lord J. Manners said access to the Royal Academy and the learned societies would be obtained from Piccadilly. The London University had made no application for additional means of access.

On the vote of 108,000l. for the purchase of a site for the new Courts of Justice, the Chancellor of the Exchequer said, in reply to questions, that the Treasury had had doubts whether the decision of the judges as to the design that should be selected was to be considered a final award, and the matter was referred to the Attorney-General, before whom all parties had power to appear. The Attorney-General had given his opinion within the last day or two, but he (the Chancellor of the Exchequer) had

not seen it. When it reached him it should be communicated to the House. As to whether a new story was to be added to Burlington House, Lord J. Manners said there had been no alterations in the plans exhibited last year, which included the erection of an additional story.

In a brief discussion previously to the House going into committee, Mr. Alderman Lawrence drew attention to the narrow and insufficient approaches to the site; and Mr. M. Chambers commented severely upon the treatment which the competing architects had received from the commission, and urged that the site was ill-chosen and too limited, and that the new building had better be erected on the Thames Embankment.

On the vote of 44,000l. for the site of the enlargement of the National Gallery, Lord J. Manners said, in reply to questions, that the ground for a portion of the site was not yet in the possession of the Government, and until it was it would not be advisable for the Government to hurry on the selection of an architect, especially after what occurred last year. Two years ago came to an untimely end, and in both cases the Government found themselves in a difficult position. He thought that he would best discharge his duty by giving no positive answer as to the intentions of the Government on the subject.

On the vote of 47,936l. for the new buildings in and about the Houses of Parliament, a desultory and grumbling discussion took place on various subjects connected with the Houses of Parliament, and Mr. B. Osborne said instead of Messrs. Pugin and Barry quarrelling over who was the real architect of the building, the wonder was they did not put the matter aside, or seek to throw upon the ancestor of each other the odium of having constructed a building in which there was not a single useful or comfortable room. The transfer of the stables of kings to Westminster Hall was disapproved of by Sir G. Bowyer as being out of place because they were dressed in the style of the George III. era, and not in the Gothic style; and Mr. Locke retorted that upon that principle the members were out of place till they also were dressed in the style of Richard II.'s reign.

On the vote of 25,000l. purchase of land for the New Palace at Westminster and the embankment of the Thames, Sir C. O'Loughlin said he hoped the noble lord would lose no time in securing the land, as it was at present covered with hay and straw yards, to the great danger (from fire) of the Houses of Parliament. Perhaps St. Margaret's Church, which interfered with the appearance of Westminster Abbey, might be removed there. Lord J. Manners said that a recommendation to that effect had been lodged with the commissioners. The votes were all agreed to.

LAMPLIGHTING BY CLOCKWORK.

AN ingenious apparatus for turning on and off the gas in street or other gas lamps was described by Mr. Stephen Tucker in a paper read at the Society of Arts on the 13th of May. On the various methods of lighting streets by gas, with proposals for the introduction of an improved system." The apparatus, said Mr. Tucker, aims at three objects of improvement—to abolish the genus lamplighter, to simultaneously light and extinguish the lamps, and to economise gas.

The Letters Patent (No. 2,435) of Mr. Walter Thurgar (who is not professionally connected with gas-engineering, but is a surgeon, at Norwich), sealed the 25th of February last, are for "Improvements in Apparatus for Regulating the Supply of Gas to Burners." The basis of this invention is the American clock. The central spindle of an eight-day clock revolves once an hour, and has two arms inserted to gear with 48 teeth on an independent plate, which therefore makes its revolution in 24 hours. Of these 48 teeth half are inserted on the upper and half on the under surface of the plate, and so have more liberty to hear upon the arms of the spindle. This independent plate has 96 cogs in its circumference, and its retrogression is thus prevented every quarter of an hour by a small spring-stop, to avoid strain on the mainspring. In this 96-cogged plate is inserted a spindle, connected with the outer or dial-plate, which has two arms, one fixed, one movable. This movable or adjusting arm is for regulating the

hour at which the gas should be lighted or put out, according to the time of year. The dial-plate, of course, revolves also once in twenty-four hours, and at the proper time the arm presses one side of the double cam fixed to the tap in the vertical gas-pipe. On each side of the tap, a small groove, through which, when the light is turned off, sufficient gas escapes to supply a small blue flame, which continues—though invisible—during the day-time. The cam being pressed turns the tap, and reduces the light to this blue flame; and on the other arm coming round and in contact with the cam, it lowers the guard, turns on the gas at full, and in effect lights the lamp. The guard (the sole object of which is to protect and hide the small daylight flame) has perforations for air at its bottom, and is connected by a tube with the plate on which the loops of the cam act.

One of these patent apparatus has been tried by Lord John Manners's orders in an outer passage of Somerset House; and another by order of the Master of the Mint, Professor Graham, over the porter's lodge at the Mint. These seem to have required amendment, as they were not strictly regular in the time of illumination. Some obvious objections to the practical and dependable use of the invention in street-lighting were started in the discussion which followed the reading of the paper.

"CURIOSITIES OF ART."

SIR,—If you wish another article on this subject, pray note No. 267 (in the Royal Academy Exhibition), "Mater Parisina," and 284, "Mater Dolorosa." The artist has represented them both of about the same age. Nearly twenty-seven years must have elapsed between the two events. They illustrate twenty-seven years from maturity,—make a woman, in Oriental countries, quite old,—indeed, as old as a woman in England would appear at sixty. C. H.

LECTURES ON SCIENCE AND INDUSTRY.

SIR,—The "Workmen's Technical Education Committee," appointed at a conference held at the rooms of the Society of Arts, under the presidency of the Earl of Lichfield, in March last, have made arrangements for the delivery of a course of popular lectures by eminent scientific men, for the purpose of illustrating the connection between progress in scientific knowledge and the prosperity of the national industry. The lectures will take place twice a-week, at the Mechanics' Institute in Southampton Buildings, and will commence with a lecture, on Tuesday evening next, by Professor R. Kerr, on "Technical Education for the Workman from an Architect's Point of View." Dr. W. B. Carpenter, Dr. Lankester, Professor Warrington Smyth, and the other eminent men secured, will give their valuable services gratuitously. There will be two courses of four lectures each; the charge for each course being sixpence, and for admission to a single lecture threepence. As we are most anxious that the London artisans should be made fully aware of these important series of lectures, we shall be greatly obliged by the insertion of this letter.

HODGSON PEARCE, Chairman.
THOMAS PATTERSON, Hon. Sec.

A QUESTION IN RESTORATION.

SIR,—Conservation in architecture is so thoroughly ignored in some instances, and in others carried to such a ridiculous extent, that I should like to elicit a decided expression of opinion upon one point, especially at the present time, for my own guidance; I hope, also, for the guidance of many others who are connected with church restorations.

I will premise that I am employed to restore a church, and that I find the north aisle a perfect specimen of Thirteenth-century Gothic, the windows being rich in geometrical tracery, and the hall tower used profusely as a decoration; but I find two exceptions, the centre and westernmost windows, which, although consisting of the original stones for the jambs and heads (curiously worked in), are Perpendicular, the old stones looking sadly out of place, the springing being

higher than the other windows, additional jamb-stones having been roughly worked, and the old arch stones looking most uncomfortable in their new four-centred resting-place. As these windows are in a tumble-down condition, am I to reproduce the tracery, as well as the jambs and arch, as I find them, copying each stone with its defective arc; or am I, after having reproduced the tracery, to inclose it in jambs and head of Perpendicular character; or am I to put two new windows, such as I have evidence to prove were similar to the rest?

What my own opinion may be is at the present time immaterial. I know two good authorities who differ, and can hardly hope, therefore, for a unanimous verdict; but, for the sake of the younger members of the profession, I dare hope that you may deem this question of sufficient importance for discussion in your valuable paper.

M. UNDERWOOD.

PLAGUE-STONES.—DERBY.

ACCORDING to "Hinton" the town of Derby fell under that severe calamity, the plague, in 1665.

"The town was forsaken; the farmers declared the Market-places; and grass grew upon the spot on which the necessities of life had been sold. To prevent a famine, the inhabitants erected, a little way out of the town, what bore the name of the *Headless Cross*, consisting of about four quadrangular steps, covered in the centre with one large stone; the whole near 5 ft. high.

Hither the market people, having their mouths primed with tobacco as a preservative, brought their provisions, stood at a distance from their property, and at a greater from the townspeople, with whom they were to traffic. The buyer was not suffered to touch any of the articles before purchase; but, when the agreement was finished, he took the goods, and deposited the money in a vessel filled with vinegar, set for that purpose. A confidence, raised by necessity, took place between buyer and seller, which never existed before or since; the first could not examine the value of his purchase, nor the second that of his money."

The Headless Cross has been placed in the Arboretum, and is in an excellent state of preservation.

JAS. J. ROBINSON.

ROYAL ACADEMY EXHIBITION.

SIR,—Would you allow me, while thanking you for your impartial criticism of my drawing at the Royal Academy, to explain that the peculiar form of the roof, of which you speak, arises from peculiar requirements of my client. I venture to ask this because I attach weight to your criticism, and desire to set myself right with your readers; and, doing so, an careless of the venomous remarks with which, for some cause unknown to me, some cowardly slanderer has continuously for years past endeavoured to injure my reputation in another journal.

FREDERICK WALLER.

THE THAMES EMBANKMENT AND THE BOYS.

SIR,—While there is much to admire and commend in the stone (granite) work of the new Thames Embankment, there is one point to which I could have wished some attention had been paid beyond what seems to have been given, viz., the avoidance, as far as could be, of such projections with that tops as give facilities for children to climb up to and rest upon or slide down by. I saw, a few days ago, on going from Westminster Bridge to Lambeth, at least twenty boys and girls climbing up by the moulding on the outside of the dado wall of the steps at Stangate, where the moulding has a flat surface of 4 in.; whereas a weathered top or upper surface would obviate this. I am quite aware the former is the more correct, as well as more elegant shape, but it leads to inconveniences. I saw the same trespass at the steps on the Westminster side, but the parties were less in number.

LONDONIENSIS.

THE TRADES MOVEMENT.

Bradford.—The operative painters some weeks ago struck work for an advance of wages—from 5½d. to 6d. per hour. The masters resisted the application on the ground that it was unreasonable; and the men, who alleged that an implied acquiescence had been previously made, offered to submit the matter to arbitration, but their employers refused. The different masters have now obtained a supply of hands from London. The men who struck work have, consequently, started an industrial society (limited), with, it is said, great promise of success.

Wolverhampton.—A general meeting of the operative carpenters and joiners has been held at the Noah's Ark Inn, for the discussion of several matters of importance relating to the trade, not the least of which was the consideration of the subject mooted by the umpire to the branch, Mr. Rupert Kettle, in the late conference

between the master builders and the men at the Town-hall, viz., setting apart a day on which to celebrate in each year the adoption of the principles of arbitration for settlement of all questions arising between the masters and the men. A unanimous and lively interest was evinced in the matter by the meeting. After much deliberation, the following resolution was adopted:—

"That this meeting of the Operative Carpenters' and Joiners' Branch of the Building Trade views with extreme gratification the existing cordiality between the members thereof and the leading master builders of Wolverhampton; and, in order to strengthen and confirm such compact, by drawing the several elements into closer communication, accepts with confidence the idea of the honoured and respected umpire to the trade, Rupert Kettle, esq., of a 'builders' day,' and that the workmen's arbitrators be appointed a committee to carry out the necessary arrangements in order to give due effect to the same."

The course pursued by the master builders in the late conference was very generally applauded.

A meeting of the operative painters has been held at the Noah's Ark Inn, to consider the desirability of placing the trade on a better footing than it now occupies in respect to the rest of the building trades. With little or no discussion it was resolved,—"That we solicit the masters for the sum of 1s. advance, and a reduction of two hours on the Saturday." It was afterwards determined that a circular was afterwards determined that a circular embodying the resolution should be sent to every employer, based upon a circular issued in May, 1865, when, the chairman remarked, the trade successfully obtained a rise of 2s. a week by one day's strike. The wages which the Wolverhampton painters now receive are 27s. a week. A committee of twelve, composed jointly of society and non-society men, was then formed, to represent the whole body in the negotiations with the masters.

Another Strike of Belgian Workmen.—The stokers of the iron company of Montigny-sur-Sambre, near Charleroi, have struck work in consequence of an intimation of lowering wages. The workmen were offered five francs per day instead of six. They declared they would not work. The next morning a placard posted on the walls of the establishment announced an increase of 5 per cent. on the sum proposed, but work has not been resumed. No disturbances have taken place.

PROVINCIAL NEWS.

Newcastle-upon-Tyne.—The "Bramell Wing" of the Ragged and Industrial Schools has been inaugurated by Sir W. Armstrong, K.C.B. The original building, which has been twice extended, was erected from the designs of the late Mr. Dobson; and the present extension has been designed and carried out by Mr. Thomas Oliver, at a cost of about 2,000l. Mr. Andrews was the clerk of the works; and Mr. W. Gibson, of the Red Barnes, was the sole contractor. The new wing consists of a commodious boys' school-room, with class-room, store-room, and work-rooms on the ground-floor, and a large boys' dormitory and reading-room above. In addition to these extensions, considerable alterations and additions have been made in the old buildings. The dining-room has been enlarged, and the two school-rooms for boys and girls have been thrown into one, to be used for a girls' school only. New class-rooms and lavatories for the girls are also provided. Alterations have been made in the administrative department, and a new sick-ward, with nurse's room adjoining, both of which are cut off from the main premises, and a separate staircase from the outside, have been provided. The new wing corresponds in its style of building with the existing premises. Every care has been taken to make it dry, warm, cleanly, and well-ventilated. The interior walls of the school-room, class-room, dormitory, and reading-rooms are built in the inside of buff-coloured glazed bricks, to a height of 5 ft. from the floor; and above this height they are faced with Parian cement. The ventilation is self-acting, with additional resources when required, and is designed on the "through and through" principle, with openings opposite; the windows also being arranged on the same plan. There is a large cubic quantity of air to each person, and abundance of light. The warming is by open fireplaces, which also assist in ventilating the rooms. New latrines are provided for the boys, and they are ventilated on the same principle as the rooms and dormitories. The increased accommodation which has been provided will admit between 50 and 60 inmates, and about 100 day-scholars in addition.

HER MAJESTY'S THEATRE.

THE foundation stone of her Majesty's Theatre was discovered on Wednesday last, whilst removing the foundations. The stone was raised in the presence of Messrs. Lee & Pain, and in a cavity in the bed of the stone were found a guinea, date 1788; half-guinea, date 1789; a shilling, date 1787; a sixpence, date 1787; a fourpenny-piece, date 1786; a threepenny-piece, date 1772; a twopenny-piece, date 1786; and a silver penny-piece, date 1786.

The position of the stone was in the north wall of the box corridor, on the centre line of the auditorium, under the opening leading from the hall to the pit corridor, at a depth of 2 ft. 3 in. below the paving of the hall. The dimensions of the stone are 2 ft. 1 in. long, 1 ft. 1½ in. wide, and 1 ft. deep. The inscriptions on the stone are as follow:—On the top—"The first stone of this new theatre was laid on the 3rd of April, 1790, in the 30th year of the reign of King George III., by the Right Honourable John Hobart, Earl of Buckingham.—*Auctor pretiosa facit.*" On the front—"The King's Theatre, in the Haymarket, first built in 1703." At right end—"But unfortunately destroyed by fire on the 17th June, 1789." On the back—"Prevalabit justitia."

CHURCH-BUILDING NEWS.

Hollington.—The old church of Hollington, Sussex, having been found inadequate, a new church, to be dedicated to St. John, has been erected, and the edifice has been consecrated by the Bishop of Chichester. In style it is Early English, slightly departed from. There is an absence of ornamentation. The nave is fitted with stained deal open seats, and these will afford accommodation for nearly 500 persons. The church is built with arches in the north wall, so as to be readily capable of enlargement. The font is a present given by the architect of the church, Mr. E. W. Wyon, of London. Mr. Howell, of Hastings, has built the edifice. The cost of the work is said to be about 4,000l.

Gloucester.—The restoration of the tower of St. Michael's Church has been commenced. Mr. Clinterhuck is the contractor, and the present contract includes the renovation of the tower up to the string-course. For this portion of the restoration sufficient money has been promised, but further subscriptions will be needed to carry out the whole of the restoration as designed.

Church Stretton.—About twelve months since it was determined to thoroughly restore this old church, and to add a second transept aisle to the south, opening to the present south transept, as also to the nave by an arcade. It was at first determined to allow a gallery, erected by the late rector, the Rev. R. N. Fomberton, at the west end of the nave, to remain, but as the work progressed it became apparent that it would sadly mar the appearance of the roof, which is a specimen of Norman building, the other parts of the church being mostly Gothic. Mr. Pountney Smith is the architect, and Mr. Pugh, of Hungerford, is the contractor.

Wheatley.—The church here, which was built and consecrated in 1857, has, at an additional cost of 600l., been crowned by a spire.

Caldecote.—All Saints' Church has been consecrated. The plan consists of nave and chancel under one roof (covered with dark red tiles surmounted by a ridge of yellow), intercepted by transepts of slightly lower elevation. The separation of nave and chancel externally is effected by carrying up the wall of partition above the roof and making it support a large bell-cote, capped with stone and finished with a metal cross, pierced for two bells, from Taylor's foundry at Loughborough. The entrances are at the south-west and north-west, the porches being formed within the walls and furnished with double doors. The west end terminates in an apsidal baptistery of semicircular form, lighted by two small windows, painted by Heaton & Butler, of London, one from the contributions of the school children, the other given by the Misses Wilson. The interior length of nave, including the baptistery, is 78 ft., and of the chancel, 32 ft.; width of nave and chancel, 21 ft.; length through the transept, 53 ft.; height from floor to ridge of roof, 33 ft. The east wall is pierced with three round-headed lights, divided internally by stone shafts with carved capitals, surmounted by a circular light, a horizontal band of red, black, and white commencing from

the wall-plate and rising in an arch which spans the entire window. The temporary glazing is of green, yellow, and white. The transepts are lighted in a similar manner, two round-headed windows beneath a circular one. The west gable is also pierced with a round light. The nave-windows are single round-headed lights filled with glass of different tints, arranged in alternate sections of square and diamond panes. The nave and chancel walls, arches, and window-heads are relieved, both within and without, by lines and alternating courses of red, black, and white, the chamfered edges being formed of yellow notched bricks, from Stevenage. The open timber roof of the chancel, though of the same construction as in the nave, is distinguished from it by the addition of colour, the portion above the sanctuary being more elaborately decorated and further enriched with gilding. The chancel walls beneath the windows are plastered and covered with conventional flower-painting in chocolate. The chancel is divided from the nave by a low stone screen, surmounted by light ironwork. The style of the building is described as Pointed with Romanesque modifications, adopted on account of the material employed, which is white brick, with red and black for ornamental purposes. The combination of colour, without being obtrusive, imparts a general warmth throughout. The masonry was executed by Mr. Warren, and the woodwork by Mr. Bates, both of Stevenage; the ironwork by Mr. Shrivell, of London; and all the decoration by Messrs. Heaton & Butler. The contract with Mr. Warren was for 1,700*l.*, and the extra work, including the furniture and gifts, is estimated at 500*l.* The church is built for 275 adults, but admitted on the day of consecration 400 persons. The burial-ground was lowered and levelled almost entirely by the unpaid labour of the men of the hamlet. The architect was Mr. A. W. Blomfield, of London.

Dorking.—St. Martin's Church has been consecrated, on the completion of the chancel, which has been built to replace the old chancel, which, in the general rebuilding, commenced in 1835, and completed in 1837, was left at a level of 7 ft. below the height of the present structure. From this cause, and from the obstruction of the central tower, it was completely cut off from the nave, and was thereby rendered useless. The limited space under the tower has hitherto been used for chancel purposes, for which it was unfit, both from want of size and of light. This inconvenient state of things has now been remedied by the building of a spacious chancel, and by opening out larger arches on the east, west, and north sides of the tower, and giving greater space for the choir and the greatly enlarged organ, which stands in the north transept, having its front in the new north arch. The style chosen for the new work was influenced by that of the old, and is Late Decorative in character. The old east window furnished the type for the new windows generally. The walls are faced with snap flint work, the dressings being of Bath stone. The roof is covered with Westmoreland slates, and the parapets are of pierced work. The carving in the interior is the work of Mr. Nichols, of Lambeth. The chancel windows are filled with stained glass by Mr. Wallis, of Newcastle. The chief or east window represents, in the different compartments, Christ's entry into Jerusalem; the Agony in the Garden; Bearing the Cross; the Betrayal; scene before Pilate; St. John taking the Virgin home; the Resurrection; and the appearance to Mary in the Garden. The south and north chancel side windows contain figures of the twelve Apostles, and there are groups from the Acts as follows:—The election of Matthias, Pentecost, Peter's sermon on the Day of Pentecost, Peter baptising, Peter and John healing the lame man, Barnabas laying the price of his hand at the Apostles' feet, Peter and John delivered from prison, Peter and John before the council, Peter raising Dorcas, Peter's vision, Peter preaching to Cornelius, and the death of James. There are two other windows having special reference to St. Martin, in his military and priestly character. As a soldier, the representative tableaux of St. Martin are—Received as a catechumen; dreams of our Lord appearing to him; joined a cavalry regiment; his baptism; divides his cloak with a herger; offers to meet the enemy armed only with the cross. As a priest, we have where St. Hilary instructs him; converts his mother; elected Bishop of Tours, aged fifty-five; burns down pagan temples and sacred trees; celebrating the Mass; and his death at the age of eighty. The architect from whose

designs and under whose superintendence the additions to the church have been carried out is Mr. Henry Woodley, of Craffham, Guildford. Messrs. Wheeler Brothers, of Reading, are the contractors. There was no clerk of the works. The cost of the building is about 6,000*l.* The windows cost 700*l.* The organ has been restored and rebuilt by Messrs. Walker & Sons, of London, and the expense will be defrayed by subscription. The lamps, brass-work, chalice, candelabra, &c., are provided by Mr. Hardman, of Birmingham.

DISSENTING CHURCH-BUILDING NEWS.

Swindon.—The chief stone of Wesley Chapel has been laid at New Swindon, by Sir F. Lyett, ex-Sheriff of London and Middlesex. Mr. T. S. Lansdown, Swindon, prepared the plans of the building, which is based on the building known as the Barracks. The style of architecture is Decorated Gothic. The principal entrance is on the south side, through three doorways, which open into a vestibule 16 ft. by 13 ft., and on either side of this are two towers, which are 66 ft. in height, and containing the staircases leading to the galleries. The body of the chapel is 69 ft. 6 in. wide, by 88 ft. long. The whole of the seats will be of deal, light-stained and varnished. On the western side of the chapel there are two class-rooms, 19 ft. 6 in. by 19 ft. each; a deacons' vestry, 19 ft. 3 in. by 15 ft. 3 in.; also a kitchen, living-room, pantry, &c., for the chapel-keeper. The entrance in the High-street will remain unaltered, and will be used as one of the principal entrances to the chapel, as well as to reach the school, class-rooms, &c.; this will make eight places of ingress and egress, including the two staircases contained in the towers. The walls are lined with Bath stone on the inside. The height from floor to ceiling will be about 29 ft. Over the class-room is a school-room, 88 ft. 6 in. by 23 ft. 6 in., and about 18 ft. high. There is also one end gallery provided, which is reached by the staircases in the towers. The whole of the windows to the chapel will be remodelled, to give an ecclesiastical appearance. The present accommodation is for 1,062, and the building is so arranged that side galleries can be added when required, which will accommodate about 300 additional persons, making a total of 1,362. The whole building will be well lighted and ventilated. The works are carried out under the superintendence of the architect, and Mr. T. Barrett, of the same place, is the contractor.

Blyth.—The foundation-stone of a new chapel for the use of the Congregationalists of Blyth has been laid. The site is in Carlton-street. The drawings have been prepared by a member of the body, and are being carried out under the superintendence and personal inspection of Mr. James Darling and Mr. John Wood. The total cost of the building, including lighting, warming, and ventilation, but exclusive of ground, will be about 1,600*l.* The contractors for the work are: mason and joiner, Mr. James Nairn, of Blyth, with Mr. Wm. White as sub-contractor for joiner work; slaters' work, Messrs. Dawber & Son; ironfounders' work, Messrs. Walker & Emley, Newcastle; plumbers' work, Messrs. Henderson & Thompson, Blyth; plasterers' work, Mr. Joseph Elliott, North Shields; painters and glaziers' work, Messrs. T. A. Bowman & Son, Morpeth.

Books Received.

A Catalogue of the Books, Manuscripts, Works of Art, Antiquities, and Relics, illustrative of the Life and Works of Shakspeare, and of the History of Stratford-upon-Avon, which are preserved in the Shakspeare Library and Museum. London: printed for the Shakspeare Fund. 1858.

In the few years which have elapsed since the establishment of the Shakspeare Fund, three of the most important of the objects in view have been nearly completed, and amongst them the formation of the valuable library and museum. The permanency of this important collection has been carefully secured. The library and museum have been conveyed to the corporation of Stratford-upon-Avon upon trust. The catalogue has been compiled by Mr. Clarence Hopper. Presents to the museum and library are of course still acceptable, as well as subscriptions

to the fund. Mr. J. O. Halliwell, of Tregunter-road, London, receives these, and also makes purchases of suitable books, &c.

Every Man's Own Lawyer: a Handy-Book of the Principles of Law and Equity. By a Barrister. Sixth edition. London: Lockwood & Co.

It is said that the man who is his own lawyer has a fool for his client; but "Every Man's Own Lawyer" is not every man's own lawyer. This epitome of law and equity must be very useful to the public generally, and may save many a six-and-eightpence, for the price of one; for the price is, appropriately, 6s. 8d. This edition is not only revised, but supplemented by the substance of new Acts.

A Dictionary of Chemistry and the Allied Branches of other Sciences. By HENRY WATTS, B.A., F.R.S., F.C.S., editor of the *Journal of the Chemical Society*, assisted by eminent contributors. Part XLV. Water—Zymurgy (completion). London: Longmans, Green, Reader, & Dyer. 1868.

This valuable and standard work, in five volumes, is now completed. We have so often spoken of it while in course of issue that all we need at present do in the way of recommendation is to announce its completion. We may here, however, quote a brief passage from the concluding number as to a cement of zinc, an incidental glimpse of which, some time since, in course of chemical experiments for a purpose unconnected with cements, led us to think it would be preferable to that of magnesium, recommended by a French chemist, and of which we lately gave some account, partly from experimental inquiry of our own:—

"When zinc-oxide is boiled with a strong solution of zinc-chloride in certain proportions, a plastic mass is obtained, which, after a while, becomes very hard, and may be used for taking casts. A cement, prepared by adding 3 pts. zinc-oxide and 1 pt. glass-powder to 50 pts. of a solution of zinc-chloride of specific gravity 1.6–1.8, with 1 pt. of borax dissolved in the smallest possible quantity of water, is much used in Paris for stopping teeth, and for making artificial teeth (Feichtinger, *Dingl. polyt. j. cl. 78*). An oxychloride of zinc, prepared by a similar process, may also be used as a paint for wood, paper, stone, or metal. It dries quickly, and is quite free from odour. (Sorel.)"

Nine years have elapsed since the Dictionary of Chemistry was begun. It has extended considerably beyond the limits originally contemplated; nevertheless, the limits has still been found too narrow for the treatment, as the editor would have wished, of many important subjects. Some of these, however, are so valuable that they have taken rank as classical treatises in their respective spheres; and, of course, such treatises greatly enhance the merits and the value of the work. So many changes and advances have been made in chemistry within the last nine years, that the editor has found a supplementary requisite to bring up many subjects to their most recent state of development; but this is unavoidable in the publication of any great work requiring time for its completion. The editor states, on the whole undertaking, that he has endeavoured to give some notice of every compound discovered up to the time of publication of each part of the work; and where full description was impossible, reference is given to original sources of information. The work is an important and valuable contribution to chemical science and the allied branches of other sciences of which it treats. The part now issued contains the title page, and an index and preface to the fifth volume.

A School Manual of Health. By EDWIN LANKESTER, M.D., F.R.S. London: Groombridge & Sons, Paternoster-row.

This is an excellent little treatise on the elementary principles of physiology. Its object is to supply the elder scholars in our national and other schools with an elementary treatise on those facts which must be known in order to secure health. It does not enter into minute details of the structure of the human body, but treats of such subjects as digestion and its organs, the nature of the food, and the elementary and organic constitution of the human body, the nature of the blood and its circulatory organs, the function of respiration, and so on, up to the cerebral functions, the two states of waking and sleep, and the spiritual nature of man.

We may quote from what Dr. Lankester says on the subject of respiration, to show how clearly and simply, yet scientifically, he inculcates the

great sanitary truths by whose guidance health may be assured:—

"In order that the function of respiration should be carried on properly, it is of the first importance that the air which is taken into the lungs should be pure. If there is a deficiency of oxygen in the air breathed by a human being, the result is the production of animal poisons, which do not take place, and a corruption of the blood ensues. The air breathed by human beings is constantly liable to a deficiency of oxygen, by its corruption during various causes of combustion. Thus, in a room lighted with gas, the gas will consume so large a quantity of oxygen as to diminish the supply for persons remaining in the room. One of the great drawbacks in the present civilization, is the practice of introducing gas into our sitting-rooms, bed-rooms, workshops, and factories, without making sufficient arrangements for the supply of the oxygen gas consumed by the lights. On the slightest of an ordinary kind consumes during burning as much oxygen as five human beings, and where no provision is made for a supply of fresh oxygen, the air is most injurious to health. In the same way a large number of human beings congregated in a small room, will consume the oxygen and render the air unfit for maintaining healthy life.

Not only do the combustion of gas and candles, and the respiration of human beings, consume the oxygen of the air, but they make it impure by giving off carbonic acid gas. This gas is given off from burning lamps, and from candles, and from the respiration of human beings. It is a most destructive gas. If a jar of carbonic acid is collected from the burning of lights or fires, or the breathing of animals, no light can be burned in it, no animal can live in it. When sent from the lungs of animals, it is instantly a part of it in the operation, and a natural ventilation is established; but when it is confined in rooms, it is breathed again and again, and the most disastrous effects follow. It is not only a poison to the blood, but it prevents those changes taking place which are necessary to health; and a variety of diseases are the result. One of the most common and obvious results of breathing an impure atmosphere is the production of the diseases known as scrofula and consumption. In those districts of London and other large towns of Great Britain and Ireland, where the greatest overcrowding takes place, scrofula and consumption are most prevalent. Not only are these diseases prevalent in such places, but persons exposed to the action of carbonic acid gas are much more liable to fevers and other diseases than those who breathe a pure supply of fresh air. Of so much importance is fresh air to the health of man, that the Government insists that in every family there should be at least a pint of fresh air for each individual.

But the most dangerous contamination of the air is that which arises from the diffusion of it of vegetable and animal poisons. When plants and animals are dying or dead they give off small particles, which, entering the human lungs, pass into the blood and produce disease. These particles though apparently dead, possess the power of producing in living particles the same decomposition as they undergo in themselves. It is thus that the particles rising into the air from drains and dead bodies, may produce in the living body the most fatal and destructive diseases. Many forms of fever are now known to arise from this source alone. Amongst others may be mentioned drain fever, which carries off from fifteen to twenty thousand human persons every year in Great Britain, and which is certainly dependent on the most offensive matter being taken into the human system and carried into the blood. The decaying matter of plants, such as their leaves and stems, in contact with water, gives forth an effluvia, known by the name of malarious, which produces the most violent and terrible fevers. The intermittent fever known by the name of ague is thus produced, and the malarious fevers of sub-tropical and tropical climates are produced in the same manner. The best remedy for these diseases is drainage, all putrefying plants and animals should be got rid of as far from near the houses of human beings. It is the duty of every person to see that all the refuse decomposing animal and vegetable matter is at once removed away, or placed at such a distance from the house that no human being can be injured by its presence. When the refuse is not removed, it should be covered up, and be perfectly covered. There are many things commonly sold in shops for this purpose; amongst them we may mention chloride of lime, carbolic acid, and the permanganate of potash and iodine.

But besides these poisoning particles which are given off from all dead and dying animal and vegetable bodies, there are certain special poisons, which are given off from every animal body which contaminate the air, and against which too active measures can hardly be taken. The human body is subject to certain diseases which, originating in the blood, produce particles in it which, given off from the body, are capable of producing the same disease. Such diseases are known by the name of small-pox, scarlet fever, measles, whooping cough, typhus and typhoid fevers, and cholera. When persons are attacked with these diseases, they are capable of giving off particles into the air which, when taken up by other bodies, will produce the same disease. By proper precautions all these diseases may be prevented from propagating themselves in other persons. With regard to small-pox, it is found that if persons are vaccinated, they are not capable of receiving the disease. Hence the duty of all parents to see that their children are vaccinated, in order to prevent their taking this terrible disease. It is certainly a misconception to suppose that vaccine matter by itself can introduce any other disease than cow-pox into the system. There are, however, a great number of persons who, without their 'catching diseases,' but everybody knows that by proper precaution they may be prevented, and it is now one of the first duties of human beings, one to the other, to take care by no means to let the poison of these diseases be conveyed from them to their neighbors. It is a common practice, much to be reprehended, to send children to school from families where small-pox, measles, or scarlet fever, or whooping cough are prevailing, thus spreading the poison amongst those who have not been previously attacked.

The air being thus easily contaminated and rendered impure, it is of the first importance that it should be secured to secure fresh air, free from carbonic acid gas and organic and poisonous impurities. In every house, sitting-room, bed-room, shop, workshop, school, or public building, the most liberal provision should be made for the free ingress and egress of fresh air from without, and the letting in of fresh air from without. This is done by what is called ventilation. There is a natural tendency of warm air to ascend, and advantage could be taken of this to have ventilators placed at the

top of the room or building, so that the warm impure air may escape. In cold weather fires ventilate rooms, by a current of warm air ascending the chimney, and the cold, fresh air rushes into the room to supply its place. In warm weather rooms should never be shut up. When there is no other means of ventilation, the top sash of the window should be let down, so as to allow of the escape of impure air. All houses should be constructed with holes and valves, to let the impure air of the rooms out into the chimneys or into the open air."

In this useful little manual of health sufficient is said of the structure of the human body to enable every reader to understand the operation of the great laws on which the health and life of human beings depend, and to show that these are God's laws, and that He will not suffer them to be broken with impunity.

Miscellanea.

SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—The third conversation of the season has been held at the gallery of the Society of British Artists, Mr. Solly, F.R.S., in the chair. After an introductory address, in which the chairman dwelt on the soothing influences of art upon all, and especially upon those engaged in science, musical performances commenced. The company was numerous, and presented a brilliant appearance; music, painting, sculpture,—the marble side by side with the life,—all combined to lend a charm to an entertainment as pleasant to the artist and amateur as encouraging to the higher branches of art.

THE METROPOLITAN DISTRICT RAILWAY AND THE THAMES EMBANKMENT.—At the last meeting of the Metropolitan Board of Works, the Works and General Purposes Committee presented a report on the proposals of the Metropolitan District Railway as to the construction of a solid embankment between the Temple and Blackfriars Bridge. A provisional agreement had been entered into for the construction of a solid embankment, with a 100 ft. roadway thereon, from the Temple Gardens to Blackfriars Bridge, and the company to construct their railway within the Embankment; the railway company to commence their works for the construction of the railway on the Embankment from Westminster Bridge to the Temple on the 1st of July next, and the other works to be carried on simultaneously with the works of the Board; the railway company to deposit 40,000l. on the 1st of July next; the payment of the 200,000l. to be paid to the Board to be spread over three years. The report was adopted.

HALF-TINTS IN PAINTING.—The great difficulty in shading is the management of the half-tints. Any one can make an extreme shade of black; and if the right feeling for half-tints and semitones is not a natural one—something analogous to that of a good ear for music—it can be to a great extent acquired, though in some cases it will demand a much greater amount of practical experience and observation than in others before they begin to perceive the many varieties of tone which are spread upon the surface of an object, especially if it be an irregular one. But when we have to add colour in connexion with light and shade, we go farther into a field of change and variety that is unbounded. And here is the test of the painter. It is the management of the minor tones which makes all the difference between a first-rate artist and a common country sign-painter. The latter may paint a red cow sufficiently well to answer the purpose of giving a title to the village ale-house. We will grant that he has the ability to make a tolerable representation of the animal in outline, but when he attempts to paint it he will do nothing more than fill up the outline with red, and darken the parts in shade with black, because he can see nothing further; but the eye of the true artist would seize upon the innumerable tints spread all over the surface—the various degrees of colour influenced by the position and strength of the light, some parts more brilliant, some more subdued, intermingled with greys of various hues in every portion—added to which are the reflections of colour and of light amongst the shadows, some warm, some cold: in short, to name all the changes and tones that would require his special attention can only be done by him who is able to paint them. Here, then, is the secret why one painter is greater than another; and their comparative excellence is determined by their ability to perceive and represent few or many of the infinite varieties of tones scattered over every object in nature.—Cassell's New Popular Educator.

VALUE OF HOUSE PROPERTY IN NEW YORK.—The rise in the value of real property in the metropolis of America is shown by the following from the *New York Times*:—"The south corner of Broadway and Bond-street has been valued within a life time at 10 dollars: it was sold once for 250 dollars, then offered for 500 dollars, then for 1,800 dollars, and in 1839 was again sold for 18,000 dollars. Recently a sewing-machine company offered 200,000 dollars for it, which being declined they have leased the premises for a long term, and are about to open "the most magnificent sewing-machine establishment in the world." During the past forty years the property has doubled in value every seven years. The whole of New York island was once sold for 10 dollars.

THE INSTITUTION OF CIVIL ENGINEERS.—At the closing business meeting for the present Session, held on Tuesday, the 19th instant, Mr. Charles Hinton Gregory, president, in the chair, nine candidates were balloted for and duly elected. The total number of elections during the Session 1867-68 has been 150, viz.: 45 members, and 105 associates. The register of the institution now contains the names of 16 honorary members, 641 members, 914 associates, and 123 students, in all 1694, as against 1419 of the various classes at the same date last year, including at that time, 20 honorary members, 591 members, 834 associates, and 4 graduates. The class of students has been created during the session just concluded, to take the place of the old Graduate Class, which is now abolished.

THE BISHOP OF LONDON'S CHURCH-BUILDING FUND.—The Bishop of London's proposal to raise a million sterling for church building and other ecclesiastical purposes is not likely, it is said, to be fully accomplished. Five of the ten years which were allowed for raising the fund have passed, and less than a third of the total amount has been contributed. A pastoral by the bishop has been read in all the churches of his diocese, calling for additional subscriptions, and stating the various objects on which the money received has been expended. The sum of 51,500l. has been given as stipends for 113 additional clergymen; 49,000l. have been voted towards building forty-seven new churches; 48,000l. for educational purposes; 54,000l. for church and school sites; and 35,000l. for objects specified by the donors.

ARTISTS' GENERAL BENEVOLENT INSTITUTION.—The fifty-third anniversary of this charity was held on Saturday night, at the Freemasons' Tavern, Mr. John Duke Coleridge, M.P., in the chair. It appears from the report of the operations of the charity for the past year, that the total income was 1,656l., of which 966l. were subscribed at the last anniversary dinner. During the year seventy-six applicants were relieved with the sum of 1,317l. The charity is administered with so much economy that an average of the last six years shows an annual expenditure of not more than 134l. The losses sustained by so many persons in all classes of society by the financial panic of 1866 have for the present prevented the committee from taking any further steps to raise a special sum of money for the endowment of an artists' orphan home, and thus avail themselves of the liberal offer made to the institution in 1866. The company present was about 150 in number. Subscriptions to the amount of nearly 800l. were announced in the course of the evening.

ACCIDENT WITH AN ENCAVATING ENGINE AT KENSINGTON.—A serious accident has occurred at the Gloucester and Cromwell-roads cutting, Kensington, where an extension line of the Metropolitan Railway is in course of construction. It appears that a steam excavating engine, together with the necessary implements and tackle, were fixed at the mouth of a pit, and the process of delving and bringing up the soil to the surface was being carried on, when, from some cause or other, the engine, &c., with its weighty accompaniments, fell over into the pit. There were three men on the engine at the time of its fall, the engineer, the stoker, and an attendant (who were severely injured), and several labourers or miners were at work below. As the engine descended the shorings were torn away, and the whole mass of mould and debris fell to the bottom. Providentially, the men at work below received the alarm by the crashing of the timber shoring, the roaring and hissing of the steam and water, and the sudden blocking out of the light. They all escaped with the exception of one man.

ALARM OF FIRE AT BUCKINGHAM PALACE.—On Friday, in last week, shortly after the arrival of the Prince and Princess of Wales at the State ball given by command of the Queen, and whilst the company was still arriving, and the ball was about to commence, it was found that from the too great heat of the gas the glass of an illuminated window cracked and fell to the floor, and the flame of the gas had commenced to attack the wooden framework. Fortunately the contractor and two men were in attendance, and they at once ran to the main and turned the gas off. The people outside, however, fearing that the palace would be destroyed, had sent off for the engines of the Metropolitan Brigade, and in a very few minutes four or five land-steamers, with a number of manual machines, arrived at the entrance to the palace, but, of course, the services of the firemen were not required.

LIVERPOOL ARCHITECTURAL SOCIETY.—The annual meeting has been held at the Royal Institution, Mr. Kilpin in the chair. The following prizes for designs of churches were presented:—First, Mr. George Smith; and second, Mr. W. J. Casson. The first prize for figure-drawing was awarded to Mr. Thomas Medcalfe, and the second to Mr. H. H. Hermann. The statement of accounts showed that at the end of last year there was a balance in hand of upwards of 10*l.*, and there now remained a balance of 5*l.* 15*s.* 3*d.* The secretary read the report of the council, which showed that the society had continued to increase in numbers, which was a proof that its influence and status in the town had not diminished. On the motion of Mr. Boul, the report was adopted. Mr. J. P. Horner was unanimously elected president of the society for the ensuing year; and Messrs. Haigh and Vale were appointed vice-presidents. The other officers were appointed, after which it was agreed that the annual excursion of the Society should this year be to Gressford and Wrexham. The chairman then read an address, in the course of which he alluded to the importance which ought to be attached to the establishment of labourers' dwellings, and made a complaint as to Liverpool not having a fine-art exhibition, such as Edinburgh and Glasgow had.

THE KIRBY UNDERDALE TUMULUS.—During April the Rev. Canon Greenwell, of Durham, and several local archaeologists, have been engaged in the full examination of the large tumulus on Lord Halifax's estates on the Wold scarp, near Kirby Underdale. The results of the examination just closed are very curious. The mound was circular, but very flat, not being more than 3 ft. high, with a diameter of 94 ft. This was due to cultivation, however. The barrow was both British and Anglo-Saxon, one over the other. The inner British barrow was 70 ft. in diameter, and covered only one burnt interment in a central grave nearly 7 ft. deep. Except in the discovery of parts of a British drinking-cup, a green-stone axe, and a few flints near, on the east, there was no further trace of the Britons. Upon the British mound, however, the Anglo-Saxons had formed a large cemetery, depositing their bodies upon it in rows 3 ft. apart, and the bodies themselves also about 3 ft. apart. These rows all ran east and west, and the burial upon the surface was shown by the elevated heads on the east side, and the heads lowest on the west. The burials exceeded seventy in number. The great bulk of the burials were contracted, many of them very much so, resembling British interments, and in this disagreeing with the almost invariable mode of Anglo-Saxon interment at full length. An immense number of relics have been found with the seventy burials. Of these the chief are five iron swords, forty iron knives (various), some of which have been in contact with cloth, the impression remaining on the oxide; twelve iron spears for sharpening knives, some showing signs of much use; eight necklaces of glass and pot beads, two with gold pendants, one with silver pendants, and an ivory one set in silver; twenty bronze buckles, some of them gilt; thirty iron buckles, four bronze boxes (one full of thread of two kinds), a flint and steel, &c. The special peculiarities of this grand tumulus were—the contracted Anglo-Saxon burials, the absence of creosote fimbria and spears, the frequency of bronze boxes, no coffins, &c., and particularly the finding of skeletons of young men—the aged ones being invariably those of women. This is regarded as an indication of frequent wars having carried off the male population at an early age.

THE SEPTON PARK QUANTITIES.—The members of the Liverpool Town Council who took exception to the quantities taken out by Messrs. Andre & Hornblower, employed Messrs. Mills & Fletcher to check the quantities, and the result is a difference, on an amount of over 70,000*l.*, of only 1*l.* 3*s.* 5*d.* To Messrs. Andre & Hornblower's charge of 1,000*l.* for taking out the quantities, there have now been added 322*l.*, charged by Messrs. Mills & Fletcher for checking these quantities.

PROCESS FOR COVERING IRON AND STEEL WITH COPPER WITHOUT A BATTERY.—This process, due to Herr Graeger, is described in a recent number of Dr. Boettger's *PolYTECHNISCHES NOTIZBLATT*, according to the *Scientific Review* for May. The objects are first well cleaned, and then painted over with a solution of protochloride of tin, and immediately afterwards with an ammoniacal solution of sulphate of copper. The layer of copper thus produced adheres so firmly to the iron or steel that the different objects can be rubbed and polished with fine chalk without injuring the deposit. The tin solution is prepared with one part of crystallised chloride of tin, two parts of water, and two parts of hydrochloric acid; the copper solution with one part sulphate of copper, sixteen parts of water, and ammonia sufficient to re-dissolve the precipitate formed when it is added. Zinc and galvanised iron can be treated, according to Boettger, directly by the copper solution, without using the tin salt. The above process may be found useful by gilders, and for various ornamental purposes.

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Turner & Sons 3,411 0 0
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Eaton & Chapman 3,165 0 0
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For dwelling-house, River, Kent, for Mr. Alfred Kingford, Mr. Rowland Rees, jun., architect:—
Fagg £2,283 0 0
Adecock 2,150 0 0
Turnbridge 1,965 0 0

For the erection of gate-ledge, on the Lincoln-road, for Mr. James Thorpe. Mr. Charles Baly, architect:—
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For the erection of cottage, near Malbushes, Newark, for Mr. William Gilstrap. Mr. Charles Baly, architect:—
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Myer & Sons 10,443 0 0 85 0 0
King & Sons 10,369 0 0 36 0 0
Crabb & Vaughan 10,296 0 0 211 0 0
Mann 10,175 0 0 70 0 0
Pritchard 10,154 0 0 79 0 0
Henshaw 9,855 0 0 84 0 0
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Chappel 974 0 0

For the erection of five cottages, near the Cornwall-road, Hammersmith. Mr. John G. Hall, architect. Quantities not supplied:—
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Chamberlain, Bros. 1,965 0 0
J. & F. Bayliss 1,204 10 0

For alterations and repairs at the Prince of Brunswick Inn, Brunnschick-street, Deptford, for Mr. H. G. Stranger. Mr. D. Haydock, architect:—
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Brown & Robinson 2,692 0 0
Hearle 2,637 0 0
Webb & Sons 2,666 0 0
Ashby & Son 2,654 0 0
Conder 2,472 0 0

For building five warehouses in Finsbury-street, E.C. Mr. Wimbie, architect:—
Perry £9,957 0 0
Patman 9,855 0 0
Kelly, Bros. 9,721 0 0
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Keable 9,543 0 0
Wells 9,529 0 0
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Abrahams 8,857 0 0
Scriven & White 8,810 0 0
Henshaw 8,660 0 0
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Little 11,599 0 0
Downes 11,560 0 0
Webb & Sons 11,468 0 0
Nicholson 11,446 0 0
Brown & Robinson 11,150 0 0
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Gammon 10,877 0 0
Jackson & Shaw 10,850 0 0
Batman Co. 10,800 0 0
Adams 10,850 0 0
Brass 10,349 0 0
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Myers 10,342 0 0

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Bloomfield 1,813 0 0
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W. Wright 1,630 0 0
Palmer 1,445 0 0
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For house at Bound's Green, for Mr. G. P. Francis. Mr. A. Rowland Bratton, architect:—
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For alterations to two houses, Inlington, Liverpool, for Mr. John Stoward. Messrs. Pictou, Chambers, & Bradley, architects:—
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For alterations and additions in forming shop and offices in Peasod-street, Windsor, for Mr. R. Little. Mr. W. Simm, architect:—
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For the erection of a pair of semi-detached villas at Sydenham, for Mr. W. A. Little. Mr. W. Powell, architect:—
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Lawrence 238 10 0
Clarks 234 0 0
Bentish 225 0 0
Harris 213 0 0
Harrison 210 0 0
Cole 199 10 0
Fogart 185 0 0
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Beales 178 0 0

For farm buildings at West Newton, near Darston, for Mr. J. H. Warre. Mr. J. Houghton Spencer, architect:—
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Smith 475 0 0
Giles & Manning 334 0 0
Shewbrooks (accepted) 395 0 0

For additions to Bicknell's Vicarage, near Stogumber, for the Rev. W. Martin Hunybbin, Mr. J. Houghton Spencer, architect:—
 Dribham & Hawkins £436 0 0
 Shevbrooks 375 0 0
 Peares 365 0 0
 Giles & Manning 355 0 0

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For erecting three houses at Upper Clapton, for Mr. Jacobson. Mr. Cheston, architect:—
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 Lewis 4,124 0 0
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For two houses, stable, and four cottages at Hammer-smith, Mr. G. Saunders, architect:—
 Williams £3,393 0 0
 Mansell 3,235 0 0
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 Adamson 3,133 0 0
 Wigmore 3,087 10 0
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For building new warehouse, 62, Coleman-street, City, E.C., for Mr. F. Walters, Mr. G. J. Lee, architect:—
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 Note.—The responsibility of altered articles, and papers read at public meetings, rests, of course, with the authors.

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CORPORATION of FOLKESTONE.—The Corporation of the Borough of Folkestone give notice, that at their meeting to be held on WEDNESDAY, the 19th day of May, 1868, at the Town Hall, at SIX o'clock p.m. they will be prepared to appoint a duly qualified person to act as Local SURVEYOR for the Borough, his engagement to commence on the 1st July, 1868. Such officer will be required to act as "Local Surveyor" and "Inspector of Nuisances;" not to follow any business or other occupation, except account, but to devote his whole attention to the faithful discharge of the duties devolving upon him in his office; to perform all the duties appertaining to those offices under the Municipal Corporation Acts, the Public Health Act, and the several Acts incorporated therewith, and any by-laws, rules, or orders made therewith, and under any other Act or Acts in force within the Borough, and to obey all the orders of the Corporation in connection with or arising out of such several duties; to take the care and management of the Fire Engine and its appurtenances; to prepare all plans, specifications, and estimates; to know the value of labour and materials; to take the charge, superintendence, and management of the Public Lamps; to investigate and report as to the Cocks, Cakes, or Clodds brought into the Borough and liable to the Coal Duty; to prepare the accounts and certify the expenditures for all the Borough's moneys and all bills (that it will form part of the duties to pay the labourers or bills); to take the charge, superintendence, and management of all such works as are now or may hereafter come within the provisions and order of the Corporation, and to perform all duties adding out of such several duties and offices. The Office to be held during the pleasure of the Corporation. Salary 200l. per annum, payable quarterly. The Corporation will provide an Office with coal and gas, stationery, and other articles required for the performance of his duties, but any expenses which may require to be paid at his own expense, in equity to be given for performance of the duties—the Officer himself in 1867, and two surties in 1868, each. Applicants must forward their applications and testimonials addressed to him, at his Office, under seal and marked "Application for Office of Surveyor," at or before FIVE o'clock on THURSDAY, the 14th INSTANT, 1868, accompanied with a letter in their own handwriting, stating their age, and their present or latest employment, and containing the names and addresses of the proposer. The Corporation do not pledge themselves to make any appointment, if the qualifications of the applicants are not approved.—By order of the Corporation,
 RALPH THOMAS BROOKMAN, Town Clerk.
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 By order of the Board,
 FREDERICK J. MORRELL, Clerk to the Board.
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VOL. XXVI.—No. 1321.

Woburn Abbey and Dunstable Church.



VERY Friday, thanks to the consideration of his Grace the Duke of Bedford, the public are admitted to Woburn Abbey, its pictures, its sculptures, and its gardens; and a great privilege this is, full of pleasure for those who know how to see. Dr. Waagen, in his "Treasures of Art in Great Britain," describes his visit to Woburn as "the most uncomfortable" of all that he had had in England, "the very respectable-looking, corpulent woman, who in her black silk gown came rustling in such state" to meet him, driving him on from room to room, and giving him no time to see anything properly, though he bore a letter to her from Dean Hunt. Things are differently managed there now, and the visitor will find the housekeeper intelligent and obliging. The number of fine portraits that are to be seen in England is certainly astounding; the three remarkable exhibitions that have been made in South Kensington are to be noted only as indicating that fact, not as having benefited the store. House after house may be visited in all parts of England full of portraits; some have never reached London; portraits, too, are pictures to be coveted irrespective of person represented. Of how many of the portraits that are being painted to-day will history say that? Hurry-scurry, slap-dash; sentiment, no finish; the head half painted, hands a blotch, and the costume nowhere: these are their characteristics. Some recent portraits at Woburn contrast but badly with the earlier works. We should be glad, for example, to see a better picture there of Earl Russell, our "Red John."

We are not proposing to write a guide to Woburn,—only a memorandum that may lead some of our readers to give themselves a day during the present bright weather. England had an exceptionally fine May, the May of the year. We cannot always speak by Milton

the flowing May, who from her green lap throws
The yellow cowslip and the pale primrose."

l the
"Queensly May,
Showering daisies on her way."

o can recollect of Mays that were brown,
not green; cold, and anything but flowery;
y the May of this year certainly the poets
been justified. Woburn may be reached in a
e of hours from London. The house was
in 1774, on the site of a Cistercian abbey,
ded in the twelfth century. It is a quad-
lar edifice, surrounding an open square,
a front "of the period," having an attached
ment and four three-quarter Ionic columns
a centre. Henry Holland, who designed
on House and old Drury-lane Theatre, was
chitect, if we recollect rightly. A marble

hust of him will be found amongst the sculpture here.

A very scholarly and well-written little "Guide to Woburn Abbey" (by J. D. Parry, M.A.) was published some thirty-six years ago, and now needs some revision to meet the alterations that have been made in the rooms. The writer of it, on entering the picture-gallery, with justice adapts Virgil's words:—

"Here those who suffer'd for their country's good;
Or blameless priests before the altar stood;
In ages past:—here souls whose mighty thrill
Glad Phœbus welcomed on the Acian hill:
Who life with various arts embellish'd then;
And those whose bounty fills the hearts of men."

Here they are set forth in their habits as they lived. After passing through the house, the large features that fix themselves most strongly on the mind are the Vandyckes, the room full of Canalettos (and such Canalettos!), and the collection of portraits of artists mostly painted by themselves.—Ruhens, Murillo, Titian, Rembrandt, Teniers, Tintoretto, Kneller, Paul Veronese, Sir Joshua Reynolds, and many others. A most charming specimen of Sir Joshua's art is that picture of Elizabeth Marchioness of Tavistock, mother of the late Duke, crowning a bust of Hymen with flowers, with a black servant in the background, said to be a portrait of Reynolds's own black page. The series of miniatures in enamel by Borel Rembrandt's "Rabbi," some of Lambert's little-known landscapes; a remarkable view of the Castle of St. Angelo, Rome, by Claude Lorraine; the foreshortened Ahel by Rubens; the "Captain-General of the Spanish Armada," attributed to Valasquez; and Sir Nicholas Bacon, by Zuccheri,—are amongst the other noteworthy items, together with some first-rate specimens of the work of Mytens, Cuyp, Cornelius Jansen, and Gavin Hamilton. Amongst the more modern works in the rooms, Eastlake's "Pilgrims coming in sight of Rome," a fine seapiece by Calcott; "The Crown offered to Lady Jane Grey," by Leslie; and a good likeness of the poet Rogers, by Hayter,—will be remembered. The pictures are in a capital state of preservation; indeed, some few of them of the Kneller and Lely period look very much as if in parts they had been cleaned with fresh paint! This should not be allowed.

We ought not to omit to say, in a notice of Woburn, however brief, that the rooms occupied by her Majesty the Queen and the late Prince Consort on the occasion of their visit to the Abbey in times gone by are maintained precisely in the state they then were. In another part of the Abbey we have the cane used by King Charles II. Posterity would be glad to find in the rooms to which we have referred some personal memento of the "Blameless Prince."

The gallery of marbles includes a number of remarkable antique reliefs and the celebrated Lanti vase, found in Adrian's villa at Tivoli, and purchased of the Lanti family, into whose possession it had come. This vase, of Parian marble, is 6 ft. 3 in. in diameter and 6 ft. in height. Another remarkable antique there, is a large sculptured marble sarcophagus, brought from the ruins of Ephesus, and sculptured with groups setting forth the death of Patroclus, the binding of Hector's body to the chariot of Achilles, and other cognate incidents. Saw in pieces, according to the story, it was built into the wall above the entrance-gates of the modern Ephesus, whence it was obtained, after some difficulties, by a determined Englishman. There is so striking a difference in the work of the two sides, and such discrepancy in the mouldings, that a critical examination is still needed. Near these very interesting remains is a fine mosaic pavement, formed out of the fragments of a larger one discovered in 1823 about a mile from Rome. The design includes a tiger chasing a bull, and some heads, probably intended for those of river

gods. A small draped head of a Roman lady, close to the border, is especially charming. This pavement was put together by the late Sir Richard Westmacott, who has left here many specimens of his tasteful skill. Thorwaldsen, Canova, and Flaxman are also well represented. We may not, however, stop to speak longer, and the gardens, the greenhouses, and the quaint Chinese dairy must be passed without a word. We have already said enough to show how much there is here to justify a visit. The town has also something to interest, if it be but in the fact that some hundreds of cottages of a superior kind have been built about it by the present and preceding Dukes. The aspect of it at night is especially picturesque. Wandering there in the moonlight, one feels the strength and the value of Night,—

"In her starry shade,
Of dim and solitary loveliness,
We learn the language of another world."

The silence, were it not for a nightingale, would be intense;—

"But she supplies the night with mournful strains,
And melancholy music fills the plains."

The market-house was rebuilt in 1830, under Mr. Edward Blore; so, too, was the church mainly.

A visitor to Woburn, making Leighton Buzzard (vice Leighton Beau Desert) his head quarters, would find many pleasant places about to occupy a second day. Leighton itself has an old church and old cross. Stewkley Church is a very interesting, unmix'd Norman building, with good west front of the usual kind. The tower was damaged with cement some years ago. More recently the interior has been repaired and set right with evident care and good feeling. In the chancel, which is vaulted and groined, some little more might have been done, the arch of the east window being much disrupted. In early times, before Britton or Rickman had begun to work, this was one of the churches always termed Saxon, but it does not present any difference from buildings in England known to belong to the Norman era. Wing Church has a Norman arcade, and a polygonal apse, with narrow pilasters on its outside, and is altogether a curious building, worth a visit. There is a large Corinthian monument here, with sarcophagus, in memory of Sir Robert Dormer, dated 1552, rather an early period for such work in England. The roof is flat, with carved figures at feet of principals, and there is a chancel screen. A brass, dated 1648, and inscribed to "Honest Old Thomas Cotes," is curious. Wing is one of the places said to have been forfeited by the Hampdens, in consequence of a blow received by the Black Prince at Great Hampden:—

"Tring, Wing, and Iringhoe,
Hamden did foregoe,
For striking of a blow."

Mentmore, the mansion built by Paxton for Baron Rothschild, and illustrated in these pages at the time, is close by; and so, too, is Eddlesborough Church, with its painted chancel-screen and lofty carved canopy over the pulpit. There is a handsome Decorated east window here, and the spandrels of the nave arcade are painted.

The most important architectural monument, however, to be found in the neighbourhood is Dunstable Priory Church, which has long been in a sad state of decay. Some years ago money was raised, and the south aisle, a fine piece of Norman work, was rebuilt. More recently it was found that the roof threatened a catastrophe, and that, unless efforts were made, the exterior would go to ruin. Subscriptions have been raised, and, under Mr. G. S. Clarke, the works are now being pushed on, but cannot be completed without further assistance. The west front of this church is remarkably picturesque and striking. The main entrance, interlaced arches, and other parts about it are Norman; the rest of the front is Early English, suggesting Salisbury and Wells.

The body of the church, apparently only the nave of the original structure, is Norman, of noble proportions, and much of this is now put into a sound and excellent state. In restoring the clerestory, Perpendicular arches have been placed within the Norman arches, and both being equally new and perfect, the conjunction is not agreeable. The wisdom or otherwise of this step depends on circumstances with which we are not fully acquainted. We find no fault, therefore, but point attention to the matter as one of those points in restoration that demand most careful consideration on the part of the architect before decision. An extension for chancel is needed towards the east, and the opportunity is afforded for making it, if sufficient money can be raised. The whole county ought to feel interested in the preservation of this most interesting structure, and give willing aid to the committee who have taken the matter in hand.

This Dunstable was probably the *Mogio Vinium* of the Romans, and certainly the *Dunstable* of the Saxons. Henry I. chartered it; he commenced the Priory Church in 1131; and it was dedicated in 1213 by Hugh, Bishop of Lincoln. It was in this church that Cranmer read the sentence of divorce against Queen Catherine. One of the earliest theatrical performances, "The Miracles of St. Katherine," took place in this town, in 1110. Kings and Queens have met in it, and great tournaments have been held here. Straw bonnets have kept its name before the world far and wide, and notwithstanding the shrinking of the female head-covering, and the adoption of silk, lace, a rose-leaf or a postage-stamp as the material, here and in many of the towns and villages around, few of the female part of the labouring population are to be seen without a mouthful of straws and their hands hard at work, plaiting.

Going as far to the north of Woburn as Dunstable is to the south, Olney, the home of the Poet Cowper, is found; where he kept his tame horses, and to which he refers so often in his letters. But we might run on and on, or right or left, never stopping for want of objects to interest; for all England is sprinkled over with instructive memories and beautiful memorials.

THE CENTENARY EXHIBITION OF THE ROYAL ACADEMY OF ARTS.

WITH more or less delicacy and accuracy of taste, more or less education in the practice or in the principles of art, or in such a command of technical language as reduces it to the level of slang, and more or less palpable or inexcusable bias, critics and correspondents of every calibre have opened fire upon the Exhibition of the Royal Academy for 1868. It is obviously easy to treat a collection of 1,200 pictures and sculptures in almost any style that may suit the temper of the writer or the taste of the public which he addresses. The old story of the handsome and the deformed leg can never be more applicable than in a case of the kind. In so large a number of new works of art it is almost certain that, wherever the exhibition might be held, the majority would be below mediocrity. Even in the case of great artists and of great works perfection is but rarely attained. Where perfection is absent there is always room for criticism; and not only so, but if actual perfection were attained it would infallibly be assailed by pseudo criticism.

While it is thus easy to increase the inharmonious Babel of sound that is now echoing from the daily and weekly press on the Exhibition of the current year, it may be more useful, as well as more agreeable, to point out some of those features as to which, we venture to think, educated students of art, unbiassed by prejudice or personal motive, cannot very widely differ. Whether the average merit of the Exhibition be higher or lower than in former years, there may be room for an honest difference of opinion. A reliable judgment on the subject can only be arrived at as the result of a careful criticism of every picture. Again, there are paintings in which there may at the same time be much to admire and much to condemn. There may be others which, whatever be their intrinsic merit, strike us chiefly as being either better or worse than was naturally to have been expected from their authors. On all three points there is room for a wide, and yet not uninformed, difference of taste, as well as for the expression of opinions which, if they are honestly formed, are dictated

by anything but cultivated connoisseurship. But there are some points on which agreement must be almost unanimous.

In the selection of his subject the artist, whether he be painter or poet, has to encounter his first and main difficulty. This is also the portion of his task to which, judging from results, he appears ordinarily to have paid the least attention,—to have arrived by haphazard. While a wide difference of style and of subject is open to the painter, there are certain limits which he can never overstep with impunity, but which we find him often overstepping in point of fact. The artist, or the portion of the public for whom the artist labours, may prefer this or that walk of art. He may be accrate, or even ennobling, as a portrait-painter; he may photograph nature with the happy pencil of Linnæus; he may portray domestic life with the painful fidelity of Faed's "Worn Out;" he may attempt historic composition, a style of work almost entirely absent from the walls of the Gallery on the present occasion; or he may take us into the regions of Fancy and of Romance, in which there is nothing to approach the heauty of the "Fairy Changeling" in last year's Exhibition; but, whatever be the power with which he can handle his brush in either of these great departments of his art, his success—his permanent success—will always be dependent on his adherence to certain great canons of his craft which he will not find inscribed on the tablets of the Academy.

Taking that department of painting in which photography, or the actual delineation of nature, has perhaps attained its greatest triumphs, and in which the artist has thus most closely contended with the mechanic, there are two or three pictures now before us which would do credit to any school of painting, at any era in the progress of art. Such is "Christmas Morning, 1866," No. 624, a sea piece, by Brett. It is hard to tell whether most to admire the judgment of the artist in the selection of his scene, or the perfect mastery of his craft by which the aspect of the moment is depicted. There may be many persons who do not much care for landscape, others who do not like sea pieces. Let such persons turn to subjects they prefer; but none the less may it be said without fear of contradiction that of its class this picture is a gem of the first water. A man may have been much at sea without having the opportunity to remark the peculiar swell, and, so to speak, texture, of the wave here seized and represented by the artist. Having once witnessed such a scene, he knows and admires the truth of the reproduction. It is not readily conceivable that, by any artist of any school or age, a real bit of marine scenery could be more faithfully and more successfully represented.

A contrast to the lurid stormy sky, and angry reflecting water of Mr. Brett, is the clear heat of the desert atmosphere given by Mr. Herbert in his "Valley of Moes" (No. 138). The purple shadows thrown on the ground by the advancing men and camels denote the early morning hour at which the landscape is delineated. The great heat of the day has not yet come on; but you see what it will be. The livid outlines of the distant mountains, fanciful as they may seem to those who have never drunk of the water of the Nile, or been wet by the salt spray of the Mediterranean, are such as are only defined by a sub-tropical sunlight. As you gaze quietly, with half-closed eyes, on the canvas, the stillness of the desert life comes upon you. These two pictures give us two aspects of Nature under her almost widely opposed conditions, and each is admirably in its way.

Another very remarkable picture, as to the merit of which there can be no question, is "The Calvary" No. 402, by E. J. Poynter. The red-hot iron head of the missile weapon is a perfect representation of the metal at the moment when the first scald that follows the removal from the furnace is just beginning to form. It is not an easy subject to paint. The success is perfect. The whole picture is full of antiquarian research, no less than of artistic merit; but we point rather to the feature which is unique, and which betrays the patient and careful attention which the artist has devoted to enable him to give the stamp and impress of truth to an imaginative work.

Very different in its mode of handling, but equally remarkable for its truth to nature, is the lantern in the "Pilgrims to St. Paul's" No. 356. The picture itself is a noble one, the expression of the two old shipmates of the great admiral is admirably conceived and adequately rendered.

The one seems to say,—"Ho is gone, his dust is here!" the other,—"All of Nelson cannot die, he yet lives." The gloom of the scene, the play of light on the faces, the general effect of the picture, all happily harmonize, but the flame of the candle, refracted through two of the glass plates of the lantern, inclined to one another, is what we have never before seen thus attempted in painting. Indistinct, it may be called, but you have to shade your eyes to be convinced that it is not actually dancing before you. You do not see the prim, decorous little pyramid of flame, with its black wick and its blue base, and its yellow top, but a confused, hazy, reduplicated image, which has no distinctness except the distinctness of reality. In the scene you trace the element of sentiment,—a sentiment that could not fail to touch the mind even if less artistically rendered. In the lantern there is nothing but a careful study, and scientific reproduction, of a very humble phenomenon. But it is one which more completely impresses on the imagination the idea of motion, and the reality of combustion, than any representation which we can call to mind. Millais has lighted his candle as Poynter has red-heated his iron.

It should be observed that the pictures of Mr. Millais are remarkably dependent not only on the light, but on the distance at which they must be viewed. When seen close they altogether lose their due effect. In the crowded rooms of the Academy this is a great misfortune to an exhibitor. If you attempt to view his productions from the only distance at which they are excellent, so many less careful observers come between you and the wall the you can only catch a glimpse of a portion at a time. Probably there is no artist who suffers so much from having his works exhibited under such circumstances as Mr. Millais.

The human interest which is excited by the reverent sorrow of the pilgrims to Nelson's tomb is turned in another direction by the charming scene of "Sterne and the French Innkeeper's Daughter" (No. 167), W. P. Frith, R.A. The pathos of the two faces is admirable. The half-veiling, half-teasing aspect of the unworshipful sentimentalist—the inquiry of "Have I gone too far, or shall I go on?" which is expressed in his face—the character of the mirth, curved and unknickered, not by the honest laugh of fun, or even the smile of sly badinage, but betraying a sense of impropriety that underlies the effort of wit—is admirably balanced by the patient, weary, enforced attention of his lovely listener,—the tacit rebuke of her countenance, before which the jibe of her tormentor would have shrivelled, had his delicacy been anything but the delicacy of self-love.

Another branch of imaginative portraiture given in the two companion pictures, the "Mater Purissima" and the "Mater Dolorosa," by J. Goodall, R.A. So lovely is the first, so delicate yet majestic in her loveliness, so appropriate the action by which she presses the offering to the Lord to her bosom, so dark is the depth of those eyes which kindled at the Ave of the Angel, that we cannot but regret that the artist should have given his time to the delineation of the companion picture. It is true that the "Mater Dolorosa" is, evidently, the work of a master, but it is, of intention, an unpleasant work. It is one of those subjects the delineation of which can only be excused by the presence of a strong religious sentiment, or rather sentimentality, for which, happily, the air of England is not healthy or encouraging. There are points of great excellence, no doubt, in the picture. The contrast of the hues of the dress and of the flesh, the disarrangement of the latter overlooked in the deep sorrow; even to somewhat too much advanced position of the wrung hands, demand a respectful verdict from the critic. But why present to us so lovely a face, marred and made unlovely by the passion of sorrow? Why spoil the portraiture of the calm and dreaming virgin mother, by teaching us that her beauty could be so withered and destroyed. It has been remarked, and justly, on these pages, that the difference of age between the two epochs selected by the painter has been lost sight of. Thirty-three years elapsed from the Easter of the Nativity to the Easter of the Crucifixion. If the tradition of the Roman Church be adopted so far as to fix the age of the Virgin at the earlier festival at fifteen (and the Mater Purissima must be three or four years older at least), the second scene must be represented by a person of nearly fifty, a period of life when, on the borders of the Mediterranean, a woman looks as old as at sixty-five or more

England. This simple reflexion shows that the artist has erred in attempting to contrast the two phases of one life. In seizing on what is painful, he has lost very much of what is dignified, and has entirely contradicted possibility. His power is so great, that it induces a wish that the second picture had not been exhibited.

If we pass from hagiology to mythology, it is impossible to repress the admiration excited by Leighton's "Nymph of the Shore" (No. 522). Not that this is a picture by any means beyond criticism; but it is one that charms, not as being faultless, but in spite of faults. It shows a great advance in the mastery of his art from the figure, "Unrobing for the Bath," of last year. It is a picture involving contradictions, which, like the charming inconsistencies of the feminine character itself, perhaps heighten our imaginative pleasure. Nude with a boldness rarely ventured on by the painter, it is pure and delicate. Carefully drawn, there is yet an angularity in the position of the hip that wars with the line of beauty. The landscape is the very shore of the Mediterranean, photographed in living colours; but it is enlivened or deformed by imaginary dolphins swimming as never fish—we beg pardon, dolphins are not fish, aquatic mammals—swam, and of the colour of a Rockingham toad. If they are put in for the purpose of heightening the ideal into the impossible, their presence may be accounted for, not justified—otherwise it is inexplicable in a picture which, with all its faults, refuses to depart from the memory, or to cease to delight the imagination.

The Ariadne is open to more discussion. Not in the whole, a pleasing picture, but chiefly so in the ground that death is not a germane subject for the pencil. Study, thought, art-imaginations, are all there. Had she only slept she would have been charming. Dead, there is much that grates on the feelings. Why will artists rush into that awful presence that dwarfs their genius and chills their hues?

Another presence,—not that of death, but of the Destroyer of death,—has been attempted with the invariable failure. In the "Disciples of Emmaus," No. 288, by C. W. Cope, the form and especially the face of Peter are very noble and appropriate. The figure of Peter's Master, modelled on a well-known Medieval model, suggests a rebuke to those who rush in with angels fear to tread,—the rebuke which, where rarely an exception, they have drawn down on their own heads.

There are some pictures which charm the observer rather by the ideas which they suggest to the mind than by the very high merit of their execution. They are the works of men who have taken at least the first step towards the highest excellence,—the selection and appreciation of pictorial incident. Such are the "Empty Sleeve," No. 657, by G. D. Leslie, A., the "Escape of the Countess of Morton to Paris with Henrietta, infant Daughter of Charles I.," E. Hicks, in which the patrician beauty of the countess, the struggle between her offended pride and delicacy and the exigency of the situation, the rude unchecked admiration of the soldiers, the angry glance of the disguised nobleman, the horror of the chaplain, and the unconscious occupation of the party at drill, all the story most forcibly and most happily. No. 672, "The Orphans of Charles I. at Rushbrooke," by J. Hayllar, is another of the same kind. A greater contrast between a sentiment that touches the heart with pathos, and that which only excites a repulsive feeling, is not readily to be found than between this fine group and the next one in the catalogue,—the "Queen Mary, after execution, cast on the ground before the empty throne. Under the C. Calderon." Pictures must be ranked those of passion which they leave on the mind, rather than for delicacy of touch or accuracy of finish, though considerable advance has been made in the artist in these respects. You cannot help hearing the hearty laugh of the lady who dandles the little baby which is to grow up into the "of the hoy's ride, and at the admirable way in which the jester paws in the character of a . . . You want the artist to explain that which he only suggests in "Whither?" But you wish to wish that Mr. Calderon, as well as Mr. . . . were less faithful to their models. To the same face so constantly reappear serious and wearisome. The arch look, the well-lined mouth, showing the shapely teeth, which comes out of all Calderon's pictures, is very

pleasing in itself; but when we see it year after year, in new dress and new scenery, we think that the artist limits his range in an extremely disadvantageous manner. The same may be said of most of the female faces of Millais. Rosalind and Celina, in drawing whom there is room for the most charming contrast, are the same person with different coloured hair. Even in "The Sisters" (No. 6), the same face, rather physiognomically than artistically admirable, again haunts us. If Raffaele had thus drawn all his virgins and saints from a single model, the world would have become extremely tired of the performance. The "Rosalind" is nevertheless a delightful work.

In speaking of truthful delineation of nature we must not omit to mention the "Chevy" of Sir E. Landseer (No. 347), which does everything but bark. In the "Rent Day in the Wilderness"—rather a straggling picture—the dogs are also quite alive. Sant has shown equal mastery of a nobler subject than the dog—his children are almost always charming. We also call attention to No. 188, "Custance sent adrift by the Constable of Alla," by P. F. Poole; No. 236, "Home News," by G. D. Leslie; No. 467, "Sion House, 1553," by Mrs. E. M. Ward; and No. 477, "In the Glen, Rathfarnham Park," a remarkable work by F. Walker, "A Fleet Wedding" (No. 269), by E. Crawford, Fritch's scene from "She Stoops to Conquer" (No. 340), Burgess's "Stolen by Gipsies" (No. 391), Hook's "Are Chimney-sweepers Bisk?" (No. 434), Hodgson's "Chinese Ladies looking at European Curiosities" (No. 453), Marks's "Experimental Gannery in the Middle Ages" (No. 494), Nicol's "Waiting at the Cross Roads" (No. 504), and the same artist's "China Merchant" (No. 531) are very lively and faithful pictures.

After, but not at a very great distance from, the sea swell of Brett, and the desert glow of Herbert, we may mention the "Corinth" of Mr. H. Johnson, in which the gleam of the distant sun on mountain peaks, seen between the columns of the fallen temple, is a real bit of Mediterranean landscape. Linnell's "English Woodlands" (No. 17), Cole's "Sunlight lingering on the Autumnal Woods" (No. 298), Redgrave's "Ancestral Woods" (No. 530), are beautiful bits of English scenery.

"Herod's Birthday Feast," No. 520, by E. Armitage, if not altogether a pleasing is a powerful and able work. The outline of the tyrant's face has probably been taken from the profiles of the Macedonian kings; the air of bloated and relaxed inebriation, though repulsive, is marvellously expressive. So is the eagerness with which every eye is turned upon Salome, evidently from the attitude of the spectators rather than from her own, at a critical moment of her display. The attention excited in the experienced tambourine-player is eminently suggestive of the skill of the dancer. The only two exceptions to the general inteness of gaze directed to the dance are to be found in the evil face of Herodias, who is watching not the performance, but the king, and in the superb contempt with which the fine old Jew behind the throne glances on the tipsy youth who shouts as he claps his hands. The brown complexion of Herodias, which has descended to her daughter, is hardly that of a woman who could have established such an empire over one of the hearty-loving Idumean kings of a land abounding in female beauty.

We have left till the last one of the most remarkable pictures in the exhibition as being one as to which, while criticism may have somewhat to condemn, taste finds much to admire. The wonderful exuberance of detail in "Madeline after Prayer," No. 685, by Maclell, diverts the eye from the beauty of the form and face of the girl herself. Why an artist should crowd his canvas with such innumerable items of millinery and upholstery, exquisitely as they are painted, is only explicable on the idea that he revels in his command of the brush. We have seen apartments nearly as crowded as is the scene in which the girl's bed is made, but it has been only in the houses of extremely wealthy Jews, where, with all that money can command, there usually lingers rather a strong flavour of the commercial genius. Such would not be the scene to tempt the visit of St. Agnes. With a modest protest, therefore, against the wealth of embellishment, first as inappropriate in idea, and then as calling the attention away from the principal figure, we cannot but speak in the highest terms of the finish of the whole painting, as well as of the beauty of the figure. If fair St. Agnes herself had sought a limner, she

could not have been more charmingly drawn. And again, when the eye has become so accustomed to the detail as to take in merely the rich colouring without glancing to the subordinate forms, the mode in which long acquaintance with the subject, no doubt, led the artist himself to regard it, the objection almost entirely disappears.

It cannot be fairly urged that an exhibition including such works as we have named, and many other lovely landscapes and agreeable domestic scenes, is altogether unworthy of marking the centenary of the Royal Academy.

TECHNICAL EDUCATION FOR THE WORKING MAN FROM AN ARCHITECT'S POINT OF VIEW.

UNDER this title the first of a series of lectures illustrative of the value of science to industry (to which reference was made in our last) was delivered by Professor Kerr, of King's College, on Tuesday evening last, in the London Mechanics' Institution, Southampton-buildings, Chancery-lane. The chair was occupied by Mr. Edward Hall, F.S.A.

Professor Kerr said that in standing up to address an assembly of working men on the question of their own education he felt that he was addressing those who were earnest in the cause, and who, without affectation, were bent on something practical; and that, therefore, he should best consult his feelings by proceeding at once to what he proposed to do. In the outset, he proposed to divide his lecture into three parts,—first, to endeavour to describe generally the nature and position of the present movement; secondly, to treat the movement from what he called the architect's point of view with reference to the working man, apart from the architect himself; and, thirdly, to take the architect's own point of view. First, then, with regard to the movement itself, as tending, in this country, in favour of technical education. In his opinion, the movement had its rise, primarily, in political changes in the past year. They had not met to talk politics; but, as a matter of fact, it was to be borne in mind that last year a very important change was made politically in the enfranchisement of the working-classes. This was effected in a very unusual manner in respect of the change in the position of political parties. It became necessary for the party who had been turned out of power to endeavour to regain power by some measure of public importance; and, as it seemed to him, that which was called a "cry" in such circumstances was found to be the question of education. But, as education had already been a cry for many years, it was thought desirable to import into it a little novelty; and, therefore, instead of "education" generally, it was "technical education" that was launched. They had been led to expect that a great deal of legislation would take place in the present session of Parliament respecting that class of men who had been suddenly elevated to political importance. The matter of technical education was taken up by the Government Department of Science and Art, generally identified with the museum at South Kensington, as regards its special function for technical education. Science and art, as a matter for Governmental action, was simply synonymous with technical education, the promotion of which was the very purpose for which the South Kensington Museum existed. The Society of Arts was appealed to, but that Society was now amongst our old-fashioned institutions. It was established originally for broad purposes—for the cultivation of science and art at large; but its original purpose was in a great measure gone, although it was still a very useful society, and, in a case of this kind the proper court to go to. The discussions which took place in the Society of Arts were characterised by a want of practical hearing on the subject in question. The class of persons most prominently represented on the occasion was, perhaps, politicians—noblemen and gentlemen of position, who were present to support the movement from their own point of view, which was a political point of view. They looked upon the people, not as a people to be educated, but as a people to be worked upon for political purposes—purposes, no doubt, entertained with the very best motives, but guided by a peculiar organisation of political life. Therefore, although there was a great deal of common sense in what the Society of Arts did, it failed exactly to hit the

mark. The working classes required that the question should be dealt with more earnestly and practically. Of those who attended the discussions, a portion also were philosophers, some of them men of great name, who made profound and eloquent speeches no doubt, but who were theorists. Their speeches ended in nothing. In the hard sense of practical life they had no proper bearing on the subject under discussion. Another class of persons who took up the subject were philanthropists. Human charity was not to be disparaged; but England had arrived at that stage in the existence of nations when philanthropy with a certain class of persons had become very much a matter of credit; and certainly, in the present instance, the speakers indulged only in vague declamation. Lastly, there was another class of persons who took up the question—those representing the manufacturing interest. Gentlemen had come from the Midland counties to represent the manufacturers of their several localities. They had a much more intelligible tale to tell, and they told it in plain language indeed. They looked upon themselves as employers of what was called labour. They had a variety of goods on hand for the market; they found that foreign dealers in labour were outbidding them in the quality and price of those goods; and, investigating the matter with the view of discovering the reason why they were thus being bid out of the market, they came to the conclusion that their work-tools, so to speak, were not good,—that the tools of the foreign workmen were better. They therefore appealed to somebody to find them better tools, better workmen, and a better class of foremen, who should be equally well qualified with those of their foreign competitors; and they said, "If you will supply us with these tools, then we will restore to England its supremacy in the market." The result was that, in answer to this appeal, only a very vague purpose was expressed,—a purpose of elevating, by some means not clearly defined, the educational character of the English workman generally; and, when it was considered how the funds were to be provided for these measures, the conclusion arrived at was, that these funds were to be provided out of the taxation of the country. The practical result of the conference of the Society of Arts was, that something was to be done which was called the education of the working classes technically, and that this was to be done at the public expense. A committee was appointed, and that committee was about to sit on the basis he had described. It had become obvious that the artisans themselves ought to take the matter into consideration. Seeing that their particular interests had not been fully represented in the discussions that had taken place on the subject, it was proposed that they should enter into discussions of their own. He felt bound to tell them that he had no great expectations of practical result from the discussions of the artisans themselves. Straightforward, honest speaking, he believed, was always the rule in the meetings of the artisan class, and therefore if he should speak at variance with his audience he had no doubt they would forgive him. He did not expect much practical result from the discussions of the workmen themselves on account of various circumstances; although at the same time he was decidedly inclined to support such discussion, believing as he did that it would be earnest and unaffected, and devoid of many distracting elements which were involved in the discussion by others; and if the discussions of the working classes had no direct practical effect, as regarded any public measure, they could do no harm. On the contrary, they must do a great deal of good in the way of prompting and inducements to individual exertion. What, then, was meant by the proposal for technical education? Primarily and properly, it signified that for vocations more or less learned a theoretical training in youth should be provided. However, at the present moment, popularly, the question took four forms, of which that was perhaps only one. First, there was the education afforded in science and art in the universities and public schools of the country. It was said that, although our higher classes were educated well in a particular way, they were not educated well in another particular way—that, whilst on the Continent science and art were included in the ordinary course of education for well-educated men, here, although not positively excluded, they were overlooked; and that therefore we were not on an equal footing with our

Continental rivals. There was a general demand for science and art in the Paris schools. There they said, "Let us not confine the education of the more humble classes to the three R's, good as these are in their way; but give us a little of scientific and artistic knowledge, so that even the common classes of the community may be possessed of that intelligence which arises from some acquaintance with these accomplishments." A third form of the proposed technical education was, that there should be a better training in England for professional men, and in this respect theoretical training was very much behind that on the Continent. Fourthly, and lastly, there was that particular form of technical education more immediately under consideration—technical education for the artisan. What, then, was this technical education for the artisan? It was that elementary education in youth which should be brought to bear upon the artisan's particular trade, so as to make him, intellectually and theoretically, more powerful and accomplished than he was at present. In this respect it was urged that on the Continent, as in France and Germany, the workman acquired a theoretical education, which was not afforded in England; and that if the English workman could be possessed of that theoretical knowledge which his foreign rivals enjoyed, more particularly in art-workmanship, then he would be able to compete with foreign workmen upon their own ground, continuing at the same time to excel on English ground in that peculiar instinct which the English workman possessed, and which the architect's point of view; and first, as to the architect's point of view, the present instance of the architect's point of view, the architect, as chief of the workmen, was not so liable, as in the case of other professions, to lose the sympathies of the class over which he was placed as director. There was something which always bound the architect and the workmen of that profession sincerely and honestly together. The position of the former was always recognised by those who were under him, and there were no disparaging interests between them. That was a very favourable condition of things for the architect in taking his particular point of view with regard to the education of the workman. The architect was better appreciated by the workman than he was by the member of Parliament. The discussions which took place in the House of Commons were very often considerably wide of the mark. Certain gentlemen seemed to make it a matter of great amusement, not only to disparage, but to ridicule the architect, whenever occasion offered; and, to believe those detractors, the architect in England was a mere ignoramus as compared with the foreign architect; whilst the buildings of the former were mere rubbish as compared with those of the latter. There was a reason for this antagonism among certain classes in the Legislature, as there was a reason for such antagonism in most other cases. The architect was possessed of a certain sentiment—sometimes amiable, sometimes not, but always a sentiment working out a very good purpose. There was also a good deal of amateurism; and therefore it was scarcely to be wondered at that the architect should present an object for disparagement to a certain class of minds. The architect was no dealer in the market, no speculator, no politician, no philosopher, no philanthropist, strictly speaking, and he was no manufacturer. He was a mere director of the work, and practical co-operator with the workman, and therefore the sympathies of the two had always been and ever would be preserved. Again, the architect possessed in his own profession a singular combination of characteristics. He was at the same time a man of science, a notary of art, and a man of business,—a combination to be found in no other profession. The architect was quite as much a man of business as the engineer, using bricks and mortar in one way as the engineer did in another, and being associated with him in the Royal Academy of Arts. His art was called "the queen of arts;" and, finally, he was quite as much a man of common sense and shrewdness in business as the builder. Combining these characteristics, then, the architect was peculiarly suitable for looking at the subject in question in a practical point of view. The technical education of the architect himself afforded a very good illustration of the technical education of the working classes. In the existing contest upon the subject there was one class of thinkers in favour of what was called the English system, and there was another in

favour of the Continental system. In the former case, the workman had to spend four or five years in passing his pupillage, in the same way as in passing apprenticeship. The master did not undertake to explain anything to him, but he must have him working upon practical business; and the argument was that if he did not learn to transact business he was a fool. That was the English system, without any hyperbole. The consequence was that when a young man after having served a pupillage in the office of an architect, when he had at last an opportunity of commencing business on his own account, he was chargeable perhaps with being somewhat empirical, although those who accused him of working by the "rule of thumb," might have a good deal to say in his favour. In France, when the pupil left school at Paris, and was destined to be an architect, he went into the workman's room to be under a man who undertook to teach him, and who carried him through a regular course of study from beginning to end, teaching him to draw, to design, and, it might be, also to construct. At the end of this course of study, the young man passed a Government examination; if he did not pass he had to go back and try again; but, having passed, he was furnished with a diploma, which served as a certificate to the public that the man was competent to be entrusted with architectural business. All the while he had done no particular work at all, and when such a man at last got into practice he did so by the aid of the Government, which employed him, and promoted him from one position to another—such being the way in which professional progress was made in France and in Germany. And what was the result? The man was educated—had his mind filled with theory,—but was deficient frequently in practice, and was entirely dependent on Government patronage. These things pointed to a difference of national character as between England on the one side of the Channel, and France on the other—a difference which every Englishman ought to understand. Narrow as the Channel was, it divided two distinct types of human intelligence which it was questionable whether centuries would bring into harmony. The systems which prevailed here and there were radically different. On the one side, there was what was called paternal government; on the other hand, not paternal but fraternal government. Under the paternal government our neighbours had all the advantage to be derived from systematic action in the mass, to whatever purpose the human energy might happen to be turned; but on our side we had everything that was to be derived from individual opinions; and from that personal self-reliance, personal self-confidence, and personal enterprise which carried Englishmen all over the world. The American practice was precisely the same as our own. The Americans had copied the French in many things, but not this. In America everything was fraternal, and a little more so than with ourselves—no superseding us in that system, but only carrying it a little further. With regard to the results of the two different administrations, existing on opposite sides of the Channel, there were provided in France schools more or less free of charge for all work,—men who chose to take advantage of them; and any workman in France might obtain a theoretical education under this paternal system, which made it the duty of the Government to find him in every thing, as opposed to our own system, according to which the individual was expected to find everything for himself. The Continental workman was much more theoretical than the English; his intellect was, perhaps, more keen and facile; but in instinct was not so practical, and was, in point of fact, comparatively feeble. The English workman might be empirical, but he generally managed to make his instinct go further in the end than the foreigner's intellect. With regard to our English Department of Science and Art, the Museum of South Kensington was an institution of which England might justly be most proud; it being, he believed, the best museum in the world. It contained a great deal of surplus matter, but still a great deal of most useful matter not to be found anywhere else; and yet it was very questionable whether the South Kensington system was at all calculated to succeed in England. The system possessed powerful friends, but it also possessed considerable enemies; and the reason of the want of success was to be found in the obvious want of accord with that English sentiment which lay at

root of all our operations in this country. There was a certain paternal character about the Department; and he was not prepared to say that it was easy to suggest a better plan, but, although not able to suggest an improvement, one might perceive a defect; and it appeared to him that the defect consisted in this, that there was a certain kind of what might be called Cesarism, copied from the Continental régime, which was independent of all matters of government as forming the essentials of our system. Therefore it was that the South Kensington Museum, with all its advantages, should be found not to succeed in this country; and if any institution of the kind was devised so as to be perfectly successful in the matter of technical education in England, it would have to be devised so as to fall in with what he had no objection to being called the prejudices to which those principally concerned had been accustomed, and which they were slow to surrender.*

A FRENCH BIOGRAPHY OF CELEBRATED ARCHITECTS.†

The venerable French architect, the late M. Alexandre Du Bois, had commenced the preparation of a monument to the memory of the great, in the form of a grand biographical work, which was to record the labours and occurrences in the lives of French and foreign architects, when his death, in his eighty-first year, put an end to his project. But since that event, which took place in 1866, the materials he had collected have been placed in the hands of M. Charles Lucas for completion and publication. The work will appear in instalments periodically, and the introductory number, completed under these auspices, is now before us. After a modest bow to the public, which, rendered into writing, runs to the effect that, if left to himself, he should not have dared to attempt the accomplishing such a magnificent scheme, mixed with expressions of gratification on being called upon to carry out that which so great a genius had conceived, M. Lucas commences his task with the biography of the founder of the work, for whose memory he entertains the most affectionate reverence. In the ordinary course this would have been deferred till his name occurred alphabetically; but his continuator, who calls himself his disciple, asks sympathy for the feeling of filial piety which compels him to place it before all others.

Alexandre Du Bois was educated first at the Central School, and subsequently at the Polytechnic, in Paris, and at an early age obtained the chair of mathematical professor at École Militaire, which he held for three years. But an intense admiration of architecture led him to place himself with MM. Le Bas and Debret, under whom he studied for some time. He next obtained a Government appointment, which he held till 1815, when, in the storms of that eventful year, he enrolled himself among his former fellow-pupils of the Polytechnic School, as one of the defenders of Paris. On the subsidence of this excitement he returned to his appointment, and superintended the erection of the *abbatoy* of Grenelle, having, previous to the outbreak, directed that of Montmartre. When the Opera-house was entrusted to M. Debret, he appointed Du Bois one of his inspectors, and he seems to have been deputed to arrange the ventilation, heating, and the acoustic and mechanical requisites of the stage. After a visit of inquiry to England, he drew up a long report upon the construction of this work, addressed to the Minister of the Maison du Roi, in which his biographer finds striking proof of his wonderful union of the artistic faculty and scientific exactness. For thirty years after this M. Du Bois filled the post of Commissaire-Voyer of the first class to the Prefecture of Police, in which he exercised beneficial influence upon works relating to the health and salubrity of Paris. From his private works, which were very numerous, M. Lucas selects two for especial mention, the first being the hydraulic problem of the conveyance of water to the summit of the Butte-Montmartre, and the other the construction of the first gasworks, which were intended to light the

Tuileries, the Opera, and some buildings on the civil list. His other works were large factories for different productions, at Batignolles, Passy, Saint-Denis, Belleville, the Faubourgs of Paris, and an industrial city at Gros-Caillois, château, villas, numberless hotels, maisons à loyer, on considerable scales. He is accredited with especial success in monuments to the dead, expressing the idea of death, his biographer relates, in a noble and elevated manner quite opposite to the fantastical style affected by contemporary artists. M. Du Bois left a library of upwards of 20,000 volumes, without counting innumerable pamphlets, gathered together principally to assist him in the literary works he undertook. Before he died he finished a "*Bibliographie des Beaux-Arts et Spécialement de l'Architecture*," in three volumes; a treatise upon "*Stéréométrie*;" a "Dictionary of Architecture," in three volumes; a treatise upon the "*Comptabilité des Bâtimens*," in two volumes; and commenced the biographies of ancient and modern architects now under notice.

M. Lucas adds that it is intended to give only the lives of such architects as have been recognised as eminent either by Government, the public, or the profession; such as the chief architects of the public administration, the laureates of the exhibitions, the *pensionnaires* of the Academies of France and Rome, and the members of the Legion of Honour. The selection of foreign architects will be guided by a similar rule. A photograph of a medalion designed by M. Lucas forms the first of the series of illustrations. On this is represented a tumulus on which are piled wreaths of *immortelles* terminating in a summit formed by a pine-apple. Tradition, carrying a torch in one hand and a wreath in the other, stands on one side of the tumulus, and a branch of laurel balances the composition on the other. Around runs the legend, "*Ad memoriam majorum*." On the reverse are a lamp for tradition, hooks for science, a star for inspiration, a pencil for form, compasses for measurement, a pen for writings, and a palm for recompense, neatly grouped. Portraits of architects, both ancient and modern, are promised. As M. Lucas has enjoyed the assistance and support of several eminent persons, and has been assured of further encouragement as his task proceeds, we doubt not he will realise the idea of M. Du Bois, and make a "golden book" of the glories of the profession of architecture.

THE MYSTERY OF LIFE AND ITS ARTS.

On the 13th inst. Mr. John Ruskin delivered a lecture, under this heading, in the Concert-room of the Exhibition Palace, Dublin. In the course of it he said, ten years in the early period of his life were devoted to endeavouring to show the excellence of the works of a man whom he believed to be the greatest English painter since Reynolds. He had, then, perfect faith in the power of every great truth to prevail ultimately, and to take its right place for usefulness amongst men. Turner, during his lifetime, knew better than he did, and discouraged his views. His books, however, got talked about, and he began to hope for victory. The trustees of the National Gallery commissioned him to arrange 300 examples of the great painter's studies in the Kensington Museum. Accordingly they had been placed there; but they were not exhibited, for the room in which they hung was always empty. That showed him that ten years of his life had been practically lost. For that he did not much care; but what he did care for was to (to him) frightful discovery that the most splendid genius in art might be permitted by Providence to labour and to perish uselessly—that in the very fineness of it there might be something rendering it as invisible to ordinary sight as an Elysian mystery;—that the glory of it was perishable as well as invisible;—that the gift of it might be as snow in summer and rain in harvest. That was the first mystery of life to him. Amongst several personal reasons which caused him to give this prosing lecture in Ireland, one of the chief was, that in reading it he should be near the beautiful building, now their Engineers' School, which was the first realisation he had the joy to see of the principles he had been endeavoring to teach, but which, alas! was now no more than the richly-designed monument of one of the most earnest souls that ever gave itself to the arts—Benjamin Woodward. But it was not in Ireland only that he

received the help of Irish sympathy and Irish genius, for to another friend of his—Sir Thomas Deane,—with Mr. Woodward, was entrusted the building of the Museum at Oxford; and the best details of it were executed by sculptors born and trained here, and the finest window in the façade was carved from his design by an Irishman. The work they did together had, however, been vain. The architects they sought to introduce was inconsistent alike with the reckless luxury, and the deforming mechanism, and the squalid misery of modern cities. He could tell of other failures as years went on; but he would proceed to speak of the result of these discouragements. They were aware that the tendency of the minds of disappointed men was to say that life was a vanity—that its pleasures could be grasped in imagination only. The cloud was but a painted cloud after all. No one had more beautifully expressed that sentiment than Pope—

"Meanwhile, Opinion glides with varying rays,
Those painted clouds that beautify our days;
Each want of happiness by Hope supplied,
And each vacuity of sense by Pride;
These build as fast as knowledge can destroy:
In folly's car still laughs the bubble joy.
One prospect lost, another still we gain,
And not a vanity is given in vain."

But the effect of failure on his own mind had been the reverse of what was described by the poet. The more disappointing his own life had been, the more solemn and wonderful it had become to him. It had become to him no more a painted cloud, but a terrible and impenetrable cloud; not a mirage, which vanished as he approached it, but a pillar of darkness which he was forbidden to draw near; for he saw that both his own failure, and his success in petty things that seemed worse than failure, arose from the want of a sufficiently earnest effort to understand the whole law and meaning of our life, and to bring it to sufficiently noble ends. He saw more clearly every day that every success in arts, as well as in other occupations, had come from the ruling of all lower purposes, not by a conviction of the nothingness, but by a solemn faith in the glory of human nature, and in the promise, however dimly apprehended, that the mortal part of that nature would at last be swallowed up in immortality, and that, indeed, the arts themselves never had reached any vital strength or honour, but in the effort to proclaim that immortality. Nothing that he had ever said was more true, but had been more misunderstood, than that the arts could not be right unless their motive was right. Continually weak painters came to him with their paintings, and the only answer that he could give them was, that if they had expended twenty instead of two years upon their work, they had not mind or hand to succeed. But let the point be tested by men who did know their business, who had the hand and the gift, or might have it, and these should serve their nation faithfully with it; for it was a greater trust than ships or armies. Ships and armies might be replaced if they were lost; but a great intellect once abused was a curse to the earth. But what he meant by saying that the arts should have a noble motive was that they had never prospered but when they were devoted to the proclamation of some divine truth or law. Yet he had seen that they had always failed in these proclamations—that poetry, sculpture, and painting, though only great when they strove to teach us something about the gods, never had taught us anything trustworthy about them, but had always betrayed their trust, and with these powers at the full reach of them, become ministers to party and to passion. He had felt, also, amazement at the incurable apathy that was in us, hearers;—that while the wisdom and rightness of every art and act of life could only be consistent with a right understanding of the end of life, we are all plunged, as it were, in a languid dream, our eyes heavy and our ears closed, lest by chance any inspiration or voice should teach us, and we should understand with our hearts. This intense apathy was the first great mystery of life that stood in the way of every perception of every virtue. They had sent for him to talk to them about art. The one thing he had to tell them was, that art ought not to be talked about. The fact that there was a talk about it signified that it was ill done, or could not be done. The highest works of art were the silent productions of instinct which the possessor of it knew to be incommunicable, and the true critic of it knew to be inexplicable but through a long process of laborious years. They were all of them wild with enthusiasm about the work of Gustave Doré. If he were to

* The remainder in our next.

† *Bibliographie Universelle des Architectes Célèbres*, par Fen Alexandre Du Bois, architecte du gouvernement, membre du Conseil d'Hygiène du Département de la Seine, et Charles Lucas, architecte. Paris, Bureau, Rue Rochechouart, 55. Imprimerie Générale de Ch. Lahure, Rue de la Fosse, 1868.

tell them that that work was wholly bad—had not by failure, but with a dreadful evil, with a harpy power of pollution, and that as long as they looked at such art as that they could have no perception of any pure or beautiful work, would they look at Gnstavo Dore's pictures the less on that account? Rather more, he fancied. On the other hand, he could talk to them about good works of art, but they would be none the wiser for that. Art could not, like science, be communicated in that way. Art was the instructive and necessary result of powers which could only be developed through successive generations, and which only burst to light under social conditions of equally slow growth. Whole eras of history, and the passions of dead millions were summed up in the existence of a noble art. If such a noble art dwelt amongst them they should simply feel it and rejoice in it, and not care to hear lectures about it. Since it was not amongst them they had only to go back to the last place where the root and stock of it was yet alive. If they were to go back for germs of national art that had decayed, they should find a more signal example in Ireland than in any other European country. In the tenth century Ireland possessed a school of illumination which in all essential qualities was wholly unrivalled. He knew none that were equal to it for invention, finish, and refinement. The lecturer, in continuation, said he had seen much of the Irish character, and he thought the form of failure it was most liable to was this, that being generous, and wholly intending to do right, it did not attend to the external laws of right, but thought it must necessarily do right because it meant to do so; and then, when it did wrong without intending to do so, the consequences came upon it, and a sense of innocence and justice led it further astray than anything it would have been capable of doing with a good conscience. Mr. Ruskin concluded his lecture by exhorting his hearers to do useful work as a means of preparing society for the development of art. Let them not strive to feed, to dress, and to lodge all those who required such aid. These were the three first arts. All the fine arts came after them. In respect of dress, he laid down that persons ought to dress so that their rank should be known; and the changes of fashion should be restricted within certain limits. It was not by parliamentary measures that they would reduce the amount of the distress that was multiplying daily; but every one should ask himself this question, "How many persons can I feed, clothe, and put into wholesome rooms?" The elevation of the mind of the masses above that state into which their physical conditions had reduced them was also an essential preliminary to the future superstructure of art.

BUILDING MATERIALS AND THEIR DEFECTS.

In a letter recently published by "A Metropolitan Ratepayer,"* the attention of the Board of Management of the Metropolitan Asylum District was specially invited to the existence of very serious defects in building materials now generally used for the construction of asylums, hospitals, and other large habitations for the accommodation of the poor. The object of this writer, in the first place, was to make those defects obvious, and then to indicate the causes by which they were produced, so as to enable the managers of the Metropolitan Asylum District, in the erection of asylums and hospitals proposed to be built in various parts of the suburbs of London, at the joint expense of the several metropolitan parishes and unions, to avoid the committal of errors similar to those which have been actually productive of very disastrous consequences to the general health of the community, and, in many individual instances, have not only shortened life, but perverted it from continuous health to a period of intense suffering. It was to ameliorate the condition of the lunatic, imbecile, and afflicted poor, under the several forms of parochial management which had obtained legislative sanction, that the Poor Law Act of 1867 was passed, and the special constitution of the Board of managers was so framed as to represent the interests of all who were under legal obligation to provide the money proposed to be thus expended. The statement made by "A Metropolitan Ratepayer" respecting the defects in

building materials, which he described, has not been challenged; in fact, those defects have been virtually admitted by every one practically conversant with the subject. He, therefore, feels it to be his duty further to ventilate the matter, and suggest how, in his opinion, such proper materials as may be required in the formation of the extensive edifices which this Board of managers propose to erect at so large an outlay of public money may be best, easiest, and most cheaply procured.

After much consideration given to this subject, the writer is most decidedly of opinion that a large proportion of the pauper inmates of workhouse infirmaries, schools, and madhouses, and those who are generally termed able-bodied paupers, inasmuch as they are capable of performing the ordinary amount of workhouse labour, are there in consequence of ailments produced by damp or wet brickwork in the habitations they or their parents had previously now reside in are not altogether free. The poor man's house is generally built on low ground, not thoroughly underdrained, and the soil of the foundation being taken out to a depth of 2 ft. or 15 in., makes a lower trench to become a receptacle for such water as may run or leak from waterbutts, sinks, drippings from the roofs, or rainfalls soaking through the ground; water thus deposited under the foundation not only saturates the brickwork underground, but is drawn up in many instances 2 ft. or 3 ft. above the surface of the soil upon which the building rests. Where the gutting of the roof has been imperfectly executed, or has become in any way defective, the walls also become saturated downwards, and thus get soddened and waterbound, so that they are never again perfectly dry. Damp caused in the manner here described may be said to originate in malformation of structure, and not solely from the use of improper or defective materials, such as the mixing of saline particles with the clay of which the bricks are made, or in the mortar used for the purpose of binding them together. There are thus two sources of damp to which the dwellings of the rich as well as those of the poor are too frequently exposed, the latter more especially on the ground of cheapness.

It may be remarked also that the houses of the poor are generally built of inferior bricks. Not that old bricks should be universally condemned as useless, for some of them are much more fit to make a dry building than new bricks manufactured with brackish water, clay mixed with sea sand, or moulded with saline materials dragged from the river channel near to where the new bricks are made, or floating up to London in leaky barges. But bricks taken from the flues, kitchens, old drains, cellars, store-rooms, and places where bams and meat are salted and preserved, cooperies and washhouses, which form a large proportion of the whole, are mixed together with certain kinds of new bricks and worked up into small buildings, at little cost, to let on what may be considered low terms, but taking all consequences into account are really exorbitantly high. Such buildings, in my opinion, never will be perfectly dry; therefore, bricks which have undergone deterioration in the way described should not be used in any building intended for human occupation. Only good, old, dry, and hard bricks, manufactured of the best material, should be so employed. All others should be used to make road bottoms, as they constitute the best material that can be selected for such a purpose. If used in that way, it may be fairly calculated that at the least one-fourth of the outlay now expended on macadamised roads would be saved, for it has been well ascertained that a weak bottom makes the wear of material under the surfaces much greater than is caused by traffic over a sound bottom. A great pecuniary saving to the several parishes of the metropolis would be the direct result.

The first step which ought to be taken in the erection of such extensive buildings as are contemplated by the Asylum Board, is the preparing a good foundation. The proper drainage of the land is an essential point which must in no case be overlooked. Then it would be desirable to put at least 12 in. of clean gravel or flints, brought from inland pits into the excavation, so forming a perfect system of under drainage, and upon that a substantial layer of concrete. The sand for mortar should be brought from inland pits, either carted or by rail. If the sand cannot be found near to or on the land, half the proportion of it required might be substituted for it, clay burned hard and ground with a

proper quantity of stone lime. Such a mixture would form a most excellent mortar. If inland cement cannot be obtained, blue lias lime should be used for the underground courses, and for the parapets. Then use for the superstructure either stone from inland quarries or close-knit burned bricks, sold made or made with inland sand. If the mould used in making the bricks be even dusted with river sand, or with sand coming from pits within a mile of the river, or swam over any portion of salt water, there would be danger in using such bricks. As blue lias lime will ensure greater strength in the walls of the building than ordinary lime, it is desirable that it should be used as a substitute for cement wherever necessary.

The demand for bricks having been gradually increasing during the last fifteen years, and that in the proportion of 10,000,000 to 1,000,000 formerly used, has caused a corresponding increase in the demand for sand for the purpose of manufacture. This material was taken from the sand-hills on the shores of the river, but that operation was found so to weaken the river-wall that, for its protection, the Board of Conservancy found it necessary to interfere and prevent sand being taken above Woolwich, under pain of fine and imprisonment, so driving those getting it below that point, and necessarily into brackish water, rendered much more so by the sewerage of the metropolis. But, even if the Thames Conservancy had not enforced this stringent regulation, it would have been impossible to have obtained a sufficient supply of freshwater sand for brickmaking purposes from that source. Recourse must therefore have been had to other means of obtaining the sand required. As it is always desirable to obtain a nice smooth face to the brick, inland sand ground very fine may be properly used for this purpose. In that part of the process of brickmaking which is called "walk flattening," the table is dusted with sand to "flat" the quantity required in order to fill the mould, and the clay, as it were, lies up the sand, so that it will pass easily through the mould without sticking. To make each brick shift clean, the mould is also dusted with the same sand. If soft Thames sand, "unweathered," be used in both cases, that of itself is sufficient to "pickle" the brick, without the harrow-loader dusting the face of it, as he generally does, with the same material. A uniform effect is produced throughout the whole of the kiln of bricks thus made; and the only way of preventing a deteriorating result is to get inland sand ground in a mill till equally fine as the sand usually employed in making what are termed "grey stocks." In all such places of the superstructure as it may be thought necessary to use cement, it is, as we have said, strongly recommended that blue lias lime be substituted. By only adopting these suggestions a good, sound, substantial building will be produced.

A METROPOLITAN RATEPAYER.

ON MODERN FURNITURE.

THE ARCHITECTURAL ASSOCIATION.

At the ordinary meeting of this society, held on Friday evening, the 22nd, Mr. Charles L. Eastlake read a paper on "Modern Furniture."

It was, he said, a subject of considerable interest, and one in which more than all others the public showed their bad taste. All kinds of household furniture bad of late years greatly deteriorated, both with respect to design and material. This, although it might seem strange, was in a great measure owing to the amount of competition in trade, in consequence of which every upholsterer found it absolutely necessary to be continually introducing new patterns, however hideous. No one dared now-a-days to find fault with a lady's taste; if one did so it was almost an unpardonable offence, and yet it was but too apparent that even in the highest circles there was very little really good taste. Materfamilias furnished her house more after fashion than in accordance with art, and as long as the shopman could persuade her that such or such a material had been supplied shortly before to some noble lord she at once purchased it, and would ever after be blind to its faults. This was much to be regretted; but it was to no small extent the effect of art forming little if any part of a young lady's education. They were supposed by learning music and other accomplishments to become judges of art; whereas it ought to be a study for them to do so. People, were, however, at last beginning to realise that

* See p. 209, ante.

there was such a thing as good taste in upholstery, jewelry, and even in millinery, and that the last fashion was not necessarily the best.

The present style of household furniture was utterly devoid of taste, and as a rule hideous in the extreme. The curves, for instance, in their chairs and sofas, which were the order of the day, what could be more uncomfortable or inconvenient? They were not ornamental, and in many instances made the article almost useless. The process was called "shaping," and a very bad practice it was, and utterly opposed to all principles of taste. The carving, too, which one met with on these pieces of furniture, was very bad, as was also the custom of veneering. A wood carver might be an artist, but a furniture carver was a mere machine, and his productions might be obtained by the yard, or in some instances by the pound. It was lamentable to notice how the turner's art had deteriorated; indeed, the work of a country wheelwright was often more artistic, inasmuch as any ornaments which he added were generally simple, and not devoid of taste. As a rule, the furniture in the hall of a modern house was the best, on account of its simplicity. The table was usually made of oak; and the chairs, since they were not intended to be moved about so much as in a sitting-room, were more acid and presentable.

The furniture, however, in the other rooms was had, no apartments being arranged in a similar style. The dining-room table, which pulled out as a telescope, was insecure, and ought not to be tolerated; while the carpets and paper were invariably ugly, and needed reform. He had seen some chairs which had been made in the early part of the seventeenth century; they were stuffed with feathers, and still retained their original shape in the mill. Furniture now-a-days scarcely lasted a lifetime, and soon became shabby and rickety; and tables, which used to be polished by hand, were now covered with what was called "French polish," in reality a sort of varnish which failed to give the wood that dark and massive appearance which was the characteristic of furniture occasionally met with in some of the country-houses. It was astonishing what an amount of articles were manufactured and sold for old work, often one panel being deemed sufficient ground for the formation of a whole sideboard. But on inspection the difference would be easily perceived. The cracks would be found filled with putty and varnished over; the carving stuck on with glue, and instead of firmly fixed; and in many respects it would be seen that they were greatly inferior to what they were supposed to represent. The curtains of the present day, he considered, were made much too long, so that they might be hitched up on pegs at the sides of the window resembling incipient engine-buffers. The consequence was, the dust accumulated, and the material soon wore out. The poles, too, on which they were hung, or supposed to be hung,—for often they were merely an imaginary ornament,—were much too big, and were finished off with some huge flower, at once inelegant and unnatural. Fringe, as Mr. Pugin had pointed out, was originally the ends of silk, which were tied into a knot to prevent them unravelling; but our modern fringe was twisted in with a number of little pieces of wood, and then attached to some article for which it was entirely unsuited. The carpet, in his opinion ought to be a square one, and not fitted into the corners of the room,—a system which was opposed to all economy, and extremely inconvenient in the case of a removal, while the pattern should be more in the Eastern style, and not in the wearisome regularity of the English productions. There were many matters, too, with respect to our bed-room furniture, which needed reform. There should be nothing there to offend the eye, but everything ought to invite repose. The great "four-poster" bedstead, surrounded by curtains which were drawn round the sleeper, was an absurdity of a past age, and totally at variance with present ideas of health; but there were many things now in use which would seem equally ridiculous to posterity. Among other things to be laughed at was the change of fashion with respect to different woods. At the present time, everything in a drawing-room was made of walnut; a little time since it was all rose-wood, and before that mahogany. It was a mistake to suppose that really good furniture would be more expensive than the present style. It would be in reality cheaper, and in every respect more satisfactory. He was glad to see that some architects had taken the matter in

hand, and he hoped that the public would assist them in the advancement of art.

Mr. Ridge quite agreed with what Mr. Eastlake had said with respect to the want of taste in the public generally; but they (the architects) must endeavour to instil some taste into them, and point out to them the absurdity of following fashion when opposed to art. Such was popular prejudice against the old style of furniture that any one about to be married and wishing to furnish his house with real taste would have to do it before the ceremony, as he would never be allowed to do it afterwards.

In answer to a question, Mr. Eastlake said that he had suggested a table which would do away with the necessity of the telescope one. He proposed to have two bearers, to be pulled out at each end; they would be twice as long inside as out, so that they would be strong enough to bear any strain. He considered that an incised ornament would be the best for wood, but any of a monumental style should be avoided.

HOW WE SET THE STEAM TO WORK.

We have hobb'd the fire, we have kindled the flame,
And lighted the mine so bright;
We have made a prison, the strongest on earth,
To hold in the "water sprite."

For the sprite is lazy, and roams abroad,
In the river, the spring, the sea;
He will sing, and babble, and murmur about,
But never to work will be.

Leave him at large, let him run down-hill,
Let him roam wherever he list,
And he suddenly rushes to and fro,
Or exhales us fog and mist.

But we want him to work wherever we will;
He is strong, and our muscles will save;
So we fasten him up in an iron box,
And force him to be our slave.

And we light the fire, and torture him well,
Till he kicks and screams like mad:
"I will get out of this nasty hole!"
Be quiet; you burst us, lad."

Then out he comes, with a rush and a roar,
In a scalding cataract shower.
"Very well," quoth we, "come out if you will,
Provided you yield us power."

And we guide him, and turn him, and twist him about,
In a narrow and straiten'd road,
And we make him to pull, and struggle, and shout,
Till he moves the heaviest load.

So he turns the mill, and works the mine,
And he takes our ships to sea;
He ploughs the land, and he moves the sand,
And he mows the meadow lea.

We found him cold, we have made him hot;
We make him slow, and weary, and wet;
We move him about from place to place,
And we make him puff and sweat.

Ah! old sprite, we have got you now,
And never will let you loose;
We have you enchain'd, and will manage your powers
By the wheel and the iron nose.

ART-UNION OF LONDON.

PRINCIPAL WORKS ALREADY SELECTED BY PRIZE-HOLDERS.

From the Royal Academy.—La Vita Nuova, F. W. W. Topham, 20*l.*; Whitley from Hoights, E. J. Newman, 100*l.*; Fishing-boats preparing for Sea, E. Hayes, 75*l.*; Lots in the Grooming Season, W. H. Hopkiss, 60*l.*; Evening in the Leir Valley, North Wales, W. Cuddey, 50*l.*; A Mountain Stream, H. J. Starb, 15*l.*; A Roman Osteria, D. W. Deane, 40*l.*; A Chiffonier, E. Crowe, 40*l.*; Reading the News, W. Hemsley, 35*l.*; The Old Lady objects to Mud, W. Weekes, 20*l.* 6*s.*; Jinnals (camel objects to Mud, W. Weekes, 20*l.* 6*s.*); Jinnals (camel objects to Mud, W. Weekes, 20*l.* 6*s.*); Spring at Burnham Beeches, W. T. Holton, 21*l.*; Spring at Burnham Beeches, W. T. Holton, 21*l.*; The Evening Hour, J. V. De Fleury, 21*l.*; Cust Ashore, A. Corbould, 21*l.*; A Moorland Stream, T. J. Banks, 15 guineas; The Confluence of the Dure and the Yare, Great Yarmouth, G. Eaton, 15 guineas; Hay-making near Henley-on-Thames, the late H. J. Boddington, 15*l.*; Under the Beeches, A. J. Starb, 15*l.*

From the Royal Scottish Academy.—Shades of Evening, Fergus More, Glen Sannox, T. Clark, 63*l.*; Shopping in the Fifteenth Century, G. Hay, 60*l.*; Near Hazlemere, Surrey, J. Peel, 24*l.*; On the Canal, near Wolverhampton, J. H. Oswald, 14*l.*

From the Society of British Artists.—On the Way, between Godding and Shalford, J. Tennant, 100*l.*; Going Home, J. J. Hill, 100*l.*; Ploughing the Deep, A. Clint, 75*l.*; Will ye go to the Highlands, my Mary? J. Craig, 65*l.*; Peel Castle, Isle of Man, J. Dunby, 60*l.*; Lochcarron, South Coast, E. Holmes, 50*l.* 6*s.*; Tantallon, E. Hayes, 50*l.*; The Flotigman's Dinner, W. Shayer, 50*l.*; Early Wooting, T. Roberts, 45*l.*; The Village School—Winter, G. A. Williams, 40*l.*; French Fishing-boats going to Sea, J. Wilson, 40*l.*; A Scene near St. Asaph, C. L. Coppard, 35*l.*; The Alambra, from the Barranco, Grausada, Spain, J. Dublin, 35*l.*; On the Machno, J. Godet, 30*l.*; A Gipsy Family—Evening, W. Shayer, 30*l.*; A Windmill, M. Crockett, A. L. B. Land, 25*l.*; Near Shebbear, North Devon, J. Peel, 21*l.*; Roadside Inn, J. F. Herring, 20*l.*; Musing, J. M. Barker, 20*l.*; Prettymann's Lane, Edimburgh, W. S. Rose, 18*l.*; The New Book, Miss F. E. Thomas, 15 guineas; Sunshine after a Shower, A. A. Glendinning, 15*l.*

From the Society of Painters in Water Colours.—Moonlight—Duch-shooting, C. Braswhite, 35*l.*; The Clover-stack, G. Davidson, 30*l.*

From the Institute of Painters in Water Colours.—View looking towards Castel-n-Mare, Bay of Naples, T. L. Rowbotham, 60 guineas; Lane Scene with Sheep, G. Shalders, 40*l.*; In the Leir Valley, J. C. Reed, 30*l.*; Kilchurn Castle, Loch Awe, Argyshire—Effect after Rain, T. L. Rowbotham, 15*l.*

From the General Exhibition of Water Colour Drawings.—Toeing the Mark, J. Lobley, 63*l.*; Tantallon, O. L. Hall, 50*l.*; Luccombe Chine, Isle of Wight, F. Walton, 20*l.*

SANITARY DEPUTATION TO GOVERNMENT.

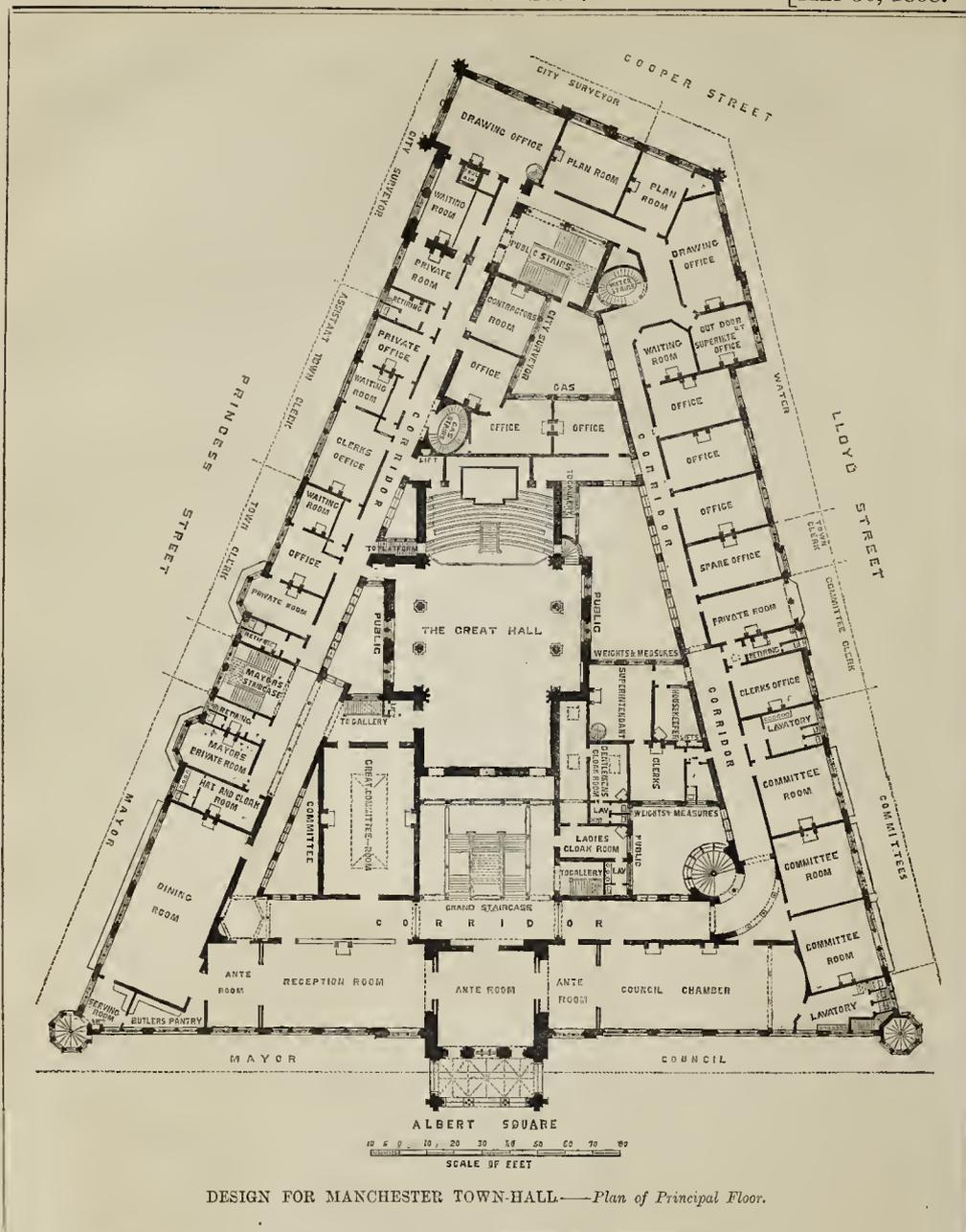
A LARGE deputation has waited upon the Duke of Marlborough, as president of the Privy Council; the Duke of Devonshire, as president of the Poor-law Board; and Mr. Gathorne Hardy, as Home Secretary, to draw attention to important matters connected with the laws of health, and other questions. The deputation was received in the council-chamber of the Privy Council Office, and was introduced by Mr. George Clive, M.P.

The ministers present were addressed at some length by Mr. Clive, Dr. Acland, Mr. Cbadwick, Mr. Acland, Dr. Ramsey, Dr. Symonds, Dr. Simpson, and Dr. Stewart; and by their remarks it was shown that the deputation represented not only the British Medical Association, a body of upwards of 4,000 medical men in all the great cities throughout the country, and the Social Science Association, but well-known gentlemen were also present from different parts of the kingdom, in order to bear testimony to the urgent necessity that exists for the Government at once to take steps to learn the complicated and inharmonious nature of the present sanitary laws, and to provide for their consolidation.

The Duke of Marlborough acknowledged that the subject was one of the greatest importance to the whole country, and said the Government was fully aware of the inconvenience of the present system of things. The Board of Health which previously existed was a movable body, and it having been dislodged in a very unworkmanlike manner, he was obliged to say, its work had been thrown upon the Privy Council. This had already arrested the attention of the Government, whose duty it would no doubt be to consider how a central body could be formed for the administration of the sanitary laws. He agreed that there should be a revision and consolidation of the sanitary laws, having special reference to the increase of the efficiency of their administration, both central and local. Local boards of health did not exist everywhere, and it might be well to make the proper authorities responsible for the administration of the sanitary laws. These ends might be attained by having a complete organisation under one department. The Government would consider these things, and would give their best attention to the whole subject. Perhaps the Government would appoint a royal commission.

THE TRADES MOVEMENT.

Wolverhampton.—The stonemasons, who had not bound themselves by the arbitration agreement, adopted the old plan, and "atruck" for higher wages; and from peculiar circumstances, the masters, finding themselves unable to resist the demand, had to yield to it. Naturally enough, the members of the other branches were anything but delighted at this, and it is quite possible that some of the men who by their own act had deprived themselves of taking advantage of the opportunity, were disposed to cancel their agreement, and follow the example of the stonemasons. Happily, this was not done. The masters were not ill-disposed in the matter, the men waited a little longer, and at length eighteen of the latter and six of the former, with Mr. Kettle as the general umpire, met and amicably discussed the matter. After considerable deliberation, a convention was arrived at, by which the wages will be immediately augmented, and the Saturday half-holiday become the rule; and this agreement is to hold good for three years. As Mr. Kettle remarks, this is "a great triumph for arbitration," which, it is to be hoped, may now be considered to be firmly established as a substitute for strikes and lock-outs so far as the building trade at Wolverhampton is concerned.



DESIGN FOR MANCHESTER TOWN-HALL.—Plan of Principal Floor.

NEW ORGANS.

Malvern.—The inhabitants of the quiet village of Malvern Wells have long coveted an organ for their church, and as long ago as 1865, when Mr. Sims Reeves was staying there for the benefit of his health, he gave a chamber concert, the proceeds of which were devoted as a fund towards the purchase of an organ for St. Peter's Church. The organ, which has been built by Nicholson, of Worcester, has now been opened.

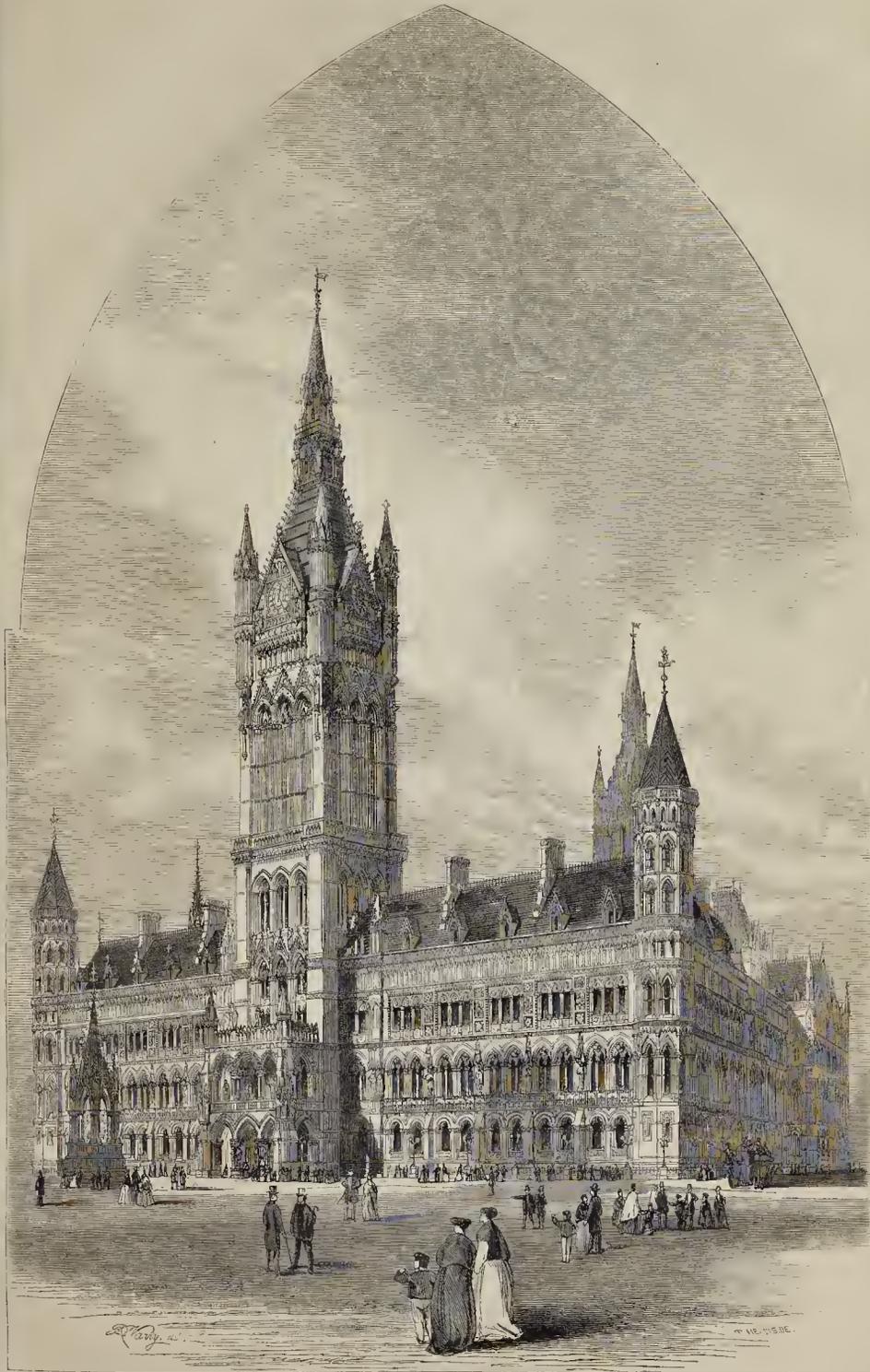
Liverpool.—The new organ in St. Peter's Church, Seel-street, built by Messrs. Conacher & Co., of Huddersfield, has been opened with Mozart's twelfth Mass, sung by an excellent

choir. The swell organ has ten stops; choir organ, seven stops; great organ, nine stops. In the pedal organ there are nine stops. There are five composition pedals to the organ, and the ordinary pedals are radiating. The bellows of the instrument are on the hydraulic principle, the engines used for the purpose being the invention of Mr. Duncan, the water engineer. The new organ is in the main gallery at the west end of the church. The old organ was in the south gallery.

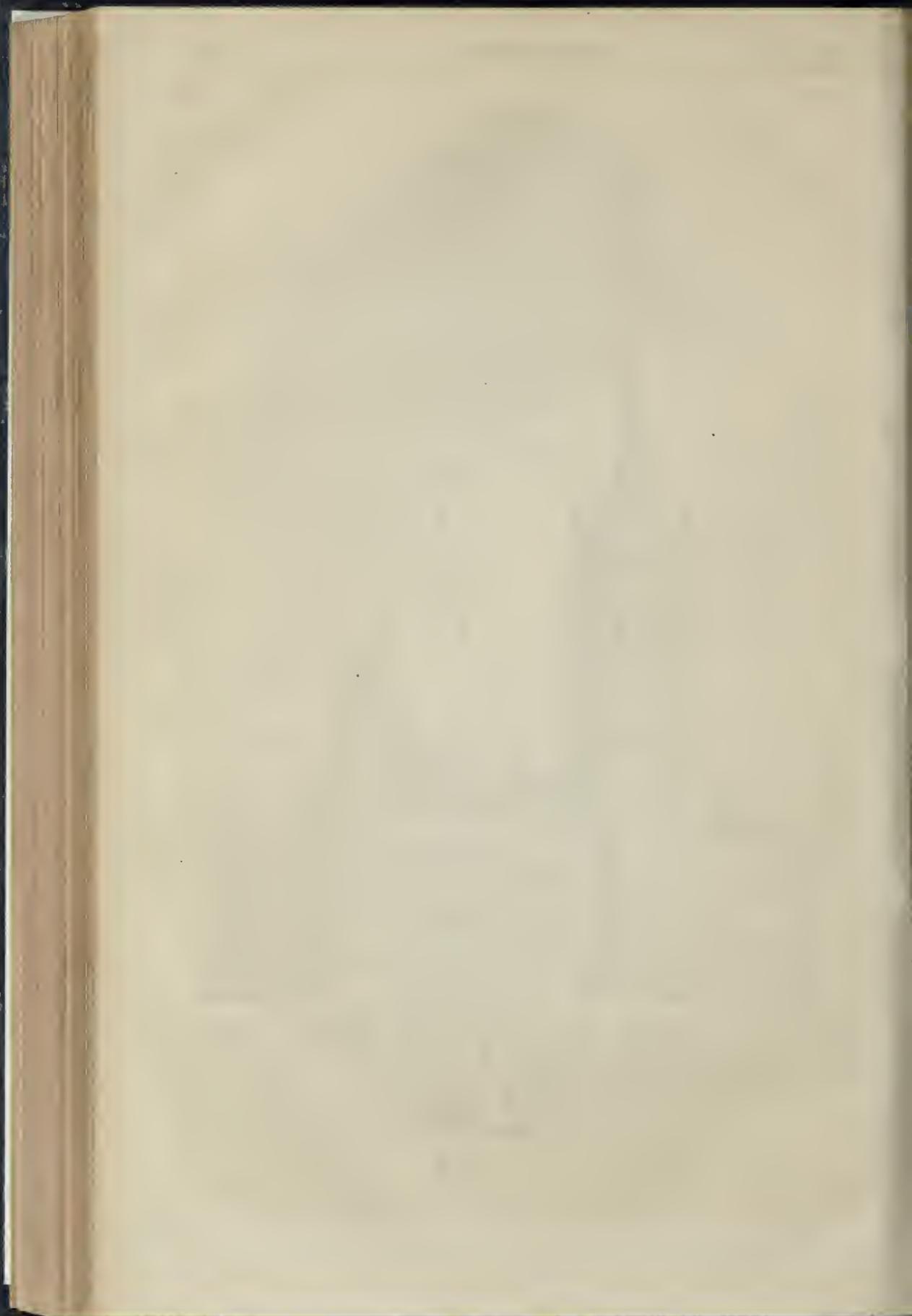
Yarmouth (Isle of Wight).—The opening of the new organ supplied to Brook Church by Messrs. Bevington & Sons, of London, has taken place. There was a grand choral service. The instrument, which was shown in the Paris

Exhibition last year, where Messrs. Bevington & Sons, it is said, gained the only prize for chancel organs, is built in the Gothic style, with illuminated speaking-pipes in front, and containing the following stops:—Bourdon, wood, CCC to CC 16 ft., 13 pipes; open diapason, metal (G), 8 ft., 47 pipes; stop diapason and claribel, wood, CC to F 8 ft., 54 pipes; dulciana, metal, C to F 8 ft., 42 pipes; principal, metal, CC to F 4 ft., 54 pipes; total of pipes, 210; one and half octave of German feet pedals. Its cost was between 80*l.* and 90*l.*

Leconfield.—A new organ has been opened in the parish church. The instrument, which was built by Messrs. Forster & Andrews, of Hull, cost 140*l.*



DESIGN SUBMITTED FOR MANCHESTER TOWN-HALL.—By MR. JOHN O. SCOTT.



MANCHESTER TOWN-HALL.

We illustrate in our present number another of the designs for Manchester Town-hall submitted in the ultimate competition,—that sent in by Mr. John O. Scott. This design was placed by the referees second in architectural merit, and third in point of general merit. We have already reviewed the design, and expressed a strong opinion of the ability displayed in it. In our review we objected to the central arch in the entrance porch being elliptical, and suggested the substitution of a stilted semicircle. Mr. Scott writes that the arch was in reality meant to be a stilted semicircle, and that the appearance alluded to was the effect of indifferent drawing.

The estimated cost of carrying out this design was stated at about 250,000*l.*

DOBROYD CASTLE.

MR. JOHN FIELDEN—as at the laying of the foundation stone of the castle—ordered to be provided, at his expense, a substantial dinner, with beer, &c., to celebrate the rearing of Dobroyd Castle, near Todmorden. The arrangements were made by Mr. W. Glover, clerk of works, at the castle. At the Masons' Arms, Gaxholme, the entertainment was prepared, and it was served up in an empty larder near to the inn. The room was almost draped with evergreens. The company were upwards of 240 in number. At the head of the room was a platform or dais, on which a piano-forte was placed, and a party from among the men at the castle sang various glees to enliven the feast, and a song on the occasion by Mr. Morgan, one of the joiners, was sung by the composer. Mr. A. Stansfield, of the masons, Mr. G. Carpenter, of the carvers; Mr. J. Brunton, clerk to Mr. Davis; and Mr. J. Pickles, mason, were the glee party. Two presentations were made during the evening—one to Mr. W. Glover, clerk of works, and another to Mr. Edwin Long, foreman over the masons. The proceedings were altogether orderly. Mr. W. Glover was in the chair, assisted by Mr. Davis in the vice-chair. Two years have now passed since the first sod of the castle was turned. During that time 35,000 cubic yards of excavation have been completed for the castle and roads connected therewith; upwards of 6,000 ft. of drain-pipes have been laid, and more than 1,000,000 bricks have been made and used. Two quarries have been opened, 120,000 cubic feet of stone have been taken from the beds of these quarries, besides 33,000 ft. for "metallic" roads; 8,000 ft. of timber, 33 tons of iron, and 8,000 ft. of Bath stone, have been used in and upon the castle. No accident of any moment has occurred. The architect of the edifice is Mr. James Gibson.

ACCIDENTS.

At the Prince of Brunswick, Brnmswick-street, Blackfriars-road, an accident has happened from the fall of a wall and a portion of an arch. It appears that builders were engaged in erecting a new cellar at this house, and for that purpose the old arch had to be removed. A portion of it had been left standing, and four men, labourers who were engaged to clean the old bricks, chose to sit under what was left. Without any notice the wall fell and buried the men in the debris. The men were extricated, and found to be severely injured.

A disastrous fire has occurred in Limehouse, on the premises of Messrs. Lloyd & Sons, steam saw-mill proprietors and timber merchants, St. Ann's-row, nearly facing Limehouse Church. The premises were for the most part destroyed, and the timber in the yard severely damaged by fire. Twenty private dwellings were also seriously injured by fire and water. The origin of the fire could not be ascertained. The books, kept in one of the Reliance fireproof safes, were all saved.

In Queen's-road (formerly known as Lamb-lane), about 200 yards from the Miles Platting Railway Station, near Manchester, an accident has happened resulting in the death of three persons, and serious injury of a fourth. Between Jessie-street and Bagulet-street, a block of old houses which stood with their end to the road, was being demolished preparatory to a better

class of houses being raised on their site. The roofs had been removed, and workmen were busily engaged taking down the side walls. For some reason not ascertained, the gable, which was anything but a substantial piece of work, being only one brick thick, and having been weakened by a flow of water, was allowed to stand at nearly its full height. The consequence was, that when the support which the side walls afforded was withdrawn, the gable gave way, and, falling outwards, broke down the boarding which had only been erected a few hours before, and covered the street to the other side. Three little children, who were amusing themselves opposite, were buried in the debris and killed on the spot, while a man who was passing along the street was knocked down and one of his legs injured, besides sustaining other injuries.

THE ARTISANS AND LABOURERS' DWELLINGS BILL.

It will not be this Session that an Artisans' and Labourers' Dwellings Act will be passed, urgent though the occasion be, as the Bill has been referred by the House of Lords to a select committee, notwithstanding the strenuous endeavours made by Lord Chelmsford, who introduced the measure to the House, to obviate this delay. The ground upon which the decision was based is that the Bill is crude and unworkable. Yet it passed through the House of Commons, and its principles have been approved of by a select committee of that House already.

Previously to the vote in the House of Lords, a numerous deputation, composed of representatives of the various local bodies of the metropolis, waited upon the Duke of Marlborough, at the Privy Council Office, to urge upon the Government the increase of taxation which the Bill will entail upon the metropolitan ratepayers, and its injustice upon the inhabitants generally. The minister in reply said, that since he had received a deputation on this subject some time ago, several facts had been brought under his notice and that of others, with more prominent light. He was bound to say that some of the sanitary provisions of the Bill were, in his opinion, of considerable importance. At the same time, facts had been laid before the Government of equal importance requiring deep consideration. Those brought before him to-day were not less so. The change of the local authority from the vestries and district Boards to the Metropolitan Board was one open to very grave question. He could not conceive, so long as rates were locally levied, that there was any advantage in spreading their expenditure over larger areas. Another fact that struck him as important was the burden of additional rates which this Bill imposed on the poorer classes. It had become now the custom to impose rates for all manner of purposes, until they had a number of people reduced thereby and constantly on the verge of pauperism,—on a precipice, as it were, ready to be toppled over. He was doubtful whether, considering this subject as a matter of political economy, it was good to allow Boards to build, and not leave it to the ordinary laws of supply and demand. He thought that, in a select committee, whatever was good would be retained, and an opportunity would be given the deputation to show what was needless or impracticable in their opinion.

THE AGRICULTURAL LABOURER.

A PAPER on the condition of the agricultural labourer has been read before the Society of Arts, by Mr. J. Bailey Denton, who stated, in the outset, that he thought it possible that a few words from a member of the Society who for many years had directed the operation of a large number of agricultural labourers, and who necessarily felt a great interest in their welfare, might have some influence upon those who are giving their attention to the means by which their condition may be improved. He then endeavoured to show that the position of the agricultural labourer was not so bad as many represented it to be, though no one could say that it was quite satisfactory; but with the profits of farming so low and uncertain as they were, it would be acknowledged, he thought, that the only way to justify an increase of labourers' wages would be by rendering the value of the labour given greater than it now was. Active hands, directed

by superior intelligence, already obtained wages above the mean, which he made out to be 16*s.*; and as there was greater scope in agriculture for the exercise of judgment than perhaps in any other trade or pursuit in which physical labour formed so great an element, owing to the diversity of its objects and the casualties which might affect them, there was no reason, he conceived, to doubt but that with an increase of knowledge on those points which alone could enhance the value of labour, the earnings of the whole class might be increased.

On the subject—the notorious subject, we may say,—of the Dorsetshire labourer, his hire, and his beer, Mr. Denton stated a case which his experience, in which Dorsetshire men were made to compete with Yorkshire and Northumberland men. He brought higher priced and competent men from Northumberland into Dorset, guaranteeing them 18*s.* a week instead of 7*s.* to 9*s.*, which their fellow labourers of Dorset were earning.

"As soon as the Dorsetshire men knew what the north-country men were getting, and saw the character of the work executed by them, they applied all their energies in imitation. At first they drank more beer, thinking that by such means they could do more work. They soon saw their error; and it was both amusing and instructive at the same time, to see how astrict they were when they found that the northern men had for their dinners good meat and bread, while they were living on bread, tobacco, and miserable beer or cider. It was by very slow degrees that the Dorsetshire men realised the truth that butchers' meat was more strengthening than bad beer. Eventually, by the example afforded them, the 'technical education' given them by the Northumberland men, and by the effect of improved food, the despised Dorsetshire men were enabled to earn as much as their teachers, and it was not long before I actually removed them into the North of England, to compete with Yorkshire men in the work they had learned; and the first place at which they were engaged was Swine, in Holderness, where there did not exist a public-house or a beer-shop in the village!"

THE BELLS OF THE CHURCH OF ST. MARY-LE-BOW.

THE well-known tower of Bow Church, in Cheapside—"the most splendid of all Wren's steeple compositions,"—contains a celebrated peal of ten bells, the weight of the tenor being 53 cwt. 22 lb., and its note C.

It appears that when Sir Christopher designed and built the present church he prepared the tower for the reception of twelve bells, but only eight were placed. At length "these got out of order; and in 1758 the citizens petitioned the vestry: the tenor bell being 'the completest in Europe,' and the other seven very inferior, they requested to be allowed, at their own expenso, to recast the seven smaller bells, and to add two trebles." This was permitted, after two celebrated architects had reported that "neither such additional weight, nor any weight that can be put upon the steeple, will have any greater effect than the bells now placed there." Accordingly the peal of ten bells was completed, and first rung on the 4th of June, 1762, the anniversary of the birth-day of King George III.

Having recently surveyed the bells, I give their several notes, weights, and inscriptions:—

No.	Note.	Weight.	No.	Note.	Weight.
		cwt. gr. lb.			cwt. gr. lb.
1	...	8 3 7	6	...	17 0 11
2	...	9 0 2	7	...	20 2 26
3	...	10 1 4	8	...	24 2 5
4	...	12 0 7	9	...	34 2 6
5	...	13 0 24	10	...	53 0 22

The first, second, third, fourth, fifth, sixth, and seventh of the peal bear the subjoined inscription, or some variety of it:—

"Lester and Pack, of London, fecit. William Gibson and James Pierrepont, Churchwardens, 1762."

On the eighth bell is:—

"The Rt. Rev. Dr. Thomas Newton, Rector. William Gibson and James Pierrepont, Churchwardens of Bow; Thos. and Jno. Stevenson, Churchwardens of St. Pancras Super Lane. Lester and Pack of London, fecit. 1762."

On the ninth we find,—

"Lester & Pack, of London, fecit. 1762. Wm. Gibson and Jan. Pierrepont, Churchwardens of Bow. Samuel Blackwell, Esq. gave 50*l.*"

The tenor is inscribed:—

"Samuel Lisle, D.D., Rector. Robert Green, Wm Cannel, Thomas Paris, Jno. Waldron, John Rufford, Churchwardens.

Bow Bell, 1699.
Re-cast 1738. Richard Phelps, Thomas Lester, Londoni fecit.

Wt. 53 : 0 : 22."

The tenor, or heaviest bell, like the tenor of Westminster Abbey, was made during the year 1738, in which Richard Phelps, the master founder, died. Thomas Lester then succeeded

to the business, and subsequently he took Thomas Pack into partnership: so that all the bells were cast at the Whitechapel foundry.

It will be observed that the tenor, being named after one of its predecessors, has "Bow Bell" inscribed upon it; and I may take occasion to remark that, "in the year 1463, it was ordained by a Common Council that the Bow bell should be rung nightly at nine of the clock,"—a vestige of the Norman *couvre-feu*, or curfew; and at length it was looked for anxiously by "the young men" pretensions and others in Cheape," as the signal for closing the shops; but the bell being usually rung somewhat late, as it seemed to them, "they made and set up a rhyme against the clerk," whose office was to ring it, as follows:—

"Clarke of the Bow-bell with the yellow locks,
For thy late ringing thy head shall have knocks."

Whereunto the clerk replying, wrote,—

"Children of Cheape, hold you all still,
For you shall have the Bow-bell rung at your will."

But, returning to the peal of bells now in the tower, I may state that a band of ringers, consisting of respectable members of the Society of College Youths, attended by the faithful steple-keeper, ascend the tower and give a performance every monthly Thursday evening. They also ring on certain festival and joyous occasions; and so skilfully are the bells hung, that even the extremely heavy tenor, when raised, is generally rung by one man, who, in common with other able ringers, stands as upright as a drill-sergeant.

Everybody has heard of Bow Bells, and many have well said that the present peal is the finest, or one of the finest, in Great Britain. I will, therefore, merely add that, although it can never be heard with due effect during the busy time of the day, the tenor alone is worth going many miles to hear. It is a magnificent bell, the grandeur and richness of its tone being truly chaurd.

THOMAS WALESBY.

MUNIFICENCE IN SHEFFIELD.

The erection of a block of buildings will forthwith be commenced at Hanging Water, which is at the end of the new road through Endcliffe Wood, for the accommodation of forty-eight poor people. The buildings will consist of thirty-six almshouses, the cost of which, about 24,000*l.*, will be borne by Mr. Mark Firth, the Master Cutler. Mr. Firth will provide for the allowance of 7*s.* a week each to the single and 10*s.* a week to the married occupants. The site will cover two acres of land. The charity will be open to the poor of all religious denominations. The plans for the building have been prepared by Mr. Hill, of Leeds, now of the firm of Hill & Swann, Sheffield. The design is Gothic, in the form of a double quadrangle, and the material rock-faced Green Moor stone, with dressed dormers and quoins. The houses in the centre wing stand back to back; those in the return wings are single. The middle of the centre wing is occupied by a small chapel for the use of the inmates, from which rises an ornamental tower. Adjoining the chapel is a house for the governor. The building is two stories high, and each house contains a living-room 12 ft. square, a bedroom of the same size, and a cellar, fitted for pantry and coals. Gas and water will be laid on to every house. Standing in a beautiful neighbourhood, the building will enjoy a warm, sheltered, sunny aspect, well suited to the residence of the aged and infirm.

NEW BUILDINGS ON PUBLIC THOROUGHFARES.

On the road forming the outer circle of Regent's Park, one of the most beautiful drives of the metropolis, about half-way between St. John's-wood Chapel and Primrose-hill, a new block of solid brickwork has been erected, which covers a space of 24 ft. by 10 ft.; it encroaches upon the driveway 8 ft., and upon the park side footway 2 ft.; at present it is carried up to a height of 8 ft., and is divided into three small rooms with separate entrances, having a fireplace and window to each. It is reported that a new main sewer is to be made on the line from Avenue-road to near Baker-street, and that these little chambers are intended for the use of inspectors and pay clerks whilst the works are

in progress; but the obtention of solid brick structures upon this favoured and well inhabited locality startles the residents, as the permanence of the structure would seem to portend a long continued nuisance and deformity to the drive. The driveway is of a nearly equable width of 40 ft., besides a footway on the side next the open Park, and also next the five terrace rangos round the circle.

In great public works, such as sewers and railways, much inconvenience must be suffered where demolition and subversions are actually necessary; but where only a new sewer of about half a mile in length is needed in a wide and fashionable thoroughfare, surely there is no necessity to erect three little offices in solid brickwork, when in the immediate vicinity much better and more suitable apartments might be had at 10*s.* a week.

Is there no parish surveyor for this locality? or has he no jurisdiction in a case where the Commissioners of Sewers are omnipotent—if in reality they are so? No such solid buildings have hitherto been imposed upon the Queen's highway; and as there is no occasion for the imposition or nuisance, the influence of the *Builder* is sought to shield the public against the innovation, as also to protect owners of property who have a stake in the neighbourhood like—

QUERRENS.

SPEAKING TUBES.

Sir,—In reply to "T. C.," speaking tubes according to his description might be of tin, zinc, copper, or iron; and if for vertical runs should be 1 1/2 in., or if for horizontal runs should be 1 1/4 in. diameter.

J. J. P.

GRINDING MONEY.

Sir,—It appears that county court judges decide cases without reference to rule or precedent; what is right according to one judge is wrong when brought before another. In the county courts, as in all other law courts, there is no code or system, and the English people have still to ask, without receiving a satisfactory answer, What is law? The question of grinding money has been many times decided in favour of the workmen. The remarks of the judge in the case reported in the last issue of the *Builder*, shows a manifest unfairness towards the plaintiff, and an ignorance of the methods of working in the building trades. In the first place, there is not a man in the trade that engages himself to work only for a single hour. It is well known that the introduction of what is called the hour system made no difference in the method of payment. When a man engages himself to an employer, he expects to stop till the job is finished; and there are few employers who would think of discharging a workman in the middle of the day. Were it otherwise, the building business would be in confusion.

The joiner, in relation to the other parts of the building trade, is in an exceptional position. He is required to carry a large number of tools to his work, which must be in working order. To keep them at their proper pitch, both time and labour are necessary, and therefore it is the rule of the trade that he should be allowed two hours' rest, or else the pay, when his services are no longer required; and it is for the interest of both parties that the rule should be maintained. It would be most unjust to keep a joiner at work till the last minute, when perhaps he had been working up old material, and every tool out of order.

A JOINER.

RAILWAY AUDITS.

Sir,—When one reads in the columns of the *Builder* of the sad *exposé* of the London, Chatham, and Dover Railway one feels disposed to ask whether it is not time for the protection of the public from fraud and deception that the affairs now of railway companies should be submitted to higher tribunals for auditing their accounts, when those who are interested with such matters in the railway companies lend themselves to every species of dishonesty, in order to hoodwink the public, who have been so unmercifully defrauded, and to check the system of railway contractors living like princes and building palaces at the expense of shareholders.

A SUBSCRIBER.

HERNE BAY PIER.

Sir,—Some time since hopes were thrown out that this pier was likely to be restored and opened to the public. I regret to hear that the efforts which were being made have been completely frustrated, and that there are now less hopes than ever of the pier being made what it ought to be,—an ornament to the town, instead of a disgrace. What is the reason? The proprietors are all very wealthy men, I believe; if so, why are they afraid to spend a few thousands? and why do they refuse to allow the townspeople to subscribe towards its restoration? If the pier is really to be left in its present disgraceful state, it is to be hoped that the merchants will carry it wholly away one of these nights, and rid the town of so unsightly and useless a structure, and leave us the neat beach of old times. Would the townspeople and visitors support or assist in starting a company to purchase the pier for constructing a new pier,—say, one of iron? There is no reason why it would not pay if properly managed. For one would find a helping hand and a few others to help as well. OBS. OF THE DISAPPOINTED.

WIDE TENDERING.

The following were sent in for new roads and sewers on the Brockley-lane estate, Forest-hill under Mr. Robert Walker:—

Hammerton	£10,434	8	10
Oliver & Rowland	6,000	0	0
Bilamy	5,560	0	0
King	5,484	14	0
Lean	5,233	10	10
Moxon	5,160	0	0
Porter	5,148	0	0
Blackmore	4,950	0	0
Fisher	4,946	0	0
Harris	4,680	0	0
Adamson & Paylor	4,660	0	0
Clarke	4,587	0	0
Morris	4,598	0	0
Strickson	4,500	0	0
Hanbard	4,345	10	0
Bloomfield	4,389	0	0
Ruff	4,318	4	10
Tinsley	4,220	0	0
Pizzey	4,200	0	0
Ossington	4,025	0	0
Turner	3,998	0	0
Brewer & Co.	3,555	0	0
Wainwright	3,510	0	0
Jackson	3,250	0	0
.....	3,200	0	0

It will scarcely be believed that these tenders were all made on the same "quantities!"

Sir,—Pray publish the following list of tenders sent in for the first portion of the restoration of St. Peter's Church, Great Berkhampstead. Mr. Butterfield, architect:—

Cook	£1,170	0	0
Harris	850	0	0
Nash & Matthews (accepted) ...	380	0	0

I think it my duty to inform you that the architect stated to the committee that the last tender but one was a fair one, but they accepted the lowest. Will some one explain how these frightful differences occur? A. B. C.

Sir,—Here are the extraordinary tenders sent in for the external painting, and the carpenters' work, in repairing and re-changing sashes, &c., at the Mile-end Old Town Workhouse. Mr. W. Dobson, architect. The quantities were not supplied:—

	Carpenters' Work.	Painting.	
Kelloway	£81	12	0
Walls, Gordon, & Co.	322	0	0
Patten	260	0	0
King	35	0	0
Leveston	13	0	0
Prescott	2	0	0
Hemby & Mann	38	0	0
Nor	25	0	0
Derby	21	0	0
Britton	10	0	0
Brown (accepted)	10	0	0
Mistry	70	0	0

A. Z.

Sir,—Will you insert the following specimen of wide tendering in the iron trade?—

For hot water pipes, and fittings for the heating of the Basingstoke Swimming Bath up to 80 degrees—	Mr. J. Curtis, Mr. G. B. Musselwhite, architect:—		
Ridd's boiler	£425	0	0
Temple	129	0	0
Hobbs, with Marriott's boiler (accepted)	125	0	0
Soper	32	12	0

TERMS OF CONTRACT.

VIGORS & PEO.

THIS was an action (Court of Queen's Bench) against Sir Morton Peto by a contractor who had contracted to carry away the materials extracted in making the excavations for the Metropolitan Railway Company; and the question was as to the construction of the contract, which was that the plaintiff should be paid at the rate of 1*s.* 4*d.* per cubic yard for the materials cut and carried away. The point was as to the meaning of the words "per cubic" yard—whether that meant the yard *in situ* (i.e., as the soil lay in the earth or the yard) as it was measured after excavation, when the materials were loose. The difference would be enormous—a matter of some thousands of pounds. At the trial, however, the plaintiff failed, the construction put upon the contract being adverse to him, evidence being adduced on the part of the defendant (which was objected to on behalf of the plaintiff, but received) to show that the phrase was understood by contractors in the sense opposite to that for which the plaintiff contended—viz., in the sense that a cubic yard means a yard of earth as it lies *in situ*. Upon this construction the plaintiff would already have been paid; on the contrary view, he would be entitled to recover some thousands more. The question was whether the evidence was admissible, and whether the plaintiff's view of the contract was the right one—that the cubic yard meant the yard of earth as it lay loose after excavation. The Lord Chief Justice pronounced the judgment of the Court in favour of the defendant. Taking the words as they stood, it might be that the plaintiff's view would be right; but taking them in the sense in which they were understood in the business, according to the finding of the jury (and the evidence the Court deemed admissible), the defendant's view was the right one—that "per cubic yard" meant the earth as it stood before excavation. The other learned judges concurred.—Judgment for the defendant.

mahe, M.P., will, with other noblemen and gentlemen, take part in the proceedings.

Hollington Church.—The font was given by Mr. E. W. Wyon, as stated in our last; but the architect is his son, Mr. E. Alexander Wyon.

DISSENTING CHURCH-BUILDING NEWS.

North Shields.—The chief stons of a new Lutheran Church has been laid here on the east side of the Borough-road, and not far from the quay. The building will consist of nave, 40 ft. long and 26 ft. wide; chancel, 15 ft. wide; small west gallery with external stone stair turret, west porch and large sacristy, communicating both with street and church. In general arrangements it resembles an English church,—chancel at the east end, with holy table raised on steps; priest's seat in north wall; stone arch between nave and chancel, and the pulpit placed on the south side of it, &c. The building is to be entirely of stone, and will externally present a west gable to Borough-road. The porch, projecting about 6 ft., occupies the lower part of the gable, and above this rises the stair-turret, to be finished with an ornamental gilded iron finial. On the north side of the porch are windows lighting the lower part of the church, and over these two lancet lights connected together by label moulds. Over these, in the upper part of the gable, is a circular sexfoiled window of large diameter. The south wall has buttresses with lancet windows between them. Internally the church is divided by roof principals into four bays or divisions, having moulded collars, rafters, &c., and ceiled with wood boarding laid to a trefoiled outline. The height from floor to wall-plate is 16 ft. 6 in. The chancel arch is of stone, resting on corbels with carved caps, &c., the font being built into the north jam. The east end of the chancel has a window of three lancet lights, which it is hoped at some time to fill with stained glass. The passages between pews and the chancel floor are to be laid with encaustic tiles. The seats will be of pine timber simply varnished, and in some places slightly stained. Provision is made for artificial lighting, ventilation, heating, &c. The church will seat 230 adults, and the entire cost of building, land, professional expenses, &c., will be about 1,350l. The contract for masons', plasterers', and joiners' works has been let to Messrs. Campbell & Goulson; for plumbing, to Messrs. Twizell; for slating, to Mr. Place; and for ironfoundry work, to Messrs. W. H. Walker & Son, of Newcastle. The church has been designed by Mr. F. R. N. Haswell, of North Shields, architect, under whose superintendence it will be erected.

Sunderland.—A new United Presbyterian Church is about to be erected in Toward-road, immediately adjoining the new park, Sunderland, from the designs and under the superintendence of Mr. Thomas Oliver, of Newcastle-upon-Tyne, architect. It will be in the Gothic style of architecture, with walling of local limestone and sandstone dressings.

STAINED GLASS.

Wellington Church.—Two stained glass windows have been put up in the chancel of the parish church, in memory of the late Mr. W. O'Connor, of London, were the artists. The windows are of the same style as the Oliver memorial window in the east part of the chancel, and fill the spaces formerly occupied by the doors of the north and south aisles. That in the north aisle contains a full-length figure of St. John the Baptist, and that in the south aisle a similar figure of St. John the Evangelist. Both windows have a border composed of the chain of office worn by the deceased as an officer of the Grand Masonic Lodge of Shropshire and North Wales, and at the upper corners of each window are the insignia of the rank held by the deceased in Freemasonry. Mr. J. Davies, architect, rendered service to the committee by undertaking to fix the windows, and that, although a subscriber to the fund, without charge. In addition to the windows, the committee have also presented a massive gold medal to the Wellington Rifle Corps, of which deceased was Lieutenant. This medal is to be competed for twice a year, and is to be called "The Anslow Memorial Medal."

Memorial Window to Sir James Graham.—The design of Messrs. John Scott & Son, of Ricker-gate, Carlisle, has been selected for the stained glass window to be erected in Arthuret Church to the memory of the late Sir James Graham. Various designs were submitted by stained glass artists in London and Newcastle. The window is divided into twelve principal compartments, and these will be filled with large figures of the Apostles attired in robes of contrasted colours. In the traceries are to be figures of angels playing on harps and other musical instruments, and in suitable positions in the design will be introduced emblems of the Brangellias. The ground-work of the design will be blue, which will be the prevailing colour, but a golden transparent canopy will give it a light and sparkling appearance, while the colours of the large figures will give variety of hue. The cost of the window will be between 200l. and 300l.

St. David's.—A chancel window has just been erected in this church. In the centre of the window is placed David, King of Israel, to whom the church is dedicated; on his right are Moses and Aaron, and on his left Elijah and John the Baptist, representatives of the Law and Prophecy. The figures are placed under canopies on a ground of geometrical tracery, enriched by a golden stain and bands and losses of colour. This window was presented by Mr. John Nicholls, the patron of St. David's, and was executed by Mr. T. W. Camm, of Smethwick.

SCHOOL-BUILDING NEWS.

Dunmow.—The new national school building has been publicly opened by the Bishop of Rochester. It stands on a rood of ground on the Dunmow Downs, the gift of the late Viscount Maynard. The materials are red brick with stone dressings, and the general style Decorated Gothic of a late date. The principal entrance-door, facing the east, is somewhat of Tudor character, with windows on the same front in keeping. The entrance, facing south, is a Perpendicular Gothic door, and the large windows facing south and east are Decorated Gothic. The ground plan is in the form of a T, the upper compartment running east and west, in length 62 ft., and that from south to north 56 ft., each being 21 ft. wide and 11 ft. high to the wall plate. The area in superficial feet is 2,457, exclusive of a class-room and lobby, with cellars underneath. The longest compartment will be the girls' and infants' school, and the other for the boys, with a movable partition separating the two. The architect is Mr. Gilbert G. Scott, jun. The contract was undertaken by Mr. William Franklin, builder, Dunmow; and the masonry was erected by Mr. A. Haselgrove, the brickwork by Mr. S. Johnson, the glazing and plumbing by Mr. J. Young, and the gas-fittings by Mr. Edwin Taylor, all of Dunmow. The freestone came from the quarries of Mr. Octavius M. Simpson, Great Casterton, Stamford.

Wilmslow.—The foundation stone of the new national schools at Wilmslow has been laid by the Bishop of Chester. These schools, the design of which has been approved by the Education Committee of the Privy Council, will comprise all that is required in a national day-school, with facilities and capabilities for parish or local meetings, lectures, &c. The boys' school-room, 42 ft. long by 20 ft. wide, is separated from the girls', which is 34 ft. long by 20 ft. wide, by folding doors, thus making one large room capable of holding 300 persons. Both of these rooms have class-rooms adjoining. The infant school is 35 ft. long by 30 ft. wide, and is entered by the same porch as the girls' school, on the north side of the building. The boys' porch is on the south side. At the east end of the building is the master's house. The site is a piece of glebe land sloping towards the south, and near to the church, with which old building, lately restored, in the Perpendicular style, the new schools have been designed to harmonize. They are to be built of grey brick, relieved by slight touches of red, in arches, band, string courses, &c. There will be accommodation according to the Government regulations for 120 boys, 100 girls, and 130 infants; 350 in all. The architects are Messrs. J. Medland Taylor & Henry Taylor, of Manchester. The cost of the schools and master's house, including value of site given by the incumbent (the Rev. F. H. Cope) is estimated at 2,500l.

Books Received.

Report to the Walton Local Board, on the Sewerage of the District, and Disposal of the Sewage of Walton and West Derby, by Irrigation. By GEO. WM. GOODISON, C.E. With an Appendix on Facts in Sewerage Farming. By READ & GOODISON, C.E. Ordered to be printed by the Walton Local Board, Liverpool.

The most generally important part of this report is the Appendix, in which an account is given of the public experience in sewage farming, and the principles of the utilization and purification of town sewage by irrigation. This is a subject we have frequently treated of, and at some length—even quite recently. Messrs. Read & Goodison give an interesting review of what has been done in this respect, even from old times, and in other countries besides England. Among the places referred to are Barking, Croydon, Chelmsford, Norwood, Bryn St. Edmunds, Edinhrgh, Carlisle, Rugby, Mansfield, Watford, Worthing, &c. The general subject of sewage treatment, with a view to the realization of an agricultural profit, is also considered. To take an illustration where, from the character both of the neighbourhood and the soil—the one covered with good houses and the other a stiff soil—the difficulties may be supposed to have been the greatest, South Norwood is an example of great success, the tenant of the land being so gratified with his farm, that he has offered to repay the Board the whole expense of the work on the condition of their granting him a long lease. The farm is 33 acres in extent. It receives the sewage of about 10,000 persons, and the purification seems all that is requisite. Forty to fifty, and even sixty tons of grass per acre are grown—15 ft. 7 in. in year, six cuttings being taken. The underdrainage originally carried out is now disposed with, and the water, after enriching the land, flows immediately into a water-course; and at the junction the stream from the farm was, say the reporters, when they saw it, much cleaner and purer to the eye than that flowing down the brook. The Norwood example—no longer an experiment—may very well be quoted as an encouragement to the authorities of inland towns who are in difficulties in connexion with this subject; and it is so quoted in Messrs. Read & Goodison's pamphlet, which ought to be well studied by borough engineers, town surveyors, and suburban farmers.

The Story of a Blind Inventor, Dr. James Gale, M.A., F.G.S., F.C.S. By JOHN PLUMMER, London: Tweedie, Strand. 1868.

Dr. GALE is the inventor of the non-explosive gunpowder process which we early brought under the notice of our readers. He has been blind since boyhood. He is fortunate in having an able biographer, although he is still in life. Mr. Plummer's object is to adduce an encouraging example of the power and value of self-help, to those engaged in the pursuit of knowledge under difficulties, by showing how perseverance and energy can vanquish the most formidable obstacles, converting impediments into so many stepping-stones towards success. The biography is written in an interesting way; and it gives an account of Dr. Gale's various inventions, especially his method of keeping gunpowder safely by temporary mixture with fine ground glass, for the prevention of explosion.

VARIORUM.

"THE Decked-well Fishing Boat, and Fisheries and Fish-market Reform." By Henry Dempster. London: Simpkin, Marshall, & Co. The improvement of fish supply to the metropolis and the country at large, as our readers know, has for years engaged our occasional attention. Mr. Dempster has done much to promote this very desirable object; and, notwithstanding the not very attractive form, of dialogue between himself and others, in which he has written his book, it contains much useful suggestion, especially as regards the enlargement and improvement generally of fishing vessels, and fish-market reform. The oyster question is also treated of.—"A Glimpse at the Social Condition of the Working Classes, during the early Part of the present Century; Trade Strikes; and Trade Unions." By the Author of the Autobiography of a Beggar.

boy. London: Heywood & Co." One object of this author is, speaking from long experience, to point out why strikes have in nine cases out of ten been failures, from serious errors in their management. Another object is to show that no combination of men can keep up the value of labour beyond its power to remunerate the capitalist; and that a high standard of labour may become in itself a tax upon the working classes by forcing up the price of all the common necessities of life. This we have often pointed out, and that it can only be during the transition from low prices to high in all branches of industry that some few can benefit at the expense of others. The unhealthy competition between reckless masters who have no respect either for the claims of their workpeople or for the rules which regulate the conduct of fair traders, and the reaction of such competition on the labour market, are also considered. The chief purpose of the author is to give advice to the working classes.

Miscellaneous.

THE NEW LAW COURTS.—In the Commons, Mr. Pease inquired whether the opinion of her Majesty's Attorney-General had been received on the legality of the award of the judges of designs for the law courts; and what was the nature of that opinion, if delivered to the Treasury.—Mr. Solator-Booth, in reply, said the award had been received, and the Government felt themselves at liberty to make any appointment they thought proper.

SEWAGE NUISANCE AT BARKING.—A memorial, signed by the vicar, the churchwardens, the medical men, and most of the inhabitants of Barking, has been prepared for presentation to the Home Secretary, setting forth the "grievous nuisance and injury" inflicted on the inhabitants of all the towns below London by the Metropolitan Main Drainage, and praying for an injunction against the Metropolitan Board of Works to restrain that body from discharging the sewage of London into the river Thames.

ALUMINIUM.—It would seem [as we asserted long ago] that so valuable a metal as aluminium, distributed (in the form of an oxide) more generally and plentifully over the globe than iron is, might be procured with no greater expenditure of labour, time, and money than iron. To be sure, we cannot apply the same crude means to the reduction of aluminium from its base, mother clay, that we can use in the reduction of iron; and this is just where scientific knowledge and practical talent are needed. We want the metal; the exigencies of the times demand its general use. It will readily combine with other metals, as copper, iron, gold, &c., and with them forms very valuable alloys. Some of its qualities seem to recommend the metal or its alloys as a material for minting, and others stamp it as of vast value in the arts. What we now need is its production in sufficient quantities and cheap enough to be employed in the arts.—*Scientific American.*

THE ENGLISH CHURCH ABROAD.—A year since the foundation of St. Andrew's Church at Compiegne was laid, owing its origin to an English lady, the Hon. Mrs. Russell Barrington. Its dedication to divine service took place lately in presence of a large crowd. St. Andrew's Church is built in a situation where, fifteen years ago, there was not a single house, but which is now dotted with picturesque villas, and the church adds to the attractiveness of the beautiful avenue on the borders of which it stands.—The vast influx of English visitors during the last few years to the various towns on the Mediterranean shores of France and Northern Italy has called for a large increase in church accommodation. There are two English churches at Nice, two at Cannes, and two at Mentone; one is about to be erected at Hyères and one at St. Remo. The church in the western bay of Mentone was opened during the past season, and a gratifying proof of the feelings of the English visitors towards the architect, Mr. William Barber, of Leicester, son of the officiating clergyman, has just been shown in the presentation to him of a testimonial with a suitable inscription. The testimonial consisted of a handsome clock, representing an ecclesiastical building in the Early Lombard style, and a pair of candelabra to match. Mr. Barber has since been appointed architect of the two projected churches referred to at Hyères and San Remo.

LADY DE ROTHSCHILD'S INDUSTRIAL EXHIBITION. The arrangements for the inauguration, by the Premier, on Whit-Monday, of the industrial exhibition to be held under the auspices of Lady de Rothschild, in the grounds of Hulton Manor House, near Aylesbury, are now complete. The prize medals offered to successful exhibitors are valued at 500*l.*

A PANIC IN THE DOME ASSEMBLY ROOM, BRIGHTON.—On Sunday evening before last, a congregation which assembled in the Pavilion Dome for short evening services, was thrown into a state of great alarm, and exposed to some danger, by a panic originating in the following cause:—The large centre chandelier had, it appeared, been undergoing the process of cleaning during the week, and the work not being quite finished, some of the strings of lustres were temporarily fastened in their proper position for the evening in question. These lustres are glass drops, strung together like heads; and in the course of the service one of the strings came unfastened, and the lustre descended in a shower upon the heads of those who were kneeling beneath the chandelier, and who, greatly alarmed by the falling drops and the rattling of other pendants, screamed and rushed in terror towards the doors. Fear spread throughout the congregation, numbering about 2,000 people, who were moving simultaneously with a view to escape, when Alderman Martin, seeing the cause of the alarm, called upon them to resume their seats, and having explained the trivial character of the accident, order was restored. Only one entrance to the room was open, the others being locked; and the crush at this point was very great.

A NEW BRANCH OF INDUSTRY.—Sheep draw from the land on which they graze a considerable quantity of potash, much of which is ultimately excreted from the skin with the sweat. It was pointed out by Chevreul that this peculiar potash compound ("suint") forms no less than one-third of the weight of raw merino wool; while, of ordinary wools, it constitutes about 15 per cent. of the weight of the fresh fleece. As the "suint" may be extracted by mere immersion in cold water it is easy for the wool manufacturers to produce more or less concentrated solutions from which the potash may be recovered by appropriate treatment. The development of this new branch of industry is principally due to M. Maumené and Rogelet, and their process is probably in operation at most of the great seats of wool manufacture in France. The wool manufacturers of Rheims, Elboeuf, and Formies annually wash the fleeces of 6,750,000 sheep, and the amount of potash, reckoned as carbonate, which these fleeces would yield, if all subjected to the new process, represents a value of 80,000*l.* But M. Maumené and Rogelet calculate that there are seven times as many sheep in France as are included in this estimate. The practical and very obvious moral supplied by these facts (says the *Quarterly*) does not yet appear to have penetrated the mind of the British farmer.

THE NOTTINGHAM PATENT BRICK COMPANY (LIMITED).—The new works of this company have been formally opened in presence of a considerable number of influential men of business and other gentlemen. The works are situated about a mile and a half from the central part of Nottingham, and in a declivity on the left-hand side of the Carlton-road, where there is plenty of working material within an easy distance, and a large quantity on the spot itself. The kiln, which is a very large one, has been built according to the designs of Messrs. Hoffmann & Leight, of Berlin, who have patented them. The new company have also availed themselves of the "Wakefield Grinding Pan" (as it is called) and the "Dry Brick Machine and Disintegrator," and the "Dry Brick Machine and Disintegrator," of Platt, Brother, & Co., of Oldham. As regards the machinery, which is upon a large scale, the managers have adopted the latest improvements. The estimated daily production of bricks will very shortly be 20,000. Upon the new plan the clay is at once dug out of the bank, put into trucks, thence into the grinding-pan, and, in an almost incredibly short space of time, it is reproduced as dry bricks, which are ready for being wheeled into the kiln, where they may be burned the same day, instead of after a delay of a month from the winning of the clay. There is also an immense saving in the expense of fuel. The spectators at the opening seemed greatly surprised at the expedition with which the raw and unprepared clay was converted into complete and well-shaped bricks.

THE METROPOLITAN BUILDINGS AND MANAGEMENT BILL.—There is not the slightest probability that this Bill will be brought into the House of Commons during the present session. We should have expressed our opinion of it before now if there had been.

DUKE OF BUCCLEUCH'S COMPENSATION.—Judgment has been given for the Duke of Buccleuch in his case against the Board of Works. The duke will therefore be entitled to the $\$325*l.*$ awarded him by Mr. Pollock as compensation for the injury done to the dual mansion by the building of the Thames Embankment, as well as to 20*l.* for interest and the costs of the preceding trial.

NEW PEALS OF BELLS.—A peal of six bells (tenor about 11 cwt.) has just been completed at Clifton, near York. They were made at the foundry of Messrs. John Warner & Son. Three bells recently erected for Sir T. Brown at his new church, Sheffield, were made by them also; and it is intended to increase the number to eight bells at a future time. Messrs. Warner's men are now employed erecting a peal of bells (tenor about 10½ cwt.) at Hunsingore; Messrs. Kirk & Parry, Sleaford, architects.

ROYAL HORTICULTURAL SOCIETY.—The great rhododendron tent in the gardens of the Royal Horticultural Society at South Kensington was opened to the public on Wednesday, and, notwithstanding the fact of its being the Derby day, attracted a large attendance of visitors. The plants this year are supplied, as usual, by Messrs. Waterer & Godfrey, and the ground under the great tent has been entirely re-arranged, under the superintendence of Mr. John Gibson, of Battersea Park, and Mr. Eyles, superintendent of the South Kensington Gardens.

MR. HENRY LESLIE'S CHOIR.—The present season of this choir was brought to a close on Wednesday night by a concert at St. James's Hall, which fully sustained the high and continually-advancing reputation and standing it has obtained in the musical world. It may safely be said that no finer concerted or choral singing, unaccompanied by instruments of any kind, can be found in the metropolis than that of the "Leslie Choir." The indefatigable efforts and thoroughly artistic abilities of the conductor have been well responded to by the members of the choir.

THE WYRE-HILL HOME MISSION SCHOOLS, BEWDLEY.—Old Bewdley, or the "Bewdley St. Giles's," being greatly in want of religious ministrations, about eight years ago a Miss Pountney conceived the idea of devoting her time and energies to the amelioration of her poor neighbours. Mr. Ryland (his present poor neighbour) came a few years since to reside in Bewdley, and one night, taking a walk up the steep and rugged cartway, once the main thoroughfare from Wales, was surprised to hear the sounds of divine service issuing from an old dilapidated building. He gently opened the door, and was astonished to see a young woman, surrounded by a number of navvies and smock-frocked labourers on their knees fervently engaged in prayer. He closed the door, and, as he walked away, resolved that if ever he was in a position to call upon the public for aid to erect a more suitable room for Miss Pountney's use, he would take the first opportunity of doing so. As soon as Mr. Ryland was appointed mayor he mentioned the subject of erecting a more suitable building for Miss Pountney's use to the Rector of Ribbesford and Mr. Thomas Bangh, J.P. These three gentlemen at once formed themselves into a committee for the purpose of carrying out Mr. Ryland's idea, the mayor being appointed chairman, the rector secretary, and Mr. Bangh treasurer. The result of their appeal to the public was most encouraging: from the humble almshouse-women, who subscribed their pence, to her Majesty the Queen, who subscribed 30 guineas, they appealed to none in vain. Mr. Thos. Lloyd Roberts, of Crofton Manor-house, gave the ground for the site of the building, and Miss Pountney has just had the pleasure of laying the corner-stone of a building that will long perpetuate the memory of her labours. The mayor handed to Miss Pountney an elegant silver trowel, bearing the following inscription: "Presented to Miss Pountney, on laying the corner-stone of Wyre-hill Home Mission Schools, Bewdley, 18th May, 1868. W. H. Ryland, esq., mayor." The trowel was the gift of Mr. T. F. Parry, of Birmingham, the architect for the schools.

The Builder.

VOL. XXVI.—No. 1322.

Gleanings from French Gardens.



It is not in the sunny, mellow, musky gardens attached to the grand old French châteaux that we must look for improved modes of gardening. It is where gardening comes within the range of commerce, where fruit and vegetables are grown to be sold, and a fortune made out of the process, that French gardeners have made strides, especially in rapid rotations of crops and in economy of space, that we ought to examine to see if the same management will benefit us. In January, 1867, Mr. Robinson visited France, to study its horticulture for this purpose. He found, as we have stated above, that large private gardens, as a rule, were not so well kept or productive as those in our

country; but that where a supply for the markets was cultivated we were left far behind. In city gardening, too, the French take the lead of us; and also in the decoration of apartments with plants. He has now published his observations in an illustrated volume, in which he details the various processes that have brought about the remunerative state of things in operation.* We purpose glancing at a few of these in which constructive works are called for, leaving the details of culture to be found on reference to Mr. Robinson's very useful, careful, and timely work.

First, as to fruit. Why are our peaches and pears so inferior to those grown for us in France? Not because there is a slight difference in the climate, but because every good French fruit-cultivator does not rely entirely upon this advantage, but takes every means to equalize the sap, and keeps every tree under control. Moreover, observes Mr. Robinson, "there is not a good fruit-garden in the neighbourhood of Paris but has its walls protected by a wide temporary coping, while in numerous cases with us there is no protection at all, or but a very imperfect one. This fact speaks for itself." We think it does. If peaches and pears require this protection in the more genial climate across the Channel, how can gardeners hope to grow them in equal perfection here without it? With similar care paid to the fruit many parts of England and Ireland could grow as fine peaches as ever were grown in Montreuil, says our

author emphatically. The construction required for the cordon system is of the most inexpensive kind. It is minutely illustrated in the volume before us. A simple galvanized wire, not thicker than strong twine, is extended at a height of a foot from the ground, and supported there by oak or iron uprights. To this wire the fruit is trained. By this means in France the apple is grown as an edging to the quarters in kitchen and fruit gardens. The term *cordons* is explained by a quotation from a letter from M. du Brossil, who claims to be the inventor of the mode of training in question. It is derived, he says, from the word "cord," and was applied by him to trees pruned to consist of a single branch, bearing fruit spurs only; this necessarily has much the appearance of a cord or rope of fruit. He regretted the long period that must elapse before a wall could be profitably covered by the larger form of trees, and invented this mode as a means of securing a more rapid and early return. The bilateral cordon or tree on which two branches are allowed to grow upon the stem, and departing from it in opposite directions, our author recommends as a means of covering the bottoms of walls, bare spaces between fruit-trees, or in front of pits, or other spots generally seen wasted in our gardens. The fine dessert apple, the Colville Blanche, most suitable for such positions, sells in Covent-garden for half-a-crown, and sometimes three shillings for each fruit. At Versailles a border of cordons has been tried; that is, three graduated heights of wire have been raised on the border before a wall covered with fruit, that nearest the wall being about 3 ft. high, the intermediate one 2 ft., and the lowest and farthest from the wall 1 ft.; but the shade given to the fruit on the wall by the highest cordon Mr. Robinson considers a disadvantage, and recommends that the three lines of cordons should be all 1 ft. from the ground. The wires for cordons are tightened, and thereby straightened, by a little contrivance, scarcely to be accounted a "machine," as it is called in the text, known as a *raidisseur*. It is a small oblong galvanized iron frame, about 3 in. long, through which passes an axle with a hole in it, and the wire is passed through a hole in the frame and then through that in the axle, when it is wound up and tightened just as a guitar string is wound round its peg,—only, instead of turning the axle with the finger and thumb, a key is used. Mr. Robinson strongly advocates the French mode of wiring all walls destined to grow fruit, as much neater, cheaper as far as labour is concerned, and much more durable than our mode of nailing with shreds of cloth; and as the French fruit-growers are supplied by the wire from this country, we may conclude that it would be even cheaper to us than it is to them. A row of strong iron spikes, at equal distances one above another, driven into the right angle formed by two walls, is all that is required to fasten on the wire, and all that is wanted for its support is that it should be threaded through iron hooks, which should also be galvanized, placed at regular intervals in straight lines. By this plan there are no holes made in the walls for insects to harbour in, and our author estimates that a man may do as much work along a wall thus wired as he could in six with the old nail and shred plan.

We perceive Mr. Robinson advocates "a new and cheap method of making garden walls." This is the concrete walling. Like the galvanized wire, our author found it first in use in Paris, but on inquiry learned that it was of English origin. The concrete is placed in position by the use of two frameworks of boards set up to the size of the wall required. When ready, the concrete is thrown into the space between the two surfaces of boards, and in twenty-four hours is hardened sufficiently to admit of their removal, when the framework is readjusted to form a further length. In some districts where there are great masses

of clinkers thrown out from furnaces this kind of wall could, doubtless, be run up at a very small expense. Our author considers that fruit-trees could not be in a more excellent position than upon a wall of this description, smoothly plastered, and wired as above. "The temporary coping taken off after all danger from frost was past, every leaf would be under the refreshing influence of the summer rains, all the advantages of walls as regards heat would be obtained, the syringing engine would not be counteracted by countless dens offering dry beds and comfortable breeding-places to the enemies of the gardener and the fruit-tree, while the appearance of the wall would be all that could be desired." The temporary coping alluded to should be formed of narrow lengths of tarpanin nailed on cheap frames from 6 ft. to 8 ft. long, and about 13 in. wide. "The use of such," continues the author, "on the walls devoted to the culture of choice pears, peaches, &c., would result in a marked improvement. The temporary coping has a great advantage in being removable, so that the trees may get the full benefit of the summer rains when all danger is past, and not suffer from want of light near the top of the wall, as they would if such a wide protecting coping were permanent." The netting and canvas protections in use in some English gardens is not, he considers, to be compared to this. A suggestion is made that there should be a smaller permanent coping of slate slabs or concrete strengthened with flat iron bars running across it; but neither of these copings, as shown, would bear a ladder against it. Nor should we like to guarantee the stability of concrete walls, of the dimensions mentioned, 9 in., 7 in., and even 6 in. thick, and 9 ft. and 12 ft. high, in a gale of wind without buttress supports at intervals.

There is a French mode of glazing iron greenhouses specially commended. Instead of overlapping the panes they are made to meet evenly, any little interstice there may be being filled with a particle of putty; and on the outside strips of thin lead-paper are laid over the junctions. The strip of "lead-paper," which is probably thin lead, is said to have a silvery appearance, and to have the effect of sealing the houses almost hermetically. We are told, too, of improved fruit-shelves:—

"Instead of being confined to wide shelves or benches all round, as is usually the case, there were several sets of shelves arranged along the room—rather narrow, sloping oak shelves—supported by oak uprights. These shelves are wide enough for five rows of pears on each side, and on such a slope that the pears rise gradually, like after line, so that the eye could see each fruit with ease, without bending or distorting any, and of course this was a great gain. But the careful constructor had gone further, by making the slight concavity upon which each line of pears rested of two laths, so that the air could flow up between them. No single fruit was allowed to touch its fellow, and thus they were in a very much better condition than in the British fruit-room, where all are frequently packed tight together, and the good ones often liable to get tainted by the bad. This was in the pear-room at Baron Rothschild's, and a more pleasing sight could not be presented to the lover of a garden—the successive shelves of splendid fruit being so arranged that every individual pear could be examined without touching one."

The French have already made an experiment in planting railway banks with fruit-trees. Mr. Robinson went to see eight leagues so planted along the line from Gretz to Colomniers, on the Chemin de Fer de l'Est. The fences of galvanized wire is in operation here, and pear-trees are trained on it so that their branches cross each other as in trellis-work. In some parts the fence is of wood, the planters reckoning that before it decays the trees will be so firmly intertwined as to support themselves. But only a single line on each side of the railway was planted, leaving a large amount of waste space still, which the author would have occupied by dwarf trees. He quotes M. Ballet: "It is quite possible and very advantageous to establish neat hedges of pear-trees more or less regularly trained. By planting them rather close together a quick result is obtained. At first it would be desirable to train the trees, as shown in the cut (exactly like trellis-work), so as to secure a dwarf-spreading tendency, but

* "Gleanings from French Gardens, comprising an Account of such Features of French Horticulture as are most worthy of Adoption in British Gardens." By W. Robinson, F.L.S. London: Frederick Warne & Co. 1868.

after a time they might be allowed to grow like any common hedge, and even clipped with a shears. They should be planted at about 4 ft. apart." This eminent French authority recommends this arrangement for railway banks as it will resist the strongest winds. Mr. Robinson suggests that we should grow figs on the sunny banks in our southern counties; and that, instead of planting one continuous fence of fruit-trees without reference to the soil or situation, as the French have done in their experiments, we should consider both and take only the more desirable spots along the lines at first.

Not only are our sunny railway banks wasted, except by enterprising railway porters at rural stations, in tiny plots, but we throw away our available spaces as though our "right little island" was the vast continent of America. Not only miles of garden-walls are left bare, the lower exterior walls of hot-houses left bare, and great blank spaces left bare, where there are fruit-trees grown at distant intervals, whereas the most skillful cultivators in "La helle Franco" arrange their branches alternately, and their trees so closely, that the branches of one run in between those of another, making the wall as green as a meadow; but we throw away other opportunities. It seems any one who has a cave or cellar, old box, tub, or tea-chest, can cultivate mushrooms if he will. Any one with the smallest garden can have salad all through the winter, by the use of the same means French growers take, which is simply to cover their salads with bell-shaped glasses, beneath which the lettuce or other salad flourishes in frost or otherwise, as in a Wardian case. Any one, as we have seen, may greatly increase the productiveness of his fruit-garden if he choose to take the same means French fruit-growers take, and the same means. In fine, we might very materially improve our condition in this respect if we thought well to set about doing so. There is no reason why peaches should not be sold about London streets for the same price as oranges, or for a halfpenny a-piece, as in Paris. The peaches sold in Paris are grown on walls in the neighbourhood; only every foot of the wall is utilised, and care is taken, by the protection described above, that the crop is not blighted every other season, or more frequently still, by frost.

The sum and substance of Mr. Robinson's book is a reiteration of our lost opportunities, our wilful waste of wall-spaces, our bungling, expensive, extravagant ways of gardening, all tending to make fruit a luxury for the wealthy only,—for those who can drive to Covent-garden and select it at a cost as high as though it had been "guarded by dragons to brighten the gardens of kings." When he has made our errors patent, he shows us how fruit-culture is managed in France by those who have attained the most success in it; and shows also how profitable it is to them, and how laudible it is for the public. But he also draws attention to the superior appearance of the French public gardens and the details that have conducted to it. And here, again, the French have naturalised a production of Great Britain, and shown that they can appreciate it, if we cannot. This is the common Irish ivy. The borders in the private garden of the Emperor at the Tuileries, as well as the more public part of the grounds, are all edged with beautiful dark green glossy bands of the Irish ivy. It may be seen again in the gardens of the Louvre, and in the Luxembourg Gardens, where it is trained to fall in wreaths from tree to tree in the avenue bordering the long basin of the fountain built by Catherine de Medicis. The municipality of Paris begrudge no expense in the purchase of trees and plants, nor in floral decoration. Mr. Robinson says one ball at the Hôtel de Ville, in the festivities of the past year, cost considerably over 30,000*l.* Ten thousand plants are sometimes taken there for one evening, in vases furnished with stoves and flat hot-water pipes. "As soon as a new road or boulevard is made in Paris, in go the trees, and every one of the millions is as carefully trained and protected as a pet tree in an English nobleman's park." Each tree is protected with a cast-iron grating, to keep the ground from becoming hard. The kinds chosen are the plane, chestnut, large-leaved elm, the Robinia, Alantus, and *Paulownia imperialis*. Of course the author seizes the opportunity to press that the Thames Embankment should be endowed with these most agreeable ornaments. The nurseries in which the plants, trees, and shrubs are reared for the principal gardens and streets, their boulevards, their river-banks, and radiating avenues, are immense

establishments, with every possible appliance. There is one for tender plants at Passy, another for trees and shrubs in the Bois de Boulogne, and a third for herbaceous plants in the Bois de Vincennes. The gardens of the State grow their own supplies. About 3,000,000 of plants are annually furnished by the first-mentioned propagating establishment for the embellishment of Paris. Everything is on a large scale. Sixty men can work at the hench in the potting-shed. Eighteen iron and glass-house buildings have just been completed, and sixty more are ordered. Then there are numbers of houses 80 ft. and 100 ft. long, filled with one variety of plant, 30,000 being the "opening quantity" for any novelty. 50,000 cuttings of one kind of fuchsia are inserted at a time. And besides the wholesale numbers of plants grown above ground under the gardens. Wherever stone is taken out of the ground for building purposes, a rough prop is left here and there sufficiently strong to support the superincumbent soil, and the quarry thus becomes a large cavern, which affords protection for the storing of choice plants. The Parisian gardener's varieties of hardy outdoor plants is much larger than ours. We do but little with palms, for instance, though there are kinds that are quite hardy enough for our climate: nothing with bamboos and bamboo-like plants, though many spots in the south of England and Ireland could grow them well: very little with the Yucca, or Adam's Needle; very little with several fern-like plants that are hardy and yet ornamental; in fine, it is clear that the list of hardy herbaceous, as well as annual plants, suitable for our public gardens, may be materially extended. While our enterprising and tasteful neighbours have the keenest appreciation of the beauties of numerous plants unacknowledged by us, they have but one idea about the floral decoration of cemeteries. That one idea is the wreath of everlasting. Faded, worn, wan, often wet, and rotten, these memorials, hanging, or lying, or fixed, on every tomb, have a most miserable and depressing effect. We respectfully suggest to M. Haussmann that he should take these places in hand, and not leave Death to be associated with such ghastly, dreary, harrowing associations. Mr. Robinson's eyes are not so dazzled by the remarkable productiveness of French gardens, nor by the glories of the public pleasure-grounds, nor by the tastes displayed in private establishments, but that he can see the wretched aspect of the cemeteries. Indeed, his work is written in a fair spirit, and his strong desire to bring the superior fruits of the earth within the means of the million, combined with the pains he has taken to show how this may be done, entitles it to our hearty recommendation.

A LIMIT TO THE ARCHITECTURAL DEVELOPMENT OF CAPITALS.

THERE is a question which not unfrequently intrudes itself on the reflection of the architect, and which, repeatedly cast aside for the consideration of more practical demands on his attention, is apt often to recur, despite of its vague and shadowy nature. It is a question of which the solution is at present impossible, in default of sufficient data on which to base the inquiry. And yet it is one that is not without influence on the whole course of structural progress and of architectural development, for it involves the elements of durability and of adaptability, two of the chief considerations in design. The question is that of the natural or possible limit to the growth of our great cities. For how long can they continue to double their area within forty years? By what agencies can such a rate of progress be arrested? And what would be the state of stagnation or of decay that would ensue on the arrest of growth?

The question is forced on our consideration at the present moment by echoes of discontent and disquiet from the banks of the Seine. Over the mathematically-drawn streets and wide and stately boulevards that own M. Haussmann as their creator there flits a shadow that seems to tell of an approaching storm. A shadow of the same tint, and direction, and origin, is to be traced in almost every part of the map of Europe. Indeed, the gloom is very rapidly closing in; the bright points are hourly diminishing in number, in size, and in illumination; and the gay streets of the capital of modern civilization seem already to be thrilled by that often

remarked shudder that is the usual precursor of a gust of tempest.

The exact form of this menacing shadow, and the relation which it bears to the question of the present size and the future extension of the French capital, and which thus throws incidental light on the probable history of our own, is this:—How soon will it be too expensive to live in Paris? How soon will the increasing pressure of rent and municipal impositions force the poor man, or the man of moderate income, outside of the *enceinte*, and beyond the limits of the ever-extracting *octroi*?

It appears that the *Crédit Foncier* (an institution which differs from the unfortunate *Crédit Mobilier* and other enterprises formed for the purpose of supplying an artificial maternity to wealthy speculations, inasmuch as it is supposed to attach the roots of its prosperity to the very soil of France) has entered into treaty with the city of Paris to supply funds for the building operations of the next decade. The amount thus to be furnished is differently stated by different authorities, all, it would seem to a foreigner, equally worthy of respect. The Minister who is regarded as the *porte-voix* of the personal Government spoke of 15,500,000*l.* (of course we reckon in sterling).

A member of the Municipal Administration, in a report at the close of 1867, arrived at 18,000,000*l.* A later authority, a councillor of State and Government commissioner, rather exceeded 18,500,000*l.* But, apart from estimate, and at the commencement of the decennial period over which it was proposed to distribute that expenditure, it seems that the *Crédit Foncier* has already discounted, or advanced money, to the amount of nearly 16,000,000*l.* sterling on the hills, *titres*, or *bons de délégation* drawn on this account on the municipal treasury. In addition to this, upwards of 2,000,000*l.* sterling have been advanced on similar security by the *Société Générale*, the *Crédit Lyonnais*, and the public.

To repay the advances of the *Crédit Foncier*, which, according to the principles of that institution, were regarded as a loan—that is to say, as a sum lent, and to be repaid in its integrity at a fixed date (this differing from that national, never-to-be-repaid subscription, which is also sarcastically termed a loan,) a charge of 2,000,000*l.* sterling *per annum* now weighs on the city of Paris. This, of course, is only an item in the account which will some day have to be summed up of the expenditure of the present enterprising Prefect of the Seine. Besides the *bons de délégation*, we find ranking against the ratepayers of the French capital, bonds of the famous year 1852 for 2,000,000*l.* sterling; from 1855 to 1860, for 8,750,000*l.* sterling; for 1865, for 12,000,000*l.* sterling; and the bonds of the "Fund of Public Works, Paris," for 4,800,000*l.* These sums form part of the 80,000,000*l.* sterling which have been raised and, as it is called, borrowed, by the towns, departments, and communes of France, during the sixteen years' life of the Second Empire. It is, therefore, not surprising to find that the annual charge of the *délégation* bonds presses somewhat uneasily on the good city, and that there is a proposition now under consideration to extend the time for the repayment of this considerable sum over a period of sixty years, instead of the ten years stipulated for in the existing and, as it should seem, somewhat irregular, treaties. The immediate inducement for this alteration in the character of the responsibility is not slight, being no less than the saving of an annual sum of 29,000,000 francs, which has to be defrayed out of the heavy *octroi* duties of Paris. But the shape of the change proposed has been defined, in a line thus:—That the population of Paris, instead of paying 20,000,000*l.* sterling within ten years, shall pay nearly 52,000,000*l.* sterling in extinction of the same debt within sixty years. This may be called paying for a long day with a vengeance.

It may be as well to point out that under the French laws there does not exist that happy immunity for the escape from pecuniary inconvenience that prevails under our own more liberal institutions. We have seen within the last week or two the account of the manner in which the directors of a certain famous undertaking horrified 533,000*l.* from the public in direct defiance of the law, and in the absence of any property, of any description whatever, on which the so-called loan could be legally based. Had this taken place in Paris, instead of London, the parties to the transaction would before this time have been condemned to the repayment,

from their own private resources, of the entire principal and interest of which the public had been thus irregularly eased, and would probably have been sentenced, into the bargain, to some such short term of imprisonment as the French judges are accustomed to add, by way of salt, to sentences of pecuniary mulct.

The very *idé mères* or nursing mother of all credit and finance companies, the child and sister of the lower Empire, the *Crédit Mobilier* itself, is even now affording an example of this wholesome vigour of the French laws. In the flush and glow of a prosperity too rapid, too vast, and too dazzling to be thought capable of reverse, the directors of this great financial association, with some slight irregularity of procedure, doubled their capital.

While Fortune smiled, and the run of luck held good, the fortunate possessors of the new (and irregular) shares were only too thankful to lay hold of them. When the aspect of things changed, and the fairy gold returned to its original form of withered, or even of poisonous, leaves, they thought it well to make inquiries, to take that legal counsel which would have been spruned in the palmy times of premin. The consolation and advice given by the men of law, if we may be allowed to condense them into four words of vernacular English, were simply, "Go at the directors." At the directors accordingly the discontented shareholders went, and the result has been the condemnation of those once famous capitalists to refund, out of their own resources, the money paid for these new and irregular shares. The judgment actually given by the tribunal at Amiens only covers the sum of some 2,000*l.* for which the action which it decided was brought, but the decision applies in principle to the whole sixty millions of francs of the new issue. The verdict will not be allowed to take effect without appeal, but the only form in which we have as yet seen any attempt to set aside the decision has been somewhat in the form of an appeal *ad misericordiam*; those directors who acted rather as sleeping partners in the concern representing that they should not be visited with the same rigorous measure of retribution as those who were the guiding spirits and active managers of the whole enterprise, such as the Messrs. Percire and M. le Duc de Galliera. To this it is rejoined that the public know nothing of the distinction between acting and ornamental directors, that the appearance of such a name as that of M. Chevalier was a point that commanded public confidence in the management, and that there can be no excuse from liability merely on the ground of misfortune.

The law thus laid down, and as yet uncontradicted, by the Tribunal of Commerce at Amiens, stringent as it is in its operation, is not more so than our own. To say that the Bench of this country is as fearless and upright in the discharge of the judicial functions as is that of France would be a very mild way of stating an uncontradicted truth. It shows, therefore, a remarkable difference in the tone and the temper of French and of English shareholders that the formidable weapons provided by our own legislature against defaulting or fraudulent directors should have been allowed hitherto to rust in desuetude. By the Consolidated Statute Law of Larceny and other similar offences, any director, manager, or public officer of any body corporate or public company guilty of making, circulating, or publishing any written statement or account which he shall know to be false in any material particular, with intent to deceive or defraud any member, shareholder, or creditor, or to induce any person to become a shareholder in the company in question, or to advance money to the same, is made subject to the penalties of misdemeanor, and to penal servitude for from three to seven years, or imprisonment, with or without hard labour and solitary confinement, for two years. If, therefore, it should continue to be the case that the directors of the *Crédit Mobilier* are the only irregularly-acting trustees who are called to give a legal account of their stewardship, there are many men in this country who will have great reason to felicitate themselves that their recommendation to the debtor of two hundred talents to take his bill and sit down quickly and write fourscore has been rather commended for its acumen, than rightly rewarded for its dishonesty, by the great master, the Public.

It is pretty clear from this example of the operation of French law, that the bonds, or *bons*, or *titres*, or obligations under whatever name that the last sixteen years have been tied round

the neck of the unfortunate residents, who can obtain no article of household consumption that has not to pay the charges of the *octroi* of the city of Paris, have been tightly tied, and that nothing but a revolution, of a much more sweeping and convulsive nature than the mere fall of a dynasty, or exchange of republican for monarchical or other form of government, can apply the sponge to such liabilities. If the present harden be so great that a delay of fifty years in the repayment of a portion of the loan absorbed by the operations of M. Haussmann must be secured at an ultimate cost of thirty-two millions sterling,—for such is the result of the statements on the subject which have been published in this country,—what must be the intensity of the present! The great advantages of residing in a capital, viewed as a centre of business, are capable of pecuniary evaluation. Against these are often to be set others which money cannot readily purchase, especially the greater health and vigour attainable by sleeping in pure country air. The railways, while hitherto they have tended to augment the population of our great centres of industry by the enormous stimulus which they have afforded to business of all kinds, may yet evince a compensating power. As residence becomes rindly and intolerably expensive, travelling will come in aid, and country residence, with railway transit to and from a mere city office, will seriously interfere with the increase or even the maintenance of the number of city residents. To some extent this influence may even be made the subject of calculation and of prediction. The area available for residence increases as the squares of distance from the central point, the rates of fare are fixed and readily ascertainable, and the probability is that the ample returns which have been found to attend extremely low fares, coupled with proper accommodation for travellers, will tend to a general increase of cheapness in travelling on all lines that carry a heavy freight of men going daily to and from their business avocations in our cities. On the other hand, the pressure per head of loans and treaties, such as those to which we have been referring, and of large and increasing expenditure, such as that of our own Board of Works, is capable of pretty accurate estimate. So long as the additional cost of the railway journey approaches the difference in rent, or in tangible and easily distinguished imposts, in the cost of the city over the country residence, there will probably be a sufficient inducement in the feeling which men have of liking to be on the spot where they conduct their business at their usual place of abode. But so soon as the balance turns in the other direction, and the domestic economist finds that he is an actual gainer in pocket by sleeping in country air, the natural advantage of the latter mode of life will tell as rapidly as they become familiar. Thus it is far from improbable that we may even now be at no very great distance from a natural limit to the increase of Paris, if not of London. Centralisation may still go on, until it becomes so impracticable, from the sheer impossibility of discharging all the business that seeks the capital within any tolerable time, as to enforce the distribution of different branches or grades of work to different provincial centres, a mode of action of which our county courts and revising barristers' courts afford examples. But, if our views are correct, the centralisation of dense, unbroken lines of street and masses of building is likely, sooner or later, to meet with a pecuniary check. The first substitute would be the dotting of a large area of country thickly over with houses, yet not so thickly as to form streets or towns. Something of this sort is now to be seen in the neighbourhood of Sydenham, where a large district is being covered by villa or cottage residences, each within its own inclosure of garden or close.

Building in this manner resembles a return to the arrangement of the great cities of antiquity, to the Babylon or Nineveh that could afford to shut its gates and await within its lofty and unassailable walls the raising of the siege from the sheer distress of the assailant, and could do so because within that formidable barrier there was cultivated land adequate to supply the food of the beleaguered inhabitants. In English walled cities, such as York and Chester, the ecclesiastical intramural precincts still present the same feature. A city was not, in earlier times, a mere mass of houses. It is only by slow degrees that the cities of our time have assumed that most unnatural and unhealthy development. So long as the financial reason operates in that

direction, a reason the force of which may be gathered from the fact that, while population in cities has been shown to double in forty years, the money value of land in cities has been found to double in seven years, or even with greater rapidity, the increase of hlook cities may be counted on. So soon as the rapidly increasing weight of municipal imposts, under whatever name they may be known, becomes so heavy that the safety-valve afforded by railway travelling comes palpably into play, the increase in the property value will receive a decided check, and the increase in residential population will probably be turned into a decrease. The example of Paris in this respect is thus of the utmost interest to all who hold, or who have to do with, house property in London. The great and pressing want of the metropolis is that unity of rule and administration of which Paris seems to have enough and to spare. But with that consolidation and simplification which a few years more or less cannot fail to introduce, consolidation of jurisdiction, of municipal management, of gas supply, of water supply, and of what may yet remain to be done as to sewage, the features of a gigantic metropolitan expenditure cannot fail to become more marked and appreciable. Palaces and halls, on which it may now seem as though the architect had free encouragement to lay out what he would, may then stand empty and untenanted. It is not croaking to say this, for a more general distribution of the increase of population and the pursuit of the arts of the builder over the whole country would be a greater good, as far as the health, the morals, or the happiness of the people at large are concerned, than the continued growth of our enormous capitals. It is chiefly, however, by financial reasons that this change is likely to be determined.

JOHN BURNET.

JOHN BURNET, the line engraver, whose skill in using the burin has not been surpassed, died on the 29th of April last, aged 84. He was married twice, but no other occasion was he happy in his selection. His second wife, by whom he had no children, was a sad invalid. She died before him.

Our great engraver was the son of George Burnet, general surveyor of excise in Scotland, a man of probity and talent, and Anne Cruikshank, his wife, sister to the eminent anatomist, the friend and associate of John Hunter. The family came originally from Aberdeen. John Burnet was born in Edinburgh on the 20th March, 1784. His associates at the Trustees' Academy for Design were Sir David Wilkie and Sir William Allan.

Burnet was the author of the following works:—

- A TREATISE ON PAINTING. In Four Parts, Illustrated by 130 Engravings, from Celebrated Pictures. 4to, price 4*l.* 10*s.*
 - 1. ON THE EDUCATION OF THE EYE. 1*l.* 6*s.*
 - 2. ON COMPOSITION. Seventh Edition. 1*l.* 2*s.*
 - 3. ON LIGHT AND SHADE. Sixth Edition. 1*l.* 2*s.*
 - 4. ON COLOUR. Fifth Edition. 1*l.* 11*s.* 6*d.*
- In royal 4to, with Proof Impressions of the Plates on India Paper, and a portrait of the Author. Price 5*l.* 5*s.* half-bound morocco, gilt tops.
- THE PROGRESS OF A PAINTER, dedicated to his then young friend, P. Cunningham.
- A 4to Edition of SIR JOSHUA REYNOLDS'S DIS COURSES.
- ILLUSTRATIONS OF THE WORKS OF J. M. W. TURNER, R.A.

One of his best works is his noble engraving from Wilkie's "Chelsea Pensioners hearing the Gazette read of the Victory won by Wellington at Waterloo." Some of his clever sketches in oil from the heads of Greenwich pensioners,—old Trafalgar men,—narrowly escaped the recent fire at the Opera House. The best-preserved are in the collection of Colonel Francis Cunningham, who fought under Sir Robert Sale at the terrible and determined defence of Jellalabad.

The last life which Allan Cunningham wrote in his "Lives of British Painters, Sculptors, and Architects," was that of James Burnet. James was four years younger than John, and was only twenty-eight when he died.

Another principal engraving from the burin of John Burnet is "The Blind Fiddler." We saw in one of Mr. Burnet's portfolios Wilkie's drawing for the fiddler's hands; the fingers were imitable in expression and in feeling.

The engraving after Wilkie which Burnet thought was the best example of his skill with the graver was "The Letter of Introduction.

The expression in the action and inquisitiveness of the dog is inimitable.

The following are some remarks by John Burnet with reference to his brother James:—

Distances.

Extreme distance ought generally to be of the same tint as the sky with which it unites, and as it approaches the middle ground the tints appear interspersed with touches of light and dark, such as the lights upon the tops of the houses, and their shadows. Be particular in marking the buildings with a firmer line than the trees; never admit colour into your distance when in the direction of the light; scumble a little with purple and grey at the bottom of your objects, losing their forms at the base. In a side light the objects are coloured where the light shines upon them, while the shadows are all of one tint; even red is grey in the shadow; but when the light is behind you every object is made out with its proper colour.

Water.

To paint water the artist must truly have the liquid pencil of Cypri. It ought, if possible, to be painted at once with a full pencil and a quantity of vehicle. The colour reflected in the water appears interspersed with their possessing a rich pulpy substance, and also from their sweetly melting into each other. In painting water particular attention should be paid to the place and distance, as it alters much according to the situation. Objects near the foreground have their reflections strong when they touch the object, and often less when they come to the bottom of the picture; while, on the contrary, objects in the distance have their reflections stronger as they approach towards you. This arises from the waves conveying the reflection being larger, and less under the influence of perspective than where they touch the distant object.

Keep your reflections as flat as possible, as nothing gives greater firmness to the object, handling it only on the edges; keep lights flat, and your shadows smooth, with the space between them touchy, so as to unite them both. These observations will be sufficient to show you his strict observance of the objects in nature, and his reasoning upon them. When viewing collections of pictures it was also his practice to note down any remarks made upon them at the time. For example, he says, under a note dated May, 1814, on viewing the pictures of Richard Wilson at the British Institution,—"I observed some pictures more pleasing than others. Those which seemed most so were light pictures, with warm foregrounds falling into a cool sky and distance, the middle-ground mostly in shadow of a purple grey, with yellow and green touches through it. A piece of blue drapery in the foreground gives great value. Of all things, he seems careful to keep a proper balance of hot and cold colour, and of light and shade, with very little positive colour, and little of black and white, but always some of each."

I find many of the remarks are too disjointed to be worked up into anything like a regular series of notes, they being for the most part observations for the guidance of his own practice in painting. However, what I have given here may be sufficient to give an idea of his mode of study, as it is not necessary to give a complete treatise on the art of painting.

I forget whether I mentioned that he was buried in Lewisham churchyard. He was anxious to be interred in the village church of Lee, which forms the background of many of his studies; but, not being a parishioner, it was not compatible with their rules; and, as he died in Blackheath, where he was removed for change of air, we buried him in the adjoining parish.

J. BURNET.

January 1844, 1853.

Here is an agreement with Burnet for the copyright of two pictures by Sir Edwin Landseer:—

"In consideration of the sum of one hundred and fifty guineas, paid to me according to agreement, I give and make over the copyrights of two pictures painted by me, namely, 'The Lassie and Sheep,' and 'The Widow Duck,' together with all profit and emolument arising from the same, to Mr. John Burnet, his heirs, assigns, and for ever.

E. LANDSEER.

March 14th, 1841.

Witness, JACOB BALL.

There is a capital portrait of Burnet by the late Stephen Poyntz Dunning, keeper of the Bourgeois Collection of Pictures at Dulwich. It is admirably engraved by Charles Fox. Mr. Burnet's great friends were the Robisons of Leytonstone, in Essex. He died at Stoke Newington.

A HALT AT DIJON.

WITH Italy in memory, and Italy again within the scope of designs at starting, it is not easy even for the idle to linger along the route that leads to the open transit over Mont Cenis. A sense of shame at passing by whole provinces of antique interest without attention is, however, not to be suppressed, and perhaps has quite as much to do as disposition to, of course it is believed, well-earned self-indulgence, in declaring a halt at Dijon, where, with but cavalier consideration for a contemporary artist, we are told in our red guide, "in spite of modern improvements, there remains a good deal within the town worthy of notice." So at the ancient capital of the Dnkes of Burgundy we pause, and open wide eyes at daybreak for reception of impressions from the seat of potentates, of whom, somehow, the relaxing historical memory of busy life finds it a little difficult to think definitely. In the style and colour of their associations they will persist in blending oddly with the characteristics of their beverage that survives them,

Charles the Bold and Philippe, and Jean-sans-Peur, all are tinged in the thoughts of a well-girt traveller, without even a Mandler in his portfolio, with some hues of pretentious self-announcement a little in excess of performance that are reflected from the wine, that has merit enough of its own no doubt, but still can scarcely shake off the imputation that it would be port if it could.

There is a fine Burgundian tone, much in harmony with these quite uncritical associations, about the two magnificent tombs—dating quite at the beginning of the fifteenth century—of the two last-named worthies. They are set up in the museum, in no doubt more than their original freshness and completeness; but, glazing as they are with hyper-restoration, there is so much that is fine about them, and so much that is interesting, and so utterly impossible has it now become to determine the claims of fifteenth as against nineteenth century, that it is best to admire the admirable, give up the reins of our imagination into the hands of the restorer or author, he pleased we know not by which, and are only concerned to analyse the wherefore.

Each duke lies recumbent, with consort beside him; all are represented in the manner that was satisfactory in the Middle Ages and has in truth a certain justification in sentiment, neither distinctly dead nor living, sleeping or awake; all retain their best good looks, as they appear in their finest apparel and most dignified array; still the interest they excite speedily declines before the attractive enrichments of the details that surround them, and the liveliness of the subsidiary figures, that, disengaged of dignity, seem not even struggling against the pre-occupations of common existence and every-day nature.

The deeply-recessed arcades along the sides of the altar tombs are occupied by a large number of very elaborate statues of friars, sculptured in the round out of alabaster, each in his niche, the friars, no doubt, of the Chartrouse of Dijon, founded by Philippe, and endowed by him, providently acting in accordance with the maxim of Hamlet, that it behoved a potentate who would not be forgotten after his death to build chapels during his lifetime. These little figures are of the greatest variety and difference of expression and physiognomy, and, if the heads are original, may more easily have been portraits than inventions. As mourners they can scarcely be said to declare themselves, and are really for the most part as widely remote from the solemn as from the grotesque in that interval so much more roomy that divides the sublime from the ridiculous. The variety of pose and gesture is only equalled by the diversity communicated by invention of folds and monuments, to the simple cowl and single robe of the friar. They are ascribed to one Claus Sluter, a Dutchman. As accessories to an almost royal tomb they are out of harmony, at least according to conventional proprieties of loyalty within a half-century of the country's bereavement; otherwise—must we say?—as sideboard or chimney-piece ornaments, and as welcome subjects individually for the photographer, they are works that would not easily in their kind be matched.

For proper architectural interest Dijon is well known as preserving various specimens of a provincialism in Gothic that has been compared to the relaxations of the style, as it diverged or declined into Indorism. Such specimens and their features are unengaging enough, and undecided enough, and, indeed, chiefly on that account unengaging. They seem akin rather to the clumsiness of expression and lapses in syntax that declare the hopeless ignorance of a base patois, rather than the vigorous irregularities of strong thought which disdain restraint and will one day dignify itself as an accepted language of art. We look in here and there at interiors that invite but little stay in other respects, and certainly none by an incongruous admixture of depressed round arches with pointed, and alternation of depressed pointed arches with round. The examples may be passed over here, relegated to the collections that the history of every art is bound to undertake, of styles abortive, and styles artificially or accidentally suspended in development, or distorted after it.

The one chief architectural interest at Dijon, so far as an idler on another errand can venture to claim acceptance for his recommendation, is the earlier and purer church of Notre Dame. This is now undergoing repair to an extent that is very little short indeed of re-construction, at least of the interior, and the exterior must be

taken in hand, and doubtless will be so thereafter. The church deserves the most reverential conservation, and that little less could be undertaken in this way than is now in progress seems pretty clear from the abundant shavings that are sustaining, no hour too soon, the tower and various walls that as yet have been scarcely interfered with. The nave is what we have called before now Colonnar—that is to say, columns, in this case round, are in the place of piers simple or compound; the capitals are not good, true, or beautiful particularly; and the stiff, horned foliage rises to the angles of an octagonal abacus. This octagon is not regular; it shelves forward peculiarly in front, and on this projection, as on a corbel, are accommodated the bases of three shafts, that spread above into the diagonal and transverse ribs of the quadripartite vaulting. The choir, or rather apse, which is dated 1229, is very shallow, and here the vaulting is supported by shafts that rise, not from columns, but from the ground, and are superposed. The triforium passage has a lightly-shafted opening to the church, but is lighted by a circular window from without immediately behind it.

The western front has been compared to Ely; above the deep triple portals rises the flat wall, that is relieved above, or differentiated at least, by two ranges of very tall pillar-erected arcades. Of these the lower has at least the excuse of an opening through the pierced wall, as if for entrance from the building into the gallery, shallow as it may be. The upper pillarless, no less, stand free of the wall, not returning round the angle, as neither do those below; and here, to all appearance, they are not sufficiently advanced to permit of standing-room behind, even if the space allowed were accessible, which to all appearance it is not. The most plausible defender of the fairness of constructed decoration, who may so often fairly have the best of the argument, will be at fault here. In such a glaring case of misapplied casual elaboration as a means of escaping from the misery of an unornamented blank wall, the lamp of sacrifice is lighted in vain; it is little more than a guttering candle burning daylight to disgrace and wastefulness, and we shall damage better causes by holding by the palpable abuse. The true glory of the facade is in the originally designed and beautiful porch below. A very spacious central arch and two considerable side arches admit (when they shall no longer be looked upon by shoring timbers) to a porch of two bays in depth, two compound shafts in front of door-jambes of the main entrance supporting the elegant vaulting. The doors are recessed in several orders, with light shafts of coloured marble and tabernacled capitals of peculiarly early character. The capitals retain much ancient colour, and indications of very decided coloured patterns remain with and without, on walls, shafts, architrave of door and its soffit, but, on the whole, not very successful in intention. It may, perhaps, be a fact explained by or illustrating much in the story of the manifold religious troubles of Burgundy that, while the sculptures of the tympanum and archivolts have been carefully and thoroughly defaced, the Virgin and Child upon the central door-post, and manifestly coeval with the rest, are absolutely uninjured.

It is impossible to witness reparations so capital as here proceeding without some qualms as to the chances of lapse in conscientiousness of adherence to the ancient model. On the conscience of our neighbours let the responsibility lie. For ourselves, well pleased with the prospect that a noble church will be saved from ruin, and seeing enough to assure us that the effect of the restored work will be consistent and expressive, we really at the present time cannot charge ourselves with the burden of what may be needless apprehensions. We willingly have faith that all the details that were of merely historical importance, and that may now disappear, have been duly recorded for the advantage of history, while art may be heard upon its own merits, and replace what was had (and such things were even in the glorious thirteenth century) with what is truly and consistently in harmony with whatever the structure contains of the better and the best. Ughness must, it may be feared, sometimes be consecrated by historical associations—may we be visited lightly in this way at home in England!—and when the consecration can scarcely be made out let us have the grace to cut boldly, out deeply, and give both to Nature and Art a fair chance of rejuvenescence and their right fair play. At Dijon at the present moment, as we have said, our frame of

mind will really not admit even of liability to lapse into captiousness: we see how much that is done is being admirably executed, and promises a truly fine effect, and cannot bring ourselves to inquire, or to feel ourselves entitled to inquire, any more how much mischief goes with it than to trouble ourselves about how the whole is to be paid for.

THE FACULTY OF INDUSTRY.

ON more than one occasion we have congratulated the nation on the acquisition of an extraordinary benefaction, and now the particulars of the Whitworth Scholarships for Mechanical Science are fully made known by a memorandum signed by the generous donor himself (an epitome of which we gave in a recent impression) it will not be inopportune to add a few words as to the use to be made of this noble foundation.

We may premise that, as was to be expected, the memorandum is directed to the arrangements for the proper use of the funds, and in a few pithy sentences shows just such wide sympathies and broad views as one would suppose ruling in the breast of the man who could devote such a considerable portion of his fortune to such an object. For instance, not only are all universities and colleges in England, Scotland, and Ireland mentioned by name, and all the more important public schools, as well as the Society of Arts, and the Department of Science and Art at South Kensington; but especial provision is made for the artisan class in the various towns and cities where mechanical industry is chiefly required; curiously enough, omitting Manchester itself, though noting Birmingham, Bristol, Swansea and Cardiff, Halifax and Huddersfield, Leeds, Northampton, and Sheffield.

In fact, as if especially to mark the unsectarian nature of the gift, Manchester, "the seat of our workshops," is provided for by having eight Exhibitions devoted to the use of Owen College, and two exhibitions devoted to its grammar-school, with no special appropriation of any of the Scholarships, to be given in 1869, or subsequently.

The broad basis of the whole scheme is only limited by the phrase "her Majesty's subjects," and so it is open to every one in any part of her Majesty's dominions to compete for these rewards, whether he reside in the farthest part of India or the most distant colony.*

How well this contrasts with the too often close and narrow schemes of former times, when some limitation to the founder's kin, or to residents in his native town, some reservation as to a particular name, a preference for some form of education, or even directions as to some particular dress or manner of living, have gone far to neutralise the value of a great and substantial donation, and even at last called for the positive interference of the Legislature to prevent the waste and corruption engendered by such mistaken limitations! Although we are admirors of old customs and forms which may not be altogether consistent with present usages, we never see the yellow-stocking and capless youths of Christ's Hospital without regret that the spirit rather than the letter of the founder's will should be adhered to, and wishing that the boys might pursue their studies or enjoy their pastimes without being obliged to wear the absurd costume prescribed for them at a time when it was only the customary dress. We cannot but believe that the large heart which originated such a noble charity would be pained at the narrow rendering of his meaning which, with mistaken respect for his memory, modern generations of governors have given to his words.

* General Particulars as to Scholarships.

"II. That the thirty scholarships of 100*l.* each should be open to all of her Majesty's subjects, whether of the United Kingdom, India, or the colonies, who do not exceed the age of twenty-six years, and be held either for two or three years, as experience may prove to be desirable; that ten scholarships should be competed for and awarded in May, 1869, at the annual national examinations in science, provided that a sufficient number of candidates prove themselves to be competent."

General Particulars as to Exhibitions.

"VII. As the scholarships scheme can only come into full operation by degrees, I propose from the fund ultimately available for the scheme at once to create sixty exhibitions or premiums of the value of 25*l.* each, tenable until April, 1869, and to place them at the absolute disposal of the governing bodies of the following educational institutions and towns, in order that they may award them to youths under twenty-two years of age, who may thus be aided to qualify themselves, and must undertake to compete for the scholarships of 100*l.* in May, 1869."

Mr. Whitworth has had the foresight to prevent his name being ultimately made liable to ridicule by unthinking men, in not clogging his gift with absurd conditions; and in placing it in the hands of the Committee of Council on Education he has obtained the highest guarantee that his scheme will be administered with due regard to the interests of the nation, as well as to his own individual wishes, and has proved that his object is the disinterested good of others rather than the vanity of making a name, or even the noble desire of "keeping his memory green" in future generations.

Another great feature in Mr. Whitworth's arrangements is its immediate effect. This is no deferred gift, to be made use of when not wanted for other purposes; but it is now, at a time when there is great demand for such mechanical teaching, that it is offered. The suggestion of the Exhibitions to be given this year is, in fact, making use of existing organisations, developing present resources, calling forth real, though latent powers, in order to arrange and encourage them for another effort, at a period not too remote to seem hopeless, nor too near to prevent any likely candidate from competing.

In fact, the announcement of the ten scholarships for May, 1869, of 100*l.* each, tenable for two or three years, would probably be practically useless in the majority of cases, were not provision made for these sixty Exhibitions this year (of 25*l.* each), in order to form a body of disciplined and worthy competitors.*

Every one, except those specially endowed with a love of study above the ordinary standard, requires an object to aim at and a stimulus to exertion, as well as some information as to his progress, in order to keep up the spirit necessary for sustained study, and often something more substantial to encourage, at least, if not to assist him on the road to the prize of ultimate success which he has in view.

As one of the proposals embodied in the memorandum referred to (and it is not the least advantage of this scheme that, like all that is really good, it seeks to engage others in the same good work), it is modestly submitted, as a suggestion, that "honours in the nature of degrees should be conferred by some competent authority on successful students each year, thus creating a Faculty of Industry analogous to the existing faculties of divinity, law, and medicine." We are inclined to be of Mr. Whitworth's opinion, "that such honours would be a great incentive to exertion, and would tend greatly to promote the object in view;" and it is not without some longing for a similar Faculty of Fine Art, actually suggested at University College not very long ago, that we read further of the hope that Government will provide "the necessary funds for endowing a sufficient number of professors of mechanics throughout the United Kingdom."

How much it is now to be regretted that the architectural voluntary examinations and the scheme of education supposed to have been fairly started a short time ago have both fallen through! For such organisations were of the very character likely to give vitality and reality to such a suggestion, and make use of the impetus of any forward movement which ought to be experienced by all "the Arts" alike, though in various degrees. An important arrangement for those who have obtained the scholarships is that as much latitude as possible is to be granted in the subsequent plan of study proposed by them. If the student wish to complete his general education instead of continuing his scientific study he may be permitted to do so. He may go to the universities or colleges affording scientific or technical instruction, or he may travel abroad. "The successful artisan should be encouraged to study theory, and the successful competitor in theory aided in getting admission to machine shops and other practical establishments."

A more admirable paragraph than the foregoing could hardly be penned; but this intention is further explained in the following additional memorandum:—

"My object in devising the foregoing scheme has been, while requiring a practical acquaintance with a few simple tools as a *sine quâ non*, to render the competition accessible on fairly equal terms to the student who combines some practice with his theory, and to the artisan who

combines some theoretical knowledge with perfection of workmanship."

With regard to certain special exhibitions offered this year to artisans—already mentioned—it is pointed out that by connecting them with the Science and Art Department under the minute of the 21st of December, 1867, the value of each might be doubled. This in itself shows a careful consideration of the interests of the working classes, which it would be well for those to remember who are always quarrelling with capital, and who so falsely imagine that the interests of the one are antagonistic to those of the other class.

Looking, then, to the details of the scheme as sketched out by Mr. Whitworth's own hand, we are impelled, as artists ourselves, claiming a thorough alliance with the constructive and mechanical arts, to ask if it be not possible to introduce, say, even the smallest element of artistic excellence to the consideration of the founder. We strongly hold that as in former times artistic and mechanical excellence were not only closely allied in the execution of ordinary or extraordinary work, but often united in the same individual (thus often going hand-in-hand as brother and sister, the one contributing grace, delicacy, and truth to the strength and manliness of the other), so ought it to be now. We seem to see some signs of an attempted union, where perhaps least expected—say in certain improved artistic forms given to simple engineering works, following closely after some of the most uncouth productions of modern times. And, if it *ought* so to be, would it not be well to acknowledge the fact in some substantial manner, and in a way to be now decided—perhaps, say, by devoting three exhibitions this year, viz., the one given to King's College and the one to University College, with one of the three devoted to the Science and Art Department (to be followed by the offer of one of the ten scholarships next year), to the producer of such special additional proof of artistic excellence in any of the various branches of mechanical science chosen as may be decided upon?

Perhaps we are looking at this matter from too professional a point of view, from too limited an area, and may be liable to the charge of a selfish attempt to secure for Architecture a share of the prize. Be it so. To the generous founder it cannot be a source of regret to find his efforts appreciated, and his sanction and encouragement desired for the advancement of art allied with his special object—mechanical skill.

We are aware that we may be treading on delicate ground, and that the "arts cognate" to architecture may be considered by some as an intrusion and an impertinence; but in reality it is far otherwise, and Architecture, which is so dependent upon and so connected with mechanical science as it is, cannot afford, if she would, to stand aside while the latter is progressing, and then quietly bring up the rear. On the contrary, she ought to take the lead, and, from higher and more dignified position, point to objects capable of being reached and aims worthy of being attempted by the most mechanical genius. For as far as the devotion of man's efforts to the noblest aim of improving and elevating his fellow man exceeds in value the application of them to his physical destruction (or to the means by which this may be accomplished), so far does the artistic elevation of science, which includes also all its practical application to the amelioration of the condition of man's daily life, exceed the application of science in all its precision and exactitude to any of the ordinary branches of mechanical art.

At the same time, we are free to admit that the proportion of those whom it is desirable to encourage in this speciality is small, as is the number of those endowed with artistic powers small compared with those capable of exercising or of cultivating in others the exercise of pure mechanical science.

What we desire to see, then, is an authoritative recognition of the power of art to elevate, refine, even improve and instruct, the practical and scientific mind and guide the strong hand of the mechanic.

As the department charged with the execution of a portion of the plan is that of Science and Art at South Kensington; and, moreover, as the Society of Arts has a share in the matter, we think it is not too much to ask that they at least should make the attempt and consider the desirability of the course we recommend. Very properly, we think, neither the Institution of

* One of these Exhibitions of 25*l.* each has been placed at the disposal of the Principal of Liverpool College, and that gentleman has thrown it open to public competition, under conditions named in the advertisement which appeared in our last number.

Engineers nor the Royal Institute of British Architects, as not being educational establishments, has been referred to; so that, as far as we see, nothing professional in either case can stand in the way of the due appropriation as may be deemed fit of certain Exhibitions which may be unapplied.*

The disposition of a certain number is specially indicated in the memorandum; but it is provided that any not so applied may be given by the Science and Art Department to any other scholastic institution which makes satisfactory arrangements for affording instruction in (amongst other things) "free-hand and mechanical drawing."

Thus seems distinctly recognised the special power of representation which an artist or designer possesses and exercises, while there is no reason why such an artist should not be as good a hand at the use of mechanical tools, and as good at geometry and physics, as one who cannot perceive the beauty of line or appreciate the excellence of one style of work to another. When all other circumstances and conditions are satisfied, let us hope that an opening will be made for the speciality of the artistic metal-workers, for instance, say at Hardman's (Birmingham), Skidmore's (Coventry), or Hart's and others (of London), who, as mechanics, are at least worthy to stand beside engine-makers and others, who do not profess to add taste to the various excellencies of finished mechanical art. Let these lead the way for many other similar classes of workmen who can combine the theories of art and science and the best workmanship in both.

SAINT PANCRAS NEW PUBLIC BATHS AND WASH-HOUSES.

THESE baths and wash-houses have been formally opened. They are situated in King-street, Camden-town. The superintendent's residence is over the entrance. There are two tepid swimming-baths, each 56 ft. by 22 ft. 6 in., with sixty dressing-boxes, fitted with dwarf doors and York stone platforms. The baths are lined with glazed tiles, and have glazed brick hot-tubs, the latter on a pattern made by the use of Staffordshire bricks in hands, &c. There are ornamental tile borders to the first-class baths representing a series of dolphins. A glazed dome skylight surmounts the swimming-baths, and there are three gas star-lights over each bath. Showers run all round under the platforms.

Of private bath rooms on the upper story there are—

	1st Class.	2nd Class.
Men's	28	58
Women's	8	10
	34	68

The baths are Finch's porcelain throughout, with Busby's patent valves.

The entrance in King's-mews leads to the public wash-houses. Here are the boiler-house and engineer's residence. The public wash-house is 54 ft. by 27 ft. There are sixty-three washing compartments of galvanized iron, with cast-iron tubs for washing and boiling. Hot and cold water and steam are laid on to each. There is a hot-air drying-closet, with a separate galvanized-iron horse for each washer suspended on wheels and iron runners: these were made by Messrs. J. & F. May, of High Holborn.

There are three wringing-machines, by Manlon & Allcott. The engineer's apartments are over the washhouse, entrance, with tank over for 26,000 gallons of water.

The architects were Messrs. Messenger & Gundry; the general contractors Messrs. Manley & Rogers. The boilers, pipes, &c., were supplied by the St. Pancras Iron Company, and the iron work was constructed by Messrs. Head, Wrightson, & Co.

THE NEW LAW COURTS.

WE have reason to believe that the Government have appointed Mr. G. E. Street, A.R.A., to be the architect of the new Courts.

* This is supposing that certain offers of Exhibitions are declined or cannot be acted of this year. The number of exhibitions to be provided as stated is sixty, while there are sixty-six disposed of in various ways; therefore it must be expected that a considerable number are not likely to be made use of this year, or these additional appropriations would not have been made in the memorandum, nor any further remarks as to others still likely to be "unapplied."

BEARWOOD.

A VERY interesting event came off on Saturday last. At Bearwood, in Berkshire, on the charming site of the old house formerly there, a fine mansion is being erected, from the designs of Professor Kerr, for Mr. John Walter, late member for the county, and again, we are glad to see, announcing his intention to stand at the ensuing election. The building being finished externally, or nearly so, Mr. Walter on that day entertained at dinner the whole of the workmen who are engaged upon it, some 380 in number, as he had previously done on laying the corner-stone. Besides Mr. and Mrs. Walter, there were present Mr. John Delane, Mr. Kerr, Captain Walter, and several other friends; and the meeting passed off in a singularly agreeable and admirable manner; workmen, architect, and employer being apparently equally pleased with each other. Mr. Walter made some felicitous addresses, in the course of which he expressed with emphasis the hope that the home there being formed would never become the seat of merely selfish enjoyment, but would be and long remain a centre of kindly hospitality and social sympathy. The health of Mr. Kerr was drunk with great warmth, as was that of the manager of the works, Mr. Deacon.

In proposing the health of the architect, Mr. Walter said that it was from the perusal of Mr. Kerr's book, "The Gentleman's Homes," he had been led to seek that gentleman's assistance. Mr. John Walter, jun., called on to reply for "Posterity," did so in a capital speech.

The house is of considerable size and great commodiousness, and includes a central picture-gallery, round which the other apartments are disposed, the windows of the chamber-story opening above its roof. When we mention that the picture gallery is 70 ft. by 24 ft., the dining-room 40 ft. by 24 ft., and the drawing-rooms 96 ft. by 26 ft., the scale of the house will be understood. The style adopted is a free version of that of the sixteenth century, the materials being red brick, of peculiarly good colour, and Mansfield stone. A more admirable piece of brickwork we have seldom seen. The slating is Westmoreland, of excellent colour. A tower, some 30 ft. square at the base, serves as the staircase. Other towers of smaller size assist the skyline, and the gables contain sculptured shields and foliage. At the garden entrance, of which a view may be found in the present exhibition of the Royal Academy, two figures of considerable beauty, Night and Morning, modelled, but not yet put into stone, will form a portion of the doorway.

It was a worthy act on the part of the owner of a building which, adorned with the fine collection of pictures he is known to possess, is destined to become one of the notable Homes of England, to let the first exercise of hospitality within its walls be in favour of those who have laboured upon it. The spirit shown on all sides was excellent, and we heartily congratulate those who are concerned in the undertaking.

At Ascot, on the road to Bearwood, a gabled house that has been built for Mr. Delane, under the direction of the same architect, was pointed out to us. This, also, is of red brick with stone dressings, and looks very well, from the railway. The planning is somewhat peculiar, to meet a special requirement; and we shall take an opportunity to make it better known to our readers.

THE LATE MR. PRITCHETT, ARCHITECT.

ON the 23rd ult. departed this life Mr. Pritchett, of York, architect, probably one of the oldest members of the profession in the country, being in his 80th year, and having been in actual practice on his own account for the long term of 55 years.

Mr. Pritchett was born October 14th, 1788, at St. Peter's, near Pemroke, of which parish his father was the clergyman. He served his articles with Mr. Medland, of Southwark, and was afterwards two years in the office of Mr. Alexander, at that time architect to several public works. He was subsequently a short time in the "Bar-rack Office" under Government, and commenced practice for himself in London in 1812. After executing two or three commissions he removed to York in 1813 to join in partnership Mr. Watson, who was the successor of Carr, the

original Yorkshire architect, and continued to practise in York up to within a few months of his death.

In those days architects were few and far between, and he and his partner had a wide range of practice in the northern counties, being out sometimes for weeks together visiting their works on horseback or driving. In the city of York his works were the deanery, some restorations at the master St. Peter's School, now the School of Art, the Savings Bank, new front to Lord Burlington's Assembly Rooms, Lady Henley's Hospital, Lendal and Salem Chapels, and many private works. In the county his works included Wakefield Asylum, one of the largest built at that time, Beverley Court-houses, and Gaol, numerous churches, chapels, schools, parsonages, and gentlemen's houses. He was architect and surveyor to the Earls Fitzwilliam during three generations, visiting their seat and estate at Wentworth on an average once a month for more than 50 years; and in addition to enlargements and improvements in the house, he erected many churches, parsonages, schools, and lodges on the estate. Among his pupils now in practice may be named Messrs. Dancks, of Whitehall-place; Blackett, of Furnival's-inn; Medland, of Gloucester; Middleton, of Cheltenham; Gilbert, of Nottingham; and his sons, of Walton-under-Edge and Darlington.

FROM SCOTLAND.

Leith.—The new Town-hall has been formally opened by the magistrates. The edifice is in Charlotte-street. The new offices have been constructed from plans prepared by Mr. Simpson, burgh assessor. On the basement floor are placed the detention-rooms, and rooms for the accommodation of the detectives and officers of the police force. The first floor is occupied by the collector's offices, burgh officers' room, and a room in which are preserved the burgh records. The provost's and town clerk's rooms are placed on the second floor, from which there is a passage leading to the old building. In the old building accommodation is provided for the registrar and sheriff-clerks. The entire cost of the new building is estimated at 1,600.—The foundation-stone of the first of a block of houses about to be erected at Hermitage-place, adjoining the Links, by the Industrial Co-operative Building Society, has been laid by Provost Watt. Eight acres of ground have been acquired, upon which it is intended to erect a number of working-men's houses. According to the plans, the houses will be of a uniform height of two stories, and so arranged internally as to conduce to the comfort and convenience of their occupants. Each house will have a plot of ground attached to it; and the working men, guarding against the error of their forefathers in building their domiciles so closely together, intend to make the roadway between the rows of houses fully 60 ft. in width. The occupant of each house, by the payment of an entrance-fee and of a small sum at stated intervals, will, in a brief period, become his own landlord.

Stirling.—Arrangements are nearly completed for the thorough restoration of the choir and chancel of the high church. It is intended to restore the whole fabric according to the style and character of the restorations effected in the cases of Glasgow Cathedral and Paisley Abbey. The improvements connected with the East Church are calculated to cost upwards of 2,000. There have already been 1,670l. subscribed. Of this latter sum the town council have subscribed 200l.; and Mr. John King, of Levernholm, has given 500l., 350l. of which are to be expended in the erection of a memorial window. It is anticipated that the Gullery Incorporation are also to erect a similar window to the memory of John Cowane, founder of Cowane's Hospital. The restoration of the transept is in the hands of a committee of some of the most influential inhabitants, and for which a sufficient sum of money has been raised, and the work is now being proceeded with. The whole work of restoration is expected to be completed in the course of the year.

Paisley.—The Fountain Gardens, a gift of Mr. Thomas Coats, of Ferguslie, to the townspeople, have been inaugurated. The grounds extend to six acres. In the centre of the park or garden is a fountain with circular basin 58 ft. in diameter. At the entrance to the grounds are two cottages, one for the superintendent and the other for ladies.

OF SOUTHBEND; SANITARY AND ARCHITECTURAL.

"The laws of health should be taught to every child, from the ragged-school upwards, and followed; and if we had preventive physicians—physicians who would keep us from getting ill, as well as cure us when we are ill—we should be a healthier, better, and happier people. The spread of knowledge on the subject is of the greatest importance; to that we must look for the desired result."*

THE recent visit of Prince Arthur to Southend has somewhat increased the public interest in this part of Essex. In 1804 it was visited by Queen Caroline and the Princess Charlotte, and by several distinguished families.

Southend consists of an old town and a new town, and there can be but one opinion as to which is the healthiest, and most convenient for a temporary habitation. The old town formerly consisted of one long irregular street (and its additions are quite as irregular), facing the sea. The new town, called Cliff Town, stands westward; the houses are attached in rows, and are of three classes. The first-class face the sea, and consist of basement, ground, one and two pair stories. The other classes form diverging lines, so as to have a view of the sea. The houses are all similar, plain, and neat, with bow windows, surmounted by balconies.

The architectural student will not find much worthy of notice in Southend. The houses in Cliff Town, although neat and convenient, present the appearance of a barrack town, more than anything else. The Congregational church is an exception, it is Early Decorated, and consists of a nave, south aisle, and a small octagonal broach spire on an octagonal tower, rising from a square base. Circular columns separate nave from aisle with foliated capitals. Roofs are high pitched and truncated. The church is in all respects similar to our parish churches, except a peculiarity at the east end; in this is an oblong space boxed in for the minister, and over this is a polygonal recess for the choir.

The hotels and houses in the old town are mere brick boxes, with holes cut for windows, so that at present we have but little architecture at Southend. The modern church in the old town, built in 1840, is proposed to be enlarged, with a tower, &c. A Wesleyan box-chapel exists already in the Old Town, and a piece of ground has been taken for a new Wesleyan chapel in Cliff Town. There is, also, to be a Catholic church erected here; and among other buildings an asylum for the Trinity brethren is talked of.

Prettlewell Church, a well-known sea-mark for navigators, "the largest and the fairest in the Rochford hundred," is a mile and a-half from Southend. Rickman says that it "is a handsome church, with a fine perpendicular tower, having good buttresses, pinnacled battlements, and four rich pinnacles." The church consists of a nave, south aisle, a large south porch, chancel and south aisle, and a tower at the west end containing six bells. The ceiling of the west end of the nave is flat, the original roof and western arch being ceiled. There are two columns and two responds between nave and aisle, which are older than the rest of the church; they are octagonal, with moulded capitals. The columns in the east part of the nave are octagonal and concave; the roof open, of low span, with moulded tie-beams. Some portions of the old benches, worm-eaten, remain in the south aisle. The pulpit stands on the north side by the chancel. The font is original, and has octagonal concave sides, with sculptures,—the crucifixion, roses, heart, &c.: it stands at the west end by the column, with christomary in a niche in the column. The windows are four centred, in three five-foiled lights.

In a north window of the nave, by the chancel, are remains of the entrance to the roof-loft. A staircase on the east side of the porch-door leads to a room over the porch. The chancel is separated from the nave by a fine moulded pointed arch, springing from semi-octagonal responds. The east window is blocked up, with an elaborate modern Gothic altar-piece, containing the Decalogue, erected in front of it. In the chancel floor is a brass, date 1612, in memory of Richard Cocks and his wife. There is a low window by the chancel-arch. Several slabs are in the floor, dates 1737, 1751, 1810, &c. The pews are similar to horse-boxes, and there are a few mural monuments, mostly modern. In the vestry is an oak chest, elaborately carved and of an early date.

The tower can be seen for miles, and will be recollecting by many visitors. It is a fine lofty

Perpendicular tower, embattled and surmounted by octagonal embattled turrets, with octagonal crocketed pinnacles, and stone staircase in south west angle. Square chequered flintwork may be seen on the tower and parapets of the body of the church.

The church has not yet fallen into the hands of the restorer, consequently is more interesting to the architect and antiquary. If the edifice be restored, the mode of treating the two heavy columns and responds of an earlier date, between the nave and aisle at the west end, will be a question. The door in the south doorway of the church is of oak, and elaborately carved. Foundations of a former north aisle are visible.

Southchurch, a mile from Southend, consists of a nave, chancel, south porch, and a tower with one bell, and a spire. The tower is Norman, and possesses north and south doorways, plain, with zigzag mouldings. On the north side of the nave is a small Norman window by the chancel arch, and a stone staircase to the roof-loft. An Early English window on the south side by the chancel arch contains a double piscina in the window seat, similar to two cushion capitals hollowed out. The roof of the nave is a span truncated, with tie-beams, and octagonal king-posts, with moulded caps and bases. The seats are modern. The font is octagonal, modern, of good proportion, with water drain.

There are many old churches within walking distance, for those who prefer something to think about, instead of wasting their time in novel reading, and dreaming at the sea-side. The churches of Rochford, Rayleigh, Eastwood, Shoebury (north and south), Wakering (north and south), Leigh, Hadleigh (and castle), Benfleet, and Thundersley, contain interesting points.

The Southend Local Board is of recent formation, and has much to do; it meets for two hours once a week. It has already effected good, and it is a question whether it would not be well to borrow money, and deal effectually with the drainage of the old town; at present the sewage empties itself on to the beach. In Cliff Town the sewer is carried a mile and a quarter into the sea; and the cost has been put upon the rents of the houses. Of course, the tenants demur; they will, however, find in the end it is cheaper to cheat the doctor and the undertaker than to have to pay them for sickness and death derived from offensive open ditches and fragrant bouquets in the public tea garden resorts. At low water the sea recedes a great distance, and leaves many acres of ground in a maddy and uninteresting condition. If a sea wall were constructed towards the end of the pier (in front of the whole of Southend), a vast quantity of ground would be recovered, and Southend much improved. If similar places were treated in this manner, the quantity of land re-secured would be enormous, and the drainage permanently improved. The present sea-wall at the bottom of the Cliff affords an agreeable promenade *when the tide is up!* One great inconvenience in Cliff Town is the absence of shady walks; in sunny weather it is rather more than warm.

The sea, and the proximity to London, are not the only attractions connected with Southend; the walks inland are pleasant, and the country wooded and rural: the botanist will find much to repay his search among the wild flowers.

The architect is more concerned with sanitary matters than he supposes; the fact is that, in my opinion, he has really more to do with these inquiries than those appointed to carry them out. Data as to deaths are quoted from the Registrar General's report: light, air, ventilation, and drainage, are better understood by the architect than the medical man; and when the latter does interfere, he usually does more harm than good. Again, as to the analysis of the water: this may be obtained from the Board of Health, or the analytical chemist. Few medical men can accomplish this, and if they could they have not the time. And, again, who knows so well of the construction of dwellings as the architect? If architects omit to make themselves thoroughly acquainted with sanitary requirements, they must not complain if they are not consulted. At present the architect is looked upon as the man "who washes the ceiling."

Regulations for guiding the cubical contents of rooms are not much respected in sea-side residences. I suppose that keeping the windows open day and night compensates for small rooms over-crowded.

Dr. Granville, in 1841, on the Spas of England, notices a new mineral spring at Hockley, about seven miles from Southend, and gives an analysis

of the water, by Richard Phillips, F.R.S., who states that one pint of the water yields,—

	Grains,—
Common salt	11.96
Carbonate of lime	5.93
Anhydrous sulphate of magnesia	20.13
Sulphate of lime	1.82
	39.84*

This spa was spoken of very highly at the time. A large Classic halling was erected for it, and it is still standing, although used for a different purpose.

The water at Southend is considered good for some complaints; it is supplied by the local waterworks, and derived from springs. It probably would be improved if all housekeepers were induced to use filters.

The soil is of a gravelly nature, consequently very dry.

In conclusion, Southend, at present, is only an idea. That the place in time will be much resorted to, there is no doubt; but, before that can be expected, the Local Board has much to do. In the main street there are about forty houses, and not any sewer, and in a street adjacent there are nearly as many cesspools as there are houses. The night-soil generally percolates the gravel. It would be very important if the Local Board could push matters forward instead of waiting for a fever; and, as regards public buildings, and other works, we can for the time being only imagine what they will be in years to come, provided that exertions be made to keep and render the place worthy of public esteem.

W. P. GRIFFITH.

TECHNICAL EDUCATION FOR THE WORKING MAN FROM AN ARCHITECT'S POINT OF VIEW.†

REFERRING next to technical education from the artisan's own point of view, Professor Kerr said he did not think the workman was more selfish than any other class of the community; but there could be no hesitation in saying that the first question the workman put to himself when a scheme of technical education was proposed for adoption in this country, was—"What advantage is this scheme to bring to the workman himself?" It was all very well to talk of creating a new class of foremen, but what advantage was the workman himself likely to derive from such a scheme? Was it to advance his craft as a matter of merit? Every workman was naturally proud of his craft, and every honest man ought to stand by his craft. Although no other advantages were shown to be obtainable, if it was shown that the trade of the craftsman would be advanced in merit, that itself would be a considerable gain. The object of the movement certainly was to advance the craft; by the improvement of the workmen and foremen, through the medium of a practical technical education. The proposal was not to educate them so as to make them masters; the purpose of the present movement was, to keep the workman as such, but to raise him as regards the merit of his workmanship; and that was the purpose the men from Manchester had in view when they came up to advocate technical education. As to the question of common primary education, he himself had found that foremen in a good position, and even masters who had been workmen, were deficient in primary education. There was not that efficiency there ought to be even with regard to the three R's. They could read, of course, but not so as to employ themselves in that continual reading which alone was of any use to the mind. They could write, but not so as to be able to express their thoughts with that precision which was worth anything. They could reckon up their wages per diem at so much an hour, but in more extended calculations they were devoid of that certainty of being right which they ought to possess. It might, no doubt, be urged that the long hours and the fatigues of labour left but little time or disposition for cultivating the refinements of education. In this argument there was a good deal of weight, coming from the average class of workmen, or from those under the average whom Providence might not have favoured with anything in the shape of particular cleverness; but at the same time there could be no doubt that even a stupid man was not justified in resting all his life in primitive ignorance; and those who called them-

* Error in excess of about one-third of a grain.

† See p. 387, ante.

* "Another Blow for Life," 1864.

self the advocates of technical education ought distinctly to understand that the technical education must have a primary basis of common education upon which to rest; and every encouragement ought to be given to the working class kindly, handsomely, and liberally, in every way, to acquire those simple elements of knowledge they required. Passing from the question of the three R's, the lecturer proceeded to speak of technical education itself, and, referring to the British Museum and other aids to technical education, he said he thought it would be wise policy if the advantages which these institutions presented were made more generally and easily available than they were. It was proposed to distribute the Kensington Museum more over the metropolis, and to have branch museums in the country. He thought it must be admitted that this was a wise measure, and especially in view of the peculiarly practical character of the English mind. Then, if the lectures which were given in these museums, and the public libraries were thrown open a little more, great good might result to the public. It was the misfortune with regard to all libraries that those in charge of them seemed to look upon the books as so many curiosities not to be touched. These, if they were only more widely thrown open, would be most important agents in the promotion of practical education in this country. Next, a word as to what was called popular science, in which the recondite or difficult matter was brought down to the meanest capacity. Among the speeches delivered at the Society of Arts conference, one was made by a learned professor which was rather staggering. Popular science, according to that speech, was "the mere skimmings of the scientific pot." Well, assuming this to be true, if men of science in its higher sense had the general contents of the pot, the humble votaries of popular science need not be grudging the skimmings. He (Professor Kerr) held in his hand one of old John Weale's rudimentary series of educational works, and a more useful set of books was never published in this country. Weale was dead and gone; and when he started that series of books probably his first object was but a bookseller's—to make profit—but at the same time he was a shrewd man, and it was to be supposed his business motive was to cater for such as the working classes. If so, he had most admirably succeeded, and it would have been difficult to start a scheme of more value than this series of educational books—albeit "skimmings of the pot of science." Every such effort as this having for its object the improvement of the people, ought to have the most kindly encouragement, and, if he who made two blades of grass grow where only one grew before, was a benefactor, much more were the promoters of popular education. As to the question of mutual instruction, he (Professor Kerr) was not there to speak of his own antecedents; but, he was free to confess that when he was sixteen years of age, he was a member of the mutual instruction class in a Mechanics' Institution, and he knew of no project yet devised which was more reliable, practically, in this country at least, as a means of education, than mutual instruction. Workmen meeting for mutual instruction were hnt doing what was done in higher walks; for what did scientific men of the highest rank meet for in the Royal Society, but for mutual instruction? From the highest to the lowest level there was something in the freedom of mutual discussion which could not be had under more formal auspices. He was proud to say that one of the most effectual agencies they possessed in regard to architectural education was a mutual instruction society amongst young men. With regard to drawing, that was an essential branch of technical education in all art-workmanship, the very language in which alone one's ideas in respect of form could be expressed. One of the great advantages of the Continental system over ours was in the fact that, in so far as the State could accomplish it, schoolboys were taught drawing; and he would impress upon all practical men the necessity of acquiring that accomplishment at any expense. Without that no art-workman was properly qualified for his work. Drawing schools, he thought, were not sufficiently open in the evenings to workmen; if they were so, they could not fail to be of the greatest advantage. Having spoken of the necessity of learning to draw, and of the advantage of studying popular science, of conducting mutual instruction classes, and so forth, he would now inquire how all this was to be accomplished. The promoters of this scheme of technical education said it was to be

done at school. He would remind the meeting of the old guilds. These were based upon this very question of technical education. They provided a definite mode of instruction for the young men of the craft; and a young man having been so instructed, was protected from the competition of another young man who did not choose to go through the proper course. Let it not be supposed that he (the lecturer) was trading on delicate ground when he asked his audience whether or not their trades unions could be made to serve the purpose of promoting the education of young men? As to the internal organisation of these institutions he did not know anything, and did not want to know. A great deal had been said about them lately, and a good deal to their prejudice; but if this matter of technical education could be taken up by the trades, something might be accomplished which would cover a multitude of sins. Another point was the question of State aid. It was to be observed that the conference of the Society of Arts came to a conclusion in favour of State aid, or of providing the funds by means of rates. Such, however absurd, was the result arrived at. Now, he had spoken in vain that night if he had not exhibited his sympathy with the peculiar character of the English system of learning business, and with the peculiar system of English government. He had shown, he thought, his perfect sympathy with the independence of the English workman as opposed to the dependence on Government by the foreigner; and he believed and maintained that the great secret of the Anglo-Saxon ascendancy, as it existed all over the world, was this encouragement of self-reliance and personal independence and enterprise. When the question therefore was put, how far they ought to depend on State aid for technical education, he replied: not at all. They thanked Government for their museums, but believed at the same time that if even these museums, in respect of Government aid were done away with, private societies would supply their place. They thanked the Government for the Department of Science and Art; but until it was brought into more perfect harmony with the prejudices of the Englishman, that department would be in vain. Then, if not upon State aid, upon what would he have them to rely? On self-education. There was no education like self-education—that they learnt at school was but the basis for self-education. If they left off education when they left school, how little would they be benefited; they built upon their school education as a basis the structure might attain to any height or expansiveness. Ask the Lord Chancellor, the hishop, the philosopher, and others who had attained to elevated positions, how they got there, and the answer would be, "By self-education." The man who was determined to be educated would be educated. That was the only way in which real intellectual eminence had ever been attained, whether in exalted or in humble life. Some complained that they had not the heart to study, that they had not the time, and so forth. He knew a man, a fellow member with himself in that same mutual instruction class in a mechanics' institution, who was a common weaver, who worked hard, reading all the while a book slung upon the loom, and he was now one of the most distinguished philosophers in England. Such instances, more or less prominent, might be quoted literally by the hundred. Let this be remembered of what he (the lecturer) had said to his audience that night, that for self-education they could neither be too stupid nor too clever. He would conclude by quoting a maxim in point—"Heaven helps those who help themselves."

Mr. Thomas Paterson, in moving a vote of thanks to Professor Kerr for his lecture, concurred with him in thinking, whatever might be said of State aid, properly so-called, that they were at least entitled to have greater facilities afforded them for the acquirement of knowledge in respect of technical education by having more easy access to museums, libraries, and the like, which were the means by which, in a great measure their education was to be acquired. For his own part, he thought, but if he was so large as to demand every energy on their own part, and on the part of their societies, and at the same time every effort that could be made for their advantage on the part of the State.

Mr. J. F. Dexter, in seconding the vote of thanks, also expressed his concurrence as to the desirability of greater facilities being afforded for the acquirement of knowledge, and said, with regard to the museums and libraries, that he did not see why other districts of London should not be as well provided as the district of South Kensington. He thought it would be well if the ratayers themselves would secure that the libraries, when once started, should have a fair attendance and be fairly used. In conclusion, he thought if the practical suggestions thrown out by Professor Kerr were carried into effect, English workmen would not be behind their rivals of France or Germany, or any other country whatever.

The Chairman (Mr. E. Hall) in conveying to Professor Kerr the thanks of the meeting, said, it might be interesting to state, upon information in his possession, that the movement on the part of the leading trade societies in respect of technical education was, perhaps, nearer to accomplishment than was generally supposed. He held in his hand one of the reports of the Amalgamated Societies, in which there was a letter from Professor Jenkins, of University College, expressing the opinion that any seeming deficiency in intelligence on the part of the English workman compared with some of his Continental rivals was really due, not to inferior intelligence, but to the want of the means of technical education; and urging that unless the men took the work in hand themselves, there was little hope of their improvement. In reply to this, it was stated, on behalf of the Amalgamated Societies, that the subject would receive the serious consideration which its importance demanded; and matters were looking hopeful, some progress having already been made towards the realisation of those things to which Professor Kerr had alluded.

THE CHURCH OF NOTRE DAME DE FRANCE, LEICESTER SQUARE.

WITHIN the well-known walls, in Leicester-square, where "Burford's Panoramas" were exhibited for years, a French Catholic Church (l'Eglise de Notre Dame de France) has been constructed, in accordance with the system introduced by M. Boileau, architect, and under his direction. We have already spoken of this system of construction for vaulted churches, with ribs of cast and wrought iron, as applied in the Church Engine (Paris), that of Vesinet (Seine et Oise), and of Montignac (Allier). Its application in Leicester-square is singular, a cross church being there formed within the existing walls of the rotunda, galleries supported on cast-iron ribs occupy the exterior angles of the nave. In this building the iron groins have been made to carry the roof of the rotunda so as to admit of the removal of the large central pillar of wood formerly there. The spaces between the ribs are filled in with brickwork cemented. Other properties surrounding the building, it has been found impossible to open more than two small rose-windows in the walls (which are filled with stained glass), and the lighting is chiefly obtained by openings in the roof. A basement story admits of arrangements for warming and ventilating the church. The entrance is by a porch in Leicester-place.

The church now finished, and which is due to the initiation of M. Faure, French missionary, will be formally inaugurated on Wednesday, the 10th of June next. Messrs. Wood were the builders, and the cost has been about 2,000l.

The high-altar, we may add, is a handsome specimen of terra-cotta work, by Vireux, of Toulon.

NEW CORN WAREHOUSES AT LIVERPOOL AND BIRKENHEAD.

NEW warehouses, built by the Mersey Docks and Harbour Board at Liverpool and Birkenhead for the accommodation of the corn trade of the Mersey, are nearly completed, and when finished and at work will, according to our authority, the *Liverpool Journal*, be the most perfect buildings of the kind in the world. On the Liverpool side the new warehouses, which are fireproof throughout, have been built on the site of the old Waterloo Dock, and comprise three blocks, forming a quadrangle, within the margin of which is the corn warehouse dock. The total length of the buildings is 1,485 ft. by 70 ft. in width. Besides the quay floor there are five stores available for storage, and a sixth, which is appropriated as a machinery floor. The aggregate clear internal area, including the quay floor, is 113 acres. The height of the building from the quay to the top of the cornice is 82 ft. The stores, with the exception of the quay floor, which is 15 ft. 3 in. high, are 9 ft. 3 in. from the surface to the underside of girder above. Every attention has been paid to the relative strength of each part of the structure, the breaking strain of the beams and girders being three times the load they are intended to carry. The total weight of grain upon the floors when fully loaded will amount to no less than 77,660 tons. The clear aggregate storage area of all the floors, exclusive of the quay and other spaces, is 48,918 square yards, affording storage capacity for

* Other lectures have since been delivered. The first of the second course, "Iron and Wood," by Professor F. C. Gilchrist, will be given on Tuesday evening next, in Southampton-buildings. The charge is but nominal. Working men who are willing to do something more than talk and complain should attend.

196,000 quarters of grain. Rails are laid within the warehouses, forming a communication with the main dock line.

Throughout the building the machinery for hoisting and distributing the grain is worked by hydraulic power. There are five self-acting traversing rocking cranes for raising the grain in tubs from the hold of the ship. Each crane is capable of raising a ton of grain at a time at the rate of 50 tons per hour, through an extreme distance of 136 ft. Having brought the grain to the machinery floor at the top of the warehouses the cranes discharge it into hoppers, from which, after being freed from dust, it is weighed by a single operator in 1-ton lots, and then transmitted by an ingenious arrangement to any part of the warehouses. This work of transmission is effected by means of endless bands, of which there are two running the entire length of the three stacks of warehouses. This system, it is said, has never before been introduced into England. The bands are of vulcanised indiarubber, 18 in. wide, and traverse at a speed of about 500 ft. per minute. They are capable of transmitting grain from end to end of the warehouses at the rate of 50 tons per hour. There are chutes for passing grain from one floor to another, into the holds of vessels, or into wagons beneath. Besides the cranes there are eleven hoists for barrels and sacks, and twenty jiggers for lowering purposes. The machinery has been supplied by Sir William Armstrong. Mr. G. F. Lyster, the engineer to the Mersey Docks and Harbour Board, has designed and superintended the erection of the whole of the building and appliances.

The Birkenhead warehouses are in many respects similar to those on the Liverpool side of the water, and are fitted up in the same manner. Their storage capacity is 212,800 qrs. of grain. They are not fireproof. Like the Liverpool warehouses, they have been designed by Mr. Lyster.

THE FEMALE SCHOOL OF ART.

A FINAL appeal is being made to the friends of the Female School of Art, to raise the sum of 1,500l., in aid of the Building Fund of the School, and to found two scholarships. If this be done, the maintenance of the school will be assured without further help from friends. A *fete* and fancy fair will be held in the gardens of the Royal Botanic Society, Regent's Park, on the 25th, 26th, and 27th of June. In reply to a petition to the Royal Academy of Arts for aid towards defraying the debt incurred by purchase of freehold property and enlargement of school, Mr. J. P. Knight writes to the superintendent, "I have the pleasure to inform you, that the Council, fully sympathising in the labours of the Female School of Art, unanimously voted the sum of 50l. towards the purpose stated in the said petition."

A petition for aid will shortly be presented to several of the City companies, by whom we trust the strong claims of the school will be favourably considered.

BRICK SMOKE.

THERE are some common brick-kilns at Swansea which cause much nuisance. Mr. R. Rawlinson, C.E., and the borough engineer, Mr. E. Cousins, at the request of the Local Board, have just now made a report on the subject, which, as it will probably interest many of our readers, we print:—

"Having been requested to report on the best known means of consuming smoke, &c., in the burning of bricks, we visited Messrs. Doulton's pottery kilns, at Lambeth, and Messrs. Hoffman's patent brick-kilns, situate at West Brompton. Ordinary kilns were at first erected at the West Brompton Metropolitan Railway Works, but they were violently objected to by the inhabitants in the neighbourhood. This patent was then adopted. The clay used is that known as 'London clay,' brought to the works from parts of the line of railway adjoining. It is a very heavy clay, and alone is too strong for brick-making; it is, therefore, mixed with sandy loam, from one to four or one to five parts, one part sandy loam to four parts clay.

The clay is not tempered, but is merely cut down and turned over; it is neither ground nor sorted. The clay, mixed with loam, is filled into barrows, each barrow containing materials

for fifty bricks, and weighing about 450 lb.; it is then passed into a pug-mill which is in connexion with the dies: by a recent arrangement these dies are lubricated with grease extracted from soap waste of the woollen manufactories of Yorkshire. During winter the moulded bricks are aired under a shed-roof formed over the kilns, so that bricks are made all the year round irrespective of weather. The bricks are sound-looking, and are very heavy in proportion to their size: this is in consequence of the character of the clay.

Hoffman's patent kiln is built in the form of a large arched passage of a circular form on plan, within which the burning of the bricks is carried on round its circumference. There are twenty-four entrance doorways, admitting of being closed with temporarily-built bricks and clay, so as to retain heat and exclude all entrance of air by the doorways so built up; the circular chamber consisting of twenty-four compartments, or spaces, with one of these doorways to each. In the centre of the ring a chimney is erected about 150 ft. in height, measuring at the base about 16 ft. square, and from each of the twenty-four compartments of the annular chamber an underground flue leads into the chimney; each flue has a valve by which its communication with the chimney can be cut off, arrangements are made by which a damper, or portcullis, can be inserted, so as to cut off all communication between any of the twenty-four compartments of the ring kiln and the next one.

After the kiln has been lighted the fire is never extinguished, but the burning of new bricks and the removal of the finished produce are carried on by a continuous and regular process from day to day. Two of the compartments on each side of the kiln have their entrance doors open, all the rest being closed. By an arrangement of valves (or dampers) in the branch flues, and the larger damper or portcullis in the main flues, air is admitted by the open doors, and has to go round the whole circuit of the kiln in order to reach the chimney. From one of the two open compartments on each side of the kiln men are taking out finished bricks, and in the other they are building unburnt bricks which are not yet quite dry.

Air entering by these compartments passes first among bricks almost cold, and then goes forward to warmer bricks, and so on to hotter and hotter, carrying the heat of the cooling bricks forward with it until it reaches half-way round one-half of the kiln, at which place there is a final accession of heat from the burning of a very small quantity of coal-dust, which is from time to time dropped in through properly-arranged flues from the top of the kiln among the bricks by numerous small openings, furnished with moveable heads. The hot air, including the products of combustion, then passes forward to the bricks, which, by its continuous current, are being dried and heated, passing on among them from hot bricks to those that are less and less so, heating them as it goes on to those which are still damp, drying them, and then passing to the chimney with moisture in the form of steam or vapour taken from the damp bricks. Each day a portcullis is shifted forward one compartment, and a corresponding change is made as to the flue which is to communicate with the chimney and the air at the end of its circuit in the annular chamber. The places where coal-dust is thrown in are also advanced one compartment, and so the whole process goes on.

In the burning of this kiln there is an absence of all smoke containing sooty particles; arising from the perfect combustion of the fuel. That which is discharged from the chimney is steam or vapour from the drying bricks, mixed with gases from burning the clay. These gases are discharged into the air at about 150 ft. Since the erection of these kilns no complaints have been made by the inhabitants of the neighbourhood.

Conclusions:—An examination of Messrs. Hoffman's patent brick-kilns has convinced us that bricks may be moulded, dried, and burned all the year round, and with great economy, as also without sending into the atmosphere black smoke. The patented process economises heat to a very great extent, and thereby saves fuel. The mode of feeding the kilns ensures a combustion of the carbon of the coal; and as very much less coal is required than in the rude method of open kiln firing, local nuisance is in a corresponding degree lessened, and the gases and vapours produced

are delivered into the surrounding atmosphere at the elevation of any chimney provided for such purpose. At Brompton this elevation is about 150 ft.

ROBERT RAWLINSON.
EDWARD COUSINS.

P.S.—The patented method as described is necessarily costly to establish, and can, we think, only be recommended where long continued use is contemplated. For short periods of time the great cost of the patented kiln must prevent their adoption. The nuisance from ordinary brick-kilns consists of dense smoke and vapour at the first lighting, and heated gases and vapour being given off into the surrounding atmosphere at low elevations 10 ft. or 15 ft. above the surface.

There are coke-kilns in use where flues of fire-bricks set dry are formed on the top of such kilns to connect all the vents with a chimney. The bricks in these flues become sufficiently heated to burn all black smoke before it can reach the chimney, and so prevent this form of nuisance, as in the patented kilns. The open beds and joints amongst the heated fire-bricks allows of a due admixture of oxygen with the carbon, and a transparent gas is the result. We are not prepared absolutely to recommend this method, but only suggest it as a cheaper expedient than the more costly but perfect mode by patent."

HALTON INDUSTRIAL EXHIBITION.

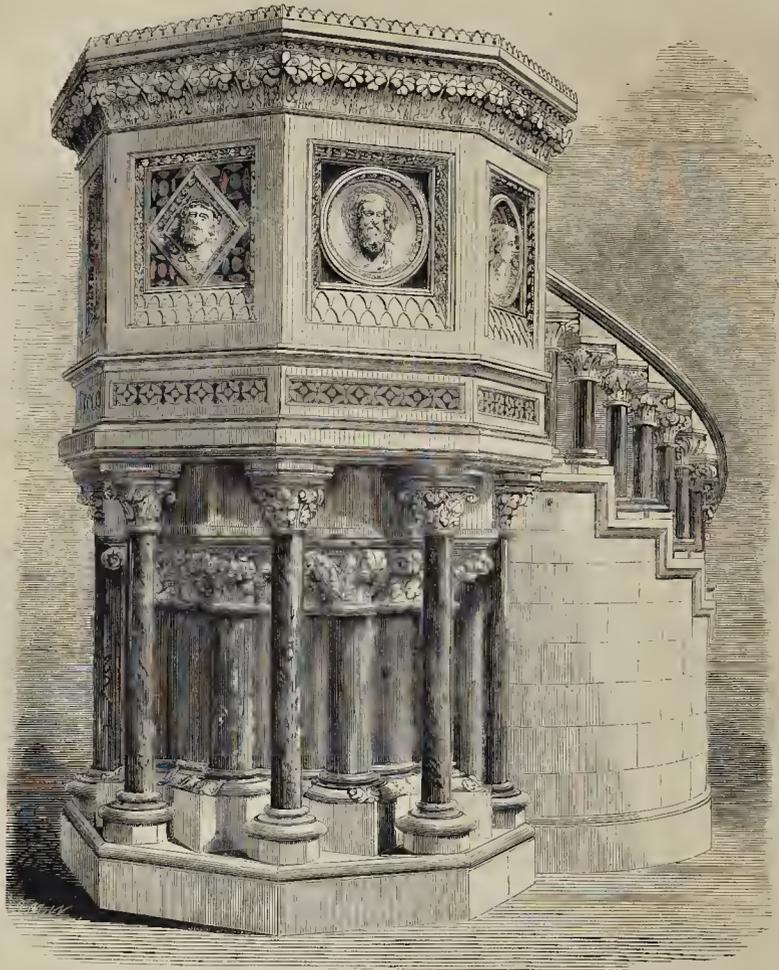
This Exhibition has been opened by the Right Hon. B. Disraeli, M.P. A large and fashionable assemblage was present, including the Premier and Mrs. Disraeli, the Bishop of Oxford, Miss Burdett Coutts, Baron Meyer de Rothschild, Sir Anthony de Rothschild, Mr. N. M. de Rothschild, M.P., the Ladies Rothschild, and Miss de Rothschild, Mr. Julian Goldsmid, M.P., and a large number of the clergy and gentry of the neighbourhood.

The children of the schools of Halton and Aston Clinton, which are supported by the Lady de Rothschild, sang, accompanied by the band of the Grenadier Guards, conducted by Mr. Daniel Godfrey, "A Song of Joyous Greeting," a chorus specially composed for the opening of this Exhibition. After the chorus had been sung, Mr. Disraeli made a short address from the steps of the Halton mansion.

"They had collected together," he said, "an exhibition of the products and manufactures of the district which would well bear comparison with others of greater pretensions. Of the lace manufacture of the county, which in later years had vied with that of the Low Countries, he had seen specimens exhibited at public exhibitions which rivalled the productions of Mechlin and Valenciennes. There was also one part of the county where the manufacture of furniture was carried on successfully; and in working up the beech woods of the district they carried on a trade which sent its products not only throughout England, but to the colonies as well. The embroidery which they would see in the Exhibition was of great merit; and there were many departments of industry which they were about to visit which could prefer claims to public approbation. There was one thing in this county which had made great progress within the past few years—the improvement of the dwellings of the working classes. The silk manufacture was carried on and was flourishing in the county town of Aylesbury. The silk which they produced was able to compete successfully with that of French manufacture; and they not only supplied themselves, but sent a great deal over to France, which got made up, and was sent back and exhibited in the shops of Regent-street as the productions of the French looms. The manufacture was steadily increasing. He had been told that nearly 200 medals would be distributed that day."

PULPIT, CHURCH OF ST. MATTHIAS, STOKES NEWINGTON.

The accompanying engraving represents the pulpit that has been set up in the Church of St. Matthias, Stoke Newington. It is of stone, with marble adjuncts, and was designed by Professor G. G. Scott. Mr. Farmer executed the work.



STONE PULPIT; CHURCH OF ST. MATTHIAS, STOKE NEWINGTON.—PROFESSOR G. G. SCOTT, ARCHITECT.

ABERDEEN PUBLIC AND MUNICIPAL BUILDINGS.

THE accommodation in the County Courts at Aberdeen having become very defective, it was found necessary to provide additional accommodation, and accordingly in the year 1861 it was resolved to erect a new Court House. Designs for this building were obtained from three architects in competition. Some time having elapsed, and there being no proper municipal and county buildings in Aberdeen, it was proposed to take advantage of the opportunity which the building of a new Court House would afford, for the erection of municipal county buildings also; and a scheme was mooted by which it was proposed to erect one large building, combining Court House, municipal and county buildings in one. This scheme it was ultimately resolved to carry out, and for this purpose a site was obtained at the west end of Union-street, the principal street of the city, and in the very centre of public business. The site is an irregular one, having frontage both to Union-street and to Broad-street—a street of secondary importance—the back of the buildings looking to the prisons, and to property of an inferior description. Plans for this enlarged

building were accordingly procured and are now being carried out.

In the building, as arranged, the right-hand portion to Union-street is to be appropriated for the use of the Court House and county officials; the left-hand portion is to be occupied by the town's officials and police commissioners. Part of the accommodation in the town's portion of the buildings is to be let as chambers for business purposes. The centre of the ground-floor of the building is occupied by the entrance to the court-rooms. The entrance is through a corridor, 60 ft. long by 16 ft. in breadth and 24 ft. high. The walls of the corridor are of freestone, having a groined roof of the same material. At the end of the corridor is a broad staircase, the first flight of which leads to the court-rooms at the back of the building. From the landing of this flight double flights of stairs, one on either hand, lead to a large hall, occupying the centre part of the building in the upper floors, the joint property of the town and county.

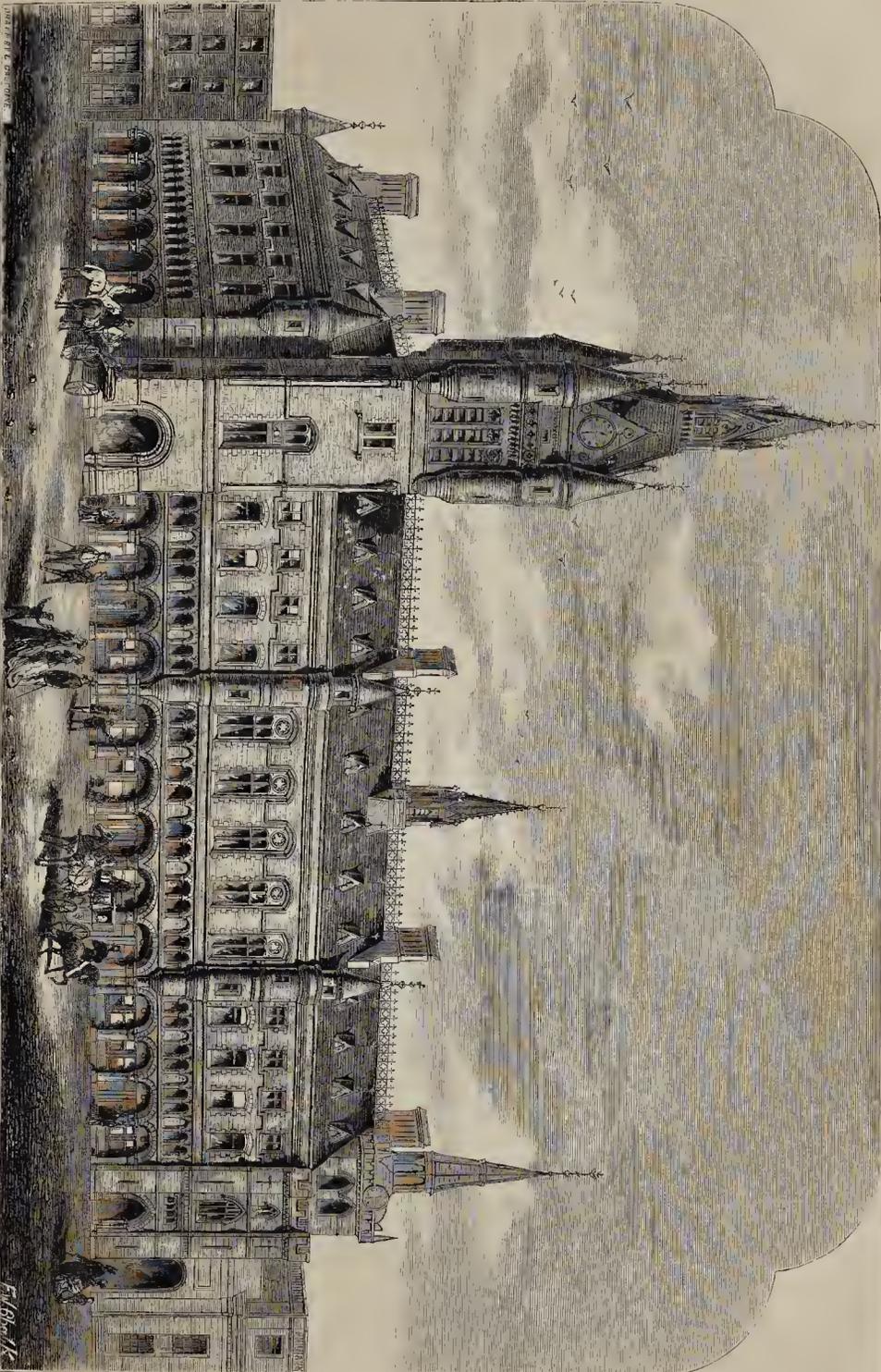
The back portion of the buildings consists only of two stories; whereas the front, as will be seen from the elevation, is four stories in height.

The style adopted in the building is a variety

of the Scottish architecture of the sixteenth century. The material used in the erection is the Aberdeen grey granite.

The tower at the right extremity of the building is an old structure, faced up about the beginning of this century in the style of Gothic then in vogue, and with which the architects have not been allowed to interfere. The principal feature of the edifice,—the great tower to the left, at the corner of Union-street and Broad-street, rises to a height of 185 ft.; and through it is the entrance to the portion of the building occupied by the municipal authorities. The height of the two principal fronts, to the parapet, is 64 ft.

The total cost of the building, when completed, is estimated at from 45,000*l.* to 50,000*l.* The contractors for the various departments are:—For the mason's work, Mr. George Donaldson, Aberdeen; for the wright's work, Mr. James Coutts, Aberdeen; for the plumber's work, Messrs. Charles Middleton & Son, Montrose; for the plasterer's work, Mr. Robert Henderson, Aberdeen; and for the slater's work, Mr. Alexander Adam, Aberdeen; and the work is being carried out under the inspection of Mr. Thomas Sidey, clerk of the works. Messrs. Paddie & Kinnear are the architects.



ABERDEEN PUBLIC AND MUNICIPAL BUILDINGS.—MESSRS. PENDER & KINNEAR, ARCHITECTS.

CONVERSAZIONE, INSTITUTION OF CIVIL ENGINEERS.

At this *conversazione*, held on the 26th ult., a diamond rock boring machine was exhibited by Mr. Appleby, which appears to be more simple in arrangement than that exhibited at the Paris Exhibition of 1867, although it bores a hole at the same speed and of the same diameter and depth. The boring head consists of a number of diamonds set in a ring, cutting a chaos of about $\frac{3}{8}$ in., and it takes out a solid core of about $\frac{1}{8}$ in. diameter, the finished size of the hole being therefore about $1\frac{1}{2}$ in. diameter, which is put down at a speed of about $1\frac{1}{2}$ in. to 2 in. per minute.

Amongst numerous other improvements and inventions, Messrs. R. Moreland & Son, of Old-street, exhibited an improved method of constructing floors for buildings. This system of flooring consists in fixing wrought-iron girders at given distances apart on the walls of buildings, and then placing between them on their lower flanges a number of wrought iron bow and string lattice girders; and on the upper or curved surface of these laying corrugated iron throughout the floor. Concrete or other material is then laid on the corrugated iron to the desired form and thickness, and sleepers, joists, and floor-boards may then be laid on the concrete in the ordinary manner. The ceiling joists are notched or otherwise, fixed on the lower part of the lattice girder, and are lathed and plastered in the usual way. The advantages claimed for this system of flooring are the adaptability of it to all spans and positions required in ordinary buildings, particularly in large spans; and it is more economical and much more rigid than floors constructed with rolled girders: large spans may be constructed by this system without the intervention of main girders, as the wrought-iron girders are made of the greatest depth possible, being kept close to both floor boards and ceiling, thereby ensuring the greatest amount of rigidity and strength, with the least possible quantity of material.

THE ARCHITECTURAL ASSOCIATION.

A MEETING of members was held at the House in Conduit-street, on Friday, the 5th ult., of which we have not yet given a notice.

Mr. Rickman, one of the delegates appointed to represent the Society at the meeting of the Architectural Alliance, read his report, by which it appeared that there had been really no meeting at all, an insufficient number being present to constitute a quorum. In consequence of this fact, he had no special report to make on the subject, but he read a letter from Mr. Chamberlain, pointing out that the Alliance had at their former meetings effected some good, and had transacted some important business. Among other things, they had adopted the scale of charges drawn up by the Institute of British Architects, which had proved an advantage to the profession generally. In conclusion, he asked their opinion as to the best method of securing its future success.

In answer to a question, Mr. Rickman said that nine or ten delegates were present last year ready to take part in the proceedings, but from some accident or other (in consequence, he believed, of a train not keeping its time) the remainder did not arrive until it was too late to transact any business. He hoped, however, that four or five other societies would send delegates this year, and, if so, the meeting might be a success.

Mr. Ridge was very much inclined to question the advisability of sending any one to represent them at the meetings of the Alliance for the future. As, however, Mr. Rickman had expressed such a strong opinion in their favour, he should not take any steps in the matter at present, unless it was the evident wish of the meeting that he should do so.

Mr. Roger Smith always had a good opinion of the object the Alliance was intended to serve. With regard to the special points raised as to a scale of charges, there were various opinions on the subject, but it was caused by the fact that different changes were made in different parts of the country. He argued that the Alliance had done well in adopting the scale of charges drawn up by the Institute of Architects, and thought that it ought to be supported, as there were many other subjects which required the deliberation of its members. He believed that

it would be a mistake to withdraw from it because the meeting last year had been unsuccessful. All members who attended it should look to the advantage of their profession; for they must remember that by raising their profession they raised themselves.

After a short discussion, it was resolved that Messrs. Roger Smith, Rickman, Matthews, and the President should attend as representatives of the Association at the next meeting of the Architectural Alliance.

The Chairman read a letter received by the committee from the Master Builders' Association, requesting them to allow a deputation from that society to wait upon them. He stated that an answer had been returned declining the request, on the ground that it would be putting the Builders' Association to considerable expense for no purpose, as many of its members of the Architectural Association were students, and others belonged to the Institute of Architects, where they would have an opportunity of hearing anything which might be advanced by the deputation which was to attend that body.

Mr. Roger Smith brought up the report of the committee appointed by the association to attend to the department in this Paris Exhibition allotted to architectural drawings. He expressed himself rather disappointed with the result, and said that the committee had guaranteed a certain sum in case of emergency, and they had been drawn upon to the extent of 3l. 8s. a piece. The exhibition of the drawings included many objects of merit, but he did not consider that it in any way adequately represented English architectural art at the present day. The success of this collection, such as it was, was mainly owing to the exertions of the committee.

Mr. Matthews then drew attention to a plan for utilising superfluous heat from ordinary fires, which elicited a short discussion.

THE NUT FOR PROFESSIONS TO CRACK.

III. PAYMENT OF OPERATIVES (AND INCIDENTALLY OF DOCTORS).

THE *Builder* is a journal "for the architect, engineer, operative, and artist," and having now, by your courtesy, had space to consider the "Nut" proposed with regard to the two former, I come to the operative, which has been well said to be absurdly called a "class," being merely the body of society—its body, as distinct from limbs, special organs, tumours, ulcers, clothes, armour, and other excrescences and appendages.

By "operatives" we understand all those necessary to a nation's manual work: consequently all of both the owners (or holders) and the users (if these be different) of the tools or capital employed in each work—all who claim such names as builder, brewer, printer, &c. Now, the first thing operatives seem to need telling is, that their only right or normal condition is where the possessors and users of this capital are entirely the same, none either working with what is not his own, or owning what another is controlling and using; and that, though this state of things may no more exist anywhere, or be ever expected to exist rigorously, than a community without sick people, orphans, or debts, yet it is the state of equilibrium towards or from which every society is moving; and if moving towards it, but from however great a distance, is healthy; but if travelling from it, then, however little removed therefrom, is in course of dissolution and destruction.

The following, then, will have no reference to a dissolving community, which no truth-telling can benefit; but will apply only to operatives who are tending towards, or resolutely intend, this their normal state. Any who, or rather any which, are not only toiling on contentedly (?) upon another's capital, but increasing and multiplying on what he may happen to find it expedient or necessary to pay them, and so regarding this as the proper, intended condition of themselves, or their children, or somebody,— "the state of life into which it hath pleased God to call" somebody,—these I do not include in the term "operatives." For how can they be called so that neither profess nor mean, nor are meant, ever to supply what is necessary to a single piece of work—the capital and labour? In fact, our language commonly does not call them either workmen or even men or women, but "hands," by an idiom as yet confined, I believe, to English—a phenomenon, by the way,

that those who speculate on the significance of changes of language in rotten old races would find worth looking at.

We are to show, then, how any community not merely dissolving and decaying must needs be approaching the state of having no mere "hands," but all operatives, in the strict sense of supplying both the requisite of work. It were easy to show how this process must constantly go on, and the number of mere "hands" grow less and less, in a people holding, believing, or worshipping what Englishmen profess to hold, believe, or worship. But the difficulty is to get any English reader to remember, or bear in mind for one minute, what things he most loudly and constantly professes. Most strangers would take for granted, as to any nation they visit, that no public words, neither their laws nor their popular songs, were more intended than what they utter to their deities in their temples. This is the kind of material by which Dean Stanley judges the Russian Dissenters called *Staroverists*, or "Old-faith-men" (professedly adhering to the primitive Christianity, or that of the first fifteen centuries, prior to all so-called reforms). That singular people seem of such literal, dull, and prosaic minds as to suppose, for instance, when they address their Deity in church (like the Englishman, once a month) in these terms,— "Lord, who shall dwell in Thy tabernacle, or who shall rest upon Thy holy hill? He that walketh uprightly, and worketh justice; . . . in whose eyes a vile person is contemned; . . . he that putteth not out his money to usury," &c.,—that literal material money (such is the gross materialism of their minds) has to do with getting to heaven!— that so spiritual a thing as religion is concerned with their daily use of such things as rouble and kopecks! * * *

For every trade or craft there is a certain quote of capital (measurable in money) necessary to each man's effective employment. It is not always to be found from what a single or even ten isolated operatives require; but if you take a hundredth of what just employs 100, or a thousandth of what employs 1,000 and no more, you have in each case the same quote. This sum, which none can ascertain better than a "hand" of that craft, must be fixedly known by the whole craft, and it must be settled among them that whoever has not this *head-money* (as the word "capital" rightly means) is no right workman, but only a "hand," and that to get this is so essentially a hand's first duty that, till it be gotten, no deed not contributing thereto is even *harmless*. For every hand which, while without this quote of wealth, is making any profit not to itself, but to another, is so far destructively working against its owner, craft, and nation.

Now, in a trade that knew their *head-money*, suppose 100 men working together. Consequently there must be among them the capital that I call 100 *head-moneys*. But suppose this very unequally shared, and, for simplicity's sake, thus: fifty have none of it, but are mere "hands;" forty-five more have just what would employ forty-five, but no more. The remaining five must, therefore, have invested fifty-five *head-moneys*, and, say, in this proportion: twenty, fifteen, ten, eight, and two.

First, you have to learn that, as long as this is so, the entire control and command of the hundred's labour must belong to these five. No others can have any voice; but what relative voice must each of these have? If you say their votes must tell as the above numbers, though you are very near right (in figures), you are wrong enough to ensure your infallible ruin. They must tell as 19, 14, 9, 7, and 1; for they rule, observe, not by virtue of their whole capital, but only of their *supererogatory* capital; otherwise the 45 common workmen would have each a vote; but they are entitled to no voice at all, as long as none of their capital helps to employ others. It is absurd to suppose the personal capital needed by a man's self can give any ruling power. *Personal* capital gives him the privileges of workmanhood, as distinguished from mere handhood, but not a penny of ought but his *supererogatory* capital (which we may call *super-capital*) can give him any rule over others.

Co-operators must not suppose they can afford, in any the smallest particular, to adopt the rough and ready shifts of common thriving companies (limited), which let a large and small shareholder's vote count alike, being too busy with outsiders' pockets to care for more than the vaguest shadow of justice among themselves. Co-operators have a job like the sub-

marine cable covering, where any single pin-hole destroys, and cannot be so small as not to entail entire ruin. I read lately of some poor Lancashire ones elaborating wondrous riles, whereby a holder of 100 shares was to find the last ten had only the voting power of the first two, or somewhat of the sort. Vildest and most suicidal ochlocracy a mob ever devised! For what end do these wise men of the North suppose any man will put capital to another's labour but either to direct that labour or to rob him? Then, if the last shares in the hundred are not to have the full directing effect of the first ones, to whom do they think, except a swindler for some thieving purpose, will it be worth while to invest those last? There are but two possible motives; and to say you will have any penny of supererogatory capital not ruling you, is to say it shall only come to rob you! So every society that do not allow each penny of super-capital (and of none but super-capital) its full and entire ruling power may be sure their sin will very soon find them out.

Now, of course all co-operators understand by this time that an operative can never receive his just due hut in two parts—one a regulated daily allowance that should always be less than the current employers' wages, and, indeed, unless the latter be grossly and unusually curtailed, must needs be less, and ought never to be called by the same odious name; the other part uncertain, though always making with the former more than the current wages, and receivable only when it is ascertained, by the periodical balancing of books, at the end of each quarter, or longer interval. This portion has been hadly and confusingly called "profits," and harshly "bonuses;" but I will call it the *dividends*. It is not the only just way, but a just one and the simplest, to divide these in the proportions of each man's receipts of allowance since the last division, but of course only of allowance for labour, not sick allowance. Hence, whatever ratios have been established between the daily allowance of different classes, the same will be the ratios between their whole earnings, when working equal times. And observe that the ruler and manager is entitled both to double an ordinary allowance, and a double share in the division. This has been settled last by an Apostle—"Let the elders that rule well be counted worthy of double honour," which might equally have been translated "a double honorarium," and applies, observe, to worldly business; for he adds next, "especially they who labour in the word and doctrine;" especially implying that it also applies to those labouring in other things. Moreover, that the words "double honour" chiefly involve double pay, you may know from what our Lord said of the son whose Corban was an excuse to "honour not his father or his mother," where unless "honour" included hard cash there would be no meaning at all. And, in case you should fancy this proportion a matter on which Divine views may vary, like human, with the age, please to observe, while you nowhere find any other, this one was exactly the same for the patriarchs. Among them an eldest son, as inheriting the rule of his father's clan, was to have the ruler's double share in all things; and this was too settled a point, before Moses's time, for him to be ordered even to state it, but only to forbid any father to alter it for private affection!

The Divine right, then, you see, of the manager, as long as you, by keeping him so, imply that he rules well, is to double emoluments. You may vote him anything more, but not less; and to subordinate rulers or foremen, what excess you please.

But you ask, perhaps, what is the difference, in this division, between the man who have their head-money and the "hands" that have it not? Simply, that the former can take their share, while the latter can only have theirs credited to them in the books as so much capital: they can touch nothing but their allowance till their personal head-money shall be thus made up.

But a "hand" wants to leave, to emigrate, or dies; or a workman with just his head-money or with any super-capital does so: what is each entitled to take away, or his heir to have? Take, first, the case of one having his exact head-money, and dwelling still at hand. He can require, on the day he leaves you, only the capital he brought at his entry. In the week after leaving, or in the next, or the tenth, or the hundredth week, he can remove whatever he brought in or earned in the first, or second, or tenth, or hundredth week after entering. For

the society is entitled to the use of each penny of his personal capital for as many days as it gave him membership. But all super-capital he takes away on the day of leaving, because he has exercised the ruling power that each penny thereof gave, for just as long as that penny has been invested. You see, then, that, whether he has super-capital or not, it will generally happen, unless he brought in his full head-money at entering, that different sums become due to him only at various times after leaving: yet you need never make more than one payment. You will find in all school arithmetics *above a century old* (that is, all that were written before the extinction of the worship of the true God in commercial England) a rule called "Equation of Payments," which is not printed now, because thieves have no use for it. That rule shows you on what day to pay any of these sums in a lump, whether the whole of them, or only those not removable when the member left.

For example, suppose the head-money fixed at 25*l.*, and that a "hand," at his entry, brought only 15*l.*. After six weeks there was a quarterly division, and he was credited 2*l.* 10*s.* 3*d.*; again, at the next quarter, 6*l.* 11*s.* 7*d.*; at the next, 5*l.* 14*s.* 4*d.*; making, beyond his head-money, 4*l.* 16*s.* 2*d.*, but of which he only leaves for super-capital 2*l.*. At the next audit his dividend is 7*l.* 0*d.*, of which he removes all but 1*l.*, and after three weeks he leaves.

Now, at leaving he is entitled to the 15*l.* wherewith he entered, and the 2*l.* and 1*l.* super-capital:—

In all.....	£18 0 0
Six weeks later.....	2 10 3
Thirteen weeks after that.....	6 11 7
Thirteen weeks after that, the rest of his head money, or.....	0 18 2
	£28 0 0

Now, to find at what time he may receive the whole 28*l.*, the old arithmetics tell you rightly to multiply each debt by the time (from any fixed date before or after) to its becoming due, and divide the sum of these products by the sum of debts, thus—

Weeks after notice to leave.....	£18 0 0	which × 1 =	£18 0 0
7.....	2 10 3	× 7 =	17 11 9
20.....	6 11 7	× 20 =	131 11 8
33.....	0 18 2	× 33 =	28 19 6
Divide by sum of debts.....	£28 0 0	£28 0 0	2 11 10

So that nine weeks four days after leaving is the time to pay the whole, if he claims none earlier.

I will now take the case of a mere "hand" leaving without having made up the head-money. Suppose it 60*l.*, and that he entered with 10*l.*, and was successively credited the following dividends, but leaves or dies without having attained full membership.

He entered with.....	£10 0 0
7 weeks later was credited.....	5 2 3
13 weeks after that.....	9 16 10
13 weeks after that.....	10 5 4
13 weeks after that.....	4 18 1
49 weeks (and leaves).....	£40 1 6

Now, if he had made 60*l.*, you would have been entitled to use each part thereof forty-six weeks. But the use of 60*l.* for forty-six weeks is plainly the same as using 40*l.* for sixty-nine weeks (because 60 × 46 = 40 × 69). Therefore he can only receive the first 10*l.* after twenty-three weeks from leaving, and each sum sixty-nine weeks after it was earned. Each is to be reckoned as earned from the middle (or thereabouts) of the time in which he was earning it. Thus:—

Weeks after leaving.....	£10 0 0	which × 23 =	£230 0 0
23.....	5 2 3	× 27 =	138 9 9
37.....	9 16 10	× 37 =	354 2 10
50.....	10 5 4	× 60 =	613 6 8
63.....	4 18 1	× 63 =	308 19 3
Divide by sum of debts... £10 1 6	£21,554 9 6		

Therefore thirty-eight weeks six days after leaving he may receive the whole.

Necessarily every co-operative body must have a doctor to tell them who is sick, and who entitled to sick allowance, and how much. Now, in order that he may find it worth while to attend to these things thoroughly, there is only one possible mode of paying him, and it is the simplest possible. He must take nothing for any visit or any medicine to the members themselves (I am not speaking of their families),

and he must undertake all this for a fixed unalterable rate of percentage on the company's whole earnings. You must deal with no doctor who suggests any other base, and the rate per cent. once fixed must never vary, be the company large or small, growing or dwindling, rich or poor, healthy or sickly.

Another learned officer has to be paid similarly, only a far less percentage, because he may serve as many as 100 or perhaps 1,000 doctors could physic. This is the actuary, who settles what is just and safe in all the non-operative money matters, as superannuation, widowhood, &c. If you had only to do with my present subject, payment of operatives, he would not be needed; for trade has reference only to pure justice, and a schoolboy can keep your books as here shown, and any system that gave a farthing to one man which this gives to another is mere theft. Questions of degree come only in the provident or non-trade affairs. And for these matters a company, which is one simple body for work and trade, will yet have to be divided into several, somewhat thus:—

A.....	Bachelors.
B.....	Married, without children.
C.....	Having 1 or 2 children.
D.....	Having 3, 4, or 5 children.
E.....	Having 6, 7, 8, or 9 children.
F.....	Having more than 9 children.

Each of these ought to be so far an independent body as to have separate right to fix their head-money, and he completely separate in their provident funds. Hence, if the birth of a child removes the father out of grade C, and he has not paid up the additional capital that D have fixed for their membership, he must be allowed to draw no dividends till they shall have made up that addition.

In fixing all such points they require the actuary, who must be, like the doctor, their percentage partner, at an invariable rate.

E. L. GARRETT.

PLAGUE STONES.

I BEG to supply you with some further information with reference to plague stones. During the years 1665 and 1666, the little village of Eyam, in North Derbyshire, was visited by the plague. To prevent the spread of the disease, it was agreed by the inhabitants, at the suggestion of the rector, Mr. Monpesson, that none of the villagers should pass certain boundaries. At points on the "cordon sanitaire" were placed troughs, containing water, in which the villagers placed money, which was exchanged on the following day by the people of the surrounding district for bread and other necessaries.

One of these troughs existed within my recollection; it was hewn out of a piece of rough sandstone, and measured about 2 ft. 6 in. each. It was broken up some years ago. A well, called Monpesson's well, that was used for the same purpose, still remains, and is an object of great interest to persons visiting the neighbourhood. For further particulars, see "Wood's History of Eyam." T. G.

"A QUESTION IN RESTORATION."

STR,—I am glad to see the question on this subject started by Mr. Underwood (p. 378, ante), because it is very important that some definite rule should be laid down for the guidance of all engaged in the important work of church restoration.

My maxim in all cases is "conservation, not destruction," being of opinion that every feature of an ancient building tending to show its history should be carefully preserved.

Such a rule being admitted, as I believe it will be by all archaeologists, to be the correct one, it follows in the case under consideration that if Mr. Underwood "puts in two new windows such as" he "has evidence to prove were similar to the rest" he will completely blot out the page in the history of the church which reads that two of the thirteenth century windows were in the fifteenth reconstructed. If, on the other hand, "he, having reproduced the tracery, encloses it in jaumbs and head of Perpendicular character," he destroys all record of the interesting fact that the thirteenth century jaumbs and arch were re-used with the new tracery in the fifteenth. If, again, he "reproduces the tracery, as well as jaumbs and arch, as he finds them, copying each stone with its defective arc,"

he completely destroys the old work, and the "sermon in stones" cannot be read without a verbal exposition.

I should say, neither "make new" nor reproduce, but carefully reset every stone of the old work that is not utterly perished; and if any are so much perished that they cannot be reset as they are, cut out and replace the smallest possible pieces that will suffice to make the work fit again; if, however, the work is so utterly gone that it cannot be reset, re-use at least one or two of the best pieces of each section, no matter how decayed, to perpetuate the history, and to show that you have read it aright, and reproduce the rest stone for stone, "defective arc" and all.

By adopting this course you not only preserve the history of the windows, but escape the horns of a dilemma, and the work will possess a value in the eyes of all true archaeologists (the only persons whose opinion is worth consulting) which no new work or total reproduction, however careful, could command. By them the "defective arc" (if proved to be historical by a presence of only two or three old stones), like the "defective arc" of a leg broken in battle, will be valued for the history it carries with it.

If the rule I have thus endeavoured to lay down were universally adopted we should not have archaeologists detesting the sight of a "restored," which often means a "destroyed," church, and our country would abound with the records of its own history.

J. P. FRICHELLT.

SIR,—I have always felt that, to find a proper solution to such questions in restoration as that proposed by Mr. Underwood in your issue of May 23rd, some reconciliation must necessarily be effected between the views of the mere antiquary and those of the art-architect. The antiquary says to the restorer, "You have no right to take away from me what I consider my birthright,—the power of examining the history of the works of our forefathers through their structures,"—a most admirable principle to lay down, but one that may be easily carried too far. To give an example,—perhaps an excessive one, but the excess will only make plainer what I mean.—The whole of the interior wall-surfaces and groining of Salisbury Cathedral are coated with whitewash, which was most probably first applied to them in the early Puritan days. Through this whitewash it may be discerned that the whole of the walls and groinings were painted in a very exquisite manner, the paintings apparently remaining perfect. Now the antiquary, to be consistent, must leave the whitewash still remaining, for the whitewash as much represents a part of the history of the building as the lovely colours which it hides. Yet, surely no antiquary would wish the lazy, fanatic whitewash to remain, and the diligent, pains-showing work done by God-fearing men for the glory of Christ's Church to be obscured? Taking this for granted, where will the antiquary draw his line, dividing what is to be preserved from what may be destroyed? I think the decision cannot be left with him alone, who only too often interprets Mr. Ruskin's golden rule for restorers, "Better a crutch than a lost limb," as forbidding the excoision of a hideous tumeur.

Now for the other side of the question. As in the supposed case given by Mr. Underwood, the architect says, "Such and such a part of the building is in a dilapidated state. The part is evidently a late insertion, and a careless one too, and, to my mind, forms an eyesore in the building. How am I to restore it? There are the three usual courses open to me:—1. To make good and sound the existing features with new work similar to the old, so far as may be necessary for stability; 2. To rebuild it in accordance with what was evidently the original design; or, 3. To design something of my own harmonizing with the original work, as far as may be, but efficiently differing from the original to mark it the work of the nineteenth century. Which shall I adopt? If I adopt the first course, I shall be accused of perpetrating a lie in every new stone I insert. If I adopt the second method, it will be soundly rated for having destroyed "the most interesting feature in the building," by robbing the antiquary of the power of reading the history of the edifice in its structure. Or, if I am bold enough to use the third course, my presumption in having dared to think that anything that I could design was fit company for the "glorious

work of our forefathers," will meet with all due condemnation."—Happy architect!

With all deference to more learned opinions than my own, I cannot but think that, in any case similar to the one mentioned by Mr. Underwood, a little consideration will show us that at any rate the first of the above methods of "restoration" ought not to be adopted, for it is very evident that the specimen he cites possesses no value except antiquarian value, and is in fact a blot on the architecture of the building; therefore, to put in new work similar to the existing features, is making a sham antiquity, which, having no value as a thing of beauty, has consequently no value whatever, and is merely the perpetration of an eyesore. I would then submit that the architect, having been loyal and conservative towards the building under his hands as far as possible, should at such points become radical, and boldly cut away the decayed eyesore, heedless of the wails of antiquaries and the carpings of critics, who can easily find fault, but cannot quite so easily advise what can be done better; taking for his motto an extension of Mr. Ruskin's surgical simile—better a newly healed scar than an eye-burning tumeur.

Which of the two remaining systems of restoration should now be carried out I must leave for further consideration.

CHARLES NOEL ARMPFIELD.

JOHN SPILLER.

SIR,—In the year 1794 died John Spiller, a pupil of Bacon, the sculptor, a distinguished student of the Royal Academy, and a sculptor of great promise. He was only thirty-one years of age, having been born in 1763. His wife—said to have been very beautiful—died of the same disease, consumption, a few months after him. What a pathetic story have we here! What is known of this young and now forgotten genius? All that I know from reading is, that the statue of Charles, which occupied the centre of the piazza of the Royal Exchange, was the work of Spiller. The enthusiasm of the young artist was so great, we are told, that, though consumption was doing its fatal work, he persisted in labouring at this statue, in spite of earnest advice to the contrary. He was, he said, to die at the foot of the statue. It was completed, and raised to its destined site. The young martyr returned home, and soon was known no more. The statue escaped at the fire which occurred on the 10th of January, 1838. In speaking of this gifted sculptor, the elder D'Israeli says,—"The energy of his labour and the strong excitement of his feelings had already made fatal inroads on his constitution." No mention is made of Spiller in Allan Canningham's "Lives of Painters and Sculptors." If any of the readers of the Builder are in possession of any particulars regarding John Spiller's life and labours, and will communicate them, it would oblige your correspondent, and might be not without interest to your readers.

S. M. P.

DISPOSAL OF SNOW IN THE CITY.

SIR,—On 4th, the practical testing of the different plans is to be hoped no further delay will take place, for if put off until winter the carrying out of the successful competition will be parallel with ordering a new fire-engine when the house is already in flames. Can you inform me what is the cause of delay? Is it really a business? A COMPETITOR.

DRAINAGE OUTSIDE METROPOLITAN AREA.

IMPORTANT TO SUBURBAN BUILDERS.

At the Marylebone Police-court, on Monday last, a case was decided by the magistrate which is of importance to builders of houses outside the metropolitan area under the jurisdiction of the Metropolitan Board of Works, and is also of interest to intending occupants of such dwellings. By the 25th & 26th Vic., c. 102, sec. 61, it is enacted, amongst other things, "that no person shall make or branch any sewer or drain, or make any opening into any sewer vested in the Metropolitan Board of Works," without the previous consent in writing of that Board; and "every person so offending shall for every such offence forfeit a sum not exceeding 50*l.*, and the Board may cut off the connection between such drain and the sewer," &c. The defendants in this case were Messrs. Midson & Dale, of 12, Princes-terrace, Upton-road, St. John's Wood, builders, and they were summoned by the Metropolitan Board for having made a sewer from certain houses erected

by them in the parish of Willesden into the main Banelagh sewer, in Paddington parish, in contravention of the statute.

The case for the Metropolitan Board was based as follows:—Their engineer reported that the parish of Willesden, although formerly within the limits of the Metropolitan Commission of Sewers, and draining naturally into the main sewer in question, was excluded from the jurisdiction of the Board of Works by the Metropolitan Local Management Act, 1856, and permission to drain property into the sewer from the Willesden side has been invariably refused by the Board. In the present case part of some of the houses is in the parish of Paddington, and within the Board's jurisdiction, and a part, in some instances the whole house, is in the parish of Willesden, and beyond the Board's jurisdiction; but the entire block forms one compact property. The question as a whole appeared to the engineer to come under the general one of the admission of the sewage of outlying districts into the Metropolitan main drainage system.

The solicitor for the Metropolitan Board, referring to the houses outside the Board's jurisdiction, remarked, that "it would seem a lamentable defect if nine or ten houses out of a block of seventeen or eighteen could be drained that the other seven or eight are not to be."

At a previous hearing of this case defendants admitted that they had made the sewer connecting the Willesden houses with the main sewer, but that it was done in ignorance; whereupon the magistrate adjourned the matter, the defendants in the meanwhile to conform with the Metropolitan Board.

On Monday, Mr. Fry, for the Board of Works, said that no difficulty was raised as to the drainage of the houses within the Paddington boundary into the main sewer, but the Board had "no power" to allow defendants to drain the houses in Willesden into the main sewer, although they were only a few feet beyond the parish boundary. In this case the Board asked that a penalty might be inflicted, as a caution to other builders.

Mr. D'Eyncourt, remarked, that outside the area of the Board of Works' jurisdiction houses were being built so rapidly that the outlying suburbs would soon become large towns. Were they to have no drainage?

Mr. Lovick, assistant engineer to the Board of Works, said that was a question for the inhabitants of those districts. The Board had nothing to do with their drainage.

Mr. D'Eyncourt then asked what would be the result if the builders in suburban places connected the drainage of the houses with the Metropolitan main drainage system.

Mr. Lovick said the Board would summon them all, and press for penalties in every case.

Mr. D'Eyncourt said it was a hard case for the inhabitants of Willesden; but their remedy would be to get an Act of Parliament if they wished to get their drainage removed by the main sewers vested in the Board of Works. Defendants had contravened the statute, and he would inflict the mitigated penalty of 5*l.*

HERNE BAY PIER.

SIR,—It would be desirable to have a printed list of the directors, or sub-directors, of this undertaking, and to determine as to their "legal liability" to keep the pier in proper repair.

Is the Board of Admiralty or Trinity Board charged with looking after such structures and exercising a proper surveillance? Surely a notice to repair should have emanated from one of those bodies; and the directors should not have been permitted to board in and shut up this pier to the inhabitants of Herne Bay and the public in general, as they have done for many years past, to the infinite loss of both.

PALATIN.

ARCHITECTURAL PUBLICATION SOCIETY.

The annual general meeting of the subscribers of this society was held at the House in Conduit-street on the 27th ult., Mr. Horace Jones in the chair.

Mr. Arthur Cates, the honorary secretary, read the following report:—

The past year has been devoted by the committee to the completion of the issue for the 17th year, 1868, and the second part for that year is now in course of distribution to the subscribers. This part continues the Text of the Dictionary as far as the article "Load," the letter K being therein completed, and much progress made with the letter L,—a further considerable portion of which letter is now in type. On examination of this part, it will be observed that many of the articles have extended to a considerable length, arising either from the importance of the subject, or from the experience and knowledge of the writer having enabled him to give fuller development than had at first been considered necessary. As expressed in a paragraph of a former report, "it is this freshness of information which has placed the Dictionary in its high position, and precludes all opportunity for any one to assert that the text is a mere compilation from preceding works of a similar nature."

In confirmation of the position which the committee again with pleasure confidently assert to have been attained by the work they refer with satisfaction to letters lately received from M. Cesar Daly, the learned editor of the *Revue Générale de l'Architecture*, and from M. Ernest Vinet, the librarian of the "Ecole Impériale des Beaux Arts," at Paris, which satisfy them that although the number of foreign subscribers is but few, those copies which have reached Paris ha a attracted well-merited attention, and that the work has made for itself a reputation in highly informed and very critical circles. M. Daly announces his intention of noticing "The Dictionary." In the *Revue*,—"Avec tous les éloges que mérite un ouvrage aussi intéressant que bien fait," while M. Vinet says:—

"Le tien essentiellement à enrichir une collection que j'ai formée des plus beaux ouvrages qui se publient à l'étranger, et le Dictionnaire des Architectes anglais est du nombre. Acquiescer ce remarquable ouvrage est difficile; il n'est pas dans le commerce, et quand il se vend c'est à un prix très élevé."

It had been the intention of the committee to have during the year issued a part of illustrations with text,

but various obstacles prevented the realization of this wish; not the least has been the difficulty which exists in procuring suitable drawings and sketches to form illustrations. This may arise from the fact of the student now relying much on the subjects produced by photography rather than on the work of his own pencil, and that many of the best collections of sketches are now reserved for reproduction in the illustrated sketch-books of architectural societies. This difficulty, and the pressing engagements of the publisher of the illustrations, have prevented the issue of the plates; but a series is now in preparation which will, it is hoped, shortly be ready for issue. The completion of the letter L will enable the committee to issue a title-page and table of contents for the binding of volume IV, of "The Dictionary," comprising the letters H, I, J, K, and L, and thus place that portion of the work in a more available form.

The committee much regret that the munificent offer of Mr. T. H. Wyatt, made in 1868, to contribute 100*l.* towards the funds of the society, has not led to the example being followed; but however desirable it may be thus to obtain funds to hasten the progress of "The Dictionary," the committee would prefer to rely on the individual exertions of the subscribers to extend the list of members, and thus increase the income at the disposal of the executive. The expense of management are nearly the same for a small or a large income; and the addition of a number of subscribers would enable the committee to increase the quantity of matter issued in each part, and thus expedite the work.

The assistance received from the general body of subscribers (with some remarkable exceptions) does not encourage the committee to anticipate much aid in this direction, but they would observe that a proposal is now under consideration, by which it is suggested that by an active and simultaneous exertion on the part of the present subscribers, which would result in the addition of one half to their number, it would be possible so to arrange the funds which would thus be placed at the disposal of the committee as to secure the completion of the text without further call on the subscribers, whose payments for past years would probably cover all future expenses, or nearly so.

Considering the prosperous state of the architectural profession, and the considerable increase made in its numbers during the last few years, this addition to the numbers of the subscribers ought to be readily obtained, and is encouraged to do so by the support of the general body of subscribers, the committee will endeavour to mature the scheme, and submit it for consideration.

The audited balance-sheets show a total receipt for the seventeenth year, 1866, of 432*l.* 0*s.* 10*d.*, and a total expenditure of 388*l.* 7*s.* 8*d.*, leaving a balance in hand of 33*l.* 13*s.* 2*d.*, to be appropriated to the most outstanding liabilities for that year, while for the eighteenth year, 1867, 178*l.* 10*s.* has been received, and 62*l.* 2*s.* 10*d.* has been expended, the balance, 126*l.* 7*s.* 2*d.* being available towards the cost of the publications for that year now in hand.

In the discussion which followed, the accounts and balance-sheets were subjected to close scrutiny, and the explanations afforded by the secretary having evidenced the satisfactory financial position of the Society, the progress of the "Dictionary" and probability of its early completion were discussed, the chairman, Professor Donaldson, Messrs. C. C. Nelson, O. Hansard, T. M. Rickman, and others, taking part. The statement made by the secretary, in reply to the inquiries addressed to him, showed that the only element required to ensure the speedy completion of the "Dictionary," was the immediate accession of a sufficient number of new subscribers to place an ample capital at the disposal of the committee. The individual interest of each subscriber was shown to be the introduction of new members, to meet whose demands the committee had available a stock of the publications of the past years sufficient, if all disposed of, to supply nearly all the capital needed for the completion of the "Dictionary of Architecture."

The report being thereon adopted, it was moved and carried, that in order to economise the funds, the printing and circulation of the report and accounts be discontinued.

Votes of thanks to the officers and chairman closed the proceedings.

ARCHITECTURAL SOCIETIES.

The Sheffield Architectural and Archaeological Society.—A number of members of this society, together with several ladies, have made an agreeable excursion into Derbyshire. Starting from the Sheffield School of Art, they drove to Padley Wood, near Grindleford-bridge, where the whole party alighted, and crossed the fields to the site of the ancient Manor House of the Padleys, Eyses, and Fitzherberts. The chapel, now the only part remaining of this once stately mansion, was inspected, and a paper on it was read by the Rev. John Stacey, M.A. The visitors next crossed Burbage Brook by a rustic bridge, and after a scramble over the rugged moorland, came by way of Booth's edge to "Higgaw Tor," which was scaled, even by the ladies. Descending on the south side, the famous "Caerswark" or "Carlswork," was next visited, and here, surrounded by the natural and artificial fortifications of this singular stronghold of the Ancient Britons, the party again listened to Mr. Stacey's notes; after which they adjourned to Fox House.

Leicester Architectural and Archaeological Society.—At a meeting of this Society, held in the Town Library, Guildhall, Leicester, the Rev. J. H. Hill in the chair, a paper, contributed by Mr. Vincent Wing, on Buckminster Church, was read; after which Mr. James Thompson (local secretary for the Society of Antiquaries for Leicestershire) read an account of a recent visit to Silchester.

Durham and Northumberland Architectural and Archaeological Society.—The first general meeting of the members of this society was held on the 18th ult. at Chester-le-Street and Lumley Castle. The party started from Durham about ten o'clock in the morning in conveyances for Chester-le-Street, where they arrived about eleven o'clock. After inspecting the parish church at Chester-le-Street, the company assembled in the churchyard, when the Rev. W. Featherstonehaugh read a paper on Romsay Chester-le-Street. In the discussion which followed, the Rev. Mr. Greenwell expressed his regret that in the restoration of Chester-le-Street old church so little regard had been paid to retain many of the ancient architectural features of the venerable church. Lumley Castle was afterwards visited, when a paper was read by Mr. Longstaffe, "On the Lords of Lumley."

Oxford Architectural and Historical Society.—A meeting of this society was held in the Taylor Building on May 20. A lecture on "Monasticism" was given by Mr. Charles Appleton, M.A., who traced its history and described the various forms which it had assumed at different ages, and discussed the views which had been held by recent historical writers and philosophers on the subject. The lecture was followed by some remarks on "The Recent Discovery of Wall-paintings on the Apsos of Checkendon Church," by Mr. E. G. Bruton. The church is one of those rare examples of an original apsidal eastern end, and it was probably built early in the twelfth century. Mr. Bruton described the steps by which the paintings were discovered, and his reasons for thinking they were painted shortly after the erection of the church. When complete they consisted of the twelve Apostles, equally divided, and ranged on either side of the walls, north and south of the east window; but the southern half had been reduced to three or part of four figures in the fifteenth century, by the insertion of a window. Some parts of the figures of our Saviour, seated on a throne, were discovered on the vault, immediately over the east window. The figures of St. Peter and St. Paul were arranged north and south of the east window, and were distinguished by being placed in panels or niches, while the others were not so separated; and to these saints the church is dedicated.

DAMAGE DURING THE THUNDERSTORM.

THE recent lightning caused great damage to house property in the metropolis, and affected the telegraph wires to a remarkable extent.

The Victoria Tower of the Houses of Parliament was struck by lightning. The House of Lords was sitting at the time for the purpose of hearing appeals. It was ascertained, however, that no material damage had been sustained.

At Brompton, Little Chelsea, and between the Fulham-road and South Kensington, at which places deep cuttings have been made for the works of the Metropolitan Railway Extension and new branch lines, the torrents of rain that fell inundated the works to the depth of 10 ft., notwithstanding that the contractors had wooden shoots to convey water across the cuttings and out of the tunnels. It is feared that some of the new brickwork, which is scarcely dry, will require to be rebuilt.

It is said that during the storm there was a fall of meteoric stones.

A frightful explosion took place at a fog-signal manufactory in Cherry-lane, Bordesley-green, Birmingham. The result was the almost entire destruction of the place in which the works were carried on, and two young women employed there were burnt to death, and four others so severely injured that several, if not all of them, have since died. The damage to the works is estimated at nearly 1,000*l.*

Morville Church, in Shropshire, was struck by lightning during the storm, and sustained considerable damage. The electric force first struck the south-west pinnacle of the tower, breaking it in pieces, and scattering the fragments of

stone in all directions. One piece, weighing 20 lb., was hurled the full length of the church, and fell upon the roof at the end of the nave, breaking the tiles.

A school was struck by lightning at Furze-hill, Brighton. The building is detached, and has two chimney stacks on the western side. Upon one of these is a lightning conductor, and that one escaped, but the lightning struck the other stack, a few feet off. It carried away four long and heavy zinc flues from the top of the stack, and tore off the slates in two places on the roof. Descending one of the flues, it tore out a register stove and displaced a mantel-piece in an upper room. It went as far as the drawing-room grate, where it put the fender on one side, and threw the fire-irons out on to the floor. The clerks in the telegraph office at the Brighton railway station were compelled to leave the place. One of the metropolitan police ventured to enter the office, but was met by a flash of electricity passing from one instrument to another. He was partially stunned and temporarily blinded, and did not recover for a considerable time.

Illinois papers have accounts of great devastation, with less of life, occasioned by a recent storm there. At Shanghai a church was destroyed by lightning during divine service. The hail and wind had broken in the window lights, and torn out the windows, sashes and all. Two persons who had succeeded in getting out were instantly killed. The building reeled like a drunken man, but no one else could get out. Despair was depicted upon every countenance. Suddenly the crash came, and with a deafening sound mingled with the shrieks of the pent-up people; timbers, scanting and all, came down with a sudden crash upon the heads of the congregation. Some had skulls broken; others, arms; others received internal injuries from which they can never recover. Nearly all were more or less injured. A tornado has also occurred in another part of North America, and a severe hurricane in the Sandwich Islands.

DEBATE AS TO SITE OF THE NEW LAW COURTS.

ON a motion for the adjournment of the House of Commons, Mr. B. Cochrane called attention to the site of the New Law Courts, and observed that the subject was one of great importance, involving as it did an outlay of between two and three millions of money. The frontage to the Strand was only 700 ft., and the depth did not exceed 550 ft. An additional frontage of 100 ft. was required. The site was unroaded by most miserable streets, and proper approaches could not be made for less than 1,000,000*l.*, in addition to the estimated cost of 2,000,000*l.* for the buildings. Now, what was the case with respect to the Thames Embankment? Between King's College, adjoining Somerset House, and the Temple, a river frontage might be obtained of 1,000 ft. with a depth of 700 ft. That site, which was perhaps unsurpassed in Europe, would afford sufficient space to accommodate the courts most advantageously. The purchase of that site might be effected for 1,000,000*l.*, and the approaches to it were already made.

Mr. M. Chambers said he had received information from a man of great experience that the approach to the Courts would cost half as much as the sum expended for the acquisition of the site. Further, the buildings on the west and the north, which were of the worst possible description, would have to be cleared away; for, if allowed to remain, they would be a disgrace to the new courts. The buildings on the east, from Bollyard to Chancery-lane, would also have to be removed, otherwise they would not be able to get to the Courts from Holborn. In the plans proposed to be adopted,—the internal by one architect and the external by another,—he found in the former that their lordships the judges, the counsel, suitors, jurors, and witnesses, would have to ascend to the courts, which would be placed as high as the House of Commons; but how they would be able to mount so high he did not know, except they adopted those things called "lifts." It was desirable, before they proceeded further, to obtain from the authorities information of the cost of the present site, and how much it would sell for if thrown into the market next year, or in the next two or three years. He quite agreed that they might dispose of the present site for at least the amount they had given for

it; but they might, in a few years, when they had constructed the Courts on the Embankment, obtain a much larger price for it.

Mr. Cowper said the Embankment site might be a better one on purely æsthetic grounds, but upon those of economy and convenience the present site would be far preferable. The present site was equidistant from both Lincoln's Inn and the Temple. The proposed site on the Embankment would cost at least twice as much as the site purchased, for the houses in Norfolk and Arundel streets would have to be bought, and, being of a better description, a large sum would have to be paid for them. He knew that some architects had stated that the space on the Strand site would not be sufficient; but that point would be determined when they knew how much room the Government would require for the accommodation to be afforded. He believed the space would be found to be amply sufficient, and, therefore, no time should be lost in appointing an architect, and commencing the works.

Sir G. Bowyer thought it wrong to proceed with the new building until they had the report of the Judicature Commission, and knew what courts would require accommodation.

Lord J. Manners said that the question of site had been settled years since, and that not by one but by repeated Acts of Parliament. The purchase of the land was virtually completed, and, therefore, he could not agree in raising the whole question of site again. The total cost of the ground would be 896,000*l.*; but to fix what it might be worth in ten years would be to make the wildest of estimates. It had been said that inconvenience would arise from the difference of level between Carey-street and the Strand; but, if he was not mistaken, there would be a much greater difference of level between the Strand and the Embankment. Carey-street would be most convenient to suitors, and, besides, was close to the Record Office, which had been built, at an expense of 200,000*l.*, at the back of Chancery-lane. The land purchased amounted to seven acres,—quite sufficient, in his judgment, for the erection of all our law courts.

SURVEYORSHIP OF GRAY'S INN.

The Benchers of the Honourable Society of Gray's Inn have elected as their Surveyor Mr. Lewis H. Isaacs, of 3, Verulam-buildings. Mr. Isaacs is Surveyor to the Holborn District Board of Works. There were fourteen candidates for the appointment.

COMPETITIONS.

Monmouth.—The Monmouth Board of Guardians, at an adjourned meeting on the 16th ult., selected a design the joint production of Mr. G. C. Haddon, of Hereford, and Mr. F. B. Payton, of Bradford, Yorkshire, submitted in competition, along with fifteen others, for their proposed new workhouse. The site is in the Old Hereford-road, and is described as highly suitable for the purpose to which it is to be devoted. The estimated cost of the new buildings is stated at 6,000*l.*

CHURCH-BUILDING NEWS.

Snetton (Nottingham).—The new church of St. Matthias, in the rapidly-grown district of Snetton, has been consecrated. The edifice is erected on land, the gift of Earl Manvers, situated on the left of Carleton-road, on the rise of the Mapperley-hills. The architects were Messrs. Hine & Evans; and the builder Mr. J. E. Hall. It is now more than ten years since plans were prepared for a building with tower and other accessories. After these plans had been approved by the Incorporated Society, it was discovered that the committee were more than 1,000*l.* short of the sum required to carry them out, and it then became a question whether the work should be further delayed, or whether the architect (Mr. Hine) should be requested to furnish plans by which the requisite number of sittings (700) could be obtained at a cost of 3,000*l.* The latter course was adopted. Externally the building presents nothing very remarkable. The edifice consists of a nave, 67 ft. long and 48 ft. wide, with open-timbered roof, the ridge of which is nearly 50 ft. from the floor;

a chancel, with circular apse of equal height, 32 ft. long and 20 ft. wide; and chancel aisles on either side, out of which a vestry and organ-chamber are partitioned off with open screens; and a south porch. The division between the nave and the chancel, and the chancel and the chancel aisles, is effected by a triple arcade, with two stone columns, in one of which the ceremonial stone forms the base. A fourth arch, rising to a height of 35 ft., divides the chancel from the apse. The walls throughout are built of Balwell stone and lined with red brick, interspersed with black brick bands and panellings. The building will provide for upwards of 700 on the floor, and the total cost, including fences, fittings, and architect's expenses, is about 3,000*l.* In addition to lancet windows at either end, the light is admitted through a range of openings formed in the roof. The gas-fittings have been executed by Mr. Rhodes.

Reading.—The restoration of St. Lawrence's Church has been completed, and the edifice reopened. The roofs have been repaired, the whitewash coatings of centuries removed, all the interior stone-work restored, and the plastering redone. The nave roof has been opened and stained, and the panelling of the aisle ceiling restored. The old flat ceiling of St. Jehn's Chapel has given way to a wagon-headed roof, to admit of the organ being placed in that part of the church. The benches, screens, and other joiner's works have been executed in oak, and the aisles are paved with Peak's tiles in simple geometric patterns. One of the south windows has been filled with stained glass by Messrs. O'Connor, of London. The subject is "The Resurrection of the Just." Various other improvements have been effected. The contract for the restoration works was taken by Mr. Henry Lovatt, of Wolverhampton, and carried out under his foreman, Mr. Henry Charlton. The works have cost about 4,000*l.* Mr. Joseph Morris was the architect employed.—The vestry of St. Mary's parish have resolved to repair the roof of the nave of St. Mary's Church, on a report by Messrs. J. B. Clacy & Son, at a cost of 400*l.*, to be raised by voluntary subscriptions.

Aylesbury.—From a statement issued by Archdeacon Bickersteth and the churchwardens of St. Mary's parish church it appears that 1,950*l.* have been expended on the restorations at the present time, and that a sum of 400*l.* requires to be raised for further works, exclusive of the chancel. The cost of restoring the tower and spire was 1,029*l.*, in place of 750*l.*, the timbers having been more seriously decayed than was anticipated.

Moulton.—The parish church at Moulton, in the county of Lincoln, has just been reopened by the Lord Bishop of the diocese, after having undergone considerable repairs and restoration. It is one of those large churches for which the county is famous, and consists of an Early pointed nave, with north and south aisles, 92 ft. by 51 ft., a perpendicular chancel, 48 ft. by 20 ft., and western tower and spire, about 170 ft. in height. A new south porch takes the place of a comparatively modern one of poor design, and a vestry and organ-chamber have been added at the east end of the north aisle. The new seats and doors are of English oak; the walls and windows have been restored, and the roofs repaired and recovered with lead. The cost of the work has been upwards of 3,000*l.*, and to meet this outlay the parish have agreed to borrow 2,000*l.*, the remainder being raised by subscriptions. The whole of the works have been executed by Mr. W. Brown, of Lynn, under the direction of the architect, Mr. William Smith, of John-street, Adelphi.

Withersfield (Suffolk).—The church here has been re-opened after restoration. It was decided to rebuild the chancel at a cost of 500*l.*, and enlarge the church by an additional aisle on the south side, and plans and specifications having been prepared by Messrs. Clark & Holland, of Newmarket, architects, the works were undertaken by Messrs. Mason & Green, of Haverhill, builders, and the whole of the repairs have been carried out. The chancel is entirely new, and built with flint. The windows are fitted with coloured glass. The roof is built of open timber work, stained and varnished. The quoins, windows, and dressings are of Bath stone, and the floor is paved with Maw's encaustic tiles, in black, red, and buff. Additional sittings are also created. The additions to the church consist of a south aisle and porch, agreeing in style with the north aisle, and built with flint, to correspond

with the exterior of the chancel. There is additional accommodation of upwards of 100 free sittings. The piers and arches to the nave are made of Bath stone, and the new aisle windows are filled with cathedral green tinted glass. All the old walls and stonework have been cleared of their old dressings and replastered, and the whole cost of the work is upwards of 1,200*l.*

Cramlington.—The new church of St. Nicholas has been consecrated. The style of architecture adopted by the architects, Messrs. Anstin & Johnson, is a severe type of Early Pointed, the details partaking much of the French character. The church consists of a chancel, 29 ft. by 29 ft.; nave, 63 ft. by 22 ft. 6 in.; north and south aisles, porch, vestry, and organ chamber; and a western tower, 72 ft. high. The church will seat 412 persons. The chancel has a three-light window, placed high up in the east wall, and filled with stained glass (by Wailes) representing the Crucifixion, the Resurrection, and the Ascension. Underneath this, there is a reredos, carved, with a central cross, surrounded by the Evangelistic symbols. The church is built entirely of finished stone internally, no plaster being used on the walls. There are oak stalls and sedilia in the chancel, which is paved with encaustic tiles. On each side of the nave there is a clearstory of sixfolded circles. One of these is filled with stained glass, representing the Prophet Jeremiah. The window is the work of Mr. Cottier, of Glasgow. The roofs are of open timber, and the seats are low and open, and darkly stained. Besides the east window, the two side windows of the chancel and a number of the lancet windows of the aisles have been filled by Mr. Wailes; the two western windows of the aisles by Messrs. Clayton & Bell; and two lancets in the south aisle by Mr. Cottier. The last represent the parable of the Wise and Foolish Virgins. Externally, the church derives dignity from the tower, which rises considerably above the nave roof. This is of low pitch, forming a contrast with the more acutely pointed chancel roof. The general contractors for the work were Messrs. Waterson & Stafford, of Morpeth. Messrs. Walker & Emley, of Newcastle, furnished the iron railing; Mr. Gibson has done the painting, and Mr. Bailoy, of Newcastle, the plumbing. The total cost of the structure has been about 3,000*l.*

DISSENTING CHURCH-BUILDING NEWS.

Manchester.—The foundation-stone of a new Wesleyan chapel has been laid in Sussex-street, Broughton-road. The edifice is built in the Italian style of architecture, the exterior being pressed bricks, with facing of Yorkshire stone. The length is 79 ft., and the breadth 52 ft. 6 in. In the rear of the building are two class-rooms and the minister's vestry. The chapel will be heated with hot water. The pews will be made with inclined backs. The windows will be finished internally with moulded archivolt impost. The front will consist of coupled doorcases, with pilasters and centro column, having carved spandrels and ornamental keys. The entablature will be surmounted by panelled pedestals, supporting the pilasters and columns of the gallery windows, which will have Corinthian capitals. The staircases and side windows are of a plainer description. The angles of the chapel have French rusticated pilasters. The front will be crowned by a pediment, with cornice, containing a ventilator and the inscription stone. The chapel will seat 800 persons, and cost about 5,000*l.* Mr. William Waddington, of Padiham, Burnley, is the architect; and Mr. Mark Foggett, of Cheetam, contractor.

Bloxham.—The new Wesleyan chapel here has been opened. It is a small Gothic edifice, built of brick, with bands of Bath stone running along the walls. The window dressings are also of Bath stone, and the gables are finished with copings of the same material. The chapel is entered by a porch, the floor of which is laid with Staffordshire pavement. The roof is an open one, supported by curved ribs and stained wood-work. At the right-hand side of a separate floor. Under the gallery is the school-room, capable of accommodating 100 scholars. There are three arches, composed of Parian cement, in the interior of the chapel—one over the front of the gallery, and one over each of the two large windows,—the pines of which are of ground glass. The building will accommodate 300 people, and was designed by Mr. Thomas

Garrett, the town surveyor of Banbury, who, with his brother, Mr. William Garrett, of Bloxham, made a gift of the site to the congregation. The entire work in connexion with the chapel has been executed by Messrs. Orchard, of Banbury. The cost, exclusive of the site, will be about 600l.

Stockport.—New Mount Tabor (Methodist) Chapel, Wellington-road South, has been opened. The Classic style has been adopted in the designs. The building is of brick, with stone dressings; the whole front elevation, however, is faced with Darley Dale stone. A Corinthian portico of four columns, approached by a flight of steps, extending the whole width of the building, forms the chief feature of the design. Within the portico are three principal entrances to the chapel. On each side of the portico are two tiers of windows, affording light to the staircase, and enriched with carved and moulded impostes. The length of the building, internally, is 73 ft., and the breadth 50 ft. A vestibule, entered from the portico, extends the whole width of the front, on ground-floor, having at the ends staircases to the gallery. The vestibule communicates with two inner lobbies, and from thence to the aisles on the ground-floor. At the rear of the building, on the ground-floor, two large vestries, minister's vestry, and a staircase for the children, communicating with basement, are arranged. The gallery is the whole length of the chapel, each side, extending over the vestibule in front, and the vestries at the back. The entire height of the chapel, from the ground-floor to the ceiling, is 34 ft. The accommodation is for about 900 persons. Beneath the chapel, on the basement, there is a school-room, 50 ft. by 44 ft., and 14 ft. high. A kitchen, store-rooms, rooms for warming apparatus, &c., are also provided on the basement. Messrs. Longson, builders, of this town, were the contractors for the whole of the works; and Mr. William Hill, of Leeds, was the architect. The lighting and ventilation have been executed by Mr. Harlow, Heaton Norris, under the instructions of Mr. Jacques, the gas-engineer, in this borough. The painting, staining, and varnishing have been done by Mr. Robert Chetham.

STAINED GLASS.

St. Mary's, Ealing.—The series of apse windows begun in 1865 by Mr. Boddington, who designed and presented them, is now completed, and they are just put up in the chancel of this church. They do not all appear from the body of the church, it being necessary to stand in the chancel to see the whole at once. The mosaic principle, in contradistinction to the mode of treatment of glass-painting of the Munich school, has been adhered to by Mr. Boddington. By the absence of all ornamentation he wishes to give all the importance to the subject, and by the pictorial representation of different events in the life of our Lord to address no many lessons to the hearts of the beholders. The subjects are selected so as to lead through a succession of scenes, from the annunciation of the birth of Christ to the Ascension, ending with the death of the first martyr, St. Stephen, and the signal conversion of St. Paul. These windows have been presented to the church by Mr. Boddington, we hear, as a thank offering for the success attending the reconstruction of St. Mary's. The other windows, now in progress by Mr. Boddington, it is hoped will ere long be completed: one of David, over the organ arch, and the other John the Baptist, over the entrance to the baptistery, are already announced. Two new windows have recently been put up in the church—the parable of the Good Samaritan, presented by Mrs. Atkinson, and four subjects from the Old Testament placed in the ambulatory by Miss Belton, by Messrs. Clayton & Bell. All Mr. Boddington's designs are executed by Messrs. Heaton, Butler, & Bayne. The apse windows represent the Annunciation, the Visitation, the Birth, the Presentation, the Flight into Egypt, the Return to Nazareth, the Baptism, the Temptation, the Call of Peter and Andrew, the Well of Samaria, the Entry into Jerusalem, the Last Supper, the Agony in the Garden, the Betrayal by Judas, the Foot of the Cross, the Descent from the Cross, the Three Marys, the Sepulchre, the Angel at the Sepulchre, Christ appearing to Mary Magdalene, Christ joining the Disciples going to Emmaus, Christ appearing to the Holy Women, Christ appearing to St. Thomas, Christ's Charge to Peter, the Ascension, the Apostles'

return to Jerusalem, Matthias chosen to replace Judas, the Holy Ghost descending at Pentecost, the Stoning of St. Stephen, the Conversion of St. Paul; in the traceries above, Angel in Adoration, the Virgin Mary, Christ Bisen, St. John the Evangelist, Angel in Adoration.

All Saints' Church, Chichester.—The east window of this church, which is composed of three lancets, has just been filled with stained glass in memory of the late Alderman Gruggen, of Chichester, banker. The subjects are the Agony in the Garden, the Betrayal, Scourging, Bearing the Cross, Crucifixion, Entombment, Resurrection, Incredulity of St. Thomas, and the Ascension. The arrangement of the window is chiefly medallions on a grisaille background: the subject of the Crucifixion occupies a prominent part of the centre opening. At the top of each lancet is an angel bearing a scroll with a text. The window was designed and executed by Mr. Bagley, of Newcastle-upon-Tyne, at the cost of 100l.

Stretford Church.—A stained-glass window has been placed in this church, in memory of the late rector, the Rev. W. E. Brendon. The subject picture is the Resurrection of our Lord, framed by canopy work and foliated ornament, composed of coloured glass, worked in the manner prevailing in the Early Gothic style. The window and brass are from the establishment of Messrs. R. B. Edmundson & Son, of Manchester.

PATENTS CONNECTED WITH BUILDING.

WATER-CLOSETS AND SINKS.—*J. G. Jennings.* Dated May 14, 1867.—According to this invention the patentee arranges water-closets in such manner that, whilst the excrementitious matters which the basin may receive, together with the small quantity of water which the basin holds, are discharged into a receiver, so as to be applicable for use as a manure, the comparatively large quantities of water which are used to scour the basin are kept out of this receiver and directed away into a sewer or otherwise, as may be desired, but without mixing with and diluting the excrementitious matter, which is consequently discharged almost in an undiluted state into the receiver, whatever be the quantity of water used to cleanse the pan. For this purpose the patentee employs a pan with a valve at the bottom, and when this valve is opened the matters in the pan press into the manure receiver. The same act of opening the valve of the pan also in the usual way opens a valve for the supply of the scouring water, and this water-supply valve is so arranged, as is well understood, as to remain open for a regulated time. The scouring water is, however, prevented from passing into the pan so long as the valve of the pan is closed. The scouring water is admitted and the excess passes away by a side opening from the pan, leaving therein only a small quantity of water, say a depth of half an inch, but more or less as may be desired, and sufficient to prevent the adhesion of soil.

PIPES FOR VENTILATING, HEATING, AND VAPORISING HOTHOUSES, &c.—*W. Taylor.* Dated July 20, 1867.—The patentee claims, first, the application of chambers or passages to pipes for receiving hot water, &c., so that such chamber or passage may receive water or other liquid to be evaporated whilst they at the same time act as conduits for the passage of air for ventilation, and thereby moisten as well as heat the air so supplied for ventilation, whereby hothouses, malshouses, and other buildings or residences, may be ventilated, heated, and vaporized, as described. Secondly, the method of forming the joints of pipes used in heating hothouses, malshouses, and other buildings and residences, as described.

VENTILATORS.—*J. Hooper.* Dated July 20, 1867.—The patentee claims constructing and arranging or combining the parts of a ventilator, substantially as described and illustrated, whereby a series of flaps or doors covering a corresponding number of openings in the body of the ventilator may be simultaneously raised or simultaneously lowered, so as to open or close to the required degree the said openings in the ventilator.

CONSTRUCTION OF THE ROOFS OF HORTICULTURAL AND OTHER BUILDINGS AND STRUCTURES. *W. Simpson & W. Howitt.* Dated July 21, 1867. The patentees claim constructing the principals of the roofs of horticultural and other buildings and structures hollow instead of solid, and of tubes, or pipes and sockets, either separately or

in combination, with longitudinal pipes, rods, &c., as described.

MOULDING CLAY FOR MAKING BRICKS, TILE &c.—*C. H. Murray.* Dated July 25, 1867.—The invention consists in constructing the dies or apertures in brickmaking machines through which the plastic material is delivered with movable hollow boxes or vessels provided with perforated sides, and supplied with any suitable lubricant, which, by extending through the perforations in the boxes, will lubricate the desired parts.

Miscellaneous.

HARVESTING OF CORN IN WET WEATHER.—The Council of the Society of Arts having offered the gold medal of the Society and a prize of fifty guineas, for the best essay on the harvesting of corn in wet seasons, received twenty essays, and the gentlemen acting as judges have unanimously recommended the Council to award the prize to Mr. W. A. Gibbs, of Gillwell-park, Essex. This award has accordingly been made.

NEW WORKHOUSE FOR CLERKENWELL UNION.—The local Guardians have resolved that a workhouse, capable of holding at least 500 persons, be constructed on the Guardians' Freehold estate at Highgate, and that a committee of seven guardians be appointed to visit the modern built workhouses of the metropolis with a view to the adoption of the most recent improvements in the construction of the Clerkenwell workhouse.

ITALIAN OPERA, COVENT GARDEN.—*Mlle. Pauline Lucca* and *Mdlle. Patti* continue to reign here by turns, and with undeviating success, *Signor Mario* assisting each in turn. In "Les Huguenots," which will be presented again on Monday evening next, *Mlle. Lucca* particularly distinguished herself last week; and the opera, as a whole, was given with remarkable vigor and perfectness. We know of no other work of the lyric stage that so completely fills the mind of the spectator and listener.

WAGES AND LABOUR.—The executive committee of the Social Science Association have resolved to invite the association to appoint a general committee for the purpose of spreading information as to the natural laws regulating the rate of wages and the supply and demand for labour. Mr. Overend, Q.C., has stated to the executive committee that, in his opinion, "almost all the crimes in trade matters originate in ignorance." It is this ignorance, wherever existing, which the committee are desirous to remove. The main object in forming the proposed general committee is to present to employers, to the working classes, and to the country generally, a list of names calculated to inspire confidence in the disinterestedness of the promoters of the object in view, and in their ability to carry on the work wisely and efficiently; but the general committee will not be called upon for more than superintendence, since, for active exertion, it is intended to have an executive committee. Upwards of forty gentlemen have already expressed their willingness to serve on the general committee.

APPOINTMENT OF ADDITIONAL PATENT LAW COMMISSIONERS.—A meeting of the Delegates' Invention Right Committee, consisting of delegates from the Inventors' Institute; the Working Men's Technical Education Committee; the Workmen's International Exhibition Committee; the Foremen Engineers' Association; the Metropolitan Working Men's Clubs' and Institutes' Union; and the Public Museums' and Free Libraries' Association, representing in the aggregate upwards of 200,000 persons, has been held at the Offices of the *Scientific Review*, Cockspur-street, to consider the determination recently arrived at by the Commissioners of Patents to appoint three additional commissioners. Much dissatisfaction was expressed at the constitution of the existing commission, to the inefficient action of which body the chief evils of the present objectionable Patent Law system were ascribed. The course adopted by the existing commissioners, in now seeking to appoint three additional commissioners, was strongly condemned by the speakers, as being objectionable and inopportune, especially when it was considered that the whole Patent Law question must shortly be dealt with by Parliament. A resolution to that effect was unanimously passed, and a copy of it was ordered to be forwarded to the commission.

SOCIETY OF ARTS.—On Wednesday evening a *conversazione* was given by this Society at the South Kensington Museum, and Mr. Hawes, the president for the year, and Lord Henry Lennox received a large and fashionable company, amongst whom were many persons eminent in politics, art, and science.

PROVIDENT INSTITUTION OF BUILDERS' FOREMEN AND CLERKS OF WORKS.—The anniversary dinner on behalf of the funds of this Institution, will take place at the Freemasons' Tavern, on Wednesday, June 10th next, when Professor G. G. Scott, will take the chair, and a goodly muster of friends is hoped for.

PARK-LANE.—The committee appointed to consider and report on the crowded condition of Park-lane have agreed to a special report, to the effect that in their opinion the inconvenience at present experienced from the overcrowded state of the traffic would be best obviated by opening up Hamilton-place as a thoroughfare for public traffic, with a width of not less than 60 ft. roadway, to be obtained by removing the houses and other buildings on the eastern side.

A MILL-STONE DRESSING MACHINE.—A trial of a new patent mill-stone-dressing machine has been made at Stowmarket. Mr. Jacobsen, a wealthy merchant, introduced the invention into this country. While at the last Paris Exhibition, he entered into a negotiation with the patentee, which ended in Mr. Jacobsen and two Edinburgh gentlemen obtaining the use of the patent in Great Britain and Ireland. The invention is simple. It consists of a "black diamond," similar to a glazier's diamond, fixed in a spindle, with a small wheel, about 1 in. in diameter, connected with a frame. The millstone to be operated on is laid on its side, and by means of a small belt or cord, adjusted to a shaft of the mill machinery, a rapid revolving motion is given to the diamond-set spindle, which, with its frame, is placed on the stone. A man attends the sharpening machine, and by the hand directs the longitudinal and lateral movements of the diamond in its operations. The fine lines it cuts, it is said, far more expeditiously and better secured than could be accomplished by the ordinary sharpening by picks, and after a few passes sharpening, the stone is brought to a perfectly level face, which is maintained without any trouble, as long as this machine is used. The manual labour connected with the sharpening of the stones is reduced from 8 hours to 2 hours per stone, and the saving effected, or profit secured, is stated at upwards of 3*l.* 10*s.* per week, in every pair of stones, or 182*l.* per annum.

THE NEW RACECOURSE, MANCHESTER.—The case of the old course at Castle Irwell, which has so long been used as the Manchester racecourse, having expired, its renewal was refused, and a new course was obtained on the left, coming from Manchester, of Regent-road, Salter's-lane, and Howard-street, Eccles New-road, and they admit the visitor to a spot at the rear of the grand stand. The extent of the ground above 100 acres, being 40 acres more than the course previously occupied by the Manchester race committee. The architects of the Grand Stand are Messrs. Bird & Son, of Manchester. The buildings are in the form of a quadrangle, and close an area of about an acre, the entrances being from the rear. The principal entrance is a double porch, from which stairs both on the right and left lead to the spectators' gallery, and there are corridors leading to the paddock, dining and refreshment rooms and the offices for stewards and other functionaries, rooms for jockeys for dressing and weighing, also adjoining corridors. The gallery of the stand will conveniently accommodate from 2,500 to 2,700 persons, all of whom will be under cover, the whole building being roofed; and there are arrangements for enclosing the front with galleries when the stand is not in use. There will be a stone gallery rising directly from the paddock, which will accommodate 400 spectators. Provision is also made for a second-class stand, which it is calculated will accommodate 4,500 spectators. Beneath the stands are booths, to let to publicans and vendors of refreshments. There is stabling convenience for eighty horses, horse boxes and two-stalled stables. The cost of the whole of the works, including the grand stand, is estimated at 40,000*l.* The ground has been laid out by Mr. Downing, C.E., Manchester; and the work carried out by Mr. Edward Rothwell, of Warrington.

METROPOLIS STREWAYS BILL.—This Bill has passed through committee in the House of Lords.

FEVER IN PRUSSIA.—In East Prussia typhus has been so destructive that no fewer than twenty physicians have died in attending on patients. The number of other victims is very variously given, and, it seems, will never be correctly ascertained.

MONUMENTAL.—A Poughkeepsie paper, called the *Eagle*, wants the Hudson river lined with colossal statues. It proposes a statue of Hudson at the entrance of the highlands, one of Liberty at Grape Island, one of Washington at West Point, and one of Fulton at Pollipel's Island!

TRIBUTE TO A FOREMAN.—On Saturday last a meeting of the workmen in the employ of Mr. J. H. Parsons, numbering upwards of 150, was held in Castle-street, Leicester-square, to present to W. Wilkins, their late foreman, on his leaving, a testimonial, accompanied with a purse of twenty guineas, as a mark of their esteem for his impartial conduct towards them during a service of nine years.

THE IMPROVEMENTS IN GUILDHALL.—Mr. Kelday, the chairman of the Guildhall Improvements Committee, mentioned at a recent Court of Common Council that the window in the Guildhall, to be presented by the Lancashire committee, would be completed by June 13th, and that arrangements had been made with the Earl of Derby to come and present the window in a formal way to the corporation.

GAS.—The Uckfield Gas Company have declared a dividend of 10 per cent., with a balance of 11*l.* to their reserve fund.—The Lewes Gas Company have agreed to borrow 2,000*l.* for a new gas-holder. A sum of 2,000*l.* has already been expended in the extension of their works. The company divide 10 per cent. dividend, and Mr. R. Crosskey at their meeting said they looked forward to the time when they could reduce the price of gas and yet pay a good dividend.

THE NEW BUILDINGS AT THE CLERKENWELL HOUSE OF DETENTION.—At the Middlesex County Sessions it has been agreed that the sum of 20,000*l.* be granted by the Court, to be raised in the usual manner, towards the cost of erecting the new buildings at the House of Correction at Coldbath-fields, according to the plans sanctioned by the Court at the November Session, 1865, in addition to the sum of 65,000*l.* already granted by the Court for that purpose.

A SILVER COFFIN—GEORGE I.—The *Universal Magazine*, about the best, except the *Gentleman's*, of the last century, in a visit to Hanover, with its " Windsor " Herenbansen, had the following passage:—"The body of George I., who died here, is interred in a silver" (doubtless meaning "onion") coffin, of admirable workmanship. What may be known now of this coffin? In the same it is stated that the number of houses then in Hanover was 1,200; but I am informed by a recent visiting friend, that the population now is above 20,000.—D.

LONDON OMNIBUSES: THREATENED WITH DRAWAL OF THE LARGER ONES.—The public complaints against the chief omnibus company of the metropolis for their bad omnibuses are notorious. With few exceptions the accommodation is so stunted as to be really indecent; and the vehicles are either close and stuffy on the one hand, or on the other are ventilated from wide and gaping apertures behind the horses and drivers, sweeping the foul air from without through the omnibuses like wind through a funnel along the heads of the passengers, and causing neuralgic attacks, more especially amongst elderly people, from which they may suffer for weeks from a single exposure to such stupid and ignorant arrangements. There are a few exceptions; some of the omnibuses being large and roomy, as well as more sensibly arranged as to ventilation. The company now threaten to withdraw these few larger buses on pretence that the public avoid them, a very unlikely thing, unless there be some special reason, such as a preference for other companies who have not given cause of offence to the public. The fact of three horses being required for these omnibuses, while the stuffy little herring boxes of the old sort require only two, though carrying not far short of the same number of passengers, seems to be a much more probable explanation of the threatened withdrawal of the only few decent vehicles than the actual avoidance of these latter by the London public.

ROYAL ACADEMY.—At a meeting of Academicians, held on Tuesday evening last, Mr. Henry Weekes, R.A., was elected Professor of Sculpture. At the same time Professor Partridge was re-elected to the Chair of Anatomy.

ARTISANS' AND LABOURERS' DWELLINGS BILL.—The following peers were named as the select committee on this Bill:—The Earl of Malmesbury, the Duke of Somerset, the Duke of Beaufort, the Earl of Derby, the Earl of Shaftesbury, the Earl of Carnarvon, the Earl Cardigan, the Earl of Kimberley, the Bishop of London, the Duke of Argyll, Lord Foley, Lord Portman, Lord Chelmsford, Lord Westbury, Lord Abingdon, and Lord Penrhyn.

STEAM ROLLERS.—The steam roller made by Messrs. Moreland & Son, for use in Hyde Park, has been at work consolidating the new roadway along Park-lane. A top dressing of gravel and sand, or hogging, to bind the broken granite, having been laid, the steam roller went ahead, and did more and better work in half an hour than the two four-horse rollers had done during a whole week. The machine weighs 27 tons, is easily guided, and makes little noise when at work.

BRITISH ARCHAEOLOGICAL ASSOCIATION.—At the meeting of the British Archaeological Association on Wednesday evening, the 27th ult., some drawings by Mr. Wadding from the screens of Suffolk churches, were exhibited. Mr. Greenshield sent a very fine ball of Pope Nicholas V., found near Glasgow Cathedral. The Rev. J. G. Cumming produced a cast taken from the head of the Bethnal-green bundle's staff and bearing a representation of the Blind Beggar. Mr. Bailey showed a very interesting head of a pastoral staff, found lately in Smithfield; this is most probably of the twelfth century. Mr. Gordon Hills produced the money-box and account-book of the Company of Stationers of Ludlow. The book commenced in 1669, and from the entries and references to a former book, and other matters, it seemed that the Company, which was in fact a trades union, had been incorporated under an Act of the 19th Henry VII., and it was probable the box was as old as this period. Mr. E. Roberts produced a deed of surrender of the time of Charles I., which the jurors of the court had signed by marks similar to masons' marks. Mr. S. Holt exhibited some ear-rings and other matters, taken by himself from a Roman coffin found at Arles. The inscription on the coffin showed that it contained the body of a certain Faustina, who had died on her twentieth birthday, it being also the day of her marriage. One pair of gold ear-rings were of an Etruscan type. Mr. Irving read a paper on the death of the Red Comyn, which led to discussion.

TECHNICAL EDUCATION FOR ENGINEERS.—A paper upon Engineering Education was read by Mr. G. Lauder at a recent meeting of the Liverpool Polytechnic Society. He limited engineering education to that knowledge necessary for a young man to acquire that he may become a skilled engineer, and pointed out the importance of a proper elementary education being enforced before a technical education is commenced, deprecating the introduction of the latter into common schools as a course which would strike at the root of all true education, as it might raise a wonderful superstructure, while it would cause a life-long regret for the want of a proper foundation. Having referred to the importance of the present movement for promoting technical education in this country, and premised that a general education and a workshop education must be the first steps in that direction, the author of the paper proceeded to enumerate the scientific subjects to which a young man destined to become an engineer should direct his attention. A thorough grounding in mathematics was indispensable. He regarded pure mechanism as a connecting link between the geometry of the schoolboy and the mechanics of the man. He considered the manner in which the mechanical sciences are taught in most of our colleges, and then useless in the education of the engineer; and says that until Rankine's " Applied Mechanics " was published, in 1858, there was not a book that could be said to be adapted to the requirements of engineers. In conclusion, he referred to the establishment of the Chair of Engineering in Owen's College, Manchester, and to the munificence of Joseph Whitworth in donating 100,000*l.* to the provision of thirty scholarships.

THE ROYAL HORTICULTURAL SOCIETY.—The great annual flower-show was opened on Tuesday at the Society's grounds, in South Kensington. The display of flowers was remarkably fine.

THE RAILWAY VIADUCT AT RUNCORN.—The girder bridge constructed by the London and North-Western Railway Company across the Mersey, at Runcorn, in order to shorten the route from London to Liverpool, is now near completion. The bridge is built on four buttresses, 167 ft. in height from their foundation, and has three central spans of 305 ft. each. At high-water the space from the water level to the bridge is 75 ft., and at low water 95 ft. Some minor works on the new junction line still remain to be finished.

THE THAMES EMBANKMENT.—In reference to the report that it was not intended to have chains or other means provided for the rescue of persons who might be in danger of drowning along the embankment wall, Mr. Raphael Brandon urges that, if chains were suspended from one ring to the next all along the wall, with a fall that would leave them in reach of a person in, say, three or four feet depth of water, they would at all times of the tide prove a valuable source of safety, and one which it is earnestly to be hoped the Board of Works will supply.

ROSHERVILLE PIER ON FIRE.—Some commotion has been created in Gravesend in consequence of Rosherville Pier suddenly braving into flames. A lighted fusee is supposed to have been thrown down on the pier, and falling through a crevice in the timbers, set them on fire. The timbers, which were exceedingly dry, and coated with pitch and tar, blazed furiously. Seen from Tilbury half the pier seemed in flames. The pier sustained much damage before the fire was extinguished. Strange to say it is the fourth time this pier has been on fire, the previous fires also all occurring at Whitsuntide.

TUBE CONSTRUCTION.—In reply to some inquiries we are enabled by Messrs. Parr & Strong to say that, in addition to the experiments made in the great hall of the Strand Hotel Company, of which we gave a view, a house, composed of granite-faced tubes, is now being erected under their direction at Bickley (near the station), and the clerk of works has instructions to give access and to supply all information upon the production of private card. The external walls of the ground-floor are composed in this case of tubes, 12 in. long, whilst those of the first-floor are constructed with 9-in. tubes. As a specimen of wharf-walling, we may mention one at Millwall, opposite the Commercial Dock Steam-boat Pier. Here the tubes are also granite-faced.

HANDEL FESTIVAL AT THE CRYSTAL PALACE.—The preparations for this great celebration may now be said to be complete in all respects. The chorus will number in all little short of 3,500. The entire orchestra will consist of 4,000 performers. The preparations for rendering the Great Transept of the Crystal Palace acoustically perfect have been in active progress for many months. The appliances by which this will be accomplished are ready to be fixed in their respective places immediately, and in this respect it may be fairly asserted that a surprise is in store. The Great Transept, the width of which is double the diameter of the dome of St. Paul's, will be converted into one vast concert-hall, enclosed on every side, its enormous arched roof being screened from the sun by several cloth coverings. This great experiment was first suggested in the *Builder* some years ago.

VELOCEPÈDES.—The Londoners have not yet adopted our suggestion to make use of self-acting vehicles, but the velocipede, according to the *Pall Mall Gazette*, is becoming a formidable rival to the horse in Paris. One velocipedist (it has been found necessary to invent the word) rolled down the Champs Elysées the other day in an "Américaine," drawn by two velocipedes, on which were mounted two postillions, or jockies. M. de Visin, a distinguished equestrian who rode over the steeple chase course of the Bois de Boulogne a fortnight ago without touching his horse's bridle, has made a match with Prince Achille Murat, in which M. de Visin on a velocipede backs himself against the Prince on horseback. M. de Visin, a few weeks ago, undertook to travel on a velocipede from Angers to Paris, and actually went as far as Tours, a distance of about fifty-four miles, when the machine broke.

THE ENCLOSURE OF TOOTING COMMON.—A meeting has been held at Tooting, "to assert and protect the rights of the commoners and parishioners over the common, and to ascertain if the recent inclosure by the lord of the manor can be justified." The rector of the parish, the Rev. Mr. Congreve, presided, and there was a very large attendance. Resolutions were passed in accordance with the objects of the meeting, and a committee was appointed to carry them out.

ROMAN REMAINS AT PAPA CASTLE.—During the last six months Papcastle has been the scene of a considerable amount of excavations, done for the sewerage and waterworks, in the course of which very numerous relics of the Roman period have turned up, many of the smaller and more interesting of which were purchased and preserved by Mr. Henry T. Wake, of Cockermouth. Among these were a quantity of leather, chiefly parts of shoes, one of which was a sole covered with very large-headed nails; fragments of glass; a steel awl; a steel punch, &c. A great quantity of oak timber was met with, in beams and boards.

FIREPROOF CONSTRUCTION AT COMPTON HOUSE, LIVERPOOL.—This large building is divided into five fireproof compartments. The brick walls forming each division are pierced with windows, for the purpose of lighting the bedrooms, and those windows are provided with Clark's steel shutters; so that if a fire were to break out in any one division the adjoining divisions would be safe, in consequence of the protection of the shutters. The ceilings of the shop are also fireproof, so that the domestic part of the premises, which is above, together with the shop which is below, are considered safe from fires which may happen in either place. The beams that sustain the flooring are of iron, and also the joists, which are placed 2 ft. apart, and filled in with concrete to the depth of the joists, 9 in., on Fox & Barrett's principle. In the event of a fire occurring in the shop security is given for the safe exit of every resident to the staircases, of which there are three, all of stone. In each staircase there is a hydrant, and upon each floor a hose, the length of each of which would be about 200 ft. There is now forming a fire brigade of 200 young men employed on the premises.

FALL OF HOUSES.—At Manchester some time ago a fire occurred on premises adjoining the Millstone Inn, Thomas-street, which caused their being pulled down. While excavating for a foundation, in order to erect a new building, one of the end walls of the inn was so much undermined as to cause it to become unsafe, though evidently unknown to the occupier; and while some fifty or sixty people were in the concert-room, a waiter gave warning that the wall was giving way, and, on examination, it was found that a portion of the cellar wall had fallen. Mr. Lyne, the city surveyor, was sent for, and pronounced the building unsafe for occupation—a fortunate circumstance, as the whole gale fell at twenty minutes after midnight, destroying a considerable quantity of the furniture and stock-in-trade. No personal injury whatever occurred.

—A somewhat singular disaster has occurred at Whitehaven. A short while ago the trustees purchased and removed some dwellings in West Strand, in order to erect apparatus for the sewerage works on the site; and in making the change they seem to have disturbed the foundations of three dwellings, which have since fallen down the embankment. In falling they struck other three houses, which were reduced to a wreck almost as complete as that to which the tumble-down dwellings were in an instant levelled. The wonder is that none of the tenants were killed, because the occurrence was sudden, if not altogether unlooked for. The furniture of the poor people, however, has been destroyed. Men were set to work to prop up other houses that are also endangered.

TENDERS.

For rebuilding foundry, Nos. 195 and 196, Brick-lane, for Messrs. Noakes & Son. Messrs. Tolley & Dale, architects:—

Peters	£200 0 0
Kiddle	300 0 0
Pritchard	855 0 0
Langmead	795 0 0
Marr	680 0 0

For the erection and completion of a row of four cottages, Walthamstow, Essex, for Mrs. Newman. Mr. George F. Payne, architect:—

Vickers & Harding (accepted)	£200 0 0
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For alterations to The Fitzroy, Charlotte-street, Fitzroy-square, for Mr. Chamen. Mr. A. E. Gough, architect:—

Keble	£500 0 0
Perkins	498 0 0

For erecting four dwelling-houses and shops in the Wanstead-road, Essex. Mr. F. G. Widdows, architect:—

Daye	£4,241 0 0
Painar	4,545 0 0
Ennor	4,363 0 0
Tully	4,945 0 0
Murray & Hatchinson	4,150 0 0
Chesson	4,980 0 0
Ward	3,806 0 0
Perry (accepted)	3,671 0 0

Alterations to the Marlborough Arms, Chelsea, for Mr. Wykes. Mr. R. W. Hart, architect:—

Day	£777 0 0
Lawrence & Bough	670 0 0
Turner & Son	670 0 0
Whittaker	670 0 0
Langford & Way	683 0 0
Kelley	613 0 0

For the new Infirmary, Hastings Union. Quantities supplied. Mr. Thomas Elworthy, architect:—

Parks	£2,694 0 0
Geary	2,632 0 0
Bourne	2,537 0 0
Hughes	4,838 0 0
Jones	2,476 0 0
Korda	2,438 0 0
Howell	2,385 0 0
Wignall	2,380 0 0
Yilder, jun. (accepted)	2,349 0 0

For roads and sewers on an estate at Penze, for London and Suburban Land Company. Messrs. Hammar & Lambert, architects:—

Reddin	£3,540 0 0
Valwright	7,300 0 0
Bentley	7,234 0 0
Ostington	7,110 0 0
Crookett	7,100 0 0
Nicholson	7,080 0 0
Mayo	7,051 0 0
Bish	7,050 0 0
Pizzey	7,035 0 0
Lawrence	6,450 0 0
Foyard	6,450 0 0
Clark	6,389 0 0
Bloomfield	6,243 0 0
Habbarth (accepted)	5,930 0 0

For repairs, papering, &c., to 31, Finsbury-square, London, for Royal Maternity Charity. Messrs. Goult & Gibbins, architects:—

Wood	£298 0 0
Nightingale	288 0 0
Barton & Moreland	288 0 0
Greaves	235 0 0

Revised Tenders from two last Builders.

Burton & Moreland	£272 0 0
Geddes	270 0 0

For four detached dwelling-houses at Malden, Surrey, Mr. Charles Blake. Mr. Henry Peak, architect. Quantities by Messrs. Rake & Ranwell:—

With 28 oz. Breech.		
Hill, Claxton, & Hobbs	£9,234 10 4	With Plin.
Loe	8,020 0 0	£8,210 0 0
Parker	7,991 5 6	8,137 5 6
Ray	7,998 0 0	8,062 0 0
Jones	7,750 0 0	7,750 0 0
Hall, Bull, & Co.	6,926 0 0	7,211 14 6
Todd & Saunders	7,000 0 0	7,000 0 0
Newman & Mann	6,850 0 0	7,030 0 0
Nightingale	6,700 0 0	6,850 0 0
Weir	6,593 9 2	6,591 9 9
Heggs	6,214 0 0	6,214 0 0
Golling	6,225 0 0	6,683 12 6
Jarret (accepted)	6,330 0 0	6,445 0 0

For house, Coldharbour-road, Dorking, for Mr. J. Abel. Mr. T. J. Dibble, architect:—

Lynn & Dudley	£269 0 0
Hamblin	635 0 0
Ingham	3,023 14 7
Taylor	479 0 0
Putney	460 0 0

For houses at Westcott, for Mr. Thos. Paine. Mr. J. Dibble, architect:—

Putney	£3,050 0 0
Hedges	2,927 0 0
Lynn & Dudley	2,800 0 0

For erecting fire-station at Fulham, for the Metropolitan Board of Works:—

Wittick (accepted)	£280 0 0
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For painters' work at the East London Union Workhouse, Homerton, Middlesex. Messrs. Jarvis & Sons, architects:—

King & Son	£204 0 0
Mason	253 0 0
Gordon	253 0 0
Pickering & Son	240 0 0
Keeps & Son	173 10 0

For alterations to Stone Hall, Otford, Surrey, for G. Barker. Messrs. Tolley & Dale, architects:—

Kesterton & Head	£375 0 0
Wright	350 0 0
Coleman	275 0 0
Galley & Moon	260 0 0
Wallis	25 15 0

For rebuilding two houses with shops at Port West Ham, for Mr. T. Hearn. Messrs. Tolley & Dale, architects:—

Hedges	£260 0 0
Ennor	664 0 0
Rivett	623 0 0
Smith	627 0 0
Cook	563 0 0
Hunt & Elkington	489 0 0

great value, and so will be the series of photographs. Unceasingly you find the mind to bear in this direction. The idea of art has insensibly disappeared; you have subsided into the task of reading a mere catalogue of names, with most, though not with all, of which you have some previous acquaintance, when, on a sudden, you meet something strange. You start as if you had a slap in the face. What is it? You find you are looking at a PICTURE. Dreary square yards of more or less accurate sign-board painting are suddenly succeeded by the works of real artists.

You look to the Catalogue for explanation. You see the words "Haus Holbein," "Vandyck," "Supplementary Collection." A greater surprise, or a more marked contrast, it was not in the power of human managers to present.

We have represented simple fact,—have put the case actually as it occurred. It is possible that part of the inferiority of the portraits from artists later than Gainsborough arises from ohemical reasons. In the works of Reynolds this is unquestionably the case. Yet few artists have given more time, or devoted more expense, to the chemical portion of their art than did Sir Joshua. His pictures, as a rule, have so much grace and truth that their sadly faded state is the more to be lamented. His blues were once as bright as those of Cornelius Jansen, yet after the lapse of two hundred and thirty years the dress of Bridget Cromwell and the scarf of her sister Mary are as fresh as the colours of Perugino himself, while the tints of the President are the mere ghosts of departed colours. In the work of Sir Thomas Lawrence the injury caused by time is less discernible; but the paintings, in spite of the grandeur of air in some—(see especially his own unfinished head),—are cold and poor when compared to those of the supplementary collection.

In comparing and criticising the works of modern artists, there may be room occasionally for difference of opinion among impartial and educated judges of painting. There is certain to be the eager contradiction of party fight. Do we see any particularly obnoxious aberration from the right path, such as the incredible "Symphony in white" of last year, we are sure to find some equally aberrant critic to hold it up as an example, not to avoid, but to follow. A certain allowance must be made for the imperfection of human nature, and, allowances or not, the disputes are sure to wax so high that the artist will, in nine cases out of ten, fail to derive the benefit which he would obtain from true and enlightened criticism.

The present instance, then, is as happy as it is unusual. If the artist, who does not shrink to paint a lady who does not object to be painted embracing a dog, may rely on the sweet voices of his friends when you ask why he does not use the brush of the painter of the Eve of St. Agnes, and reply that he prefers his own, he cannot make the same answer when you point to the real, enduring work of Holbein or of Vandyck. The instances are rare in which a modern style, which it would be altogether unwise to call mediocrity, is exhibited in such close proximity to works of undeniably excellent execution. If the contrast presented on the walls of South Kensington do not teach our portrait-painters to reconsider their ways, nothing will. The case is hopeless. They will implicitly reply,—“We do not care for fame, we paint for money.”

Tonching the catalogue, of course there are differences of opinion. The little scraps of information appear to be rather inserted with a view of identifying than of explaining the portraits. Thus in No. 1 (the Prince of Wales, afterwards George IV.), we find the note “scarlet uniform;” in No. 332 (the Prince Consort), “dark uniform.” This is not information. Any one who looks at the pictures is struck, in the very first instance, by the colour of the uniform. That which we want to know, and that which it would greatly enhance not only the interest but the historic value of the catalogue to have included, is, *what* uniform is represented in each instance.

We have named these two pictures as instances of the highest merit of the Exhibition. The interest is at once moral, historical, and artistic. No greater contrast has been presented by any person in modern history than by these successive occupants, not of the Crown, but of the Castle of Windsor. They are two very beautiful paintings. The horse in the first may too much distract the attention from the Prince; but the latter is a noble and a charming figure, and the face presents such indications both of delicate and refined taste, and of intelligence, as to teach

a memorable lesson of the ill effects of unchecked power, unbalanced station, and unmeasured flattery. In the second, Winterhalter's portrait of Albert Francis Augustus Charles Emmanuel, Prince Consort of England, we have one of the best paintings of the more recent part of the Exhibition. If it is compared with the two other pictures by the same artist, it will be seen to be immeasurably superior, not only as a happy inspiration, but as a painting. The tender grace, the modest yet manly pose, the pictorial beauty of both feature and expression, both face and form, represent the happy development of that most charming infant head an engraving of which is prefixed to her Majesty's memorials of the Prince Consort.

Again, we are disposed to think, if the principle of grouping had been that of the character of the subjects, we should have had much to interest and to instruct the mind brought before the ordinary visitor, for which we now have to search the catalogue, and to visit and re-visit the Gallery. Take the painters, for instance. If a bay had been devoted to them how many persons would have lingered there. It would have been well to compare the fine portrait of West, whom we can hardly regard otherwise than as a champion of decadence in art, by Lawrence (No. 17), with that by himself (No. 945), and again with the noble unfinished head, or rather head of the unfinished autograph picture, of Sir Thomas himself. Again, the contrast between the marked and somewhat picturesque features of Joseph Mallord William Turner, R.A., by himself (No. 912), and the dreary smudge of the same by the same (No. 94), requires explanation. The dates of the two ought to be, at least approximately, given.

Another group of great interest would have been composed of architects and engineers. We have some of them in proximity,—a very fair likeness of Brunel, hanging under a not good representation of Robert Stephenson, and near a very rampant idealisation of rough old George. We have Sir Charles Barry looking as if with prophetic uneasiness across another hay at a plain but powerful portrait of A. W. Pugin, in a bedizen frame,—an encasing of the artist in heraldic emblems which his own taste would have repudiated for his own picture-frame. Cookerell, and Wyatt, and other artists in stone and in brick, would have formed a most interesting group.

Another group might have been thrown together of those fair, fatally fair, faces, the history of whose owners forms no inconsiderable part of political biography, if not even of political history. Here, indeed, the exquisite charm of Lely's "Nell Gwynne" throws other royal favourites into shade; but there is a small group of very memorable beauties. The two famous Miss Gunnings must not be included in the group to which we refer. For the *furor* which they caused, their portraits do not enable us to account. Their chief charm must have been that of vivacity of manner; for we would undertake to produce a pair of milkmaids who should fully rival, both in features and in complexion, the very pleasant pictures of these celebrated beauties now at Kensington. An expedition to Langham, near Milford, the birthplace of "Mistress Gwynn," would be likely to enrich the portfolio of the artist. Whether it be the air, or the wit, or the water which is so favourable to female beauty, may be matter of doubt, but this little nook of "England beyond Wales," certainly produces forms and faces that show that, if portraiture is in its decadence among us, it is not for want of lovely women to paint.

Among the famous "difficulties" of the Georgian era we have Dorothy Bland, Mrs. Jordan, as a brilliant Irish girl, and again in maturer life; Mary Darby, afterwards Mrs. Robinson, the "Perdita" to whom the Prince of Wales played "Florizel," by Gainsborough, by Reynolds twice, and by Romney; Emma Hart, Lady Hamilton, the evil genius of Nelson, twice by Romney, once ironically placed in the posture of Guido's Magdalen. Even by the poor work of the painter the idea of a very beautiful woman is only partially obscured. Queen of this aphroditocracy ranks Maria Anna Smythe, wife of Edward Weld, of Lutworth Castle; then of Thomas Fitzherbert, of Swinerton; then, in 1785, of George Prince of Wales, who risked his revolutionary crown by his private marriage, afterwards denied, with a Roman Catholic. The present portrait is by Gainsborough, that of a woman of queenly beauty.

The portraits of men of fame and note will be

selected by each visitor rather from personal than from artistic reasons. There are finer portraits of Wellington and of Nelson than those now exhibited. The rueful and dreary aspect of the reverend father of the latter bore suggests the idea that the boy must have been truly happy to find himself at sea at twelve years old. The face of Erskine is one of those that most command attention, and it is curious to trace how much younger Gainsborough's powdered portrait looks than the later dark-haired likeness by Lawrence. Lord Eldon, at forty-seven, by Sir Thomas Lawrence, is a very fine face, and his portrait, in his robes as chancellor, has a most imposing air of superhuman wisdom. Spencer Perceval's posthumous portrait is remarkable. There is much intelligence in the face,—no bad feeling, and yet it is repulsive. It reminds one of a glorified frog. In his "Sir John Moore," Sir Thomas Lawrence makes perhaps his nearest approach to the style of Gainsborough. Porson's deep brow resembles that of Brnel.

The most valuable picture in the Exhibition (to which we referred in our first article*) is also the oldest. It is called in the catalogue a contemporary representation of King Richard II., a note which dates it before the close of the fourteenth century. It has been cleaned with complete success by Mr. Richmond, among whose numerous crayon drawings will be found some of the best of the modern portraits. The face has an air of dignified repose, and the hands, though very ill drawn, are evidently portraits, as faithfully given as the painter's power would allow. Those who are aware of the remarkable indication which is given of the feeble or the over-streained state of the brain, the approach towards idiocy on the one hand, or mania on the other, by the articulation of the joints, will look with great interest at an illustration of this physiological remark in a painting more than 450 years old.

In ending these remarks we have only to repeat the expression of satisfaction that such a collection of portraits has been brought together. For the purposes of the historian and of the physiognomist, this opportunity of securing the represented features of so many historical characters is a boon of great value. We wonder if M. Froude would have written his estimate of King Henry VIII. if he had been familiar with the numerous portraits of the monarch, especially if he had seen them in a group. And if a deeper and more wholesome lesson to living painters than the collectors of the Gallery thought to impart has been extracted from the result of their labours, we trust that this also may not be without golden fruit.

DOINGS IN GERMANY.

At Vienna, the new opera-house, begun under the superintendence of the architect Vau der Null, is now rapidly progressing towards completion. Professor von Siccardsburg has been nominated architect to the building in the room of the former gentleman, whose untimely death was a loss felt by all lovers of art in the Austrian capital.

At Pesth, the committee appointed to report upon the safety of the central dome on the cathedral came to the conclusion that the work was perfectly safe, and that the substructure was well qualified to carry its intended weight of about 2,000 tons. Scarcely a fortnight after, the whole dome came down "with a run," and work which cost more than 25,000, is now a worthless heap of rubbish.

At Frankfurt, three leading architects of Germany, Messrs. Douzinger, of Ulm; Schmidt, of Vienna; and Voigtel, of Cologne; having been called upon to report as to the best means of restoring the cathedral, partially destroyed by fire on the 15th of August last, are unanimously of opinion that all the work up to the crown of the upper windows of the tower is safe, that all above that should be taken down and rebuilt, and that the tower should be *finished*, neither with dome (as before) nor spire, but according to the original design, with a crown representing that of Imperial Germany. They further advise that the damaged roofs should be reconstructed of iron covered with slate, that the site round the cathedral should be cleared of the houses now built against it, and that the cloisters shown on the original plan should be executed.

Cologne.—The old gilt on the tower, so well

* See p. 273, ante.

known to all travellers, and the feature of all views of the cathedral—*vide* even any Eau-de-Cologne bottle—has now disappeared. It was erected shortly before 1524, in which year the works were discontinued owing to the Protestant tendency of the then Archbishop Hermann V. Connt of Wied. From that time to this it was only used once, namely, on the 4th September, 1842, the date on which the works were again resumed. On that occasion the ancient gib was used to raise a mighty block of stone, to symbolise the energetic vigour with which it was now intended to finish this grand old church. Professor Blaser has been commissioned with the execution of a statue of the late King Frederick William. The figure (on horseback) will be 21 ft. high, the pedestal 20 ft. making a total of 41 ft. The king is represented in his coronation robes, and bare-headed.

At Dresden an English church is being erected from the plans of Mr. St. Aubyn. The costs are chiefly, if not entirely borne by Mrs. Göschen, mother of the present member for the City of London.

ON THE FOREIGN ARTISTS EMPLOYED IN ENGLAND DURING THE SIXTEENTH CENTURY, AND THEIR INFLUENCE ON BRITISH ART.*

DURING the first few years of the sixteenth century, the influence of the great Italian school of art manifested itself strongly in Germany, in the persons of men such as Albert Durer, Peter Vischer, and Jean de Mabuse; but in England scarcely at all, excepting by transmission through the entry of the last-named into the service of Henry VII.

Mr. Wortum, who has made it a labour of love to test the correctness of all the usually received dates which serve as landmarks in the chronology of art-history, has stated it as his opinion that this fine artist, indifferently known as Jan de M'Abuse, Jan Gessart, and Johannes Malodius, was born about 1470—visited this country in 1498 or 1499, and died in 1532. To him we shall return almost immediately. I have already alluded to the fusion of the practice of various branches of fine arts by the leading foreign artists of the close of the fifteenth and commencement of the sixteenth centuries, and I would now especially point attention to it as the transcendent quality which fitted the pioneers of the revival of art for the task of reformers. In two notable cases this quality extended itself into the form of all but universality. In the persons of Leonardo da Vinci and Albert Durer, the same habits of profound philosophic inquiry, combined with the utmost appreciation of mechanical dexterity, existed, and induced their record of studies in every direction. In the notebooks of the former, preserved at Paris and Milan, and in those of the latter in the British Museum, ample evidence is preserved of the parallel ardour with which these master-minds devoted themselves to the study of geometry; engineering, both civil and military; practical architecture (Albert Durer's studies of wooden roofs are peculiarly interesting); human and comparative anatomy, physiology, and the science of the laws of proportion, balance and movement in all things capable either of setting themselves in motion, or of being set in motion by others. Not only their private note-books, but their published works tell the same tale. To the attention of the architectural student I would especially commend Albert Durer's "Ueber-richtung der messung mit dem Zirckel und Reyschecht" (Nurem., 1525), and his "Eidliche Underricht zu Befestigung der stet, Schloss und flecken," a very important essay on fortification, containing, amongst other matters, a lively prototype of the circular system which has been so warmly advocated by our distinguished fellow, Mr. Ferguson. It is by no means foreign to our special subject to observe the skill attained by such great artists in the science of attack and defence, as expounded in the admirably illustrated works of Valerius and Vegetius, the text-books of the great Condottieri of the sixteenth century; since we shall find that one of the most skillful Italian painters who ever worked in this country died in the service of Henry VIII., in the exercise of his duties as "magister tormentorum," or divisor of implements of war. Vasari's pleasant chapter on the

"diversi artefici Fiamminghi," traces the spread of Italian art in Flanders, and commemorates the leaders of that school, specimens of which were early brought into this country by means of the renowned Corporation of the Merchants of the Stalhof or Steleyard, to whom such important privileges were granted by Henry VII.; and who were as ready to protect and support Flemish artists visiting England, as the Pelaviana Bards and other great Lombard merchants settled in London were to assist and introduce Italians of adequate ability.

Having now traced, firstly, England's need of skilled artists and artisans at the close of the fifteenth century, and secondly, the abundance of contemporary art-talent in Italy, Germany, and Flanders, we proceed to trace the mission-aria who were induced to visit us, and propagate the doctrines and practice of the art of the Renaissance, destined to supersede the waning traditions of our once admirable school of Medieval art.

Walpole, in his anecdotes, assures us that two painters only are mentioned in the reign of Henry VII. A bald statement is preserved in the registrar's office at Wells, that one, Holbein, lived and died here in the reign of Henry VII. He was probably a hinner, and can scarcely have been a relative of the great Holbein of the succeeding reign. The other painter was the Jean Gossart, born at Maubeuge in Hainault, and hence known as Maubeugius, or Mabusius, or Mabuse, to whom allusion has been already made. By education and talent he was well fitted to set a new fashion in England, since Vasari tells us that "Giovanni di Mabuse fu quasi il primo che portasse d'Italia in Flandria il vero modo di fare storie piene di figure grandi e di poesie." His talents and industry were great, in spite of his dissipated habits. The anecdote is told of him that when given a suit of damask by the Marquis de Veron, in which to appear before Charles V., he sold the cloth, and made himself a suit of paper, which passed muster even with the emperor for the genuine article. He painted the celebrated Adam and Eve, which being hung at Whitehall, gave its name to the gallery. In Walpole's time this picture was in the king's antechamber at St. James's, and subsequently at Windsor. Walpole has engraved an interior of a church with some figures he regards as intended to represent the king's children, Henry and Elizabeth.

The well-known picture of three children, generally supposed to portray the family of Henry VII. in the royal collection at Windsor, of which replicas, attributed to Holbein, exist in the Wilton and other collections, has been lately identified on good grounds by Mr. G. Scharf* as the original picture referred to in Henry VIII.'s catalogue as "item a table, with the pictures of the three children of the Kynde of Denmarke, with a curtayne of white and yellow sarsenet pased together," and in that of King Charles I. as "item a Whitehall piece, curiously painted by Mabusius, wherein two men-children and one woman-child playing with some oranges in their hands, by a green table; little half-length figures upon a board in a wooden frame."

The best evidence, however, that we possess in this country of the rare talents of Mabuse, consists in the grand picture at Castle Howard, which some of my hearers may remember to have seen when exhibited in London at the British Institution. This is certainly one of the most masterly pictures of the early Netherlandish school in existence. It was originally painted for the Abbey of Grammont, and represents the worship of the Magi. It is rich in ornamental and quasi-architectural accessories, and although painted apparently before the visit to Italy, which made him what Vasari and Sandrart have described him, the artist had evidently emancipated himself from Gothic trammels, and had begun to emulate the change of manner effected by his honoured friends and rivals, Lucas Van Leyden and Albert Durer. Van Mander, who is the best authority, as the earliest biographer of Flemish artists, records only the fact of Mabuse's visit to this country, and we are left altogether in the dark as to the duration of his visit, and the extent of influence exercised by him upon English art. All we can do is to esteem him as the precursor of the im-

pending change, which only assumed a definite shape in the early years of the reign of Henry VIII., which I need scarcely remind you commenced in the year 1509, at which date the handsome and accomplished heir to Henry VII.'s vast accumulated wealth had only attained his eighteenth year.

The proficiency of Henry VIII. at the period of his accession to the throne, in both reading, writing, and speaking Latin, French, and Italian, is testified by the foreign ambassadors who then visited at his court; and for a measure at least of this proficiency he was obviously indebted to the learned Frenchman Giles du Vadia or "Egidius Dewes," who was employed as Royal librarian by Henry VIII., as he had been in his youth by his father. Dewes died in 1535, having instructed all the Royal Family in his native language. At Henry's command he wrote "An Introductorie for to learn to rede, to pronounce, and to speak French truly, compiled for the Princess Mary." Thus was Henry specially qualified to hold personal intercourse with the foreigners in whose society he rejoiced to exhibit his magnificence and rare personal accomplishments. The king and his first great minister met as upon common ground in their love of display, no less than in their love of learning, and in their desire to raise Englishmen to at least a level with the natives of those countries, with whose advanced civilization and cultivation of the arts of luxury and delight of every kind they actively sympathised. They vied as it were in giving encouragement alike to literature and art. To induce the most learned professors to visit this country for the purpose of raising the standard of classical education, or to take into their service foreign artists capable of recreating the outward forms of classical art, were to both objects of almost equal emulation.

The following, in addition to Mabuse, appear to have been, as far as I have been able to trace them, the principal foreign artists and artificers employed in England during the sixteenth century, in an approximation to chronological sequence, and in the order in which I propose now to, far too briefly, notice their lives and works; dwelling (as is fitting to such a architectural audience) upon those who exercised a direct influence upon architecture, and passing rapidly over those who practised as painters only.

1. Torrigiano.
2. John Maynard, or Meiner.
3. Benedetto da Rovenzano.
4. Antonio Cavallari.
5. Vincent, or Vincenzo, Volpe.
6. Anthony, or Antonio, toto dell Nunciata.
7. Barthelomew, or Bartolomeo Penne.
8. Lucas Carnefi.
9. Nicholas Modena, or Nicola da Modena.
10. Ambrose, painter to the Queen of Navarre.
11. Theodora Bernardi.
12. Antony Bernardi.
13. Lambert Bernardi.
14. Ellis, or Alice Carmillon, "millyner," otherwise, probably Eliza Carmillon, Milanese.
15. Cirolamo da Trevizi.
16. Gerard Horneband.
17. Luke Horneband.
18. Susanna Horneband.
19. Lavinia Termick.
20. Katharine Maynor, of Antwerp.
21. Harry Mayner, painter, one of the witnesses to Holbein's will, 1543.
22. Hans Holbein.
23. Anthony Suecher, armourer.
24. John of Antwerp, or Antwerp, goldsmith.
25. Jan Mustyan, born at Enghien, arms maker.
26. John de Mayne, seal engraver.
27. Richard Atayll, stone engraver.
28. John of Padua.
29. Johannes Corvus Flandrus.
30. Gervas Flic, Gerberius Flecus, Flicus, or Fliccius "Germanus."
31. Guillim Strates.
32. Sir Antonio Moore.
33. Joost van Cleef (Zotte).
34. Nicholas Lyzarde, or Nicolo Lizardi, d. 1570.
35. Lucas de Heere, b. 1534, d. 1581.
36. Frederico Zuechero, b. 1543, d. 1609.
37. Cornelius Kettel, b. 1548, d. 1604.
38. Mark Garard, b. 1581, d. 1635.
39. Henry Cornelius From, b. 1565, d. 1640.
40. Petrucio Ubal dini, worked in London, 1565.
41. George Hoefnagel.

It appears that Henry VIII. basied himself in the first year of his reign with the collection of information as to the probable cost of the Royal monument projected by his father, and as to the most fitting persons to execute it. A memorandum of this nature, docketed in the King's own hand, exists in the Record Office, and has been printed in Mr. Brewer's most interesting "Calendar." It contains various estimates made by different artificers, all apparently Englishmen, excepting John Maynard, the painter, whose real name seems to have been Hans Meiner. Most of the persons whose names are mentioned in this memorandum were subsequently employed, with the notable addition of the eminent foreigner to

* From a paper by Mr. M. Digby Wyatt, read at the ordinary general meeting of the Royal Institute of British Architects, held on Monday, the 18th of May.

* See his "Remarks on some Portraits from Windsor Castle, Hampton Court, and Wilton House."—Archæologia, vol. xxxix. p. 245.
 † Sandrart follows Vasari's very words in declaring that Mabuse was one of the first "Historien voll neckender Bilder zu machen, und allerley Postereyen darin zu setzen."

whom we shall presently refer, and to whom probably the design of the whole is due, as well as the execution of the really artistic portions. Meritorious in their way as several of these English art-workmen may have been, it was but natural that the king should seek to employ for the effigy, at least, of his father some one of the great artists of Italy, whose fame had spread throughout Europe; and samples of whose rare talents had been no doubt brought to this country by the rich Lombard merchants, and by the Venetians, whose interest it was at the commencement of his reign to conciliate the king's favour, which they could do in no more graceful way than by anticipating his artistic necessities. I have already alluded to Henry's accomplishments as a linguist, which no doubt facilitated his acquisition of foreign tastes—another of his natural endowments, his love of and ear for music—should also be noted as a special bond of sympathy between himself and his cultivated Italian contemporaries.

The king's early marriage with Catherine of Aragon may be regarded as another predisposing cause tending to induce Henry to look abroad for the highest class of artistic talent. That he was fortunate in the first great master upon whom he lighted is proved by the rare merits of the works of Pietro Torrigiano, which we are still fortunate enough to reckon amongst our national art-treasures.

This distinguished artist, who was born at Florence in 1470, was taken whilst a youth into the academy founded by Lorenzo di Medici the elder, and directed by Bertholdo, a pupil of Donatello. Amongst the students were Buonarroti, Rustici, Granacci, Niccolò di Domenico Sazzi, Lorenzo da Credi, and Giuliano Bugiardini, all Florentines; and Baccio da Monte Lupo, Andrea Contucci, of Monte San-Sovino, and other strangers. It was whilst they were fellow students here that Torrigiano broke Buonarroti's nose with a stone. Torrigiano described to Cellini how it happened; and we are told in the autobiography of the latter that Torrigiano and Michelangelo were copying Masaccio's frescoes at the Church of the Carmine together, and that the latter so bantered and tormented the former that, unable to endure it, he gave him a violent blow on the nose, which he would hear the mark of to the day of his death. Vasari says, however, that Torrigiano hated Michelangelo, and was constantly seeking to injure him because Michelangelo was superior to him. Whether that was the case or not, Lorenzo di Medici was so incensed against Torrigiano that, if he had not fled from Florence, he would have been heavily punished. The Pope Alexander VI. employed him, on his arrival in Rome, on the stucco-work of that part of the Vatican called the Torre Borgia; but, being attracted by the pay and spoil of the soldiers under the Duke of Valentino (the Pope's son), then in the Romagna, Torrigiano gave up his work, joined the army, and comported himself bravely.

He then followed Paolo Vitelli in the war against Pisa, and was with Piero di Medici at the action on the Garigliano, where he obtained a pair of colours and the reputation of a brave ensign. Disappointed, however, in obtaining the grade of captain, he returned to his art, and prepared various small figures in bronze and marble, which he sold to Florentine merchants, together with numerous drawings, all of which Vasari praises for "good manner" and great boldness of execution. The merchants above-mentioned invited Torrigiano to proceed to England, where, Vasari tells us, and we shall presently see, that he executed many works. "And now," says his biographer, "did Torrigiano receive so many rewards and was so largely remunerated that, had he not been a most violent, reckless, and ill-conducted person, he might there have lived a life of ease, and brought his days to a quiet close." We have no knowledge of his reckless or violent conduct in England, nor in Art is it probable that he had a rival; still he left England for Spain, after having executed the monument to Henry VII. In Spain he executed various works, and gained great reputation; but, quarrelling with the Duke d'Arcos, to whom he had sold a statue of the Virgin, he broke it to pieces with a hammer. This want of reverence, either for what was "*sin pecado concebida*," or, for what was almost equally venerated in Spain, a "grande," and perhaps his long stay in apostate England, induced the Inquisition to arrest and imprison him; in the prisons of which anti-reforming institution, at Seville, through indignation and grief, he is averred to have starved himself to

death, in 1522, but in which it is more probable he suffered that fate which the nature of his accusers would indicate as probable. Over the door of the Sala Capitular, Granada, is a "Charity," by Torrigiano, executed as a sample of his talent, when he was at Granada, competing for "The Sepulchre of the Catholic Sovereigns," which was finally executed by Peralta, of Genoa.

I have not interrupted this hasty narrative of Torrigiano's chequered life by dwelling specially upon the circumstances of his engagements and works in this country, but as that is what primarily interests us, I proceed to allude to them now. Vasari tells us that Pietro made little figures of marble and bronze for certain Florentine merchants, by whom it is highly probable that some specimens of his handicraft were forwarded to the branches of their firm settled at London. Amongst such merchants the great firm of the "Bardi" stands conspicuous; and the entry found by Vertue amongst the records of the Court of Requests, of a cause tried in 1518 before the Council at the Palace of Greenwich, and in which the great sculptor appeared as one of the witnesses, is interesting as identifying the connexion which existed between him and Pietro di Bardi and Bernardo Cavalcanti, between whom rested the cause of strife. Vasari's words as to the fact that Torrigiano was not only invited, but brought (*condotto*) to this country by the Florentine merchants for whom he had worked at Florence, are precise; nor can we doubt that he was hired for the express object of executing works for the king, since he began to work for him immediately upon his arrival in this country (in 1515 probably), and one work only of his is extant in this country which was not executed, either directly or indirectly, for the Crown. Where, alas! are the "*infinite cose di marmo, di bronzo, e di legno*," which Vasari tells us he wrought while in the service of "that king," in competition with natives of this country, "to all of whom he was superior"?

The original agreement into which he entered for the execution of the monument to King Henry VII. and his queen with the executors of that monarch, is given at full length in Ackermann's "Westminster Abbey" (vol. ii. pp. 140 to 143). It bears date A.D. 1516, and is a most interesting document. He must have worked with rare diligence, for Stowe tells us that the tomb was finished in 1519. To describe such a monument here would of course be superfluous. All must alike have recognised how entirely unlike it must have been to anything done in this country before its erection. It struck, as it were, a key-note of an absolutely fresh pitch, and produced a "great sensation" far and wide upon all who saw or heard of its grandeur. I am happy to have been able to procure an excellent cast from it for the Crystal Palace, in which, from the models having been gilt, as the original was, and from its being freed from the fine Gothic screen which surrounds the original, the merits of Torrigiano's work may perhaps be even better studied than in the original. To bring the details as to architectural style under the reader's notice, I reproduce Cottingham's view of one end of this monument. His success in this work led to the same artist's employment to execute the monument to Margaret Countess of Richmond, the mother of Henry VII., the great fondness of, and honest actress to, several of our collegiate institutions. To me, I must confess, this effigy in bronze has always appeared superior to those of either Henry VII. or Elizabeth of York. I am obliged, therefore, to differ altogether from Dr. Waagen, who, strangely enough, remarks that it is "so far of inferior merit as that the head and hands were merely casts from moulds taken from nature." That the artist may have been assisted by such casts is possible, but, to those who know well what post-mortem casts look like, the difference between the heavenly resignation and sentiment of the Countess's head and hands and the rigidity of expression never wanting in casts taken from corpses must be at once apparent. The very perfection of style with which the bronze is wrought, its surface, and the beautiful modelling of the drapery might, I think, have redeemed Torrigiano from such an insinuation.

The one other monument we still possess, either from the hand of Torrigiano or from that of Benedetto de Rovizzano, but most likely the former, too little known for its rare merit, is in terra-cotta, coloured most tastefully and skillfully. It is in the chapel of the Rolls Court in Chancery-lane, and commemorates Dr. John

Young, Master of the Rolls in the reign of Henry VIII. He lies, supine, with crossed hands, and wears a most dignified expression on his countenance, which is modelled in masterly style. In a recess above his effigy is a head of Christ, in the centre, and on each side an angel's head, in high relief. Even in Italy I know no finer coloured terra-cotta head than that of the Christ. The architectural members of the monument are of the purest cinque-cento, and, on the whole, the monument to Dr. John Young is one of the finest objects of Renaissance art in the world. Would it were more seen. I naturally endeavoured to get casts, so as to reproduce it in *fac-simile* at Sydenham, but an honour which the reasonableness of the plea upon which the then Master of the Rolls rested his unwillingness to grant my prayer. At Strawberry Hill was a model in stone of the head of Henry VII. in the agony of death. It is in the great style of Raffiello and Michelangelo, and worthy of either. It may fairly be assumed to have been a study executed by Torrigiano to show his capacity for executing the work—his trial-piece, in fact. It is engraved in Carter's "Ancient Painting and Sculpture." The question has occasionally been asked whether Torrigiano had anything to do with the stone statues in Henry VII.'s Chapel at Westminster. No one can, I think, believe that he had. We are, indeed, told that Robert Verbe, Robert Jennings, and John Lebons were the master masons, and they were very probably some of those *maestri di quel paese*, alluded to by Vasari, to whom Torrigiano "showed himself so superior."

That the king was pleased with Torrigiano's work is proved by the fact of his going so far as to sanction the preparation of a draft agreement with Torsyans, as he is called, for the erection of a monument to himself and Queen Catherine, at a cost of 2,000*l.* This draft agreement, dated in 1518, was found in the Chapter-house at Westminster, amongst the papers of Cardinal Wolsey, and has been printed in the "Archæologia" (vol. xvi. p. 84). Why this agreement was never carried out does not appear; but, since both Vasari and Cellini agree in describing Torrigiano as a proud, passionate, intractable, and foolish man, as well as a capital artist, it is probable that the fault was his own, and that he quarrelled with those "*bestie di quelli Inglesti*," as he never wearied of describing our countrymen to Cellini. Torrigiano visited Florence just about the date of this draft, for the purpose of engaging assistance for this very work; for Benvenuto, in his Life, says that Torrigiano expressly told him that he had to execute a great work, *al mio Re*, consisting of, or at any rate involving, *grand opere di bronzo*. Cellini did not like Torrigiano's manners, and declined to go to England with him, which perhaps helped to disgust the former with his commission: anyhow, the affair went off.

The only foreigner who appears to have worked with Torrigiano was the painter, John Maynard, or Meinert, of whom little is known save that he was so employed, and that he was probably a relative of a certain Harry Mayner, painter, "of Antwerp," who appears as one of the witnesses to Holbein's will.

This, however, was but an accidental circumstance, for Henry's taste for foreign fashions was carried into every branch of his establishment, from his serjeant-painters, architects, sculptors, and masters of engineering and music, to his cooks and grooms.

The patronage thus afforded to foreigners of all kinds, did not fail to excite bitter jealousy and enmity on the part of the city of London; and ultimately, on the "evil May-day" of 1517, the rising took place which had for its object to cut to pieces all the strangers in London, in number from 6,000 to 7,000. There seems little doubt, indeed, that several of the celebrated seventy-eight "faulds and abusses of religion" complained of in the protestation of the clergy of the Lower House, presented to Henry in 1536, derived particular "gravamen" andunction from jealousy of foreign practice. The musical novelties sanctioned by the King in his private chapel gave great offence in the Church; and but for his protection of Italian, versus English, composers and organ-players, he might never have been told by his clergy that, "syrning and saying of mass mattins or evensongs, is but roryng, howling, whistelyng, mummyng, conyuring, and joggyn; and the playing at the organs a foolish vanity."

Warned, perhaps, by the temper shown on "evil May-day," Wolsey seems to have hesitated about entrusting the design of his palaces at

Hampton Court and York-place to foreigners; and, as far as internal evidence may be trusted, these buildings would appear to have been based altogether on English models. Hangings and furniture he purchased largely on the Continent, and thereby tended to introduce new types of ornament and art-manufactures into this country, which of course re-acted upon the style of national architecture. The only decided evidence of Italian art of the sixteenth century Hampton Court still shows, consists in the terracotta roundels, with busts of Hadrian and Trajan built into the towers of the eastern gateway of Wolsey's first Court, and others of the same kind in the adjoining Court. These have been attributed to Lino della Robbia, and are said by Mr. Cole (Felix Sumnerley) to have been given to the Cardinal by Leo X. As they are by no means like della Robbia's work, I don't feel the first assertion, and I am inclined to doubt the second, partly because Leo X. was no great patron of della Robbia's, partly because as gifts they would be scarcely valuable enough, and partly because other similar roundels and terra cottas exist in contemporary buildings in this country, as, notably, in the courtyard of St. Donat's Castle, Glamorganshire, one of which I engrave. Of those which once abounded in this country in Henry VIII.'s possession, and have perished, we are fortunately provided with sufficiently detailed descriptions to enable us to form a good idea of their general character.

We are indebted to Mr. Wornum for having printed, in the Appendix to his excellent "account of the life and works of Hans Holbein," copious extracts from the inventory of art "properties" preserved in the Palace of Whitehall, in the year 1547. Other extracts had been printed previously by Mr. Cole, Mr. Waring, &c. Amongst those entries are many which illustrate the general state of such contemporary art—as that patronised by the Cardinal at Hampton Court and elsewhere—very curiously. In the first place, there is to be noted the fact that what are called "pictures" appear to be bas-reliefs coloured, and more or less gilt, and made either of "erthe," i.e., majolica (as the roundels), or of black "towche," or touch stone. In the second place, what we now call pictures are all called "tablets;" and this title is adopted whether the "table" be an ordinary painting on wood or canvas, an alto relievo in alabaster or wood, a hanging in needlework, a plaque in enamel, a slab of marguerite, or a specimen of glass-painting. The subjects of the "tablets" are, with few exceptions, either portraits or ecclesiastical and devotional themes. In one or two instances only do "histories," taken from Ovid and other authors so popular with the masters of the early Italian Renaissance, make their appearance; and even in those rare instances they seem scarcely yet naturalised and at their ease, as witness the "stained cloth with Phoebus riding in his cart in the air with th' history of him." Some of the pictures "made of erthe," may very probably have been the productions of Italians either in the king's or in his minister's employ, as they certainly executed such works in their own country, and there is no reason why they should not have done so here also.

It was in his noble palaces of York-place and Hampton Court, furnished with all the sumptuous hangings and adornments which he never seemed tired of seeking for abroad, that the great cardinal kept his high state and magnificence described by Cavendish, which was admired of all foreigners, and was even more royal than that maintained by his proud master. Thus sings old Skelton:

"The Kynges Courte
Should have the excellence;
But Hampton Court
Hath the pre-eminence:
And Yorke's Place,
With my Lord's grace,
To whose magnificence
Is all the confidence."

Probably Benedetto da Roverezano and other Italians in Wolsey's service contributed to produce this stately "magnificence," which was so well understood and methodised in Italy through men like Bernardo Castiglione, author of the "Cortigiano," and was maintained with great punctilio in the Court of Rome; which was, no doubt, the great model followed by one, the "ultima Thule," of whose ambition was to occupy the chair of St. Peter.

In the pages of Vasari it is to be found the biography of the eminent artist last mentioned, and it is unnecessary, therefore, to do more here than note that Roverezano's works at

Florence, executed before he was tempted to enter the Cardinal's service, had earned for him a first-rate reputation. Those works combined architecture and sculpture; and prominently amongst them are to be remembered the chapel and shrine for the relics of San Giovanni Cualberto, proposed to be attached to the Church of Santa Trinita at Florence. The chapel which was added to St. George's Chapel at Windsor by the Cardinal, I need scarcely remind you, was intended to contain his tomb and monument, and it was to execute this work that Benedetto da Roverezano was specially retained. He was assisted by Antonio Cavallari, and probably other foreigners; and worked, as we are told by Lord Herbert, from about 1524 to 1529. "The design whereof (he adds) was so glorious that it exceeded far that of Henry VII." After spending 4,250 ducats upon it, the Cardinal fell under the displeasure of the King, who, seizing upon his subject's palaces and other property, left him not even the poor "simlacra" he had destined to commemorate his unprecedented grandeur.

After the Cardinal's fall, he wrote from York, asking the King to let him have his own figure for his tomb at York, with "such parts of his tomb as shall please the King." He also beseeched the King to send Anthony Cavallari, the glider of the tomb, back to Antwerp, and to permit "Benedict, the carver," to return to Italy. The King did neither, but used up the materials for his own tomb.

The services of Roverezano were transferred from the Cardinal to the King, who endeavoured to adapt much of the work which had been done for Wolsey for his own monument. This, according to Nicholas Charles (Lancaster Herald), who left behind him the manuscript description of "The manner of the Tombe to be made for the King's Grace at Windsor," printed in Speed's "History of Britain" (p. 1083), was to be mainly of copper gilt. Upon two separate altars, or table-tombs of touchstone, the figures of Henry VIII. and his Queen, Jane Seymour, were intended to lie recumbent in their Royal habits, "not as death, but as sleeping," and of the size of a man and woman, with two angels at the head of each. "Upon a high basement between them, upon which shall be the history of St. George embossed, shall stand the King on horseback in full armor, of the stature of a goodly man, and a large horse. Over all, the Image of God the Father, holding the King's soul in His left hand, and His right hand extended in the act of benediction. Thirteen prophets and four saints, all 5 ft. high, and between each pillars of serpentine marble. The amount of the carvings—133 statues, and 44 stories, or has-reliefs." Dallaway observes that: "In Henry VIII.'s will (dated 1546) this tomb is specified as 'an honourable tomb for our bones to rest in, which is well onward, and almost made therefore already.'" Had but the King's successors completed what was "so well onward," England might have now to boast a Royal monument, before which those of the Abbaye of St. Denis might "pale their inefficual fires." The bulk of what was done must have been very great, since the metal melted down and sold by the Parliament Commissioners fetched 620*l*. I am inclined to fancy it possible that the beautiful statuette of St. George and the Dragon belonging to Mr. Louis Huth, which I have engraved, may have been a study for an equestrian group for this monument, superseded by the equestrian statue of Henry, above described.

Poor Benedetto's eyes were injured by working in the King's foundry, and he at length returned home rich; but doomed speedily to lose vision altogether (in 1550), and to die shortly afterwards. Of his fellow workman, Cavallari, we lose sight after the period of Wolsey's disgrace.

For a notice of the next artist upon our list, Vincent or Vincenzo Volpe, I am indebted to Mr. Congh Nicholl's admirable essay "On the Contemporaries and Successors of Holbein," printed in the 39th volume of the "Archæologia." After giving extracts from records proving Volpe's employment by the King in various branches of decorative painting, from 1514 to 1530, Mr. Nicholl adds: "I think it by no means improbable that Vincent Volpe may have been the painter of some of those curious military pictures, something between plans and bird's-eye views, that are still to be seen on the walls of Hampton Court. That he was an eminent artist is proved by the fact of his receiving wages equal to two-thirds of those paid to Holbein. Volpe is one of the very few eminent foreigners of this period who seem to

have escaped the notice of Virtue, Walpole, and Dallaway, to whom Englishmen have ransou to feel deeply indebted for the preservation of so much relating to the history of art in this country, in every way worthy to be had in remembrance.*

GHOSTS IN PICCADILLY.

"To be sold, the handsome Entrance Gateway and admired Stone Erection for the Colonnades at Burlington House."—*Adv't.*

"CARRMAN, leave me here a little, while as yet 'tis early morn,
At this mansion old and famous, I will rest and view the form.
'Tis this place, and all around it, as of old, the shadows fall
Upon colonnade and mansion with a smoke-begrimed wall."

"Stalwart porter, looking gloomy, reclining at the gate,
Doth muse upon the old time, or the future contem-plate."

"I for olden times care little, and at trifles am not daunted;
The source of all my misery 'a to guard a house that's haunted
By the ghosts of the departed, who at eve when I'm a napping,
At my door and at my casement continually are rapping.
Jostling, pushing, quick they enter, for they're all in wondrous haste,
To revisit scenes so pleasant, where they met the 'Man of Taste.'

With swords, gold lace, and ruffles, and their coats of brilliant hue,
They lounge about the courtyard—a strange and motley crew.
There's Pope, the Waap of Twickenham, with Arbutnot and Gay,
Bygone times and scenes recalling as arm-in-arm they stray.

"Handel—mighty master—of his sad and solemn strain,
Elysian transport to their souls—it thrill'd through every vein,
Of 'Burlington's fair palace,' and its famed 'delicious meal.'

Of balls and routs and junkettings, fond memories o'er them stem
Hornes Walpole, smiling blandly, vows 'The colonnade, so bright,
Was the handiwork of fairies, and they built it in a night.'

Swift, who's rather airy, says, 'Mannars put it up for sale,
Till Hope† came to the rescue, and told a flattering tale—
Of its graceful form and beauty, and declared 'twould be a scandal
To destroy of Art a monument—he'd believe it of a Vandal.'

So gravely walking, softly talking, every topic they recall
That reminds them of the mansion with a smoke-begrimed wall.
Until Chanticleer, he crows, they vanish somewhat flutter'd.

And round about the gateway a chorus loud in utter'd:
O Sydney Smirke and Barry! O Banks and Penne-thorne!
A worthy task's before ye, to excel its present form." X‡

ON TRAPS FOR HOUSE-DRAINS AND GULLIES.

THE object of trapping house-drains and gullies is to prevent the foul air engendered in the sewers and drains from escaping into the houses and streets. The traps used for this purpose are of two kinds—namely, flap-traps and syphon-traps. The original flap-trap was similar to the old sluice-valve, and consisted of a door of wood or iron, fitted into a rabbeted frame, and hinged at top. The original syphon-trap consisted of a square brick box, with a stone placed on edge across the centre, and dipping 2 in. or 3 in. below the bottom of the drain. This was called the "bricklayers' trap." The flap-traps and syphon-traps so made were formerly used, either separately or in combination, for trapping the house-drains. The flaps were hung sometimes under the inlets, but chiefly on the outlets; while the syphons were placed under the inlets, and on the line of the drains, with flaps in addition at the outlets. The gullies were trapped by fixing flaps only on the ends of the drains in the sewers. The traps now employed for trapping house-drains and gullies are made on the principle of the old wood flap, on that of the old brick box with a dipstone, and by a combination of both; and the practice is to place the syphons under the inlets, and to hang the flaps on the outlets as heretofore.

* To be continued. † A. J. Beresford Hope, M.P.
‡ This is stolen very freely, you will perceive, from Tennyson, Pope, and Gay; so, although I sign myself very respectfully yours, you will at once recognise in me
A PLAGIARY.

The flap-trap now in use consists of a galvanised iron disc, hung by shackles at top, and covering a round hole in a block of stoneware. This is known as the "lock-flap." The same flap is also similarly hung on the end of a short length of stoneware pipe. There is a raised rim round the face of the block, and also round the end of the pipe, with a corresponding rim round the back of the flap. In the best made traps these rims are ground so as to form air-tight seats for the flaps. Many traps, however, are made with the rims unground. The action of this trap is very unsatisfactory. It is operative only while the flap is closed on its seat, and inoperative each time the flap is forced open by the drainage behind it endeavouring to escape. Its action, therefore, is intermittent. Moreover, while the flap is closed it not only checks the flow of the drainage, but the obstruction it presents often causes the drain to choke. Frequently hits of stick and rags get between the flap and its seat, and block it open permanently; and some of the flaps become furred and eaten through, or stick fast, by oxidation. While, therefore, the flap is thus kept open, and each time that it is opened by the pressure of the drainage behind it, the sewer-air rushes up the drain and escapes into the house. How often have sickness and death resulted from this cause? The flap-trap, therefore, whether used separately, or in combination with the syphon, is not only worse than useless, but positively mischievous, and should be abolished. This was pointed out by the writer, in the *Builder*, many years ago. It, however, is almost as great as ever. There are also a vast number of drains the outlets of which are not trapped at all, and up which the sewer-air is continually escaping into the houses. These drains are, of course, as bad or worse, in this respect, than those which are supposed to be trapped.

The syphon-trap now in use consists of a stoneware pipe bent longitudinally. The upper part of the bend in the centre dips one or two inches below a straight line drawn from the bottom of the pipe at the ends, or below the outlet. The water occupying the cavity formed by the bend, together with the part of the pipe dipping below the surface of the water, produces the trap. While, therefore, the water in the bend prevents the sewer-air from escaping into the drain, and thence into the external atmosphere, it permits the free discharge of the drainage through it at all times without unseating the trap. The trap is stagnant only for a short time, because the drainage coming down the drain displaces that in the trap. This trap is always in operation, both as a trap and a drain; and therefore it only should be used for trapping house-drains and gullies. The common "bell-traps," and all other traps in which there are partitions dipping into water in bends below the outlets of the traps, are only varied forms of what is called the "syphon-trap."

The question has often been asked whether house-drains should be trapped at the outlets in the sewers as well as at the inlets in the houses. To this it may be replied that, inasmuch as the sewers are partly ventilated by the house-drains, there can be no doubt that, for the sake of health and comfort, air communication between the sewers and the houses should be cut off as effectually as possible. It has also been remarked that "if the drains are trapped at the outlets as well as at the inlets, how is the foul air engendered in the drains themselves to be got rid of, seeing that when the closets are opened, or water is poured down the inlets, the drain-air would escape into the houses at those points the same as at present?" To this it may also be replied that the remedy is both easy and simple; thus, let it be insisted on as part of the construction of the drain that a ventilating-pipe shall be carried from or near to the highest part of the drain to the top of the house, and there communicate with the atmosphere. The air passing through the closets and inlets, each time water is poured down them, would expel the drain-air, which would escape by the ventilating-pipe. In the event of the draught being the reverse way, which doubtless would be the case in some instances, it would be considerably less objectionable to receive atmospheric air into the house by this means than sewer-air as at present. The closet soil-pipe, and also the rain-pipe, afford a ready means of accomplishing this very necessary improvement in house-drainage. The soil and rain pipes should be untrapped at bottom, continued to the tops of the houses, and covered with gratings. The joints of the rain-

pipes should be filled with cement, so that air may not escape at those places. The writer has adopted this plan in many instances, with successful and beneficial results. He would therefore recommend that all house-drains should be effectually trapped, by syphon-traps or otherwise, at the outlets of the drains in the sewers, or as near to the sewers as is practicable; and that from or near to the highest point of the drain a ventilating pipe should be carried to the top of the house, so as to discharge the drain-air at the least objectionable point. The Metropolitan Board, and the local Boards and vestries, have the power to order this improvement to be carried out.

Formerly the sewers, after they were cleaned by hand labour and cartage, accumulated deposit until it was necessary to repeat the process again and again. Cleansing the sewers by flushing is a similar palliative. The truth is, that resorting to flushing for keeping the sewers clean is a proof that the channels are too large and too wide, and that such sewers are little better than common cesspools. The motion of a stream is produced by one end of its bed or its surface being lower than the other, that is, by the force of gravity; and the velocity varies with the difference in the forms and areas of the transverse sections, it being least where the sections are shallow and wide, and greatest where they are deep and narrow. The discharges are equal through the various sections. From this it will be seen that the utmost impelling power is produced in a deep narrow section where the velocity is quickest. When, therefore, it is considered that the removal of decomposing matter from houses and towns is dependent on the water discharged with the matter into the drains and sewers, it is evident that the channels should be made narrow and smooth in order that the impelling power of the water may not be lost. That portion of the matter which is of less specific gravity than the water will float, and be carried away by the current, however sluggish it may be; while that portion which is heavier will deposit, if the force of the current be insufficient to urge it forward. The maintaining power is proportional to the fall, but the impeding influence depends on the extent of the bed in contact with the current compared with its volume. In wide-bottomed sewers, therefore, the impulsion of the flow is weakened to such an extent that the heavier matter always deposits, but by narrowing the channels to a minimum the flow is augmented sufficiently to prevent deposit. The writer found, from observation and experiment in the sewers, that when the currents glided from 13 to 2 miles per hour, the velocity was ample to cut through and remove deposit, and also to carry away coarse sand and gravel. He is confident, therefore, that if the drains from the houses were to be collected into narrow and smooth channels, the currents would be sufficiently powerful to keep the greater number of the sewers in the metropolis free from decomposing deposit without flushing. Had the money, which has been expended in flushing, been judiciously applied in rectifying the channels, the sewers would now be self-cleansing. Going on, therefore, with the method of flushing is merely wasting the ratepayers' money. All that is necessary to be done to make those sewers self-cleansing which are now obliged to be flushed is "to hed stoneware channel tiles along the inverts, and to fill up the sides with concrete," also sloping to the channels, and to continue the outlets of the house-drains and gullies into them with stoneware pipes and syphon-traps. This simple plan was proposed by the writer twenty-one years ago, and is to be seen in his evidence before the Metropolitan Sanitary Commission, 1847. Here is the germ or origin of the "concrete sewer." Large-sized "cement concrete pipes" were also made and laid, under the direction of the writer, in the open sewers in the Surrey and Kent district in 1848 or 1849. In some of the old flat-bottomed sewers, and in others where the levels are defective, the inverts should be taken out and new ones formed, to improved levels, with stoneware blocks and Portland cement concrete, or brickwork in cement, underpinning the side walls. Either of the suggested plans would almost supersede flushing, and be found cheap and efficient.

Some years ago it was considered that, if the sewers could be kept free from decaying matter by flushing or otherwise, no foul air would be engendered within them, and no special means would be required for ventilating them. Dr. Arnott, however, said, what is the fact, that "nothing can prevent the sewers from being

filled with offensive effluvia, even if there be a good declivity and a rapid current. Flushing might lessen the quantity of impure air, but would not free the town from the amount." The truth is, that sewage matter, while it is passing along the sewers, continually evolves hydrogen and carbonic acid gases. Hence the necessity for an effectual system of ventilation. The sewers are now ventilated partly by the house-drains, partly by the gullies, and partly by the air-shafts in the middle of the streets. To allow the house-drains, or even the gullies, near to the houses, to be used for this purpose is a palpable mistake. Every house-drain and street-gully in the metropolis should be effectually trapped by syphon traps, both at the outlets in the sewers and at the inlets in the houses and streets. The sewers might be ventilated by one or all of the following processes:—By air-shafts in the middle of the streets, as at present; by jets of water falling down the air-shafts; by jets of gas in the air-shafts continually burning over or under gratings or candle-pipes containing dry chemical compounds; by pipes connected with the crowns of the sewers and carried up the sides of public buildings or the flank walls of houses; by lofty chimneys, or posts in the centre of public urinals, into which the impure air might be drawn by fires or fans, and there heated and burned. A reduction in the death-rate of the metropolis would result from the adoption of the above suggestions.

The most practical and efficient method of ventilation would appear to be that by distinct systems of downcast and upcast shafts. Bridging the metropolis into certain ventilating areas or districts, the existing air-shafts in each district would serve as downcast shafts; and, at a suitable situation on the line of a sewer in the district, a pair of air-ducts should be formed leading upwards from the crown of the sewer to the surface, and then bending over and downwards through a fire-chamber placed under the junction of the air-ducts, with a horizontal passage leading from the ash-hole to the upcast shaft. By this method air near the surface of the streets would be drawn down the air-shafts; and, with the foul air engendered in the sewers, would be drawn out of them and pass through the furnace downwards. Thus the sewer-air and the fuel-smoke would be burnt or consumed by the fire; the sewer-air, with the products of combustion, would together pass into the atmosphere at a high level almost clear and invisible; and the air-passage between the fire and the upcast shaft, and the upcast shaft itself, would never become coated with soot. The supply of fuel to the furnace, and the discharge of ashes from the ash-hole, would be by self-acting appliances. All the sewers in each ventilating district, which do not now communicate with each other, should be made to do so; then the foul air in all the sewers would be drawn off and burnt.

JOHN PHILLIPS.

WHERE ARE WE GOING TO?

SUCH is the title of a popular religious tract: the intention of its author has evidently been to arouse serious reflection as to what sort of life we are leading, and where it will probably land us. I wish some able hand would write a "Where are we going to?" in the matter of our commercial interests. It is a very serious question, and there are very many reflecting minds struck with the idea that we are going anywhere but to prosperity and settled commercial progress—in fact, that we are going to—the dogs. Not to allow this much, we may at the same time admit that there are serious signs of the times not to be mistaken. Note the state of public credit as represented by the various financial or speculative companies; mark the low ebb of morality to which trading is reduced; observe the shameless impudence of fraudulent bankrupts, and the almost universal corruption and misrepresentation (may we say fraud) connected with the reports and accounts of many of the recently-started limited companies. Worse, far worse, than all, see the deep-seated principle of antagonism which exists betwixt the vital elements of all national prosperity, namely, capital and labour. Crimes of the most revolting and inhuman character have been committed and approved by British workmen in the interests and by the instigation of their trade unions. Where are we going to? What mania is it that has seized the minds of our operatives, and is ever urging them to demand more pay and less work,

and to enforce these demands by tyrannical and unjust regulations (called club rules), and by inhuman cruelties towards their fellow-men?"

That the workman should receive fair remuneration for his labour, and that the duration of it should not extend beyond such reasonable limits as will allow him time for rest and recreation, mental and physical, is most proper, and every right-minded man will assist in bringing about such a consummation; but when the demands for pay are out of proportion to the work done, and to the masters' legitimate and reasonable profit thereon, when the fictitious advances so enforced are swallowed up in the increased price of all necessities, created by this very means of everybody "asking for more"—then there is at the root of the whole matter a principle unsound and dangerous, and which may fairly lead to the question, "Where are we going to?"

Reader, come with me a little while, and I will show you where we are going. It is a bright spring morning; the air is sweet and pure, and it seems as if the restored strength and renewed activity of nature imparted some of its elasticity to us, as we feel eager for our appointed tasks, professional or otherwise. We see before us a hard day's work, and we rejoice in it, as we feel the active pulses beat, and as we breathe the soft, pure, cool air. It is ten o'clock. Here, in a dingy back street, I take you past the "Jolly Waggoners" around the doors of which are grouped men of all ages, wearing the well-known dress of English mechanics. They seem listless and weary; not a few are under the influence of "beer and baccy." Some of them, as they idly lean against the door-post of the rendezvous seem, one could suppose, ashamed of their position. From the open window of the "front parlour" there arises a din of voices engaged in controversy, and a stream of tobacco-smoke issues in graceful curls into the street. These, dear reader, are the noble British workmen, and at the Jolly Waggoners is their club-room; here they have come day by day for weeks past to idle away their time in talk and drink, or to receive the miserable weekly dole which the club provides for them, for they are on strike. They are here to vindicate the liberty of the British workman to do as he likes, and to compel his fellow-workmen to do as he does. There is one young man here; he looks as though he had been educated for better purposes, and had dreamed of a more noble destiny than to stand one of an idle group before a tavern door for days and weeks; but he is in the club—he must be in the club or there is no work for him—and being in it he must do as the club does; he must parade at the Jolly Waggoners; he must smoke and drink and "keep his heart up." Instead of fair pay, which he could have (and would if he dared), he must hold out his hand and receive from the secretary 8s. a week instead of 36s.; he must drink a part of this, because the Jolly Waggoners expect it. Poor lad, he took the drawing prize at the mechanics' institution three years ago; he married a wife much younger than himself; he has two little ones, and he sees before him moral degradation by forced contact at the alehouse with the roughest in the shop, and at home he meets a wife dejected and heart-sick at the long strike, which the men are so "nobly" continuing against their employers.

The other day I visited the home of a striker. In a small back court, approached from the main street by an inclined passage 3 ft. wide, I found two dwellings. Into one of these I entered. A cellar-room about 10 ft. square formed the habitable part, and into this eating, drinking, and sleeping were all compressed. The air was stifling, the bed close to the fire, the small cupboard, with eatables, was in a corner closely adjoining a slop- or sink-stone, which was full of foul water, for which there was no escape, the outlet being choked up. Greasy rags and crockery, with other odd things, littered the floor, and at a small fire sat a woman, with an infant at her breast. I have made minute inspections of the poorest districts in largely-populated towns, but no pen-and-ink description can convey an adequate impression of the sickening details of these human (let us rather say inhuman) dens. I never shall forget that woman's face. It was young and fair and clean,—more, it was trustful and truthful. It was an honest face; and as the infant nestled to its mother's breast she answered my inquiries with a simplicity most touching. Why did her husband allow her and her infant to live in such a place? Why did he not take her to a proper dwelling, where she could breathe; why leave

her here in this fever prison? "Does he drink?" I asked.—"No." "Is he idle?"—"No." "Is he cruel?"—"No; but," said she, with upturned eyes and a sort of heroic suffering smile, "he is on strike."

Poor innocent sufferers! you may thank the Trades Union for that idea of liberty which deuces to your bread-winning the right to labour where, and how, and for how much be pleases; which places his impulsive industry on a level with the sluggish drone; which silks all his desires to ruse, and keeps him weighted down to the club-level; which checks and finally destroys every aspiration after preferment; which keeps him, against his better nature and his free will, one of a dissipated gang, at enmity with his employers; which robs his wife and child of their needful support and their wonted cottage comforts; and which may, and often does, lead a man to confirmed habits of indifference, and finally of dissipation.

Meanwhile, the world wags on somehow or other, and does not sink under its sense of the want of the *confères* at the Jolly Waggoners. The master contends and struggles on as well as he can against his two enemies,—his own workpeople and competition; and whilst our hero is leaning idly against the well-greased door-jamb of the Jolly Waggoners, ship-loads of rolled iron, and ready-made joiners' work, and other like things, come rolling in from abroad, and he sees his bread taken from him and his, and given to strangers; until at last, reduced to want and driven to desperation, he and some few others like him begin to think, become mutinous, and the strike is ended just where it began; the men go back to work loaded with debt, encumbered with loose and idle habits, ashamed of their defeat, and unable to look their employers fairly in the face. The secretary of the club flourishes on until another strike brews up, upon some trifling difference, and he is once again in his glory, feeding upon the misfortune and the folly of his fellow-men, and they cannot see it; for, heedless as the thrice-burned moth, they will be led again and again into the flame.

Where are we going to? There is a complaint of bad trade, and well there may be. I know of many thousands of pounds ready to be invested in the building branches; but the bidders are unwilling to encounter the annoyances and hindrances met with from workmen and their union system, and the difficulty there is in getting work done at all; for it is a fact that, for six days' time, there is not four days' real work, with wages 20 per cent. higher than they were four years ago. To complain is to be insulted; to persist is to cause a strike. What I have herein stated is simple truth, and I commend it to thoughtful perusal; and let every man who feels an interest in his country's future welfare seriously ask himself, "Where are we going to?"

J. B.

SEWERAGE AND OTHER SANITARY MATTERS.

Teddington.—At a recent special meeting of the Local Board, the subject of drainage was especially considered. Some conversation took place about the schemes proposed by the neighbouring towns, Kingston and Surbiton. Several gentlemen of the Board thought it would prove injurious to the neighbourhood if Kingston were allowed to take its sewage to Ham fields, especially when the wind set in the direction of Teddington. Others did not think it would prove in the least injurious to them, but they did think that if Kingston tried to get Ham fields for sewage purposes, there was no reason why they, who were situated nearer Ham fields than Kingston, should not also carry their sewage to that spot. In answer to a question from one of the members, as to what course Hampton Wick was likely to take, it was said that very probably it would oppose the Kingston scheme, unless Kingston consented to take Hampton Wick with them. Upon this, another gentleman remarked that Teddington ought to go where Hampton Wick and Kingston went. The Clerk said he saw by the report of the Hanwell Lunatic Asylum that they disposed of all their sewage on seven acres of land. The inmates numbered 2,000, and 500 officers, which was more than the present population of Teddington. The Surveyor said he found that they were living on a natural filter bed, composed of sand and gravel, and if they determined to make use of the advantages they possessed they would find that in filtering their sewage they

would save a deal of money. Acting on this principle he had drawn up a scheme, which he read, and wherein he advocated that all water-closets and sink drainage should be taken into cesspools,—a very doubtful scheme. A communication was received from Messrs. Grover & Wragge, of London, engineers, suggesting a plan of drainage, with two sets of pipes in the same excavation, one for rainfall and the other for sewage. Ultimately, a committee was appointed to consider the whole subject of drainage for the district.

Northwich.—The Rivers Pollution Commission have visited Northwich, and were about to proceed to Congleton, after making preliminary inquiries. In course of a conversation with the local authorities, Mr. Williams made a curious statement, that Northwich was fast going down; and if the streets sunk at their present rate by Mr. Harrison's old shop, in less than five years the town would be under the level of the Weaver.

Leamington.—The Local Board of Health have held a special meeting, with closed doors, to discuss a communication received from Mr. Thomas Heath, of Myton Grange, the plaintiff in the recent Chancery proceedings. It will be recollected that the sewage of Leamington is decolourised by the lime process, and the effluent water is discharged into the River Leam, a short distance above its confluence with the Avon. Mr. Heath resides on the banks of the Avon, and about four years ago instituted proceedings in Chancery against the Leamington Local Board for polluting that river and the Leam with the town sewage. A long and costly course of litigation ensued. The Board was to be restrained from discharging any water polluted with sewage into the River Leam, unless and until certain additional works had been executed, including the cleansing of the bed of the River Leam from the sewage outfall to its confluence with the Avon. There was delay in carrying out these works, and Vice-Chancellor Wood held that the Board had been guilty of contempt of Court. A sequestration of the town property was accordingly granted, and it was put in force in August last. Then an application was made to Vice-Chancellor Mallins, the vacation Vice-Chancellor, for an extension of the time for the execution of the works, which was granted. The local Board then completed the whole of the additional works directed by the Court, paid the plaintiff's costs, and hoped the difficulty had been surmounted. Complaints, however, have since been made from time to time of the failure of decolourising works, and even members of the Board have called attention to the amount of filth that was being discharged into the River Leam. Matters have again come to a crisis, and it will depend upon the action taken by the local Board whether the town will be again involved in litigation. The substance of Mr. Heath's letter is understood to be—that he affirms the pollution of the river still continues, and he repeats that nothing will ever be satisfactory to him but the entire removal of the sewage outfall from the river, and the adoption of irrigation. The Board were allowed fourteen days to decide what they would do; but in the event of their determining to adhere to the present unsatisfactory system of decolourisation, Mr. Heath intimates that he shall again institute proceedings in Chancery against them for polluting the Rivers Leam and Avon with the town sewage.

Whitehaven.—The sewerage works have been completed and opened. A sort of temporary dam had been erected near the mouth of the main sewer, thereby impounding the sewage. After the tunnel and pumping works had been inspected by Mr. Charles Hawkesley, C.E., accompanied by Mr. Thompson, Mr. Doover (the contractor), Mr. Anderson (the clerk of the works), Mr. Bowman, and others. Mr. Thompson, the only town trustee present, entered the sewer, and, removing some of the stones by which the sewage had been impounded, he declared the works opened. The sewerage tunnel is 554 yards in length, or, speaking roundly, about one-third of a mile. It is egg-shaped, and is about 6 ft. 6 in. in height. Flood-gates shut out the sea at high water. The tunnel is, for the most part, formed of a double row of bricks. A considerable portion towards the centre is through solid rock, and here the brickwork is only to the height of three or four feet. Connected with the sewerage are centrifugal pumps, capable of raising 1,000 cubic feet per minute, and worked by two engines of 25-horse power each. Under ordinary circumstances these pumps will not be required, except perhaps two or three days, or, at most, two or three weeks in

the year. A great portion of the town lies at so low a level that in the case of a very high tide or heavy rains there would be a danger of flooding the lower tenements of the houses. It is to prevent a casualty like this that it has been found necessary to incur the cost of constructing the pumps, which are so placed that, instead of passing into the tunnel, the sewage may be pumped into the harbor.

Sheffield.—Small-pox is very prevalent in Sheffield. A letter on the subject from Dr. Skinner, one of the medical officers of the union, was recently read at a meeting of the local guardians. The disease, he says, is fast spreading. He had himself alone nineteen cases in hand, in only two of which there had been previous vaccination. We may here incidentally mention that the writer of this notice happened lately to have a letter from Manchester, in which it was stated that the writer of the letter and his wife, while resident at a hotel in Sheffield for a few weeks, had both been seized with small-pox, of which, however, they had recovered, and they were glad to get out of the town.

WOBURN, DUNSTABLE, AND VICINITIES.

St.—Perhaps you will permit one who must at least have known an interesting district as well as most living, to offer some experience.

In my humble publication of 1831 (over 300 pages), which you kindly complimented, as reviewer at that time, was, as you have seen, considerably more than a mere "guide to the Abbey?"—some history and description of the "Monastery" town, and neighbourhood, and Russell family.

You have heard, Sir, something of the great misfortunes and low estate, for many a year, of the writer, but may not so well know that it has been mainly owing to unhappy failures of kind memorialising friends living and dead, including Mr. Britton, &c., to obtain a pension from the high local quarter. The writer's father (v. a monument from the destroyed church), having been parish priest for twenty-three years, and part of that time "domestic chaplain." And himself, besides the above and a 4to on Bedfordshire (very much borrowed from), having published a small work (140 pages) on Woburn, &c., kindly noticed by reviewers fifty years ago, at what may be well conceded as not a frequent age for this kind of effort—"eighteen."

Of the present attractions no doubt one of the principal will be the "Sculpture Gallery" (130 ft. long): altered from a "greenhouse" by a "good" duke (ob. 1839), still respected and regretted by the inhabitants. The first introductions were eight central marble shafts (with capitals added in London), from excavations in, or near, Rome; and bold *bassi-reliefs*, especially the "Hunt of the Caledonian Boar." There are now many classic, sepulchral, and votive inscriptions, torii, tazze, candelabra, &c. Of modern sculptures, are a very elegant "Cupid and Psyche," and "Hero and Leander" (rescued from the waves), both by Westmacott.

In the picture-gallery (111 ft. long, but narrow) is a small portrait of Surrey's "Fair Geraldine," pronounced by Pennant *not very fair*. There are many family and other portraits in other parts of the house. In the saloon,—a finely-proportioned room, 27 ft. high, with carved blue and gold ceiling,—is (or was) a beautiful "Christ appearing to Mary," by Annibale Carracci (though with scarcely as pretty a landscape as *Meng's*, at All Souls), and the celebrated "Baker's Dream." Hayter's "Trial of Lord William Russell," with careful portraits of the day (several times engraved), was a "commission" of 1,500*l.*—liberal, but certainly excellently earned. A feature just worth mentioning in this house is some bold sculptured statuary marble chimney-pieces.

Fliccroft (though "Holland" was employed otherwise) was the architect of the Quadrangle, which is spacious. He was complimented by Horace Walpole for his "St. Giles's" Church, in very similar, and "St. Olave's, Southwark," not dissimilar, style.

Lying in four or five parishes, the Park has the unusual extent of 3,500 acres, with usually about 1,000 head of deer, good hill and dale scenery, some fine trees, including isolated beech, and sufficient water. Some of the neighbouring villages are also picturesque, the principal object being Hanslope spire (on high ground), 15 miles distant.

Amphill, 6 miles distant, is an "historical"

and pleasing little town (population about 2,000), whilom celebrated for its "castle," above of two Catharines, at the time of the pronouncement of divorce,* its site still marked by an inscription of Horace Walpole's, an Earl of Upper Ossory; for its picturesque old oak-abounding park and extensive neighbouring ruins of Houghton House, built almost certainly by Inigo Jones for the celebrated Countess of Pembroke. There was a late rumour that the popular Prince of Teck, with his amiable consort, were likely to rent the domain of Amphill.

Dunstable Church is still the most "cathedral"-like, except St. Alban's Abbey, in this part of England, its remaining north-west tower indicating to less appreciative visitors a corresponding "twin" one. As the writer stated in the *Gentleman's Magazine* long ago, no efforts are known to have been made to trace the original "foundations" (here not disturbing churchyard). With the present 120 ft., it was perhaps not far from 300ft. long; but there are no certain signs of transepts. It is, of course, occasionally mentioned in the famous "Chronicle." Here are many fine modern monuments, similar to one of a great benefactor here in Bow Church, and a very lofty "Last Supper," gift of two sisters, and painted (500*l.*) by Sir James Thornhill.†

Houghton Regis, one mile north-east, derived its name from a palace. The neighbouring "Chilterns" are above 200 ft. high, and Bedford, 20 miles distant, can be seen. Dunstable is famous for educational and almshouse foundations, contrasting happily in the latter with the exceedingly poor ones—1*s.* a week each—at Woburn, which have been before mentioned in one or two quarters. If some generous and humane distant benefactor and visitor would augment these, he might, doubtless, leave a "fragrant" memory (though acting from higher motives) in that small town.

J. D. PARRY.

TRADES' UNION CONGRESS AT MANCHESTER.

A CONGRESS of trades' councils, federations of trades, and trade societies generally, assembled at the Mechanic's Institute, David street, Portland street, Manchester, on Tuesday in last week, to consider various subjects of interest to the working classes and trade societies at the present time. Mr. W. H. Wood, secretary of the Manchester and Salford Trades' Council, which called the congress, presided, and Mr. Shorrocks acted as secretary. It was announced that there were thirty-four delegates present, representing 118,367 trades' unionists of all the large interests of the country.

A paper by Mr. G. Potter, of London, on the necessity for Trades' Unions, was read. This paper had been read at Preston, and adopted by the Preston Trades' Council in preference to two other papers which had been drawn up. It was regarded by the conference as the best defence of Trades' Unions that had yet been given.

On Wednesday the conference reassembled. Mr. Wood, the Chairman, read a paper to show further the necessity for Trades' Unions. Mr. Dewhirst (Bradford Trades' Council) read one on "Regulation of the Hours of Labour." These and other papers were followed by discussions on the respective subjects of the papers. Mr. Booker (Amalgamated Carpenters) then read a paper on "Technical Education," which was partly discussed when the conference adjourned.

On Thursday the adjourned discussion on technical education was resumed. The meeting ultimately gave a vote, which was presumed to be in favour of the principle of technical education,

* Shakespeare, who probably never saw this spot, though he must have passed through Dunstable, makes a great mistake in speaking of—

"—Dunstable, six miles from Amphill."

By the nearest cross route it is about double. It seems to have been much overlooked that Henry VIII. certainly desired to make this church a Cathedral after the Reformation (some apparent confirmation of great size). On a change of purpose, however, the rest of the priory church was demolished, leaving the nave for the parishioners; "a clock above the pulpit" (probably here) had been mentioned in the "Chronicle" about 1400, or earlier. Mr. Steele (about 120 years ago) described "five large bells; and the same number occurs in Willis & Coles' (Little-known County and "Deacons' Lists. Four of these old, and the tenor a "noble" modern one, 38 cwt., recast near the end of the last century into eight, tenor 21 cwt. The former small organ was the second or third in date (i. e., of the eighteenth century) in the county.

but the sentiment of the meeting was not embodied in any definite form.

A paper was expected to be read on "The present Royal Commission on Trade Unions; how far worthy of the confidence of the trade union interest," but a debate on the subject took place without any paper having been read.

Mr. Potter read a resolution, which he wished to have an opinion on from the meeting:—

"That after a full and deliberate discussion on the Royal Commission's appointment to inquire into the operations of trades' unions, the delegates assembled in this Congress are of opinion that the Commission is looked upon up to the present time with suspicion and disfavour by a majority of the trades of England, both in regard to its unfair composition, and to its one-sided and to a great extent secret proceedings."

He could not consent, he said, to wholesale condemnation.

Ultimately this resolution was adopted, 25 voting for it, and 6 against it.

The Chairman, Mr. W. H. Wood, read a paper to prove that the limitation of apprentices was a necessity. Mr. Potter expressed himself opposed to the principle. Ultimately the resolution was unanimously passed:—"That we urgently recommend all trades to adopt the apprenticeship system, and in all cases to limit the number of apprentices if found desirable to protect the interest of any trade or trades."

On Friday Mr. Davies (masons) read a paper on the subject of legalisation of trade societies. The Chairman (Mr. W. H. Wood) then read another paper on the same subject, written by Mr. J. Keegan, cabinet makers' secretary, Dublin, and another by Mr. Hutchinson (United Boiler-makers).

The following resolution was then unanimously carried:—

"Resolved, that this Congress pledges itself in the name of the respective societies represented, to aid and assist the London Committee of Amalgamated Trades in their laudable efforts to secure the legalisation and protection of trade funds, and hereby declares its firm determination to continue the agitation, and to make the support of this measure a condition for candidates for Parliamentary honours before giving any pledge or vote at the ensuing election."

Mr. Kane (malleable ironworkers) opened a debate upon the effect of trades' unions on foreign competition. The meeting, after the debate, adopted the principles of Mr. Kane's opening address by special vote. Mr. Bronfield (Sheffield) read a paper on "Trades' Unions and Political Economy."

Mr. C. Barker (letter-press printers) then read a paper on "The Factory Acts Extension Bill, 1867; the necessity of compulsory inspection, and its application to all places where women and children are employed." After the reading of this paper the Congress adjourned.

ARTISTS AND ARABS.*

FROM Marseilles to Algiers is but a forty-eight-hour's journey by steamboat. You step on board in the late autumn, say, and every hour's run brings you nearer to a new summer. When the voyage is only half accomplished, the sea that has been wintry sparkles and flashes with a smooth hosom; the sun that has been veiled and distant peers into everything and plays upon everything with an intense radiance; and by the time the famed "City of Pirates" is in sight, the genial atmosphere is sending a thrill of satisfaction through every vein. No wonder, then, that Algiers is spoken of with ecstasy by most who know its charms. The sunrises are scented as with mingled odours from orange-trees and violets; the sunsets seem to fill the earth with adoration; and the Moorish noon is a long, silent, solemn rapture of sunshine, coffee, and tobacco. Next to seeing the fair city the French call "*la ville du corsair*" for ourselves, we must account it a pleasure to view it through a painter's eyes. The *Hispaneur* is likely to give us his personal impressions; but the painter describes with the same simple desire to depict that he feels when he takes pencil in hand, subject to no more idiosyncrasy than his style renders inevitable. What we lose in word-power we gain in bare pictorial facts when an artist takes the trouble to tell us what he has seen. Mr. Henry Blackburn has been at these parts, and has shown us Algiers in much the same picturesque manner as in former times he showed us artistic "bits" of Spain.

* Artists and Arabs; or, Sketching in Sunshine. By Henry Blackburn. With numerous illustrations. London: Sampson Low, Son, & Marston, 1868.

After a summer's sketching campaign in the beautiful chestnut-wooded Val d'Aosta and a supplementary loiter on the north shore of Lago Maggiore, Mr. Blackburn and his friends—two or three,—tossed up to settle where they would winter; whether it should be in Spain again, or a Rome, or in Trebizond, Cairo, Tunis, or Algiers. The lot fell upon Algiers, and the next morning the party set out on its route. His account of the sea-voyage between Marseilles and Algiers brings vividly before us the effects of the change of climate upon all on board as the vessel neared the African shore. Bundles of old clothing that had lain about the deck, scarcely noticed, unwound themselves, and basked in the generous sun, goodly specimens of Oriental humanity; dark visages crept out from under tarpaulins, from behind boxes, and from other out-of-the-way places; till at least double the number of passengers that were visible on starting could be counted on board. The first view of Algiers that greets the straining eyes of the voyagers, is a low, dark line of coast, with a background of mountains. This shady, wavy line gradually turns to a golden shore in the twilight, with a single bright sparkle upon it; upon to "a little white pyramid or triangle of chalk, on a green shore, shelving to the sea; next, into an irregular mass of houses, with flat roofs, and mosques with ornamented towers and minarets, surrounded and surmounted by grim fortifications, which are not Moorish;" and then the French aspect comes into view, with its harbour, lighthouse, hotels, and Place. But Mr. Blackburn's business is with the Moorish or picturesque aspect of the place. After one afternoon passed in the Place Royale listening, in company with groups of French officers and their wives, Arabs and Moors, to the band of the Chasseurs d'Afrique, noting the arcades and shops around in Parisian models,—Orientalized, however, here and there, with such names as Mustapha over the doors,—taking count of the intrusion of the "Hausmann" style of architecture, and French names of the streets departing east and west of the Place, the mingling of the fashions of *le Follet* with the costumes of Arab women and children, the Caliph-like dress of the Moors, the flowing robes of the Marabouts and further distinctions peculiar to the Jews, and others again to the Kabyles, we are shown little more of the French. He takes up his abode in Moorish quarters, and sees more of the mosques and their frequenters than he does of the congregations of the Roman Catholic churches. These Moorish quarters are in the upper part of the town approached by narrow, climbing, slippery, crooked streets, and here there are "mysterious-looking old houses that meet overhead and shut out the sky;" open shops, in front of which are seated embroiderers at work surrounded by heaps of rich stuffs, or old merchant traders, cross-legged, calmly smoking; others full of festoons of dried fruits, red morocco slippers, or earthenware vessels of quaint forms; Moorish *cafés* which you may enter without question; an old Moorish hat of curious design, innumerable carved lattices, low doorways studded with massive bosses or nails, narrow windows with grilles, steps in the steep pavements; and ever and anon you encounter large soft masses of white gauze in these narrow streets, which are no less than veiled Moorish ladies taking the air. Among the curious scents of this densely-packed quarter, Mr. Blackburn mentions one that he and his friends were unable to account for. It was that made by a Moor in branding his donkeys, hehdominally, with his monogram. We give a sample of the colours with which our author paints this part of Algiers. Everything we purchase is odd and quaint, irregular or ornious in some way. Every piece of embroidery, every remnant of old carpet, differs from another in pattern as the leaves on the trees. There is no repetition, and herein lies its charm and true value to us. Every fabric differs either in patterns or combination of colours. It is something, as we said, unique,—something to treasure, something that will not remind us of the mill." The Arab quarter has its distinct features, too, and is rich in wares for sale that are artistically valuable, such as weapons with ornamented hilts, horse-gear of rondrous workmanship, women's trinkets, and algeero anklets, beads, corals, and piles of similar characteristic objects.

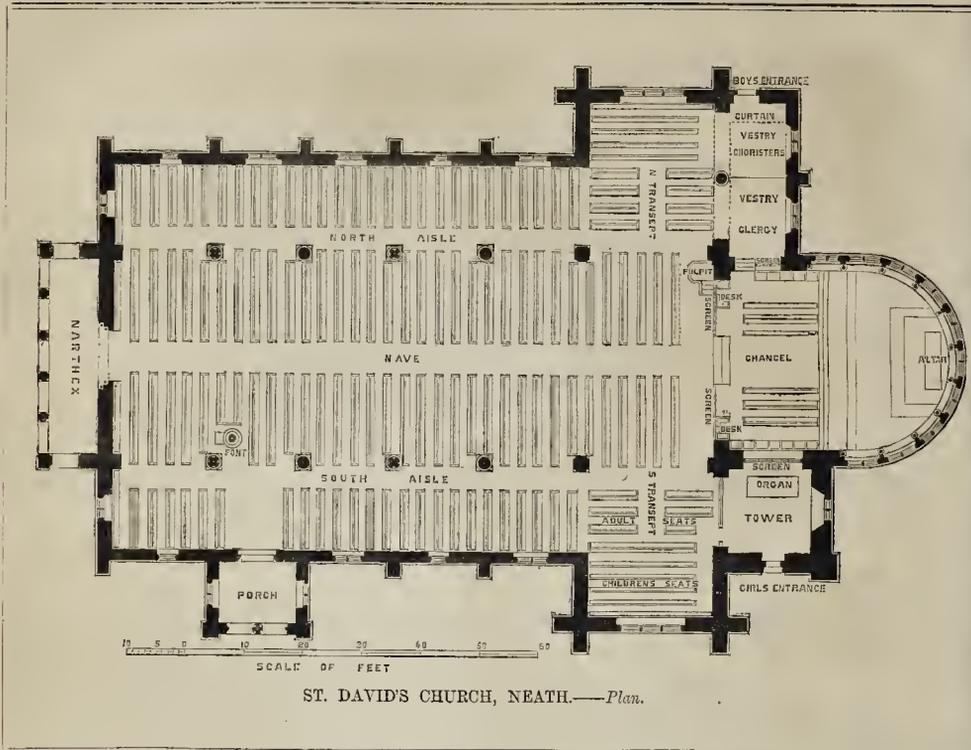
There is some little difficulty in getting models, especially females. Our author tells us that it was some days before he could hear of any one willing to sit for double the usual remuneration. At last he agrees with the father of a

Fatima for two francs an hour, which the hour considered poor pay. She is a little, fat, married woman, of thirteen years of age, with small hands and feet, and large rolling eyes, made to look larger still by the aid of henna, phlegmatic, yet restless, from an artist's point of view. Here is her portrait. "Her costume, when she throws off her baik (and with it a tradition of the Mahomedan faith, that forbids her to show her face to an unbeliever), is a rich loose crimson jacket, embroidered with gold, a thin white bodice, loose silk trowsers reaching to the knee and fastened round the waist by a magnificent sash of various colours, red morocco slippers, a profusion of rings on her little fingers, and bracelets and anklets of gold filagree work. Through her waving black hair are twined strings of coins and the folds of a silk handkerchief, the hair falling at the back in plaits below the waist." For all this splendour she is not beautiful, nor scarcely interesting; for an expression of "utter boredom" is the only one seen on her countenance. Our author apparently got on better with a Moorish Jewess, who presented herself one morning accompanied by her mother, whose disorderly appearance, dirty shawl, discoloured black hair, and bare feet, formed an extraordinary contrast to the queenly picture she presented when her toilet was completed. Her dress was more European in its shape than that of Fatima, having a flowing skirt and square-cut bodice without sleeves, but it resembled hers in the profusion of brocades, gold ornaments, armlets, necklaces, and rings. On her head was a tiara of gold and jewels, and on her feet tiny velvet embroidered slippers. She was more tractable than the other lady, but still unmanageable with regard to regular attendance. As sitters, our author speaks with more satisfaction of the camels than of either Jewesses or Moors. These creatures, if fed first, and the flies kept off them, will "sit" almost immovably through the live-long day, breaking its monotony only, occasionally, by a croak. "We should like to see," says Mr. Blackburn, "one or two of our popular artists, who persist in painting camels and desert scenes without ever having been to the East, just sit down here quietly for one day and paint a camel's head; not flinching from the work, but mastering the wonderful texture and alaginess of his thick coat or mane, its massive beauty, and its infinite gradations of colour. Such a sitter no portrait-painter ever had in England." Always on the look-out for pictorial effects, our author sees them where others would not. He says that colour and contrast seem to be felt everywhere to such an extent that no two Orientals will walk down a street side-by-side unless the colours of their costumes harmonize or blend together. This is, perhaps, saying too much. We can believe in rich colourings seen in the streets such as those afforded by a Negress selling oranges or citrons; an Arab boy with red fez or white turban carrying purple fruit in a basket of leaves, though we cannot follow our author so far as to allow that these occupations are chosen from a feeling for colour, as he would assert.

A blemish in the book is the fact that there is no date to it. We are quite in the dark as to how many years ago this winter was spent in Algiers. That it was not a very recent sojourn we find both in notes and in the text; but on this point there should have been more definite information. It detracts from the sense of freshness in the narrative to come upon passages such as "Years elapsed between our first and last visit to our favourite street, yet there they were (a row of eighteen Moorish gentlemen smoking before a *café*) when we came again still doing nothing in a row; and opposite to them the merchants who do no trade, also sitting in their accustomed places, surrounded by the same old wares." When the lapse of years is mentioned only a few pages from an allusion to a picture exhibited in the Royal Academy in 1867, which must have been seen to have furnished the illustration it afforded, some confusion is created, which is intensified when we come, further on, to a note bearing date 1857. Another blemish is the choice of subjects for the engravings. Of the models alluded to the author gives a camel's head and a negro, while the characters he describes more fully he omits. We must submit that a sketch of Fatima, for instance, would have been more interesting than that of a bride of whom we are told nothing, that is furnished by a French artist. There are groups of aloes and specimens of palms, besides a storm out among the tombs and palms and aloes; but not

many specimens of the workmanship of Moorish or Arab hands, save patterns of embroidery reproduced as vignettes. The great mosque rising almost out of the Mediterranean, and an interior view of the house occupied by the artists, are the best samples of Algerine architecture. This house is in a narrow street, the white walls of which nearly meet overhead. A low dark door, with a heavy handle and latch, gives admission to the open courtyard in the centre; and a narrow staircase in one corner of this furnishes access to the first or principal floor, which is furnished with an open gallery on its four sides, from which you can look down upon the courtyard below or up to the blue sky above. And there is an upper terrace or house-top from which the whole town is visible. This is what Mr. Blackburn says of the accommodation:—"The arrangement of the rooms round the courtyard, all opening inwards, is excellent. They are cool in summer, and warm even on the coldest nights; and, although we are in a noisy and thickly-populated part of the town, we are ignorant of what goes on outside, the massive walls keeping out nearly all sound. The floors and walls are tiled, so that they can be cleaned and cooled by water being thrown over them. The carpets and cushions spread about invite one to the most luxurious repose. Tables and chairs are unknown. There is nothing to offend the eye in shape or form; nothing to offend the ear, not even a door to slam. . . . Here we work with the greatest freedom and comfort, without interruption or any drawbacks that we can think of. The climate is so equal, warm, and pleasant, even in December and January, that by preference we generally sit on the upper terrace, where we have the perfection of light, and are at the same time sufficiently protected from sun and wind. At night we sleep almost in the open air, and need scarcely drop the curtains at the arched doorways of our rooms. There are no mosquitoes to trouble us, and there is certainly no fear of intrusion." By way of contrast to this sunny state of things the author glances to the condition of a friend in Gower-street at the same season of the year, with the depressing street, dreary with damp mud and dotted with gaunt lamp-posts, stretching to the right and left of him, and sums up with an invitation to all who would study comfortably to come to Algiers. A large number of French artists seem to have preceded Mr. Blackburn. We know, of course, that it was here Horace Vernet tarried; and learn that other artists of distinction annually study here. With but a few notable exceptions these French artists, however, remain closely closeted, "copying and re-copying fanciful desert scenes, such as camels dying on sandy plains, under a sky of the heaviest opaque blue, and with cold grey shadows upon the ground; drawing imaginary mausoleums on impossible house-tops; and, in short, working more from fancy than from facts;" doing, in fine, as flourishing an export trade as the photographers. Our author does not begrudge them their pecuniary success, and speaks very kindly of numberless civilities received from them; but, as his own sympathies are with open-air studies from the life, camping out on mountain tops for the sake of the knowledge of a mountain side, and spending days in half-deserted cemeteries for the sake of the aloes, palms, cacti, shrubs, flowers, and palm-trees, he looks with some slight upon their "hot-bolling" proceedings.

The book gives a clear notion of Algiers. Not because of any great literary skill, to which there is no pretence, but by virtue of the artist's knack of depicting things as he sees them, combined with the author's acceptance of the superiority of out-door sketching from life, carried out in his text. His prominent idea is that we may, if we like, realize much of our ideal of beauty and happiness in this world, and that the place to do it in is Algiers. The "City of Pirates," or as the French call it, the "Diamond set in Emeralds," he declares, is perfect as a residence for artists; cheap, without many taxes, cares, or "distractions;" and with splendid opportunities for study of nature, character, the civilization of the East, as well as of the West, varied costumes, and a grand architecture. But it is the solitary country in the neighbourhood of Algiers that he most strongly recommends. In one excursion he spent some time in a tent pitched nearly 3,000 ft. above the level of the sea, in the mountain scenery around Medeah. And he made another sketching excursion among the Djurura



ST. DAVID'S CHURCH, NEATH.—Plan.

mountains, where, about sixty miles from Algiers, at a similar altitude, the French were building a fortress to protect their colonists, and keep the Kabyles in check. Some of the Kabyle villages were still smouldering when his tent was pitched upon the heights of Beni-Raten. Here the Mediterranean was visible, apparently above the purple hills, and higher than all around, save a few snowy peaks, conveying a wonderful sense of height and distance. In Algiers, there is, perhaps, a temptation to too much luxury, to too much dreaming away of time on Turkey carpets, on terrasses: too much scent of henna, too, he speaks of, and of too strong a flavour of coffee and tobacco. But a few months spent among the mountains braco frame, eye, and mind alike. The longest journey that he would suggest to an artist to make in one winter, however, is to the cedar forests of Tomet-el-Hâd, because too much travelling is incompatible with work. These cedars, supposed to be "the wildest, and most wonderful to be met with in any part of the world," have hitherto only been sketched by our own countrymen and countrywomen, for French artists have not as yet tired of the luxuries of Algiers. We reiterate that those who cannot visit this famous city may make themselves familiar with its aspect by means of Mr. Blackburn's volume.

ST. DAVID'S CHURCH, NEATH, WALES.

THE town of Neath, containing a population exceeding 8,000, has been, till recently, sadly deficient in the matter of church accommodation. The old parish church, supposed to be the ancient garrison or castle chapel, was so small and inferior a structure, that but a small proportion of the mixed population could avail themselves of the privilege of church services, and this evil was still further increased by the existence of faculty pews.

During the years 1866-7, a noble effort was made by the inhabitants to meet the growing requirements of a rapidly increasing population. A central site was given by Mr. Howell Gwyn, M.P., of Dyffryn, a liberal contributor to the new church. The Rev. John Griffiths,

whose energy is known throughout the principality, supported by a committee of the principal inhabitants, has succeeded in completing the new church of St. David, with the sole exception of the upper portion of the tower and spire. A fund to complete this feature, has been raised, headed by a donation of 500*l.* from Mr. Nash Vaughan, a liberal churchman, who has largely contributed to this work, in addition to the erection of a church on his own estate.

The population of Neath being bi-lingual, the rector has determined to devote this as a free church, open alike to rich and poor, who prefer the English service, the old church being devoted to Welsh services.

The church has been recently consecrated, and comprises a nave with aisles, north and south transepts, the former with an eastern aisle; chancel with circular apse, and a tower on the south side of chancel. A narthex at the west end extends the entire width of nave, and there is a porch to the south. The nave is 100 ft. long by 32 ft. wide, and 39 ft. high to the plate, and 62 ft. to ridge, and consists of six bays in length: the easternmost arches, being wider and higher than the rest, form the crossing of the transepts.

The arches are formed of concentric rims of stone and brick, supported alternately by circular and clustered columns, with moulded bases and foliated capitals, of an early French type, under square abaci. The nave is lighted by lofty clearstory comlet windows. The west window is formed of four lights, with geometrical circles in the head, and is moulded internally and externally.

The aisles have lean-to roofs, and are supported by stone and brick arches, forming flying buttresses to the external walls. Each aisle is 13 ft. wide, and 13 ft. high at plate. The bays are marked by projecting buttresses, carried up through panelled parapet, and are surmounted by octagonal pinnacles.

The transepts are 21 ft. wide, and project 10 ft. from the nave, and are 47 ft. high to the ridge. In the gables are lofty three-light geometrical windows. An arcade filled in with screenwork, separates the north transept from its aisle, forming vestries for the clergy and choris-

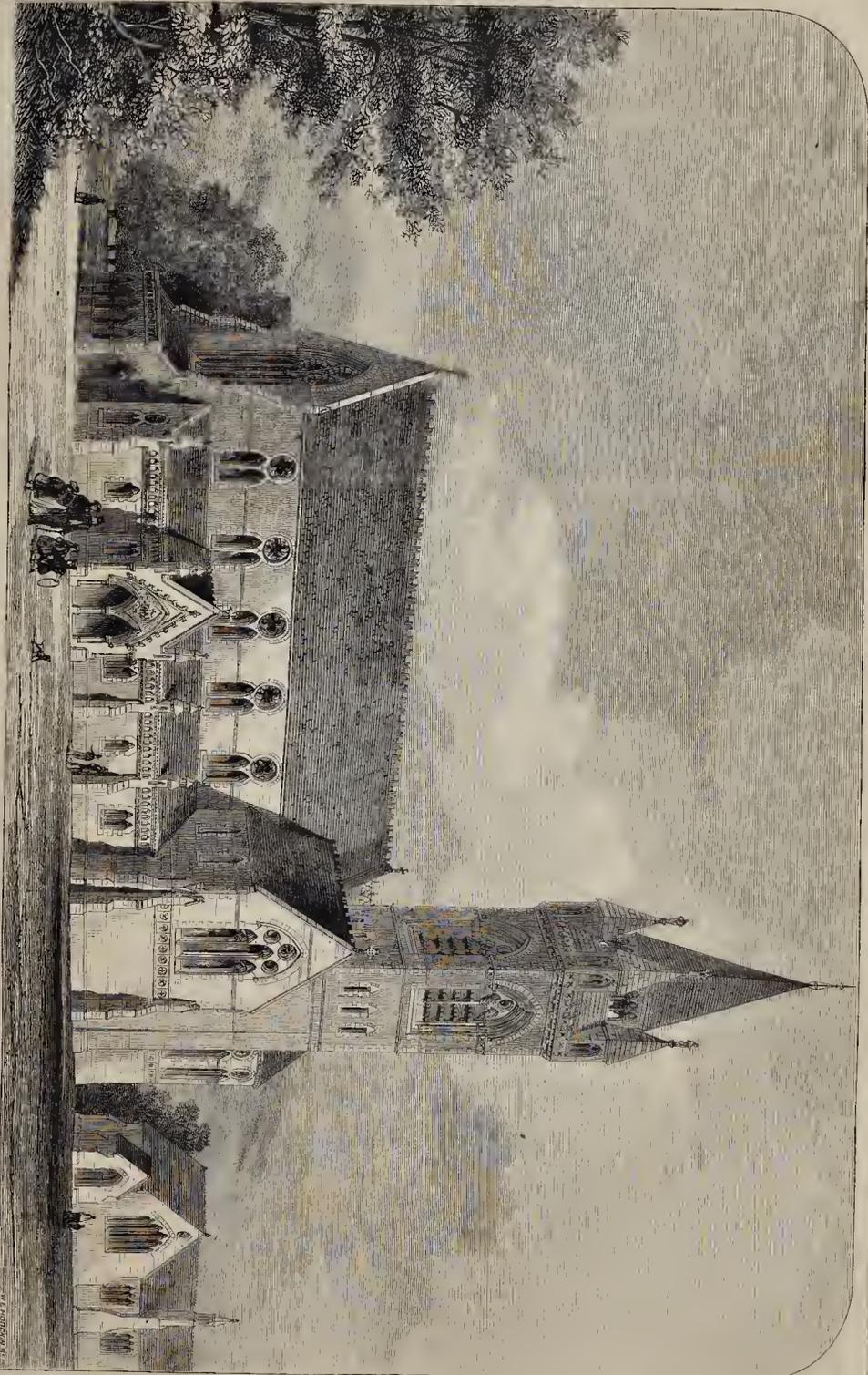
ters. The tower, which opens into the chancel and south transept, forms the organ chamber. The chancel is 40 ft. long, 29 ft. wide, and 48 ft. to panelled roof. It is raised three steps above the nave, and separated therefrom by a low stone screen, under a chancel arch, 41 ft. high, formed of rims of richly moulded stone and brickwork. The apse is further raised by seven steps, and is lighted by ten comlet windows, with traceried heads, which form a continuous arcade round the apse. A carved stone reredos fills the space between the altar and the apse windows.

The two chief entrances are at the west, by means of an open arcaded narthex, 9 ft. wide, and the south porch fills the second bay from the west, and is entered through a lofty arch, subdivided into two openings. The spanrel contains a large vesica, in which is carved a representation of the preaching of St. David. The tower forms a handsome feature, connecting the apse with the south transept, and is 20 ft. square, and is carried up without buttresses to a height of 95 ft., where it terminates in a bartlemated parapet, with angle tourelles, the spires of which terminate with statues of the Evangelists. The lower part of the spire forms an irregular octagon, supporting a stone arcade, which carries the spire, formed of timber, and covered with Staffordshire tiles.

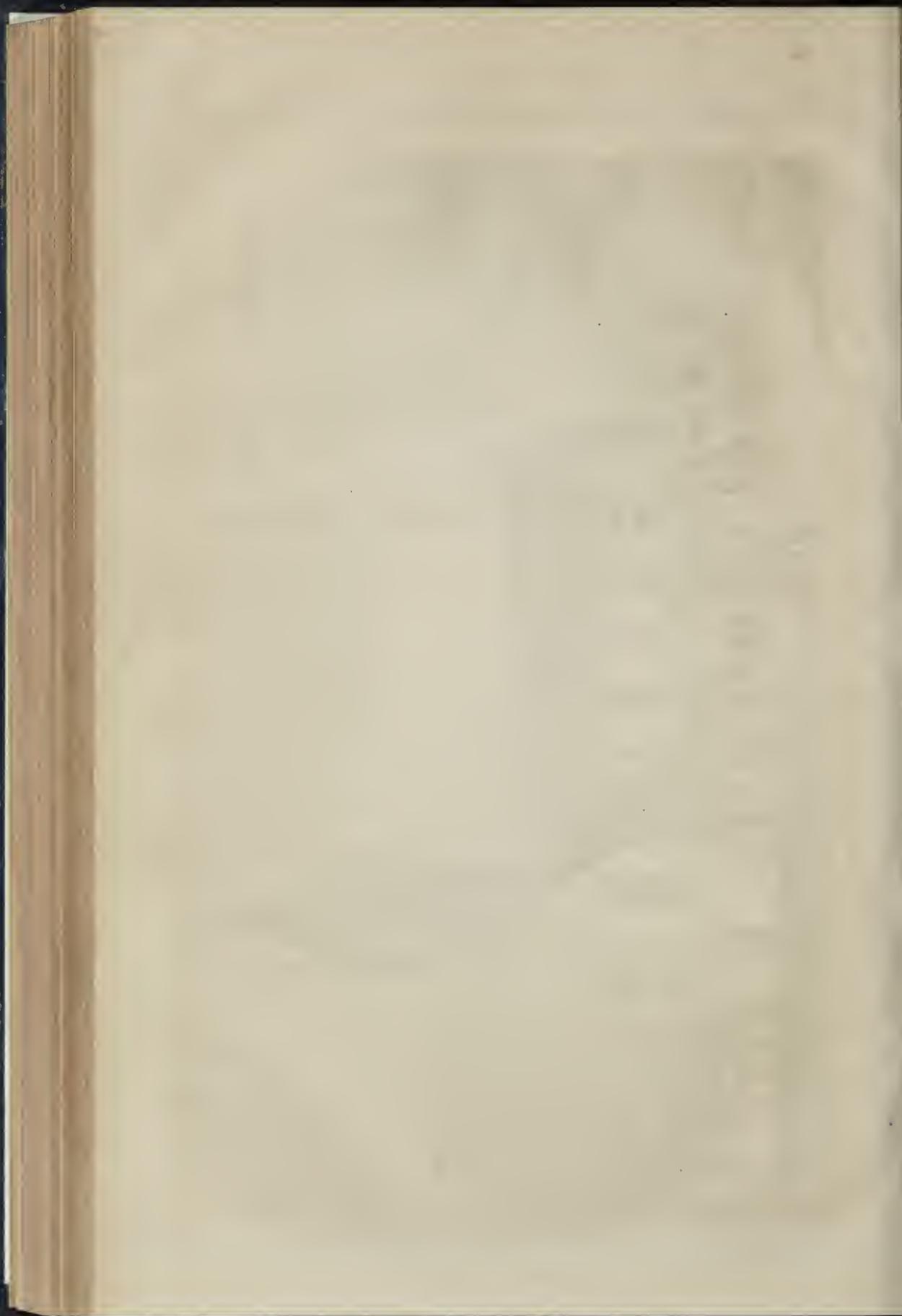
The stone employed in the erection of the church is from the Kidcoed quarry, with bands of red sandstone, and the dressings throughout are of Bath stone. The roofs are of fir, covered with Broseley tiles. Internally the church is lined with local red bricks, varied with Staffordshire blue bricks. The whole area, internally, is floored with tiles. Open benches provide accommodation for 1,200 worshippers. Messrs. Hall, of Bristol, furnished the gasfittings, the nave being lighted by wrought-iron corona, suspended from the arched principals of the roof, the chancel, by a large corona and standards rising from the stone screen.

Haden's system has been adopted for warming. Messrs. Gray & Davison have supplied a powerful organ, at a cost of 400*l.*

The general contractors were Messrs. Jones & Sons, of Gloucester. The architect was Mr. John Norton. The cost was 7,000*l.*



ST. DAVIDS CHURCH, NEATH, WALES.—MR. JOHN NORTON, ARCHITECT



COMPETITIONS.

Slough Church.—The competitive designs for the new parish church of St. Lawrence, to be erected at Slough, have for some days been on view in the High-street. There are eleven sets of plans, some of which possess considerable merit. A design which has for a motto an open book with compass and square has been well spoken of. So has one marked "In Cruce spes." The third favourite is marked with a double triangle in a circle. The sum to be expended is 10,000*l.* The committee have called in Mr. Christian to aid them in the decision.

Alston Parish Church.—The first premium for improving the parish church of Alston, Cumberland, has been awarded to design by Mr. T. Oliver, architect, Newcastle; the second to Mr. T. C. Ebdy, architect, Durham. The drawings are to be submitted to the "Incorporated Church Building Society" for final decision.

ROMFORD DRAINAGE COMPETITION.

The award on the competitive plans for these works has been given in favour of Messrs. Russ & Minns, Parliament-street, Westminster, and their plans are about to be carried out under their directions.

The sewage is to be carried by gravitation on to land, nearly three miles from the town, and employed in irrigation. Mr. Beardmore was employed by the Board as consulting engineer, and the decision arrived at is in accordance with his report and recommendation.

SCHOOLS OF ART.

The Nottingham School.—A public meeting for the distribution of prizes has been held in the hall of this school. The chairman read the following—

Comparative Statement of the Result of the Government Examinations of 1867 and 1868.

Subject.	1867	1868	Increase for 1868
Freehand drawing—			
Number passed.....	18	14	36
Number of prizes for excel- lence.....	11	24	13
Practical Geometry—			
Number passed.....	30	43	13
Number of prizes for excel- lence.....	14	18	4
Perspective—			
Number passed.....	18	21	3
Number of prizes for excel- lence.....	7	13	6
Model drawing—			
Number passed.....	34	44	10
Number of prizes for excel- lence.....	6	14	8
Mechanical drawing—			
Number passed.....	4	5	1
Number of prizes for excel- lence.....	nil	2	2
Full certificates for having passed in the first four sub- jects.....	9	19	10
Total number of papers passed..	144	207	63
Total number of prizes for excel- lence.....	38	71	33
Total number of students examined.....	300	366	66
Total number of successful artisan students.....	132	178	46
Amount of Government Grant on artisans for examinations only	206	289	223

Mr. Rawle, the head-master, addressed the meeting, or rather the students, encouraging those who had not won prizes and congratulating those who had. He called attention to the vacation prizes offered for competition, the number of which was greater than last year's and of more value. In all there were twenty-nine prizes, some of 5*l.* 5*s.* There was also a special list of prizes for ladies, who last year, he said, had worked very pluckily. The subject of technical instruction concluded the address.

The Birkenhead School.—The annual meeting of the subscribers and friends of this school has been held at the Institution, Hamilton-street. Mr. James Taylor presided, and there was only a very small attendance. Mr. Hinde, the secretary, read the annual report, which stated that, in 1865, the Birkenhead School of Art was established, and, although worked under many disadvantages, it had been eminently successful, and had fully contributed its quota to art-education. The best answer to a statement publicly made that the school was used by a

class for whom it never was intended, was the fact that, of the students attending evening classes of the school since its establishment in 1862, 259 were workers in iron, 109 workers in wood, 77 bricklayers, plasterers, and masons; 44 house painters and plumbers; 52 architects' apprentices, school-masters, and governesses; 41 sundry trades; and 53 school boys and girls; making a total of 659. There had thus been benefited thirty different branches of trade, and no fewer than 415 prizes of different grades, including five Queen's prizes and 105 medals from the Science and Art Department, had been received by the pupils. The committee were desirous of erecting a better and more suitable building for the purposes of the school, and hoped that in time this might be accomplished. The report concluded by tendering the thanks of the committee to Mr. Bentley, the master of the school, for the attention he had manifested. Since 1861 the number of students was 6,034, of whom 223 (attending the morning classes) had paid 701*l.* for instruction, or about 3*l.* 8*s.* each; and 832 attending the evening classes had paid 449*l.*, or 13*s.* 2*d.* each. The chairman remarked that he had been informed by Mr. Bentley that upwards of 400 drawings, the works of the students, had been sent up to London; and he hoped that many prizes would be awarded to the Birkenhead competitors.

PROPOSED PORTRAIT OF MR. TITE, M.P.

At the meeting of the Institute on Monday evening last, a letter was read from Mr. Tite, the President, discouraging (in very handsome terms) a proposal which had been made for the presentation to him of a testimonial volume, in acknowledgment of his recent donation of 500*l.* to the library. Mr. Kerr remarked that, to put the matter plainly, it was the feeling of members that Mr. Tite's portrait, like the late Mr. Cockerell's, ought to be placed in the rooms. Mr. Marrable supported the proposal, and it was received with universal approbation as a recommendation to the Council. Not only the liberality of the honorable gentleman to the library, but his readiness to aid the Institute and the profession in every way, as well as the high public position which he so worthily occupies, as the reward, we may say, of professional eminence, will, we doubt not, make this a very popular proposal, and we hope it will be well carried out.

PRIZES TO ART-MASTERS.

We are informed that the Lords of the Committee of Council on Education have awarded to Mr. W. G. Muckley, head master of the Manchester School of Art, the first prize for the best report referring to instruction in art, as suggested by the industrial arts of the Paris Exhibition last year.

FURTHER ACCOUNTS OF DAMAGE BY THE LATE THUNDER-STORM.

The steeple of St. Stephen's Church, South-wark, was struck by lightning. The top of the steeple is covered with tiles, which were stripped off, but no further damage was done.

The lightning struck the premises of a linen-draper, in Church-street, Dalston-lane. The electric current first caught the chimney-stack, and running down the wall passed through the conservatory, completely shattering the roof.

During the storm a wooden house in East-street, Bromley, was struck. In the upper part of the house one of the weather-boards was thrown to a considerable distance; the lightning then entered the upper room, where it did some damage to the fireplace. It then passed to a lower apartment and through the wall, tearing off another of the weather-boards. About the same time the house of a brazier was struck; part of the wooden framework over the window was destroyed, and many panes of glass broken.

The temporary Congregational Church at Buckhurst-hill, near Woodford, was struck. It was instantly in a blaze at the apex of the roof. Some workmen brought ladders at once and extinguished it with water. Three or four houses on the hill were also struck.

The lightning struck the gable end of a new house in Gladstone-street, Chesterfield. The bricks were hurled from their places, and the roof was

completely lifted up. It passed through the ceilings of both back and front bed-rooms, stripping the plaster off the walls on the staircase, and afterwards went through the huck window. There were nine persons in the house at the time, but fortunately they were down-stairs and received no injury. At about the same time a large oak tree, a short distance off, was split.

Two seamen belonging to a hulk lying off Rotherhithe were struck by the lightning. One of the men, who was clasping an iron bar, is dreadfully injured, having nearly the whole of one side scorched from head to foot. The other man remained totally blind for several hours. A man was killed in the east of London while combing his hair before a looking-glass.

At Doncaster, a gardener, who was in the open air, was struck by the lightning, and only slightly hurt, but the windows of a cottage near him were broken.

As to the fall of supposed meteoric stones in Birmingham before alluded to, it appears that there was an immense number of these stones, all of very small dimensions, the largest being 3/4 in. in length. They are said to resemble fragments of Rowley ragstone. The most singular thing connected with them, were they really meteoric, is the fact that in June, 1858, the very same thing happened in the same town, also during a thunderstorm. May they not have been carried up by an electric whirlwind from some local ragstone quarry, and showered into the town on both occasions? It is scarcely credible that such an occurrence could in both cases have taken place in one and the same town had the fragments been meteoric.

That electric disturbances are more active and powerful than usual, not only in England but in various parts of the world, seems evident from the events both of last year and this year.

VENTILATION.

The ventilation of the Old Men's Dormitory in the Truro Union workhouse, Cornwall, is described to us as being very satisfactory. It is at any rate very simple. The dormitory, containing forty beds, is one wing of the house, and has two external walls. Three perforated zinc tubes, about 3 in. in diameter, open at each end to the atmosphere, placed at equal distances, pass across from side to side nearly close up to the ceiling, and thus constant circulation is kept up, without, as we are told, any perceptible draught in any part of the room. The master of the workhouse says the result is excellent:—"No foul air is to be found in the dormitory at any time."

PROPOSED NEW CHURCH IN PARISH OF ST. PANCRAS, LONDON.

A NEW church of a large size is about to be commenced forthwith in Kentish Town, on an elevated and excellent site presented by Christ Church College, Oxford. Independently of the site being gratuitous, funds are already provided,—it is said, about 15,000*l.*—for the erection of an edifice which would do honour to the parish. The money has been obtained from the Midland Railway Company in compensation for the church in the Euston-road, of which the Rev. Mr. Andrews was incumbent. This church was pulled down in order to form part of the new station now in progress, and Mr. Andrews will be the incumbent of the new district in Kentish Town.

It is essential, however, that more light be thrown upon a part of the subject which interests both architects, builders, and parishioners; for it is stated that the vicar has appointed his own son to be the architect, who is about to undertake this work as his "first job," and intends to provide a builder from Cardiff to execute it without competition.

Nothing is implied against the young architect, simply because nothing is known about him, except that he is wholly inexperienced; and in such an important matter the vicar should surely even now put him into double harness, to prevent the possibility of a mess. The late vicar, Canon Dale, would have appointed Mr. Johnson, who was the architect of the church pulled down, and also of the churches in Oakley-square and Camden-square; but some say it would have been but an appropriate return for the gift of the site if the vicar had appointed the surveyors of the College Estate, who by education and

experience are well qualified to carry out the work with credit. They say "a man never sees clearly when he has got the sun in his eyes," and it is feared that the worthy vicar's vision has been somewhat dazed in this way.

Then, again, are there no builders worthy of this work in great St. Pancras? Have the Cnabits, the Mansfields, and many others, shunt up their shops? The appointment of a Welsh builder seems a questionable act. Tenders should be invited in the usual method. The parishioners have clearly a right to a voice in this matter, for it was by their subscriptions that Mr. Andrews's church was built, and this one is to be erected identically with the same funds, returned and increased by the railway company.

THE PURIFICATION OF RIVERS.

Huddersfield.

The Borough Engineer to the Improvement Commissioners of Huddersfield, writing to Mr. Rawlinson, says,—

"I thought it might be interesting to you to know that this river, which, up to the time of the inquiry held by your commission in Huddersfield, was in so dreadfully polluted a state that nothing could live in it, is now so much improved that large quantities of young fish have been seen in it within the last few days, and I have myself seen scores of boys fishing at the weir near to the brewery in Lockwood no later than Saturday last. From inquiries I have made I understand that large quantities of young trout have been seen, as well as numbers of eels. This, I think, proves that the inquiry has done some good in inducing, without compulsion, parties to keep their refuse out of the streams."

A useful lesson may be learned from this example, namely, that to keep solid refuse out of rivers, will immediately improve the condition of the river's bed, and also of the water. The solids of sewage,—or rather solids washed from sewers, it is evident, produce a large proportion of the mischief. At Birmingham the depositing tanks intercept some 30,000 tons of refuse annually. The Metropolitan Board of Works pass into the river Thames from their new intercepting sewers (if at a similar rate to Birmingham in proportion to area and population) not less than 300,000 tons of solid matter per annum. No wonder that the river is shoaling at, below, and above Barking Creek, and also fouling under the effects of such masses of refuse washed from the metropolitan streets and roads. It will be better and cheaper to prevent this vast mass of refuse entering the river, than to suffer from the effects of pollution and pay for dredging.

THE BELLS OF THE CHURCH OF ST. SAVIOUR, SOUTHWARK.

NEAR the south foot of London Bridge stands the noble and very interesting Church of St. Saviour—formerly the priory of St. Mary Overy—which ranks first in magnitude among the parish churches of the metropolis. Its massive tower contains a grand peal of twelve bells, the weight of the tenor being 5½ cwt., and its note B.

The following are the respective notes and weights of the bells:—

No.	Note.	Weight, cwt. qr. lb.	No.	Note.	Weight, cwt. qr. lb.
1	F sharp	7 1 20	7	G sharp	13 2 4
2	B	7 3 20	8	F sharp	17 1 21
3	D sharp	7 3 0	9	E	19 0 21
4	C sharp	9 0 10	10	D sharp	25 3 21
5	B	10 0 14	11	C sharp	34 1 2
6	A sharp	11 0 16	12	B	51 2 0

This church formerly possessed a peal of eight bells; weight of tenor, 46 cwt. 3 qr. 21 lb.; but in 1735 these were re-cast, with additional metal, by — Knight, of Winchester-yard, near the edifice, and made a peal of twelve, which was first rung by the College Youths, on Saturday evening, the 2nd of August, in the same year.

The tenth and eleventh of this peal were re-cast by Messrs. Mears—the former in 1844, weight 24 cwt. 3 qr. 7 lb.; the latter in 1820, weight 32 cwt. 0 qr. 24 lb.; and Messrs. Warner have lately repaired the gear of some of the bells.

It should be mentioned that the College Youths have rung many remarkable peals on these bells, some of which are recorded on the tablets placed in the hofry; and that certain members of that respectable society still ring here on special and joyous occasions.

A band of ringers also meet in the belfry for practice on alternate Tuesday evenings.

THOMAS WALESBY.

PANIC IN BUILDINGS.

I SAW a notice in the *Builder* of what threatened to be a serious disaster at Brighton, from a panic-struck congregation rushing to the only door left unlocked, to escape from what they supposed to be a falling building. Though fatal accidents from falling buildings are rare, panics from those supposed to be falling are not, and the danger from them is greatly increased by the obstinate stupidity so often shown of providing insufficient channels of egress, or, as in this case, locking all the doors but one. A very common fault is having the doors made to open inwards only; so if there be a rush to escape, the door may easily be held fast by those striving to get out. Nothing can well be easier for architects with brains than to have doors free from this most dangerous defect at all places liable to be crowded, such as churches, theatres, and meeting-halls; and it would not be very difficult, and would be convenient always and of vital importance in emergencies, if as many doors opening outwards were provided as there is room for through the outer walls, by which the crowds could always quickly depart, while the risk of a dangerous rush would be almost entirely prevented. It would be easy to fasten such doors so as to prevent their being opened from without, but very easily opened from within, so that a crowd frantic from fright could always escape.

P. H. HOLLAND.

SPREAD OF FIRE.

WILL you allow me space in your columns to invoke, if I may have that good fortune, the more earnest attention of your many professional readers to the losses which take place in this country by fires of valuable and interesting property (relics of the past) owing in great measure to the nature of our buildings. It seems strange that whilst men's minds are so largely devoted to improvements and inventions, very little—if any—attempts has been made to improve on the principle on which houses are built as to confine fire to the particular region in which it originates, or even to arrest fire and bring it under better control. It occurs to me that the present mode of battening is the most destructive that could be adopted, the spaces between the battens constituting a series of flues as well as conductors around each room, carrying fire with fearful rapidity to the room above, and thence to the roof. Could not walls be equally well battened by placing the battens horizontally instead of perpendicularly and thus checking, if not absolutely stopping the progress of fire? Sufficient open spaces might be left for ventilation; improvements might also, I should think, be made in the framework of partitions.

The burning of large mansions with their valuable collections was occupying my mind, but street architecture is also of the greatest importance, and for the latter no such opportunity ever existed in this country (notwithstanding the early visit paid us by the Romans) as the present, when any inexpensive modes of preventing or checking fire which can be suggested might be incorporated in the code of rules established by Local Boards and made compulsory.

EDILIS BRITANNICUS.

POSTAL DESPATCH.

THE conveniences and comforts of life are made up in a great degree of trifles; so, also, it is by the careful attention that is now-a-days given to matters of minute detail that the immense and increasing business of this great country is kept in motion with such surprising regularity. No department of the public service is perhaps more important, relatively, than the postal; and it is here that I would suggest an improvement.

Observe the thousands of letters delivered daily in every large city and town. Notice in all weathers,—in blinding snow or driving sleet, in wind and rain, by night and day,—the patient and ever-civil and cheerful postman (our modern Mercury) standing at the doors of dwellings with no response to his knock or ring. The servant is up-stairs or in the cellar, or the inmates are from home, and the postman waits. Legislation has touched the naming of streets and the numbering of our doors. Why should not touch the postal system, and, by securing

more despatch in the delivery of letters, save many an anxious waiting, many an unfulfilled engagement or missed train, because our Mercury has been "kept out in the cold" by our thoughtless neighbours? To save trouble in head-quarters, I beg to present a draft of my little bill; and, if the Postmaster-General will get it put into due form, and also into practice, he will deserve still further our thanks:—

"Whereas much unnecessary delay occurs in the delivery of letters, and thereby is incurred by her Majesty's subjects much inconvenience, annoyance, and loss; now therefore be enacted that on or before the first day of November next, every inhabitant householder occupying any dwelling or other premises of the annual rateable value of 10l. and upwards, shall, in the door of such dwelling or premises, or near thereto, or in some equally convenient place, provide, fix, and maintain a suitable receptacle for letters; and every person making default herein shall, upon information of any postmaster, and proof and conviction before any magistrate, be liable to a penalty of five shillings per day for every day during which such default shall continue. *Vivat Regina*, also the Postmaster-General."

JOSEPH BRIERLEY.

MÜNSTER, WESTPHALIA.

As your valuable paper has often been the means of preventing the destruction of works of art, I write to inform you of an act of barbarity about to be perpetrated in this ancient and interesting city. The magnificent rood-screen which adorns the cathedral here is, I regret to state, about to be demolished,—in fact, a portion of it has already been removed. This is more surprising, as the people of Münster have shown a laudable zeal and great taste in the restoration of many of their churches, and I cannot but fear that this contemplated destruction is the result of a false idea that a late Gothic screen is out of place in a Romanesque church. I will make further inquiries, and let you know the whole history of the matter, should you consider it of sufficient importance for publication.

H. W. BREWER.

P.S.—I have made a careful drawing of the screen in its present condition.

A QUESTION OF MEASUREMENT.

SIR,—Will one of your correspondents point out a good method of finding the content of a conical heap of ballast. I have already tried Peddie's and Nashitt's systems, finding some difference in the results?

	Dimensions of Ballast Heap.	f. in.
Girt at base	133 0
Girt at top	88 0
Height	9 6
A WORKING MAT.		

A QUESTION CONCERNING SINK TRAPS.

SIR,—I believe that my difficulty, which I request you to solve, is shared by most householders, and that the information which I ask through your columns may be useful to many persons who, knowingly or not, are subjected to great inconvenience and risk through the neglect or obtuseness of servants with regard to the management of the scullery sink-drain.

This "bell-trap" was invented for the purpose of preventing the effluvia escaping from the drain into the house, but in consequence of the stupidity or stupidity of servants the grating in the sink is removed, and the "bell-trap" gets clogged up; that necessitates its removal, and the escape of noxious gases takes place. This doubtless is the cause of the unpleasant smells which are often noticed coming from the basement, but for which annoyance the servants always have a ready excuse in order to hide the true cause.

Now some bell-traps are fixed immediately under the grating in the sink, and that is the reason given for not having the grating fastened down, as the trap gets quickly filled with sand, &c., and requires constantly clearing. Would not that difficulty be obviated if the bell-trap were to be fixed under the bricks or stones just level with the flooring? It may be useful to call attention to the defect at this season, as many householders exercise no control or supervision over their servants in these matters; and the health and even the life of many individuals may be jeopardized through their neglect in such simple, salutary matters as their upon which I now ask an opinion.

M. A. B.

WASTE LAND.

SIR,—I wish to be informed whether a local Board has power to take all waste land in front of property. A member of our board says that all waste land in front of property once dedicated to the public becomes public property for ever. As this is causing a deal of trouble here, I wish you to explain the matter.

A BUILDER.

High Crompton, near Oldham.
* * * Look to the Act of Parliament.

THE BUILDERS' BENEVOLENT INSTITUTION.

A GENERAL meeting of the friends and subscribers to this charitable institution was held at Willis's Rooms, King-street, St. James's, on Thursday, the 28th ult., for the purpose of electing two pensioners on the fund, — one male and one female, — from a list of nine candidates. Mr. W. R. Rogers (president) occupied the chair, and expressed his regret that they were not then able to elect a greater number, but hoped that the funds would allow another election in the present year. The amount of stock is 11,200*l.* 15*s.* 3*d.* for the Relief Fund, and 2,920*l.* 4*s.* 6*d.* for the Building Fund, making a total of 14,120*l.* 19*s.* 9*d.*

At the close of the poll the following were declared to be the successful candidates: —
G. H. Michelmore, 74, St. Peter's-street, Islington, aged 75; and Maria Curwin, 4, Eden-terrace, Bridge-road, Battersea, aged 67, widow of a builder.

NATIONAL COTTAGE HOSPITAL FOR CONSUMPTIVE PATIENTS.

THE inaugural dinner of a benevolent society, founded for the reception of consumptive patients from all parts of the kingdom, on the separate or cottage principle, has been held at the City Terminus Hotel, Cannon-street. The chair was occupied by Sir Lawrence Peel. The company present numbered about 100. The patients will be scattered through a series of cottages, or villas, situated near Ventnor, in the Isle of Wight, in a locality well sheltered from the prevailing winds. They will be of an ornamental character, designed in harmony with the surrounding scenery, constructed upon the most approved sanitary principles, and surrounded by gardens. The erection of sixteen cottages is contemplated; each cottage to furnish hospital accommodation for six persons; and the cost of building will be about 600*l.* A piece of land, of over six acres in extent, has been secured, commanding a fine view of both land and sea. It is intended, after the pattern of the Bournemouth Sanatorium, that this National Cottage Hospital for Consumption and Diseases of the Chest shall be in part self-supporting. The Ventnor Hospital, as it will be called, though situated in the Isle of Wight, will be by no means a local institution, it being designed for the admission and relief of patients from all parts, and of all denominations; and the pecuniary support obtained being derived from the whole kingdom, the hospital will be entitled to be regarded as a national institution. The plans for four "cottage hospitals" have been accepted, and their construction is to be immediately commenced. At the meeting the subscription list was read: the amount subscribed amounted to over 2,500*l.*

NOTES IN THE HOUSE OF COMMONS.

MR. B. HOPE called attention to an advertisement of the sale by auction of the colonnade, frieze, &c., of Burlington House. He contended that the Government ought to re-erect the colonnade and the archway in some of the public parks. Lord J. Manners said if the hon. gentleman would communicate with him privately he would attend to his views. Mr. D. Griffith thought a more serious answer should have been given. Since then the colonnade has been withdrawn from the sale.

The Thames Embankment (Chelsea) Bill has been read a third time. Mr. Tite stated that the Metropolitan Board of Works expected to raise 260,000*l.* on the further continuance of the coal and fire duties for six or seven years; and if the Government would consent to a small enlargement of the guarantee it had already given, there would be no difficulty about the finance of the work.

A desultory and grumbling discussion took place in committee of supply, on the vote of 141,690*l.*, to complete the sum necessary for salaries and expenses of the Department of Science and Art, and the establishments connected therewith. Lord R. Montagu explained that there was a total reduction in the vote for the present year of 20,000*l.* Mr. B. Hope said that doubtless the expenditure of this money was necessary for the existence of the provincial schools of art as well as the department at South Kensington, and whatever might be its faults, he could not help bearing testimony to the great energy and zeal displayed by all connected with the department. What he should like to see was one central administration, embracing the British Museum, the Science and Art Department, and

the Board of Works. Colonel Sykes said that 7,132,000 persons had visited the Museum since it was opened, and he believed that by supporting an institution of that character they were doing more for the instruction of the people than all the elementary schools in the country. Lord R. Montagu, in reference to objections made as to the publication of the art catalogue, said that the total cost of it would be 8,000*l.*, and the House had not objected to its publication in connexion with *Notes and Queries*. As to the South Kensington Museum, it must not be regarded as a local but a national institution. The plans of the Museum had been laid on the table. The buildings had cost 195,000*l.*, and he knew of no other building being in contemplation. He did not believe any one would begrudge Mr. Cole an addition of 300*l.* a year, which was proposed. The vote was agreed to, as were also 6,063*l.* (to complete 9,063*l.*) for the University of London, and 10,992*l.* (to complete 15,992*l.*) for the National Gallery.

FATAL FALL OF A CORNICE IN SHEFFIELD.

A HEAVY cornice in High-street, Sheffield, nearly opposite the Post-office, has suddenly fallen, without any previous appearance of instability, killing one person, and severely, if not fatally, injuring others. The cornice belonged to a block of three houses, erected twenty-seven years ago, and which had not shown any signs of insecurity or weakness, although a plate-glass shop-window had been unaccountably broken, so as to lead to fear of a settlement of the front wall, but an architect could discover no signs of anything wrong. On examination, it is said, of the cornice, it was found that the masonry had had but a narrow resting-place. There are two accounts given of the stonework of the coping, one of which is, that it was 24 in. wide, the wall itself being only 9 in., the difference—15 in.—overhanging the street; and the other representing the wall to be 8 in. thick, and the stonework 16 in., 8 in. of which overhung the street.

SEWERAGE AND IRRIGATION AT HARROGATE.

At a recent meeting of the Harrogate Improvement Commission the surveyor's plans and sections of the new sewerage of the town were considered. The report of the surveyor, Mr. J. Richardson, embraced a system of sewerage for the town, together with a scheme for disposing of the sewage by irrigation. The improvement district contains 790 acres, of which 264 acres are already built upon, or likely to be built upon, and the whole district is well situated for obtaining an efficient system of drainage. The report recommends that four of the five outfalls should be abandoned, and the whole of the sewage collected to one outfall, that of the Coppice, north of the Cheltenham grounds, and be conveyed thence by a sewer through private land, across Ripon Road, into land belonging to the Duchy of Lancaster, which the Board have arranged to take under lease from the present lessee for a term of twenty years. It was unanimously resolved that the plan be at once submitted to the consulting engineer to report thereon. It was stated that although the estimated cost of the sewerage and irrigation scheme will be 7,000*l.*, the repayment of the capital borrowed may be extended over thirty years; and, allowing a very moderate rent for the land irrigated, the sewerage rate will not exceed threepence in the pound.

FROM SCOTLAND.

Partick (near Glasgow).—The foundation-stone of the free high church has been laid. The church is situated at the west end of Hamilton-crescent, Partick. The ground slopes rapidly towards the south, where the principal entrance is placed in the haesment, and the floor of the church is approached by two spacious stairs in the aisles encircling this end of the building, which is apsidal in form. Immediately above this aisle are three large windows, filled with geometrical tracery, lighting the church. The style of architecture is early geometrical Gothic. There will be no galleries, but provision is made

for their erection hereafter if required. Mean-time fitting accommodation will be provided for about 720. The space under the south end of the church is made available for a prayer meeting hall, and at either side there is a session house and ladies' room. The cost of the building will be about 4,600*l.* The architect is Mr. John Honeyman, Junr., of Glasgow. The mason is Mr. A. Coghill; and the joiners are Messrs. William McCall & Son. The clerk of works is Mr. Wm. Kent.

Breckin.—One of those curious subterranean buildings, named Picts' houses, has been discovered at Fithie, in the parish of Farnell. The building is curvilinear, about 12 ft. long, 5 ft. wide, and sloping from 4 ft. to 6 ft. deep, on a floor of red sandstone rock. The side walls are built of a rude masonry, laid in clay, and there was a layer of worked (milled) clay on the floor. The chamber was covered by three boulders, one of gneiss, about 8 to 9 ft. long and 3 to 4 ft. broad, weighing nearly two tons; one about 7 to 4 ft. long by 3 ft. broad, of limestone; and one about 5 ft. long by 3 ft. broad, of freestone. These boulders were laid crosswise. About half a mile distant are the remains of a large kitchen-midden. This circumstance has led to the belief that the neighbourhood had been the seat of a considerable population in early times. On excavating the chamber, several remarkable discoveries were made. The floor, laid with clay, seemed to be strewn with small pieces of charcoal. Laid on the floor, immediately under the middle of the central or largest boulder, were the remains, strange to say, of a classical urn or vase, ornamented on the outside with a beautiful pattern. The urn was in fragments when found, but as many have been preserved as will show its character and the great beauty of the ornamental designs which adorn it. From the appearance of the fractures the vase seems to have been crushed long ago by the soil which had dropped in the course of ages through between the boulders and gradually at last almost filled up the chamber with a mass of soft earth.

CHURCH-BUILDING NEWS.

Tibberton.—The new church here is nearly ready for consecration. Mr. Hopkins is the architect, and Mr. Warner, of Malvern, the builder, at an estimated cost of 1,040*l.* As before, it only consists of chancel and nave, with south porch, and wooden bell-turret with spiret at the west end, sloping into the nave roof. Blue lias stone from Broughton Hackett has been used for the walls externally, and Bath stone facings; plain Broseley tiles, without bands or ornamental ridge tiles, on the steep-pitched roof. The walls are lined with red brick and bands of blue-and-white ditto; and red and black tiles cover the floor. Early English was the style adopted, and the windows are all lancet lights—single, double, treble, and quadruple, with stone moulded rosette arches above them. The east window is a copy of the old one, being a three-light; while that at the west end has four lights and a circular window above, being all under one arch. There is but little carving in the church, and that has been done by Mr. Boulton, of Cheltenham. Rimmington's hot-air apparatus will give warmth to the building. Two bells have been re-cast into one, with the addition of more metal, and the new bell weighs 3½ cwt. This was the work of Messrs. Taylor & Co., of Loughborough. The chirolyard has been lowered and the base of the wall well drained.

Nottingham.—St. Matthias's Church, Carlton-road, has been consecrated. The edifice consists of a lofty nave 67 ft. long and 48 ft. wide, with open timbered roof, the ridge of which is nearly 50 ft. from the floor; a chancel with circular apse of equal height 32 ft. long and 20 ft. wide, and chancel aisles on either side, out of which a vestry and organ chamber are partitioned off with open screens and a south porch. The division between the nave and the chancel and the chancel aisles is effected by a triple arcade with two stone columns, in one of which the ceremonial stone forms the base. A fourth arch, rising to a height of 35 ft. divides the chancel from the apse. The walls throughout are built of Bulwell stone, and lined with red brick interspersed with black brick bands and panellings. The building will provide for upwards of 700 on the floor, and the total cost including fences, fittings, and architect's expenses, is about 3,000*l.* In addition to Lancet windows at either end, the light is admitted through a range of openings

formed in the roof. The works have been executed by Mr. J. E. Hall, of Nottingham; the gas fittings by Mr. Rhodes, and the decorations by Mr. J. Marshall. The architect was Mr. Hine.

Arlingham (Gloucestershire).—The church has been re-opened for divine service, after an internal restoration. The works were carried out by Mr. J. Meredith, builder, Gloucester, under the direction of Mr. H. James, architect, Gloucester. The whole cost of the restoration was 600l.

Thornton-Hough (Cheshire).—The new church of All Saints here has been consecrated. The edifice, with its schools and parsonage, has been built from designs prepared by Messrs. John Kirk & Sons, of Huddersfield and Dewbury, architects, and under their superintendance. The style of architecture adopted is Gothic of the thirteenth century. The plan of the church is cruciform, having a tower and spire at the south-west corner about 120 ft. high, with a warming apparatus under the same. In the upper part of the tower there is a bell-chamber, and clook with four dials. At the north-west corner there is a porch and staircase to the west gallery for children. The general plan of the church consists of a nave, transept, organ-chamber, vestry, chancel, tower, and west porch. The nave is divided from the chancel and transepts by five arches, supported by circular columns and corbels surmounted by octagonal abaci, having the bell portions filled in with conventional carving. All the windows have tracery heads; that in the west gable has five lights, those in the chancel and transepts have each three lights, and all the remainder have two lights. The window in the chancel is of stained glass, representing the Crucifixion, and has been supplied by Messrs. Clayton & Bell, of London: all the remaining windows are of cathedral tinted rolled plate, with stained margins. All the masonry is of stone, from the immediate neighbourhood; the wall stones are of red sandstone, and the dressings are of white ashlar, from Storton quarries. The spire is surmounted by a wrought-iron vane, and each gable has a wrought-iron finial, all painted and gilded. The roof is constructed on the open principle. Sittings are provided for 460 persons—viz., 264 in the nave, 76 in the transepts, 20 in the choir, and 100 in the gallery. The warming is by hot water. Near the church, the schools, parsonage, and teachers' residence have been erected, in the same style of architecture as the church, and of the same class of materials, all of which are inclosed by walls and entrance gateways, surmounted by ornamental wrought arches and finials, with lamps suspended therefrom. The church and schools are fitted up with cornice and brackets for gas, finished line and gold, and have been supplied by Messrs. Lidster & Armitage, of Huddersfield. The cost of the entire erections has been about 8,500l., exclusive of the ground and endowment.

SCHOOL-BUILDING NEWS.

Arnold.—A new school, for the education of the children of the working classes, has been opened at Arnold. The building is plain and unpretending. In the front it is ornamented with white brick quoins. The doors and windows are arched in red and white brick, which affords some relief to the general sameness of its appearance. It is in the T shape, and, with the aid of folding doors, can be readily converted into three separate rooms. Its dimensions are,—height 15 ft., length 38 ft., width 14 ft.; the large class-room, height 10 ft., length 15 ft., width 12 ft.; while the smaller class-room is half the size of the one just described. The school has been erected, from plans supplied by Mr. W. Jackson, architect, Nottingham, by Mr. Worrall, builder, Arnold, at a cost (including land and fixtures) of 620l. Its space will accommodate 195 children, according to the Government requirements. The site is in the centre of the village.

Saltire.—Recently a large number of new erections have been going on at Saltire, consisting of private dwellings, a number of almshouses, and public buildings, some of which are now completed, and one of them, a large and elaborate school-room, has just been opened. The building is situated in the centre of the Victoria or main road to Saltire, and is set back from the road 60 ft. The plan is based upon the system of instruction recommended by the Committee of Council on Education, and provides accommodation for 750 children. The boys and girls' school-rooms are placed at opposite ends of the

building. Each room is 80 ft. long and 20 ft. 3 in. wide. Between the wings on the front is a double colonnade, and in the centre, projecting forward, is the infants' school-room, 54 ft. by 24 ft. To each school-room are attached class-rooms, cloak-rooms with Jennings's patent tip-up lavatories, and every convenience. Separate entrances to the front are formed under each colonnade. To the back are placed extensive play-grounds, laid with asphalt, for each division of the scholars, and large covered play-grounds are also provided for the children in wet weather. The boys' play-ground has the addition of complete gymnastic appliances. The interior of the school-room is lofty and well lighted and ventilated; lined with pressed brickwork 3 ft. 6 in. high, and the windows finished inside with brick. The whole of the building throughout is heated with hot water, and is lighted in the evening by gas pendants from the ribs of the ceiling. The style adopted is Italian in its character. The wings of the building are terminated by pediments, the tympana of which are filled by sculptured ornament; under these are three-light Venetian windows, supported by columns. The sculpture in the pediments has been executed by Mr. Milnes, of London. Over the centre compartment of the front is a bell turret with figures of children holding instruments of instruction over the centre arch. The sides of the schools are relieved by large two-light windows, supported by consoles and with shafts, and carved capitals and pediments over. The base of the building is in hoisted and channelled ashlar; and the cornices and window dressings throughout in hoisted ashlar, with the walls in pitched-faced work. The architects are Messrs. Lockwood & Mawson, of Bradford and London.

Books Received.

The Architect's, Engineer's, and Building Trades' Directory; a Business Book of Reference for the various Industries connected with the Arts of Construction throughout England, Scotland, and Wales. London: Wyman & Sons, Great Queen-street, W.C.: Wyman, Bros., Calcutta and Allahabad. 1868.

We have here a very remarkable work, and one that can scarcely fail to prove greatly useful, not merely to individuals, but to the professions to which it relates. As the publishers said in their first prospectus:—

"Class literature being now a recognised necessity and a prominent fact of the age, little apology is required in presenting the prospectus of a work intended to supply an admitted want, viz., a Business Directory for the especial use of the various and important professions and trades identified with the arts of construction in this country. Unlike the clerical, legal, and medical professions, each of which has at least one annual record of its members, the architects and engineers of England possess no general list of their members or record of their professional achievements. This single fact seems to indicate how greatly such a work as the present is required; it will therefore, in addition to the usual directory matter, seek to give in a form at once very brief and very complete,—the salient facts in the professional history of every architect and engineer throughout England, Scotland, and Wales."

"The publishers hope to furnish a work which shall not only be invaluable to all concerned as a mere useful directory, but shall shortly become a literary monument of modern times in the domain of art and science as applied to construction. Such being their aim, the publishers cannot believe that the architects and engineers of the present day—unrecorded and almost unrecorded as they are without some such register—will fail to perceive the professional value, or to co-operate in the production, of a work having regard to the promotion of their own importance and status."

The work consists of five divisions.—1. Institutions, Societies, and Charities. Under this head is given a list of the principal institutions, societies, and charities connected with architecture, engineering, the arts and sciences, and the building trades, including an account of the objects contemplated by them, and lists of officers and members from official sources. Large and interesting as this list is, it may be properly increased in the next edition, some of the provincial architectural societies being omitted. 2. Architects, Engineers, Surveyors, Sculptors, &c. This comprises, in an alphabetical classification, under proper heads, lists of architects, engineers, surveyors, sculptors, and others prominently identified with architecture and engineering throughout nine hundred cities, towns, and principal places in England, Scotland, and Wales; and, in most cases, in addition to the name and address, is presented a concise record of the salient facts in the professional career of living architects and engineers. There are lacunæ here to be filled up, and the whole should be revised hereafter

by a competent hand, so as to preserve a balance in the accounts. 3. Building-trades' Directory; which comprehends in an alphabetical classification of trades the names and addresses of contractors, builders, engineers, granite, stone, glass, slat, brick, iron, and timber merchants, iron and brass founders, stone and metal workers, ship-builders, and, in short, the various industries connected with the arts of construction. 4. Towns and Official Directory. Preceding each local directory throughout the work will be found information as to all the various offices, boards, and public offices connected with engineering and building, sanitary matters, and gas and water supply, the members of Parliament, together with an approximate estimate of the population. The arrangement of this division will enable persons desirous of communicating with architects, engineers, and the building trades in any particular town, to find at a glance the name and address they seek. It furnishes a classified local building-trades' directory for each name and trade referred to elsewhere in the work, and is of great value. And 5. Notes of Patents likely to prove of special interest taken out in the course of the past year; the name and address of the person or persons taking out each patent; together with its date and number on the books at the Office of the Commissioners of Patents. In addition there is a Trade Appendix, furnishing a useful collection of trade lists and business announcements pertinent to the subject-matter of the work.

An examination of the book shows that no fewer than 3,500 persons are referred to in the professional division; namely, architects, civil engineers, surveyors, and sculptors; and that the trade list contains the addresses of 7,000 holders; the total number of names in the book is nearly 50,000. About 900 towns are referred to, and the number of trades included in the work is about 200.

The publishers may fairly congratulate themselves upon the success which has thus far attended their enterprise; for, whatever its shortcomings, the volume undoubtedly contains a mass of special information exclusively relating to architecture and engineering, which fully justified its production. Only those who have ever essayed the compilation of facts to be gathered from thousands of people located in hundreds of places, can form any adequate conception of the enormous task comprised within the limits of this volume; and we hear with surprise that the work has been scarcely five months in process of compilation from the commencement to the end.

The binding is artistic and quaint, but as the architects named in the book are not Medieval and do not wear coifs, and the builders are not Egyptians, we do not see any reason why they should be so represented on the cover.

The Architect's, Engineer's, and Building Trades' Directory has nothing to do with the Pharos; it is a book of to-day, eminently and entirely so, and as such we warmly recommend it to the public in general, and to the readers of the *Builder* in particular.

Reports of the (United States) Commissioner of Patents for the years 1863 and 1864. Arts and Manufactures. 4 vols. Washington: Government Printing-office, 1866. Steven's American Library and Literary Agency, 17, Henrietta-street, Covent Garden, London.

It is said that the well-condensed and valuable abstracts of patents issued by the United States Government are so profusely circulated, that there is a joke, in the Yankee style, current in the States, that the hackwoodmen build book-huts with them instead of log-huts. The intention of the Government is liberal and excellent, and it ought to benefit inventors, and promote invention throughout the States. Each year's reports are given in two portly volumes, one entirely of illustrations, and the whole forms an extensive and important record. The letter-press volume for 1863 consists of 895 pages octavo; and that for 1864 of no less than 1073. Each volume contains an index of subjects, and a separate index of names, besides a condensed abstract of all the patents taken out for the year indicated. Thus the volume for 1864 begins with No. 41,047, and ends with No. 45,684; and there are besides abstracts of re-issues running from No. 1,596 to 1,843; a list of designs, and also one of extensions.

The number of applications for patents in 1864 was 6,972, and the number granted, in-

cluding re-issues and designs, 5,020. The number of expired patents was 1,034, and the number extended 48. Of the patents granted, there were 4,862 to citizens of the United States; 89 to subjects of Great Britain; 38 to Frenchmen; and 31 to other foreigners. The money received on applications for patents, re-issues, &c., was 220,864.76 dols., and for copies and recording assignments, 20,055.22 dols. The expenditure for salaries, &c., was 229,868.00 dols. The business of the office had increased during the twenty-eight years ending 31st December, 1863, from 765 applications filed to 6,972, and from 29,289.08 dols. to 240,919.98 dols. received; and from 33,506.98 dols. to 229,868.00 dols. expended.

Miscellaneous.

THE SUPERVISION OF ASYLUMS FOR THE INSANE. We have received from an architect a melancholy statement of the circumstances under which he (being, as he states, perfectly sane), was confined in an asylum, by means of false certificates, and half starved. It is not a matter that we can investigate, however much we may commiserate; and we advise our correspondent to state his case to one of the medical journals.

THE ARUNDEL SOCIETY.—The annual meeting of this Society was held on Tuesday, the 9th instant, under the presidency of Mr. Austen Layard, M.P., who made an interesting address. Mr. Norton, hon. secretary, read the nineteenth annual report of the council, which showed that the Society was in a very satisfactory financial condition. Several members addressed the meeting; and a suggestion that the council should now look to Spain, as well as Italy, for subjects, was received with favour.

TOTNESS CHURCH RESTORATION.—At a recent meeting of the Committee, the Secretary stated that he had received about 100l. since the last issue of circulars, making about 1,040l. available for the first section. The secretary was directed to write to Mr. Gilbert Scott for specifications in order that advertisements for contracts might be at once issued. 150l. only are now required to complete the first section of the work. It is to be hoped that care will be taken not to over-restore the very fine stone screen existing in this church, of which two valuable illustrations were given in the Architectural Publication Society's Dictionary, January, 1866. The screen is on the whole in very good repair, showing some traces of colour. Even the original doors remain, and are still in use. The tower of this church is also one of the best proportioned in Devonshire.

WORKING MEN'S CLUB AND INSTITUTE UNION.—The sixth annual meeting of this institution was held on Monday last, at Exeter Hall, under the presidency of the Earl of Carnarvon. The report stated that the number of working men's clubs and institutes, of the existence of which the council are at present aware, is 312. According to returns received from eighty-five clubs the average number of members amounts to 128 to each club. Of the eighty-five clubs sending returns, fifty-four report themselves as self-supporting, or very nearly so; and of these forty are entirely self-supporting. In these eighty-five clubs sending returns, there have been 103 educational classes in operation during the past winter. Twenty-eight clubs report that provident societies of various kinds have either been formed by their members or hold meetings at the club. Nearly all state that they have had various lectures and entertainments during the six winter months, amounting to 239 lectures and 4548 entertainments for the eighty-five clubs. The chairman remarked that one of the great benefits conferred by working men's clubs lay in the fact that they stood out as the alternative, so to speak, and the rivals of the public-house and public-house influence. The adoption of the report was moved and spoken to by Lords Lyttelton and Lichfield. The Rev. Mr. Solly took the opportunity of explaining that his retirement from the position of honorary secretary was solely owing to the fact that his views with regard to the working of the institution were so opposed to those entertained by others officially connected with it, that it was undesirable that he should hold office any longer. Various gentlemen delivered addresses advocating the claims of the institution. On Tuesday a conference was held, at the Society of Arts, Adelphi, under the presidency of the Earl of Lichfield. Several papers were read, and questions were discussed.

COLLIERY EXPLOSIONS.—Having seen in your paper of the 23rd ult. a correspondent's idea of preventing colliery explosions; I beg to suggest that a large "air-pump worked by steam power" would, by suction and evacuation, I think, be sufficient to prevent these great calamities.—H. E. G.

RAILWAY STATISTICS.—The *Statistical Abstract* for the United Kingdom, just published, shows that at the end of 1866, 13,854 miles of lines were open to the public throughout the kingdom, 9,701 of which were in England and Wales, 2,244 in Scotland, and 1,909 in Ireland, representing a total paid-up capital of 481,872,184l. sterling. During the year 238,214,329 passengers (including season-ticket holders) were conveyed on railways in England and Wales, 23,102,936 in Scotland, and 13,066,630 in Ireland. The total of traffic receipts in England and Wales was 32,274,869l.; in Scotland, 4,127,131l.; and in Ireland, 1,762,354l., which for the United Kingdom amounts to 2,754l. per mile of railway. The total of working expenses for the United Kingdom amounted to 18,811,673l., and the net receipts to 19,352,681l., or an increase of more than a million and a half sterling as to the former, and of more than half a million sterling as to the latter, in comparison with the previous year.

POLEGATE; A NEW TOWN COMMENCED.—A fête recently took place at Polegate, mainly to commemorate the completion of the first score of houses erected on the estate of Mr. Owen Fuller Meyrick, and situated near the railway station. This estate comprises about 90 acres of land, adapted for building purposes; and from its close contiguity to the Polegate station and its nearness to the favourite watering-places of Hastings and Eastbourne, there is thought to be every probability that ere long the site will be studded with villas and the better class of houses. The property is marked out in lots, many of which have already found purchasers. Roads have been formed by Mr. W. Beeny, the contractor; numerous trees, plants, and flowers have been planted by Mr. Thomas Larkin, nurseryman; and the drainage and water-supply have been ensured. A spot has been chosen for a church. The finishing of the first row of houses on the estate was considered an "event," and hence the rural fête.

YORKSHIRE UNION OF MECHANICS' INSTITUTES. The thirty-first annual meeting of delegates from the different institutes in connexion with the Yorkshire Union has been held in York. The president, Mr. Edward Baines, M.P., opened the proceedings by an address, congratulatory on the flourishing condition of the union. The annual report entered somewhat largely into the question of scientific instruction, and expressed the opinion that mechanics' institutions may be made the medium for imparting the special or technical education now demanded. The report stated that an association in Paris, similar in its objects to these institutes, employs more than 150 teachers. A presentation was made to Mr. James Hole, one of the secretaries of the Union, in recognition of his services during twenty years, consisting of a gold watch and chain, a purse containing one hundred and five pounds, together with an illuminated testimonial on vellum in carved oak frame. Other testimonials were afterwards presented to Mr. Hole. In the evening a public meeting was held, presided over by the Archbishop of York.

IRON STOVES AND FEVER.—At the last sitting of the Academy of Science at Paris, Dr. Decaisne sent in a paper on "The Heating of Rooms by Cast-iron Stoves," which, in his opinion, predisposes to typhus fever. He states that forty-two cases of that malady which he has observed in the course of the last ten years in various communes of the Oise, may be divided into three classes:—1. The patients who were in the habit of using cast-iron stoves with scarcely any ventilation; 2. Those who used the same with imperfect ventilation; and 3. Those who heated their dwellings by other means. Between the two former categories the differences were very slight, the advantages being on the side of ventilation; but generally all the patients belonging to these classes experienced stupor, twitching of the tendons, delirium, and especially nasal and intestinal hæmorrhagia, while the duration of the disorder itself and the convalescence lasted much longer than in the case of those who did not warm their rooms with cast-iron stoves, and who generally suffered infinitely less from these symptoms.

ROYAL ACADEMY TRAVELLING STUDENTSHIP.—Mr. John Humphrey Spanton, to whom the gold medal was awarded by the Royal Academy in December last, has been elected travelling student in architecture for two years.

WHITEHALL.—The intention has been mentioned lately of concentrating the Public Offices at Whitehall: would it not be wise to look to the plan of Inigo Jones, which, it was mentioned some time ago in the *Builder*, exists in the British Museum?—E.

THE CHURCH "NOTRE DAME DE FRANCE."—We are informed that the sum expended is 4,000l. instead of 2,000l. as stated. The architect wishes it understood (and we do not wonder that he should so wish) that he had nothing to do with the design of the entrance-doors.

THE BATH AND WEST OF ENGLAND AGRICULTURAL AND ART EXHIBITION.—The Falmouth Exhibition of the Bath and West of England Agricultural Society has been opened. Besides the usual agricultural and horticultural display there is an exhibition of the works of local artists and of art manufactures, as well as a South Kensington collection. The local artists are well represented, and there is a varied display of articles of taste and utility in the building devoted to art manufactures.

ELECTRIC ORNAMENTS.—Electro-magnetism, it is said, is now employed to make small butterflies flutter their wings on ball head-dresses, in Paris. Within the chignon are concealed a small battery and a minute Ruhmkorff coil. On the bosom may be a brooch, with a head upon it, the eyes of which turn in all directions. This, too, is accomplished by the use of a battery and coil so minute as to be concealed within the brooch itself. Could not a battery be applied to make larger butterfly fans?

AN ALFRED MEMORIAL HOSPITAL FOR SYDNEY. At a meeting in London of an English committee for the erection of this hospital, Sir John Young, bart., in the chair, it was resolved to invite subscriptions and co-operation from every colonist in England, and from all connected with the Australian colonies. A sub-committee was appointed, consisting of Mr. Moses Joseph, Mr. William Mort, and Captain Mayne, to conduct the correspondence, and to receive subscriptions, &c. A list was opened, and eighteen gentlemen at once subscribed about 700l.

RATTENING.—An ingenious correspondent of *Notes and Queries* says, "This word is not in Hunter's *Hallamshire Glossary*; it appears to be old Norse—"Ridding, disciplina, flagellatio," which expresses precisely the correction which the saw-grinders' union administers to refractory brethren." This, however, is quite a mistake; in the first place rattening is not corporal punishment of any kind; it is simply the destruction or the theft of machine hands, tools, &c.; and this was sardoniously attributed to rats; hence, rattening, and not from old Norse.

FRESH MEAT FROM AUSTRALIA.—Great interest is, we learn, being taken now in Sydney in a process for preserving fresh meat known as Mort's freezing process, the cold being obtained by the liquefaction of ammonia. A public meeting has subscribed 3,000l. towards sending to England a shipload of 260 tons of fresh meat, which may be expected to arrive this autumn. It is to consist of choice meat, and to be sold at sixpence and sound at fourpence per stone, preserved for eleven months by this refrigerating process, is said to have been perfectly fresh when eaten two or three days after being thawed. It is well known that flesh of the Mammoth, preserved in Siberian ice for many thousands of years, was eaten and relished by dogs in our day.

MANUFACTURE OF STEEL.—A process, which it is asserted will prove even more important than that of Mr. Bessemer, inasmuch as it is hoped that it will be free from the objection that the worn metal cannot be economically re-melted, is now about to be introduced. The invention consists in the use of machinery by which pig-iron is ground to powder by a very rapidly-moving cutter. The extreme friction produces a heat so intense that the iron is set on fire, and, after scintillating, falls down a reddish-brown dust. The combustion causes the superfluous carbon to be got rid of; the dust is then put into a crucible, melted, and when cooled, is found to be ingots of very good steel. This process was explained at the recent *conferenza* of the Institution of Civil Engineers.

THE PRINTERS' PENSION CORPORATION.—The Very Reverend Dr. A. P. Stanley, Dean of Westminster, has kindly consented to preside at the anniversary festival of that thriving institution, the Printers' Pension, Almshouse, and Orphan Asylum Corporation, to be held early in July.

INDUSTRIAL EXHIBITION IN HANTS.—An industrial exhibition, recently held at Abbots Anne, near Andover, Hants, was opened by the Earl of Portsmouth. The exhibition, which remained open a week, occupied the whole of the large school-rooms, the reading rooms and mechanics' institute, and two large tents. There were over 1,000 exhibitors.

THE NEW ACT ON LONDON IMPROVEMENTS.—The new Act to further continue the statutes on the London coal and wine duties has just been printed. The Acts are continued till the year 1872. The proceeds of 4d., part of 12d. duty, are to be applied to complete the Holborn Valley and other improvements, and afterwards to improvements "in or adjacent to the City of London," as sanctioned by Parliament.

BAILEY HILL (MOLD) EXPLORATIONS.—Subscription-lists have been exhibited at Messrs. Pring & Price's and Mr. Thomas E. Birch's establishments, Mold, containing a list of gentlemen who have formed themselves into a committee for the purpose of raising funds to explore the far-famed "Bailey Hill," in that town. In May last a circular wall, from 3½ yards to 4 yards in thickness, surrounding the top of the mound, was discovered by Mr. Cain Parry; and it is believed that there still exist further remains of the old castle, which is supposed to have stood there during the Norman period, and been demolished in 1260.

IMPROVED PARAFFIN, OR PETROLEUM LAMPS.—A New York firm of Patentes, Messrs. Ives & Co., according to the *Mining and Petroleum Standard*, are selling lamps with considerable improvements. They are of various forms, as for hanging, bracketing, or standing. The chimney and shade of the standing or table lamp, move to the side on a hinge, so as to allow the lamp to be lighted, or replenished, without separation of the parts, and not even the burner requires to be unscrewed, the oil being inserted from the filler through a long and slender spout. The bracket lamp moves aside by a spring, and is lighted or replenished in a similar way. The hanging lamp is a balance one, and can readily be drawn down for lighting or replenishment.

CHARGES OF CONSPIRACY AGAINST UNIONIST WORKMEN.—At the Police-court, Liverpool, Andrew Colleen, T. Williams, John Murphy and James Ball, bricklayers, were brought up under warrant, charged with conspiring by unlawful means to impoverish Archibald Parker in his trade or business, and to restrain the freedom of trade. The case arose out of the strike of bricklayers in the town, which had put a stop to the progress of several extensive buildings. A large edifice is in course of erection at Lime-street Railway Station, and in consequence of the turnout of the bricklayers employed there a number of non-union men were brought down from London to take their places. The society men put into operation the picketing system at Lime-street, and this led to the apprehension of the prisoners. Mr. Parkinson said he was glad to state that an interview had been held with the unionist committee, and it had been promised that the picketing system should be abandoned, and that the non-society men should be allowed to work unmolested. Under these circumstances he consented to the prisoners being liberated upon entering into their own recognizances to appear that day month. These terms being accepted by the solicitor for the defence, Mr. Raffles, the stipendiary, discharged the prisoners. Since then, however, Mr. Parkinson has again applied for warrants against certain operative bricklayers for picketing. He said that notwithstanding the promise given that the system should be discontinued, it was still being exercised in gross violation of good faith, and amounting to nearly contempt of court. After some witnesses had been examined the magistrates were granted.—Nine members of the masons' union at Sheffield have been committed for trial at the local assizes on the charge of conspiracy to prevent Mr. Powell, a builder, from carrying on his business, by using threats and intimidation to those who were willing to enter his employ. The dispute was about dressing stone at a quarry "in defiance of one of the Society's rules."

No Gas.—The now somewhat singular event of a large town being lighted with oil has just occurred at Cambridge. A new gas company being started, the Improvement Commissioners granted it a three years' contract to light the public streets. An attempt was subsequently made to buy off this threatened competition, and the new company suspended its operations for nearly a month, and at the last moment the old company became inexorable. It being impossible to get the works ready by the 12th June, the period when the contract was to commence, oil lamps have been resorted to for the present.

REPERDS FOR CIRENCESTER CHURCH.—A sculptured stone reredos has been put up in Cirencester church. It consists of three large panels, sculptured in *alto relievo*, representing the Crucifixion, the Agony in the Garden of Gethsemane, and the Resurrection; and four niches containing figures of the four Evangelists. In the centre panel, which contains a representation of the Crucifixion, there are eight figures. The panel on the left shows the Agony of our Saviour in the Garden. The right hand panel contains a representation of the Resurrection of our Saviour. The four niches containing figures of the four Evangelists, St. Matthew, St. Mark, St. Luke, and St. John, intersect and form a border to the panels. The canopies are carved, and are surmounted by finials. A diaper and a molding with carved oak foliage terminates the reredos proper on either side. Receding panels of a smaller description are attached to each side. That on the left contains St. John the Baptist preaching in the wilderness, and the Annunciation of the Virgin Mary. On the right are representations of the Nativity and Baptism of our Saviour. These panels contain a number of objects. A cornice, on the top of which is a battlement, surmounts the whole. The architectural portion of the work was designed by Mr. Scott, jun. The sculpture was designed, and the work executed, by Mr. E. E. Geffulowski, of London.

TENDERS.

For restoring and enlarging Doughty's Hospital, Norwich, for the charity trustees, Mr. James S. Bonest, city surveyor, architect. Quantities supplied.—
 Mitchell & Walker £2,408 13 0
 Wright 1,810 0 0
 Wiseman 1,615 15 0
 Downing 1,498 0 0
 Newham 1,680 0 0
 Gilbert 1,890 0 0
 Hood 1,320 0 0
 Aldous 1,610 0 0
 Murray 1,498 18 0
 Browne & Bailey 1,490 0 0
 Spinks 1,488 0 0
 Welkin & Curtis 1,478 0 0
 Nelson 1,457 0 0
 Rice 1,365 0 0
 Webb 1,308 12 0

For Nos. 213 and 214, Upper-street, Tilington. Messrs. W. G. Habershon & Pite, architects.—
 Houses. Parly Walls.
 Grose £1,792 258
 Southcott 1,695 234
 Manley & Rogers 1,692 236
 Henshaw 1,675 275
 Patman & Fotheringham 1,475 225
 Williams 1,448 239
 Forrest 1,365 224
 Cowland 1,350 200
 Carter & Son 1,285 220

For building No. 50, Old Broad-street.—
 Holland & Hannen £10,327 0 0
 Trollope 9,860 0 0
 Mansfield 9,860 0 0
 Cabrit 9,860 0 0
 Jackson & Shaw 9,743 0 0
 Ashby & Horner 8,670 0 0
 Ashby & Son 8,642 0 0
 Lawrence & Sons 8,430 0 0

For seven houses, Præd-street, Paddington, for the Metropolitan Railway Company, Messrs. Withall & Evers, architects. Quantities by Messrs. Paine & Clark.—
 T'Anson £15,820 0 0
 Macey 15,543 0 0
 Ebbis & Sons 15,197 0 0
 Fosters 15,080 0 0
 Manley & Rogers 14,867 0 0
 Webb & Sons 14,419 0 0

For erecting Wesleyan North End Chapel, with school and offices in Lovers-lane, Newark-upon-Trent, Mr. Charles Bally, architect. Revised tenders accepted.—
 For Bricklayer's, Mason's, Plasterer's, and Slater's Work.
 Leary £7,024 14 0
 Carpenter's, Joiner's, Plumber's, Glazier's, Ironmonger's, and Painter's Work.
 Henderson £500 8 0

By Mr. Lees for a mansion for Mr. Harvey, at Reigate.—
 Holdsworth £2,412 0 0
 Bagdally 2,167 0 0
 Deadman, Carpenter, & Grocer 1,784 0 0

For rebuilding Messrs. Farmiloe & Sons' warehouses at Saint John-street, West Smithfield. Mr. Lewis H. Isaacs, architect. Quantities supplied by Mr. Robert.—
 Sewell & Son £14,639 0 0
 Holland & Hannen 14,383 0 0
 Macey 14,177 0 0
 Hivett 14,103 0 0
 Phillips 13,987 0 0
 Perry & Co. 13,589 0 0
 Patman & Fotheringham 13,260 0 0
 Cooper & Cullum 13,260 0 0
 Webb & Son 13,247 0 0
 Browne & Robinson (accepted) 12,915 0 0

For survey of district for the Eastbourne Local Board.—
 Bowdler & Malpas £875 0 0
 Cook 750 0 0
 Fuller 647 0 0
 Gotto & Beesley 600 0 0
 Walters & Shoplant 503 0 0
 Mercer 500 0 0
 Stalor 475 0 0
 Belvis & Gardner 475 0 0
 Martin 463 0 0
 Gregory & Holland 449 0 0
 Pease 440 9 9
 Wrighton 388 0 0
 Thomas & Davenhill 380 0 0
 Valls 345 6 8
 Coules 350 0 0
 Castle & Eyo 350 0 0
 Dover 332 0 0
 Smith 329 0 0
 Cochraus 315 0 0
 Alexander & Littlewood 300 0 0
 Wood 294 0 0
 Col 280 0 0
 Merrett 250 0 0
 Stewart 238 0 0
 Porter 218 0 0
 Bates 201 0 0
 Purcell 200 0 0
 Russ & Minns 200 0 0
 Ball & Smith 190 0 0
 Lea & Walton (accepted) 125 0 0

For the construction of brick and pipe sewers and other works for the Eastbourne Local Board.—
 Contract 1. Contract 2. Contract 3.
 Procter £1,236 11 3 ... 1,852 17 6 ... 529 7 9
 Williams 1,605 6 0 ... 1,654 13 0 ... 691 7 8
 Bloomfield 1,068 0 0 ... 1,433 0 0 ... 643 0 0
 Coker 1,038 9 0 ... 1,394 15 0 ... 614 11 0
 Robson 918 18 0 ... 1,412 8 3 ... 639 9 8
 Reard 837 11 0 ... 1,389 2 2 ... 608 16 0
 Goeb 830 4 6 ... 1,297 4 0 ... 566 15 4
 Hayward 749 11 1 ... 1,414 14 9 ... 546 17 11
 Hounson 724 3 8 ... 1,348 18 3 ... 514 11 3
 1,348 18 3 ... 561 15 0

* Accepted.
 For extension, transepts, and chancel to Rumanute Church, Clifton.—
 Beaven £2,724 0 0
 Davis & Son 2,665 0 0
 Thorn 2,623 0 0
 Jones 2,559 0 0
 Wilkins 2,209 0 0
 Diment (accepted) 1,573 0 0

For alterations to the Reliance Assurance Office, King William-street, City. Mr. Fred. Chancellor, architect. Quantities by Messrs. Curtis & Son.—
 Ruder & Son £1,216 0 0
 Mann 1,157 0 0
 Hill & Sons (accepted) 1,556 0 0

For building pair of villas, for Mr. Morton, on lot 19, "The Elms," Hamgate. Mr. John R. Collett, architect.—
 Kelton (accepted) £1,434 0 0

For enclosing Hailsham Cattle Market, Sussex. R. K. Bessley, architect.—
 Crisford £1,016 6 0
 Robson 1,370 0 0
 Thompson 875 0 0
 Stonestreet 806 5 0

For warbouse, Upper Thames-street, for Messrs. Walter Macfarlane & Co. Quantities supplied by Mr. R. Ovenden Harris.—
 Piper & Wheeler £3,910 0 0
 Comdor 3,739 0 0
 Browne & Robinson 3,398 0 0
 Brass 3,254 0 0
 Gammon & Sons (accepted) 3,177 0 0

For a pair of houses in Tufnell Park, Holloway. Mr. George Tredit, architect.—
 Brass £2,597 0 0
 Kelton 2,425 0 0
 Henshaw 2,394 0 0
 Sharman 2,383 0 0
 Carter 2,347 0 0
 Williams 2,337 0 0
 Bishop 2,265 0 0
 Dimsdale 2,200 0 0
 Ennor (accepted) 2,162 0 0

For alterations and new front at No. 41, Western-road, Brighton. Mr. Tuppen, architect.—
 Ancombe £455 0 0
 Lockyer 435 0 0
 Bruton 375 0 0
 Kemp (accepted) 354 0 0

For rebuilding the Orford Music Hall, in the New-road, Brighton. Mr. Tuppen, architect.—
 Lockyer £795 0 0
 Ancombe 703 0 0
 Dean & Dickerson 655 0 0

For alterations at the Ship Inn, Newhaven. Mr. Tuppen, architect.—
 Davey £303 0 0
 Lower & Simmonds 286 0 0
 Bestell 275 8 0
 Holloway & Son 195 15 0

The Builder.

VOL. XXVI.—No. 1324.

A Word of Counsel to the Explorers of Palestine.



I have a word or two of friendly advice to offer to our friends the Palestine Exploration Society.

The *Builder* was the first journal to set the example of doing more in the way of calling the attention of the public to the subject of the survey of Palestine than is involved in the mere insertion of letters received from the officials. We have done this as feeling a deep and permanent interest in a subject so especially cognate to those which we habitually bring before our readers. Even architecture proper may gain valuable illustration from

the investigation of such buildings as the Golden Gate, and of the characteristic earmarks that betoken the masonry of Herod and of Solomon. Archaeological questions of extreme interest are also involved, and, above all, the topography of the spot which, of all on the surface of our planet, is marked by the most venerable sanctity, appeared likely to be redeemed from a condition of hopeless confusion. It would not have been either ungraceful or undeserved if our labours to promote the worthy object of the society,—labours which to no inconsiderable extent have awakened echoes in the columns of several of our contemporaries,—had been referred to with some expression of gratitude by those interested in the exploration.

Stimulated by the successive appeals which have been made for its aid, the public has come forward to such an extent as to obviate the need, which appeared at one time to be pressing, for the arrest of the works conducted by Lieut. Warren. As each new appeal has been made for contributions, detailed acknowledgements of the sums received have been published, in such a manner as to be satisfactory to each individual subscriber; but neither from these successive lists, nor from the statement made, according to the newspaper reports, at the public meeting, that the treasurer had something under 2,000l. in hand, do the actual balance-sheet of the society, and *procès* of the operations, past and projected, of the conductors of the enterprise, come clearly and fully before the public. The whole matter is somewhat *en l'air*. Country subscribers have been hoping to receive more systematic information in return for their subscriptions, and all the interesting speeches of the patrons of the enterprise,—of such men as Sir Henry Rawlinson, Mr. Layard, and the Dean of Westminster, fail to supply that definite programme which it is desirable to have brought before those interested in the support of the undertaking.

It would be well that all the subscribers should be provided with a block plan of the

localities investigated and to be investigated by the officers of the survey, together with the reports which have been printed from time to time. These, moreover, should be serially numbered, and all details of work should be so described as to admit of immediate reference to the key-plan, so that all persons in any way accustomed to the use of maps should be enabled readily to comprehend what has been and still may be done.

The attention which has been given to a subject of minor interest, that of the "complicated network of drains and reservoirs," which indeed has been brought before the public in a separate and entire work, might have been, we venture to think, better bestowed on those topographical questions to which all others are subordinate, and the determination of which is the most important result to be expected from the labours of the explorers. We do not undervalue the importance of the determination of the depth of the south wall of the Haram beneath the present surface of the rubbish which encumbers the site, or of the course and mode of junction of the wall of Ophel to that of the Haram. The latter are the principal discoveries of value as yet made with reference to the main object of the search, the identification of the features existing before the Christian era. Monkish Jerusalem is comparatively uninteresting, our first aim must be the determination of Scriptural localities.

We cannot, therefore, but think that Lieut. Warren undervalued the results of his actual discoveries, when he spoke at the meeting of the area of the Haram as containing room for much more than the site of the Temple and the Tower of Antonia. "Space for three such sites" as that of the Temple, are the words of the report.

The first point to decide as to this part of the investigation, a point which to a certain extent Lieut. Warren has elucidated, was the true character of the masonry surrounding the altar-shaped hill on which the Temple unquestionably stood. Was it the date of the Crusaders? in which case its position would have told no little. Was it built by Herod? Did it contain any of the work of Solomon? For, if this superb *encinte* could be identified with the work of the builder of the third, still more with that of the first, Temple, it follows that we have in its actual dimensions the measurement of the "Stadium" of Josephus, and that the grand double square, six stadia in circuit, half of which contained the Temple, and the other half the fortress, accurately coincide with this gigantic walled platform of some 1,800 ft. long by 900 ft. wide.

The shafts and galleries of Lieut. Warren, in enabling him to ascertain the depth at which the southern and the eastern walls of this quadrangle sprang from the living rock, have verified the large dimensions used by Josephus. The investigation of the masonry, and the comparison of its characteristics with those of certain well-known buildings, leave no room to doubt the presence in these walls of the work both of Herod and of Solomon himself; and certitude is thus attained that the altar mountain is not, in its present dimensions, the work of some unrecorded builder at some unknown date, but the repaired remains of the original circumvallation raised by the two great Temple-building kings. The topographical importance of this fact is primary, and this is the first definite result of the survey.

The next point, important in itself, and important as being that on which all other topographical questions must more or less directly hinge, is to determine the course of the three walls of Josephus. There can be no doubt of the prime importance of this desideratum. We have already pointed out that, before gunpowder was available for military demolition, it

was impossible that such buildings as the walls of ancient Jerusalem should have been destroyed to below the level of the ground, or even to below the level of the debris caused by the overthrow of the upper part of the walls themselves. These foundations, then, are *in esse*: to trace them is the first duty of the topographer. That once done, there are many questions that will settle themselves. It is not, for instance, conceivable that when this first step to a restored topography of the city besieged by Titus shall have been taken, we shall find writers continuing to start with the assumption that a certain tower is the "Hippicene" of Josephus. This identification appears to have been arrived at by the following syllogism:—Josephus says there was a tower called Hippicus. Here is a tower. Ergo, here is Hippicus. Unfortunately for this sort of logic, which people rarely apply to any subjects but those which are in some way connected with Scripture, the dimensions, no less than the position of the tower in question, are entirely irreconcilable with the description given by the great Jewish historian of Hippicene.

The verification of the site of the Holy Sepulchre is another of the points closely dependent on the determination of the course of the wall. We do not say that positive determination is thus immediately attainable, but negative is. If the Church of the Holy Sepulchre, venerated as such by unbroken tradition from the date of the appropriately styled "invention" of the cross by the Empress Helena, be without the wall of the city,—the wall described by Josephus,—it does not necessarily follow that the site is the true one. But if it be within the wall, it is certain that such will not be the case. This, then, will be one of the first results of this much-needed first part of the survey.

The essential condition of the most successful amount of the exploration is, to bear in mind what may and what may not be fairly expected from its prosecution. It is only by an organized direction of all efforts to attain these primary ends that waste of time, of money, and of energy will be avoided. Research at Jerusalem will have a totally different result from research at Thebes, at Nimrod, or at Pompeii. We shall find no historic sculptures, no palaces buried under their own ruins, no indications of the daily life of a population suddenly overwhelmed by the volcanic agency of nature. A few scraps of pottery, a few bronze nails, an engraved ring, a Hebrew coin or two, glass fragments of the third or fourth century of the Christian era,—such are the results that, in the excavation of Jerusalem, replace the papyri of the Theban tombs, the glass, and ivory, and clay, and metal, of the Assyrian drinking-vessels, and ornaments, and domestic utensils, and the clay tablets of their imperishable, though quaint and humble, domestic records. For the restoration of the house of Paneas, or for the reopening of the amphitheatre, we have to be content with the piercing of long-closed galleries under the courts of the Temple, and the opening to the light of day of enormous stones, which seem to have been re-cut in the time of Solomon. The severe style of ornamentation adopted by a people who were forbidden to reproduce animal forms, may occasionally make its appearance among the ruins. There may possibly occur some memorial of the fifty-six years of Assyrian rule. Sir Henry Rawlinson entertained a hope of the disinterment of some Babylonian cylinder or obelisk containing Nebuchadnezzar's own account of his conquest. There is a more historically-founded hope of the intact preservation of the places of sepulture of eleven of the kings of the House of David in the bowels of Mount Zion; but it is not in archaeological results that the survey can be expected to be fruitful.

On the other hand, in the books of Kings, Chronicles, Ezra, and Nehemiah, we have nume-

rous details as to the topographical features of Jerusalem, that it will be of the utmost interest fully to explain. Fewer, but even more interesting allusions, occur in the first five books of the New Testament. In the "Antiquities," and in the

"Wars" of Josephus, we have the fullest details preserved in any ancient history of any ancient city. In the Talmud we have a counterpart of the Holy City itself—a mass of recoverable details hidden under the accumulated rubbish of centuries. The pick and shovel of the excavator are the instruments of a new and an indispensable exegesis applicable to these important tests. But the application must be systematic. It is not by a shaft here and a gallery there,—the measurement of a reservoir, or the opening of an arch, that the light of day will be thrown on the subject. Isolated and minor discoveries of this nature are like the feeble ray of light which is thrown from the cauld of a solitary visitor on the roof or sides of some gigantic cavern, the shimmer of a torch on the stalactites of "Peveril's Hole" in the Peak. We want the full illumination of the blue lights. We want such a combined and organised effort to solve the topographical questions, as shall at once give us the true plan of the city described by Josephus, and taken by Titus. When these historic walls are once dotted in, not as a guess, but as a continuous certainty, on the excellent ordnance survey, each minor detail will find its proper place, and assume its due relative importance. The completion of the thorough investigation of the Haram area,—of its northern and its western wall, as well as of its honeycomb substructure, and the tracing of the walls of Herod, and of Nehemiah, are the objects to which all others should be made subservient.

It is very well to urge the public to support the work. We have been glad to lend our own voice to swell the cry for help. We have been glad to point out in what widely different portions of the public addressed by the newspaper press are to be found groups of different character, each of which claims a peculiar and a special interest in the exploration of the ancient city. To that venerable fellowship—perhaps the most ancient in the world—wider than either of the forms of monotheistic faith—practical in its aims and conduct, and bound, by a tie never to be forgotten, to venerate the site of the house reared without sound of "hammer, or axe, or any tool of iron"—we were the first to indicate the propriety of an appeal which is now beginning to be productive, but which ought to be, not dimly indicated, but distinctly and specially made. To the archaeologist and the architect we have pointed out that if the discoveries probable in their departments of art are likely to be few, they would be at once venerable from antiquity and certain in the indications which they will give.

The clergy of the Church of England have not been slow to perceive what volumes of vapid and erroneous comment may be superseded by a few well-chosen photographs. The members of the Dissenting churches, accustomed to find money to carry out what they consider to be the true interpretation of the New Testament, only require to have the nature of the explorations made satisfactorily clear to their minds, in order to make sure that it shall not fail for want of voluntary aid. But though this urgency is a very good thing in its way, people are apt to become tired of its repetition. They want to be satisfied, not only as to the good faith, but as to the good sense, with which these contributions are laid out. They do not so much care to know that this shaft is 35 ft. deep, and that 46 ft., as to understand what is the course definitely proposed by the person responsible for the direction of the exploration,—how the monthly progress carries out that comprehensive and well-digested design; and, above all how the main requisite of the certain restoration of the block plan of the Jerusalem of the Gospel era—the triple-walled city of the great Jewish historian—is steadily advancing. Whatever additional information may have been gathered by those subscribers who had the advantage of hearing the address of Lieut. Warren, on the occasion of the meeting at Willis's Rooms, we have reason to know that sentiments such as we have expressed are entertained, and we think reasonably entertained, by country subscribers. Much has been done—money has been forthcoming in good faith—disinterested energy has been devoted to a worthy end—personal labour has not been shunned by those of our countrymen who have been exposed to all the trials of the climate of Palestine, and all the toil of labour in the East. What we are anxious

to see is, that all the efforts made and yet to be made for the exploration of the Holy Land should be so directed by competent and practised intelligence, and so subordinated to the requirements of well-organised method, that we shall, by the return of the hot weather of 1869, be able to point out, fully and distinctly, how much more we know of ancient Jerusalem than we knew in the spring of 1868.

"I hoped," wrote a country clergyman, who had sent his contribution to the exploration fund in consequence of the statements made in the *Builder*, "that on subscribing my guinea I might receive any further accounts. It would, I should think, be worth while to send the letterpress, if not the etchings also, to subscribers. If I know the secretary I should also suggest whether it would not be worth while to get fifteen or twenty copies of photographs boldly printed in colours" (meaning copies of fifteen or twenty photographs) "on calico, like those which Elliot Stock lends out (a great many sets on different subjects) for popular lectures. The size of these is 4 ft. by 3 ft. I should be very willing to give a popular lecture on the subject, and no doubt many would do the same, and popular interest would thus be awakened."

There is always a delicacy felt in speaking of "honorary" services in any terms than those of unqualified gratitude. This is one of the great evils of such a method of conducting any important undertaking. For the want of the voice of friendly criticism much is often left undone that might be done with advantage. We are so fully of opinion that a debt of gratitude is due to the energetic man who may be regarded as the father of this enterprise, that we wish distinctly to state that any remarks we have made have been suggested by the wish to strengthen his hands. We do not see how any competent person can be expected to devote gratuitously to such a purpose the time, and thought, and uninterrupted attention that are necessary to the adequate organisation of the enterprise. A certain degree of vagueness of object is sure thus to supervene. This becomes quite evident from the speech of Lieut. Warren. "The explorers must be content, he feared," said that officer, "to be baffled and perplexed for a long time to come before they could bring out Jerusalem as it was; for, starting as it might appear, they had not yet a single fixed point from which to commence."

Considering the great mass of writing,—we can hardly call it literature,—existing on the subject of Jerusalem, the wild guesses, and the impossible assumptions that have what is called "authority" to support them, the perplexity of Lieut. Warren is most natural. At the same time it is an unanswerable proof of the importance of the line of conduct which we suggest. A distinct plan of operations should be sketched out and communicated to the subscribers; estimates should be attached to the programme, as in all cases of serious engineering undertakings; and it should be understood that the first point to be carried out is the identification and the survey of the foundations of the ancient walls, and the consequent delineation of the ground-plan of the Holy City, as it existed when its streets were trodden by—

"Those blessed feet
Which, eighteen hundred years ago, were nailed,
For our salvation, to the bitter cross."

LIFE RISKS IN EDINBURGH.

EDINBURGH is just now in a vortex of "movements" of one description or another. Not to speak of political movements, with which we are not conversant, there are, to begin, the well-known annual games, high-jinks or *saturnalities* which spring from the decayed embers of the annuity-tax (church-rate) agitations, and which this year seem to have exploded with uncommon violence in crushing the laudable attempt to establish a free public library. In the second place, there is a great social and sanitary movement set a-going for the purpose of eradicating poverty and extinguishing crime, on the principles of voluntary association. In the third place, there is a noble and magnificent effort being made to reconstruct, at the cost of 100,000*l.*, the ancient and celebrated Medical Hospital, which has been so long and so honorably identified with the Edinburgh Medical School. We purpose devoting some space to the discussion of these two latter subjects; but before doing so we wish to clear away some rubbish, so to speak, which has been accumu-

lating on our hands, and at this moment encumbering our pathway.

How does it occur that Edinburgh should be the scene of so many extraordinary and fatal accidents? * Now it is an ancient tenement filled with inhabitants toppling over in the High-street. Then a fire breaks out at the basement of a long stair in the Canongate; and the poor inmates, deprived of all egress, precipitate themselves and their children from the seventh story windows. Again, the chimney-stalk of a comparatively new tenement in Duke-street is blown over, and crashes through the roof, and all the joisting and flooring of several stories, destroying the lives of four or five people in its fatal descent. No doubt this accident occurred during a storm; and by certain authorities it may be assigned to that category of casualties which are comprehended under a visitation of Providence! It is just possible that the same excuse will be made for the loss of life arising from the fall of enormous masses of rock which are every now and then detached from the cliffs with which Edinburgh is surrounded. But we must confess that, in our opinion, such an excuse is alike insufficient and unwarrantable. We have on former occasions been compelled to animadvert on the negligence and want of foresight on the part of the Edinburgh local authorities;—particularly, we may state, in regard to the fall of that ancient tenement in the High-street which had been undermined in the course of alterations; and the destruction by fire of the Theatre Royal, at which the Dean of Guild, Mr. Lorimer, was killed. We are afraid that we must continue to hold them responsible in certain other cases which we now proceed to particularise.

We shall begin with the storm. Our readers will remember that on the 24th day of January a fearful storm raged over a great part of Scotland, as well as England, which resulted in grievous loss of life, in many painful accidents, and in no small destruction of property. The fall of the barometer during the previous night gave warning of some atmospheric change at hand: the sky had become by ten o'clock overcast and lowering; and by twelve o'clock the tempest had set in. It grew in fury till about one o'clock, when there occurred in Edinburgh the saddest of all the incidents of the storm. A tall chimney-stalk at the back of the residence of Mr. John Keegan, S.S.C., in Duke-street, was blown down, and, tumbling through the roof, it threw down the whole of the back wall of the house, five stories in height, hurrying six inmates in the ruins. It was found, after digging through the *debris*, that four persons had been killed. In the upper part of the house a servant had been killed and another severely injured; further down, Miss Keegan had been killed; and of three clerks at the house in the lowest apartment, two were killed and one narrowly escaped, although he was extricated almost unscathed. Several other accidents also occurred in Edinburgh, but fortunately in none of them were lives lost. Many narrow escapes, however, took place from falling chimney-stalks, cans, and bricks; and all the streets were strewn with fragments of masonry, slates, tiles, and loose mortar.

It was pointed out in our columns at the time, and we desire to reproduce the argument, that although this gale, or rather storm, was more than commonly severe, the accidents with which it has been accompanied are by no means uncommon. Indeed, they are the very reverse. Every year numerous accidents occur from chimney-pots and decaying roofs in Edinburgh, both in the Old and the New Town; and we do not need to inform our Edinburgh readers that it does not always require a terrific storm to produce the fall of a lofty tenement and a destruction of human life. It is not easy to account in a single word for this condition of things; but one defect in the Edinburgh municipal administration is very conspicuous—there is no Building Act in Edinburgh. There seems to be no proper supervision, inspection, or regulation with regard to buildings in force in the city. We cannot better describe the *Deau of Guild Court*, which is popularly supposed to be entrusted with these important duties, than by comparing it to the Court of Border Wardens, or the man-at-arms in the Lord Mayor's Show. It is an institution that has long survived its usefulness, and ought to be abandoned. There are, we are aware, a city architect in Edinburgh (Mr. Cousin), a borough engineer (Mr. Macpher-

* See on this head "A Chapter of Accidents" in our volume for 1860.

son), and last, though not least, a medical officer of health (Dr. Littlejohn), all men of standing and experience in their respective professions. There could hardly an occasion arise, we should imagine, in which an official report from either or all of these burgh officials would have been of greater value. Yet it is a most extraordinary thing that no such report ever appeared; or, if it did, it never reached the public through the ordinary channels of information, or in the reports of the town council proceedings. Indeed, so far from "improving on the occasion," as the fashion is in certain other matters across the Tweed, there was a studious, and, as we think, culpable desire on the part of the authorities to hush the matter up altogether. The only professional, if not authoritative, deliverance the emergency called forth, as far as we could discover, was a sort of semi-official article in the *Scotsman*, which was partly transferred to our columns at the time, in which the whole theory of official responsibility was completely repudiated. At the same time the doctrine was laid down that the common law of property on the part of the landlord, and the *instinct of self-preservation* on the part of the occupier, comprehended all the principles necessary to foresee and provide against such extraordinary and fatal calamities. We will not stay to point out the preposterous character of such a defence, and we have already shown that the highly unwarrantable statement with regard to the duties of the burgh engineer was not in accordance with the local Acts of Parliament, even as compiled by the very highest local authority on such matters in Edinburgh,—*videlicet*, the town clerk.* This curious dogma of the instinct of self-preservation will, we suspect, be equally at fault in another class of accidents to which we must now refer. Edinburgh, we need scarcely say, is a city of comparative altitudes. Like ancient Rome in this respect, it is built on hills, although we do not know as to seven hills. At all events there are plenty of precipitous cliffs and jutting rocks overhanging the principal thoroughfares, chiefly composed of a porphyritic greenstone, sometimes basaltic, as at Samson's Ribs, but more commonly conglomerate, as we see them on the cuttings of the Calton Hill and Salisbury Craigs. The Castle itself is built on a bluff intrusive igneous rock having a sheer perpendicular fall on its western shoulder of 200 ft. to the lower plateau of Prince's-street. Prince's-street, again, is 200 ft. feet above the level of the sea, while the valley of the Water of Leith at Dean Bridge is about 120 ft. lower than this. Just at this point an accident occurred the other day of which we happen to have mislaid the account; but it was of this nature. At Randolph Cliff a portion of rock, estimated at 100 tons weight, fell one evening about seven o'clock into the pathway below, causing much anxiety and consternation in the neighbourhood. Fortunately, no one was passing at the time, so that no accidents occurred, and no lives were lost. A detachment of policemen were sent to guard the spot until the fallen *débris* was cleared away by the authorities.

We particularly wish to state that this is not an isolated nor an unrequent occurrence. Not long ago a huge piece of rock became detached at Salisbury Craigs, which overlooks the beautiful valley of the Queen's Park, from a height of 400 ft. Down it came, thundering and crashing into the valley, and alighted among a group of innocent schoolboys, one of whom was fearfully injured, and who afterwards, we believe, died in one of the surgical wards of the Royal Infirmary. Just suppose this accident to have happened during a gala day when the park was crowded, or at a volunteer review! On another occasion, we remember, a mass of rock, weighing 50 tons, became detached from the cliffs under the south wall of Edinburgh Castle, and fell into the roadway of Johnstone-terrace, during the night, with a noise like thunder. It was fortunate indeed that this fall did occur during the night, for had it occurred during the day the loss of life might have been appalling. Once more: there is a

brewery, situated under the cliffs of the Calton Hill, which was severely damaged the other day by a similar accident; indeed it may, for anything we know to the contrary, be at this moment as liable to extinction as the ancient villa of Lucullus (Castel dell' Novo), which was buried not long ago under the precipitous cliffs of Pizzofalcone, near Naples. Now, in the case of a dreadful catastrophe like this occurring in Edinburgh, we should like to know who is to blame. Such a thing may occur it will be admitted.

"The oaks of the mountains fall;
The mountains themselves decay with years."

It has been wisely ordained that rocks of every description shall slowly disintegrate and subside into soils; and this process of weathering is always most apparent after a severe winter, or rather after a succession of severe frosts. It may be safely affirmed that there are no special circumstances which render Edinburgh free of the operation of such natural laws, or which absolve her rulers from the guilt of neglecting them. Naples, it will be allowed, is as beautiful, and we have no doubt, as well governed a city as Edinburgh; and at Naples there were seventy lives lost. What security, we again ask, has Edinburgh against such a dreadful catastrophe? We are sorry to answer the question—there is absolutely none. It is only after the fatal event has occurred that the activities of the Edinburgh authorities come into play. In such a possible calamity we can imagine the Lord Provost and the Lord Dean of Guild actively engaged in digging up the mutilated corpses of the citizens; and an able report on the expense incurred in the operation presented to the next meeting of the Town Council by the burgh engineer. It is also possible that a day of fasting and humiliation might be ordained by the United Presbyterian churches; and most probable that a Bill would be brought into Parliament by the senior member for Edinburgh to prohibit entirely the sale of spirituous liquors in Scotland! And so would the municipal conscience be satisfied, and once more go to sleep!

Seriously speaking, this is a subject which should at once be seen to. No city in the empire, if we except the metropolis itself, can boast of so many and such eminent scientific men as Edinburgh; and this is a matter which scientific men alone can dispose of. It is needless to expect much knowledge, or even much foresight or discrimination, at the hands of a corporation which is composed, as we understand, chiefly of respectable tradesmen. The Lord Provost Chambers, one might suppose, would constitute an honourable exception; but then his lordship is often in a minority upon public questions—as, for example, on a recent occasion when the offer of the North British Railway was refused; and Prince's-street, one of the most beautiful esplanades in Europe, was selected for the site of a vegetable market.

We shall now say a few words about the fires. Towards the close of last year Edinburgh was the scene of two or three most disastrous and calamitous fires; in fact, they are more properly described as conflagrations. It is hardly necessary to say that there was great destruction of property; we must also tell there were some severe and more than usually harrowing cases of the loss of life. The circumstances under which these fatal occurrences originated show very little grounds for believing in the wisdom or public spirit of the Edinburgh local government. But our readers shall judge. On the 9th day of September, 1867, there was an explosion, and consequently a fire, on the premises of a firework manufacturer in the Canongate, which eventually turned out to be the most shocking disaster which it had been our lot for several years to record. The results were the death of five persons, and dangerous injuries to at least nine others. However alarming this dreadful explosion was in front, it was in the rear of the tenement that its terrible effects began soonest to appear.

Chessel's-court, notwithstanding its worn and dilapidated appearance, is still the most spacious court in the Canongate; and the stair leading to the floors of the tall tenement entered from the court. By this solitary stair it is possible, we believe, that such a number as 120 human beings had ingress and egress to their separate domiciles; and this egress was barred by a terrific flame from the firework-maker's back door. No sooner were the inhabitants of the floors above aware that they were imprisoned than a scene of terrible agony occurred. The women were

to be seen at the windows shrieking madly for help, and wringing their hands with indescribable anguish and bitterness. It is horrible to tell, but it is true, that the wretched and maddened mothers at length began to throw their children over the windows; yet up to this moment there was absolutely no appearance of the fire-brigade. To collect the fire-brigade in Edinburgh is a task of some difficulty and research, as the firemen do not attend at the stations, and are in general occupied with other professions. It is melancholy to add that there was no fire-escape. Such an invention at that time had not penetrated into Scotland, and so the process of pitching over the children proceeded. At length help of a better kind began to arrive. A soldier, a private dragoon of the Scotch Greys, took command of the crowd. Mr. R. M. Ballantyne was seen to rush through the flames. Mr. Slater brought a long ladder from his yard, and with much exertion and after some unsuccessful efforts it was raised against the wall. A sailor immediately climbed up and began to rescue the terrified inmates. But the ladder was too short. One good-looking married woman, named Ferguson, about thirty years of age, in a paroxysm of frenzy and despair, leaped from the window to the ground; and her body, horribly fractured and mangled, was in a few moments afterwards transported through the crowd to the Royal Infirmary. Other poor women were seen aloft clinging to the wall, and holding on to the lintels and the burning window-sills, terrified at the prospect of the fatal leap. Several of the inmates were unaccounted for; and some, it was found, were suffocated or burning inside the walls. But we will not prolong the agonizing scene. At length the fire-engines did arrive, but of course there was no water. There is very little of that commodity to spare in the old town of Edinburgh, as we have often pointed out; the manufactories for which the supply is chiefly reserved, lie for the most part at the outskirts of the city. A feeble pressure, however, was somehow got, and the engines when once under play did excellent work. We shall venture to pass by the valorous exploits of the civic authorities,—the lord provost, the magistrates, the town councillors, the town clerk, the lord dean of guild, the burgh engineers, the superintendent of police,—who all arrived in due course, and are honourably distinguished in the newspaper reports. Nevertheless, great complaints were heard, we understand, at the Cross of Edinburgh about this period of the harassing nature of official life. For it must be recorded that on the following evening the terrified authorities were again started in their sleep and aroused from their slumbers by another fire of still greater magnitude,—also arising from the combustible materials of another dangerous trade, which had been long and successfully carried on by a distinguished councillor now retired from office,—and occurring in another poor and densely-populated locality. On this occasion, although many severe accidents happened, fortunately no lives were lost; for the fire-engines were early on the spot, and there was a copious supply of water. It is proper to add that not long afterwards a fire-escape was procured for the city of Edinburgh—not without considerable opposition in the town council by certain wise and honourable members, who still persisted in maintaining that the best fire-escape and the highest security that Edinburgh possessed was the long staircase of stone!

ON THE FOREIGN ARTISTS EMPLOYED IN ENGLAND DURING THE SIXTEENTH CENTURY, AND THEIR INFLUENCE ON BRITISH ART.*

WE now come to an artist of much greater importance than Volpe, the excellent Florentine painter and architect, Anthonio, or Toto, dell' Nunziata, in his youth a pupil of Ghirlandajo's, and a formidable rival ("*uno sprone del del continuo lo pugnava*") to the all-accomplished Perino dell' Vaga. In him we at length meet with an artist gifted with special talent for architecture. He, like Torrigiano, and probably most of the other Italians who entered the service of the king, "was taken [*condotto*]" to England by some of the Florentine merchants. There (says Vasari, in his "Life of Perino dell' Vaga") Toto executed all his works, "and by the king of that province for whom he wrought

* Comp. "A Voice from Edinburgh after the Storm," p. 112, *ante*, and "The Duties of the Burgh Engineer," p. 215. In this last article a reference is given to the sections of the local Acts regulating the engineer's duties, which certainly do not coincide with the *Scotsman's* statement "that he has other and quite different duties to perform."—*Vide the Scotsman*, February, 1868. Indeed, it would be very curious if he had. But we must own that the duties of the burgh engineer of Edinburgh seem to be of rather a complicated character, if we may judge from the following advertisement which appeared in the same newspaper:—"King's Stables.—Lots to Let. Occupied by Messrs. McLean & Hope, Rent, 28s.—Apply at Burgh Engineer's Office, Police-chambers."

* By Mr. M. D. Wyatt. See p. 423, *ante*.

in architecture (as well as in sculpture and painting), and for whom he built his principal palace, was most handsomely rewarded." The credit is due to my friend the late Mr. Carpenter, of the British Museum, of having been the first to notice this passage, and identify Toto with the design of Nonesuch. Not only was Nonesuch the principal palace built by Henry, but it was the only one he can be really said to have built; and it was, moreover, 'so different from all other palaces, in England at least, as to have fairly earned its cognomen. Toto's earliest education had specially fitted him for dealing with such an infinity of allegorical and quasi-pictorial sculpture as that with which we shall find Nonesuch to have been adorned; since his father, in whose "hottegh" he was first brought up, obtained his nickname of "Nanzata" from his annually furnishing all the quantity of imagery with which the Feast of the Annunciation was wont to be set forth in a tangible shape at Florence. From Mr. Gough Nicholls, who wrote a capital notice of Nonesuch in the *Gentleman's Magazine* in August, 1837, I borrow the following notice of the edifice:—

"The original and principal structure was of two stories, the lower being of substantial and well-wrought freestone, and the upper of wood, richly adorned and set forth, and garnished with a variety of statues, pictures (i. e., coloured figures in relief), and other artistic forms of excellent art and workmanship, and of no small cost.* Its roof was covered with blue slate. In the centre, over the gatehouse to the inner court, was a clock-turret, and at either end of the structure, east and west, was a large tower of five stories high, commanding an extensive prospect. This singular building remained in good condition for more than a century; for it is noticed both by Evelyn and Peeps, in their diaries in the year 1665, when it was temporarily occupied by the office of the Exchequer during the prevalence of the plague in London. 'I took (says Evelyn) an exact view of the plaster statues and bas-reliefs inserted 'twixt the timbers and panchions of the outside walls of the court, which must needs have been the work of some celebrated Italian. I much admired how it lasted so well and entire since the time of Henry VIII., exposed as they are to the air, and pity it is they are not taken out and preserved in some dry place: a gallery would become them. There are some mezzo-reliefs as big as the life. The story is of the heathen gods, emblems, compartments, &c. The palace consists of two courts, of which the first is of stone, castle-like (built in the reign of Elizabeth), by the Lord Lumley; the other of timber, a Gothic fabric, but these walls incomparably beautified. I observed that the appearing-timber panchions, entrelaces, &c., were all so covered with scales of slate, that it seemed carved in the wood and painted, the slate fastened on the timbers in pretty figures, that has, like a coat of armour, preserved it from rotting. There stand in the garden two handsome stone pyramids.' Peeps describes the same features as 'figures of stories and good painting of Rubens's or Holbein's doing; and one great thing is, that most of the house is covered,—I mean the posts and quarters in the walls,—with lead, and gilded.'

"In the earliest description of Nonesuch, that published in Brann's 'Civitates,' 1532, it is stated that Henry VIII. 'procured many excellent artificers, architectes, sculptors, and statuaries, as well Italians, French, and Dutch as natives, who all applied to the ornament of this mansion the finest and most curious skill they possessed in their several arts, embellishing it within and without with magnificent statues, some of which vividly represent the antiquities of Rome, and some surpass them'—terms which are echoed by Camden in his 'Britannia,' who declares that Nonesuch was 'built with so much splendor and elegance that it stands a monument of art, and you would think the whole science of architecture exhausted on this one building. It has such a profusion of animated statues and finished pieces of art, rivaling the monuments of ancient Rome itself, that it justly receives and maintains its name from them.'

Henry VIII. did not commence the erection of Nonesuch before 1538, for it was in that year that he acquired the site, previously called Cuddington. It was still unfinished at his death, and remained so during the reign of Edward VI., but in that of Mary it was completed by the Earl of Arundel, 'after the first intent and meaning of the said king his old maister,' and

the front quadrangle was afterwards added by the Earl's son-in-law, Lord Lumley, from whose hands it reverted to the Crown in 1591 by exchange for other property."

Fortunately, we may form a good idea of the aspect of Nonesuch from early prints, the most important illustration being the view taken by George Hoefnagel in 1582, an impression of which is amongst the choice engravings shown in the King's Library of the British Museum. In whatever capacity Toto may have worked for the king, in the records he is always described as "paynter," and he ultimately held the appointment of "serjeant paynter." In the accounts he is always associated with "Bartilmew Penne" (Bartolomeo Penni), another Florentine, with whom, no doubt, he generally worked. Much discussion has taken place amongst the learned as to the identity of this Bartolomeo Penni with the Luca Penni, brother-in-law to Ferruccio Vaga, mentioned by Vasari as having entered the service of Henry VIII. In spite of Vasari, I am inclined to believe that they were two individuals of the same family, Luca being in the service of Francis I., and Bartolomeo in that of Henry VIII. Like Inigo Jones subsequently, Toto was an ingenious designer of "masques and entries," as his father had been before him.

If Bartolomeo even were Luca, neither is it to be confounded with another Luca, a painter of Leyden, who came over here with a large family, tempted by the reports of Henry's magnificence. At least so says Walpole, whose error in confusing this Lucas with Cornelius Hayes, whose name occurs in a list of new year's gifts for the thirtieth year of Henry's reign, in which mention is made of a silver cup given to Hans Holbein, made by "Corneli," has been pointed out by Mr. Franks in the "Archæologia," vol. xxxix., page 8.

We now come to an artist whose ability must have been first-rate—Nicholas of Modena, generally described in the accounts as "kerver." He appears to have entered the king's service in 1537, and to have continued attached to the Court at any rate as late as the fifth of Edward VI. (1552). He made the royal effigy (the "picture," as Machyn calls it) which surmounted the king's coffin at his death; and Mr. Nicholls has unearthed, *inter alia*, a curious description of a contemporary work of art as "hy Modeno a feire picture" (no doubt carving, the term "picture" being constantly used to describe basso and alto reliefs), "paynted the Freche King his boole personage, sett in a frame of woide." This entry has assisted Mr. Scharf in identifying as by Modeno the beautiful little figure of Henry VIII. standing on the capital of an Ionic column, exquisitely carved in bone stone in very high relief, which formed one of the greatest of the Strawberry-hill treasures. It is now in the possession of Mr. Dent, of Sudley Castle. In spite of its diminutive size, Mr. Scharf recognizes it as one of "the noblest representations of King Henry in existence." It once belonged to the Arundel collection, and afterwards to Lady Betty Germaine; it bears, therefore, a good pedigree. From identity of style Mr. Scharf also attributes to Modeno, a fine circular medallion of stone in high relief in the Long Gallery at Hampton Court, which has been hitherto associated with the name of Torrigiano. I cannot help thinking that the beautiful statuette of St. George and the Dragon standing on a fine cinque-cento pedestal, carved in wood and gilt and painted, in the collection of Mr. Louis Huth, is by the same hand, if not by Rovezzano (see *ante*, page 425) or Torrigiano.

Of Ambrose, "paynter to the Queen of Navarre," I have been able only to find that on the 13th of June, 1532, he received some twenty crowns "for bringing of a picture to the King's Grace to Eltham." It is not probable that such an artist would have visited this country without desiring and receiving some employment from so liberal a patron as Henry VIII. bore the reputation of being throughout Europe; but of what nature any such employment he may have obtained was, or what status Ambrose himself occupied as an artist, I have been unable to discover.

Of not much greater note appear to have been the three Bernardi,—viz., Theodore the father, and Antony and Lambert his two sons. They were all brought to England in 1519 by Bishop Sherburne, and employed by him on several pictures illustrating the history of the diocese of Chichester, which in a sadly repainted and mutilated form have descended to our days. Dallaway considers that the chambers in Conday

Honse were also painted by them; and they were probably amongst the earliest of the decorative painters whose peculiar arabesque work adorned the architecture of the Renaissance in England, and set the fashion of the rich coloured decoration subsequently followed in the great Elizabethan houses. Purity of style, however, of painted arabesque never seems to have obtained to any great extent in England. The King's notion of decorative painting seems to have been divided between heraldic insignia and fantastic "imprese" or emblems. He was particularly fond of ordering the introduction of the "Kynghes hestes," and the King's or the Queen's "wordes" with "knotys" and "badgys"; and the royal vagaries in this way frequently go far to spoil the designs even of the accomplished Holbein. He appears, nevertheless, to have kept some skilful Italian decorative painters about him; and no doubt the miniaturist Ellis, Alice, or Alys Carmillyon Millyner, otherwise Elia Carmillione Milanesa, who was in his service from 1523 to 1548, was well versed in the fine decorative style of Northern Italy and the school of Leonardo and Luini.

Girolamo da Treviso, by whom the fine altarpiece representing "the Madonna and Child enthroned with Saints and Angels," in our National Gallery, was painted, and who stands next upon our list, was born at Treviso, in 1497. Having failed, as it is related by Vasari, in a competition at Genoa with Porcio del Vaga, about 1530, he quitted his native country and entered the service of "hief Harry," as a "magister tormentorum," or engineer. He was killed by a cannon-ball in the year 1544, at the siege of Bologna. Henry having failed in inducing Raffaele to visit England, had to content himself with Trevisano, who was one of the closest imitators of the great Urbinese, not in his painting only but in his architectural and decorative studies as well. His knowledge of engineering was, however, his special recommendation to the king, and led to his employment at a large salary and to his most honourable entertainment by his master, whom he delighted with "alcune prove d'edifitii ingegnosi cavati da altri in Toscana e per Italia."

But for his inopportune and early death at the age of thirty-seven only, Girolamo would probably have done more for architecture in England than any of his contemporaries who practised in this country. With him closes the list of Italians, predecessors, contemporaries, and rivals of Holbein in England; and it remains for us now to trace rapidly natives of other countries who fall into the same general category. I cannot, however, but preface my notes on this portion of my theme by drawing attention to the notable deficiency of the supply of artists or art-workmen from France. One can only attribute this to the combination of several accidents—1st, the greater fame of the Italian schools; 2nd, the influence of the Italian merchants resident in London; 3rd, the old tendency of Flemings to suck the golden eggs of Britain; 4th, the rivalry of the merchants of the Steyerland with those from Italy; and 5th, the King's jealousy of Francis I. and the French.

When Holbein visited England, bringing with him his letter of introduction from Erasmus to Sir Thomas More, in probably the year 1526, he was himself but thirty-two years of age, King Henry VIII. being four years his senior, and having occupied the throne since 1509. At the date of his arrival, although one John Browne held the office of serjeant painter to his Majesty, the really ablest artist resident in this country appears to have been Luke Hornebolt of Ghent.* This clever painter's father, Gerard, and his sister Susanna, were both residents in England before the year 1523, and such was the talent of the lady especially, that Albert Durer records in his diary, that when he visited her father in Antwerp in 1521:—"Item. Master Gerard, the illuminator, has a little daughter about eighteen years old, named Susanna, who has illuminated a little leaf, a Saviour, for which I have given a florin. It is a great wonder that a woman can do so much." Guicciardini is scarcely less emphatic when he declares "that so excellent was she in illumination, that the great King Henry VIII., with noble gifts and abundant provisions, enticed her to England, where she lived many years in great favour and estimation with all the Court; and there, finally, she died

* Specimens of Hornebolt's ability may be examined in the shape of twenty-one drawings of allegorical subjects added to the collection of the British Museum during last year.

† Descrizione di tutti i paesi Bassi.

* Survey of the Parliamentary Commissioners in 1650.

rich and honoured." Susanna's great rival as a miniature painter, in addition to Eliza Carnillione, already noticed, was Lavinia Teerlinck, daughter of Simon Benninck, of Antwerp, best known as Simon of Bruges. Mr. J. G. Nicholls, in his admirable essay in the "Archæologia," "On the Contemporaries and Successors of Holbein," has given many interesting particulars touching this lady, and her ultimately great popularity with Queen Elizabeth, whom she painted many times, and from whom she received in return many valuable presents of gilt plate. She also was one of Henry VIII.'s importations. We hear further of a very clever female artist in the same style, one Katherine Maynor, of Antwerp. She was, no doubt, thoroughly imbued with Holbeinism, as her brother Harry was one of his most intimate friends.

The extension of the arts of printing and engraving diverted these able female artists from their original vocation, the embellishment of manuscripts for royal libraries, and no doubt induced them to turn their attention to the delightful practice of miniature portrait painting. So transcendent is the merit of the finest miniatures of Henry VIII.'s time, that writers of art have, until quite recently, been willing to attribute them to no other hand than that of the immortal Holbein himself. The important discovery in February, 1861, of that artist's will by Mr. W. H. Black,* and the fixture thereby of the date of his death in 1543,—eleven years earlier than the date at which it had been previously believed to have taken place,—have imposed upon cognoscenti the burden of discovering by whom the works were done, which, clearly referable to the eleven years in question, had been previously hesitatingly ascribed to Holbein. Among these are many miniatures of the highest excellence, the merit of the execution of which must now be restored to their rightful owners above enumerated—clever descendants of the great misal painters of Italy and Burgundy. The conclusion is then forced upon us, that the same hands which painted the miniatures of these eleven years must have done those which exactly correspond with them, and which must have been completed before Holbein's death. Away, then, melts the tradition, which was never very satisfactory, although universally accepted, that Holbein was the great founder of our national school of miniature painting, ultimately made so illustrious by the Hilliards, Oliver, and Coopers. Fortunately his reputation needs no hurried plume, and there is quite enough left to prove his just title to the admiration and estimation in which he ever has been, and must always be, revered as one of the ablest artists who ever lived. The artistic quality he possessed in the highest degree was, I consider, the intensity with which he realised "form." Able master as he was of delineation, what gives the stamp of enduring truth to his work is the feeling of assurance his delineation conveys to the mind of the spectator, that what he has drawn from life was the "very effigies" of what he saw; that what he designed could never be executed with equal propriety in any other way than as his drawing defined it. There is never any uncertainty as to his intention or meaning. What he says was, what he says should be, should he. In this precise conception of pure form, and power of conveying his own sense of it to others, he stood upon the same platform as the great men to whose universal genius I have already alluded—Albert Dürer and Leonardo da Vinci. The artist who possesses in a high degree any such power as that I have attempted to define, must of necessity have the requisite aptitude for success in either painting architecture, or sculpture, or all three; since the power in question lies at the root of and is indispensable to the satisfactory practice of either or all. Architects will do well to look earnestly at each relic as time has spared of the genius of Dürer, Da Vinci, and especially of Hans Holbein, since, so far as I know, they were the best makers of working drawings who ever lived. Of whatever they drew they gave every characteristic, and their slightest sketches never fail to mark essentials and to omit secondaries of form and expression. How often in architects', painters', and sculptors' studios is the reverse the case.

Happily there is no need now to dwell upon Holbein's career as a painter, for the excellence

of recent memoirs of him, published both at home and abroad, leave little or nothing unillustrated on that head. His peculiar interest to us is his genius as a designer, and the impetus given by his example and practice in substituting fresh models of beautiful form for the feeble mannerisms into which Gothic art had sunk at the date of his arrival in this country. This took place in the year 1526, Holbein being at that time in his twenty-eighth year. He came to us from Basle, where he had been practising designing in all its branches for about ten years. The existence of many works at Basle referable to this period induced, until comparatively recently, the not unnatural supposition that Hans Holbein was a native of that city. The only difficulty which this theory presented was the very great one of discovering from whom he could, if reared at Basle, have received the peculiar education in art which made him a great master at so early an age as from eighteen to twenty. That term may rarely be applied to one who united at so early an age, in such a place as Basle, and at almost the beginning of the sixteenth century, the following qualities:—a competent knowledge of the theory and practice of drawing and painting; an unerring eye and thoroughly-trained hand; a mastery over the rules of composition and design on the best Italian traditions; an acquaintance with the forms and proportions of classical architecture and ornament; a thorough technical facility in applying art to industries demanding specific design, and a pliant facility which enabled him to lend himself to each conventional form of design, as though that particular form had been his individual speciality. Happily the demonstration by Dr. Pesevaux, in 1846, that Holbein had been reared in Augsburg, from whence, at the age of about eighteen, he removed with his father to Basle, "came to the front" to solve the mystery of much which appeared inscrutable, and to account for Holbein's having acquired in early youth that universality of practice which distinguished his maturity, and which specially brings him within our notice this evening. I need scarcely remind you, that as one of the most considerable of the old imperial free cities of Germany, Augsburg shared with Nuremberg the first extension of commercial and manufacturing energy from Italy Northwards and towards the West. The princely mercantile houses of the Fuggers and the Welsers rivalled the Bardi and the Medicis in the vastness of their operations, and in the encouragement they gave to art and artists. They brought to Augsburg the handicrafts as well as the products of Milan, Florence, Venice, and Genoa, and preceded the rest of Europe in disseminating the principles of the application of the types of Renaissance form to architecture and industrial art. This was the hot-bed in which the budding genius of Hans Holbein was forced, and here it was that he learnt, like the most famous contemporary Italians, how to apply his dexterity and readiness in design to every possible theme. In fresco, oil, stained-glass painting, designing for the early printers, Froben and Bebelius of Basle, Trechsel of Lyons, and at a later date probably, Pynson in England, wood-blocks, title-pages, borders and alphabets, making working drawings for jewellers, metal workers, weavers, tapestry workers, wood and stone carvings, and even for masons and carpenters, he exercised himself freely during his residence at Basle, and so much to the delight of the citizens, that great efforts were made to recall him even after he had taken root in this country.

It would be beside my present object to dwell upon the circumstances of his life, his friendship with Erasmus, by whom he was introduced to Sir Thomas More—his employment by Henry VIII.—and the portraits and pictures he executed for the king and others. My aim is to recall to you the evidences we are fortunate enough to still possess of his admirable talents as a designer. First and foremost amongst such evidences, as exhibiting the widest range of his powers, must be placed the invaluable small octavo volume of designs, principally for jewellers' and cutlers' work, which is preserved amongst the Sloane MSS. in the British Museum. This precious little book contains as many as 182 subjects, mounted upon twenty-nine pieces of card-board. The designs are for the most part drawn with a pen with black ink, and then some slight touches of brown have been put on for the shadows.

Most of the designs have the ground blackened, the ornaments being left in white. Some of the jewels are entirely coloured, and are

often touched up with gold; several of them are designed for enamelling in high relief.

It ought to be remarked that there are certain circlets with groups of figures in them "or *impresa*," and jewels introduced; these might possibly be intended for "enseigns," to be worn in the hat. No one can fail to be struck in looking over this book with the great use evidently intended to be made of niello, or black inlay, an art then exceedingly popular in Italy, through Maso Finiguerra, Peregrino da Cesena, &c.; in fact, it is used in nearly every one of the designs. This, no doubt, was an Augsburg novelty, borrowed from Italy, and popularised by Holbein and others; indeed much jewelry of the age shows this peculiarity. Another most noticeable point in these designs is their entire and absolute freedom from any trace of Gothic manner. Holbein no doubt derived great advantage from the works carried on around him by the various admirable Italian masters of ornament, by whom, as we have seen, Henry had surrounded himself. Many of the objects, designs for which are contained in the volume under discussion, were no doubt intended for the new year's gifts, with which kings, nobles, and commoners annually reciprocated expressions of good-will, and with the particulars of which the Royal and other accounts of the period are teeming.

In all these beautiful designs, and indeed in all the accessories introduced in his pictures, the artist has proved his clear practical acquaintance with the technical processes by which he contemplated the realisation of the effect he aimed at. Nothing is left vague; and the artisan is, as it were, taken by the hand and aided by the designer, instead of feeling himself hampered (as is too often the case in modern designs) by the impracticability of successfully rendering the effect of the working drawing by any process known to either the workman or the draughtsman.

While rendering all due tribute to the masterly power of the inventor, justice should also be done to the executants, who met, for the fitting elaboration of such complex and ambitious designs, involving the combination of ornament both superficial and chased in the round, with the human figure nude, and in vigorous action, have been craftsmen of no mean skill. Let us now endeavour to see who some of these were. The King's leading goldsmith, by whom, no doubt, Holbein's splendid designs for plate were chiefly executed, was "John Anwarpe," or John of Antwerp, who was one of the witnesses to his will, and to whom he died indebted in the sum of six pounds, no small amount in those days and in comparison with his own yearly salary from the King of thirty pounds only. Some of his other designs for precious arms, &c., may probably have been wrought by another witness to his will, Anthony Sneider, "a farmer," who is considered by Mr. Franks* to have been one of the "Almayne" or German art-workmen employed at the King's palace at Greenwich. Others of this band, probably Augsburgers, as Holbein himself was, since they were the best of all German armourers, whose names have been lost to us, may have executed such objects as the daggers, &c., I have attempted to describe. Of other foreigners whose names are recorded in the traditions of other branches of production, and who may have worked for the King from Holbein's designs, the most worthy mentioned were Jan Mustyan, a native of Enghien, Henry VIII.'s arras maker, John de Mayns, his engraver, and Richard Atsyll, his precious stone and cameo cutter.

It is curious that the high estimate of the technical powers of Holbein in every department, his universal practical aptitude, in fact, which the scanty relics of his working drawings, preserved here and at Basle, vindicate on all occasions, is corroborated by the epithet applied to him in an interesting letter from Erasmus introducing him to Peter Agidius, wherein he describes him simply as an "insignis artifex," i.e. not painter, nor architect, nor sculptor, but simple workman—master of all crafts, the true magister "artium," answering to "the maker" of the Greeks.

In architecture I would not wish to detract from Holbein's merit; but we have seen, from the number of different able Italians employed by Henry VIII. before the date of Holbein's arrival in this country, how much reason there is to doubt Walpole's assertion that "the beginning of reformation in building seems owing to

* See the "Archæologia," vol. xxxix., in which the text of the will, and Mr. Black's, Mr. Nicholls's, Mr. Franks's, and Mr. Schatz's comments on the altered aspect thrown by it upon contemporary art history are printed *in extenso*.

* Discovery of the will of Hans Holbein.

Holbein." Of his work, so far as I know, one specimen only remains, viz., the porch or "loggia" at Wilton. I cannot admit this, nor indeed has it ever been so considered, as beautiful, but it is at any rate free from any admixture of Gothic detail. Of the two gates he designed for the king at Whitehall, now removed, plates are given in the "Vetusta Monimenta." One of the Whitehall gates was built in glazed bricks, in different colours, and was decorated with four large circular medallions of huts in terracotta, possibly the work of Rovezzano, or one of the other Italians skilled in the processes of Northern Italy. I have already alluded to the existence of medallions of a somewhat similar kind at Hampton Court and St. Donat's Castle, Glamorganshire, as well as in great quantities in the king's private collection.

One can feel but little surprised at the redundancy of these "tables in earth," since not only were many doubtless brought to this country from Italy, where, at the beginning of the sixteenth century, the productions of Luca della Robbia and his successors, as well as those of the ordinary majolica manufacturers, enjoyed the highest vogue; but it has been recorded that many Italians, skilled in all the contemporary ceramic processes of their country, quitted it to practise their art in other parts of Europe. Thus we know that one of the "Castel Durante" artists, Guido di Savino, and his two sons, made majolica at Antwerp during the earliest years of the century.

What further architectural works Holbein may have done can now scarcely be traced. There is, however, one very important one, which has not hitherto, so far as I am aware, been ascribed to him, but which, from internal evidence, I cannot hesitate to believe must have been executed from his designs. I refer to the splendid woodwork of King's College Chapel, Cambridge. In its way, it is a model of Renaissance wood-carving, revealing in every arabesque, and especially in the ornaments of the imbrices, the peculiarities of classical form as they were first, if I hear the Italian into German by Albert Durer, Aldorffer, Peter Vischer, and others, including Holbein. A comparison of this work with the detail shown upon his admirable design for a richly and highly-elaborated chimney-piece, having on it the arms, &c., of Henry VIII., probably executed for one of his palaces, drawn with the pen, and washed with Indian ink and colour—from the collections of Richardson and Horace Walpole—now in the print-room of the British Museum, will at once, I think, serve to establish the identity between the designers of one and the other monument.

In judging of the influence exercised on architecture and the industrial arts, of which architecture must ever have been and he the foster-mother, by such men as Holbein and the Italians, of whom mention has been made, it should ever be remembered that our impressions are derived, not from all they did, but from the "disjecta membra" alone of their greatness which time and tradition have spared to us.

With Holbein's death, now clearly ascertained to have taken place in 1543, perished the last of the great artists whose talents were trained on the old Italian system of art-education to fructify in every field, and to yield fruit of every variety. From that time forwards, in this country at least, painters were painters, sculptors sculptors, and architects architects; but the great masters of arts, to whom form was everything, and the medium by which it was to be expressed a matter of comparative indifference, fade from the range of historic vision.

No research has yet clearly made out who "Johannes de Padua," the celebrated architect who mainly took the place of Holbein as Henry VIII.'s chief engineer, really was. The earliest document referring to him appears to be the patent which appointed him "Devizor of his Majesty's Buildings," in 1541—the year after Holbein's death. Mr. Worman, in a note, supplementary to one by Dallaway on the subject, states the fact that it was in this same year that Girolamo da Trevisi, the former official architect to the king, met his death. He hence infers that Giovanni succeeded to Girolamo. Dallaway observes that in the above year Henry had completed his palaces, and "little more could have been done before his death in 1547." I think it would be altogether wrong to assume from this that John of Padua did nothing for the king before the date of his appointment by patent, since he would scarcely have obtained his formal

nomination unless he had already proved his capabilities to that potent monarch's satisfaction. This view is supported by the terms in which the king granted him in the same year a special fee of 2s. per diem. He gives it of his "assured knowledge," as well as "mere motion," and further, "in considerations boni et fidelis serviti quod dilectus servicus noster Johannes de Padua nobis in architectura, ac alias in re musica inventis impendit se impendere intendit." We thus find that he had won upon the king's good graces by his musical, no less than by his architectural skill. Moreover, the works at Nonsuch were far from being complete at that date. After the king's death, Giovanni probably entered the service of the Protector Somerset, for whom he carried out the magnificent palace in the Strand, which was left in a very incomplete state when the once all-powerful noble met his untimely end upon the scaffold.

Beyond his work at Somerset House, which appears to be well authenticated, I must confess that much which has been attributed to John of Padua appears to me apocryphal, and Longlet, especially, scarcely answers to one's expectation of what a regularly-educated Italian architect's work was likely to have been. The necessity for such education began to be seriously felt in England even before the supposed date of the commencement of Longlet (1567), since as early as 1550 John Shute was sent to Italy expressly to study architecture, by John Dudley Duke of Northumberland. As Dallaway remarks, John Shute, on his return in 1563, published the first scientific book on architecture which appeared in our language. His principal foreign rival was apparently Theodore Have of Cleves. He is honourably mentioned in the annals of Caine College, Cambridge, as the author of the pillar and stone erected in Dr. Caine Court ("*hæca constructio toto solaris decoratum*"), of exquisite and wonderful workmanship, bearing sixty dials (*horologia*). He is further on stated to have been "an excellent artist and celebrated professor of architecture," and he is supposed (on, I think, good grounds) to have been "the architect" to whom Dr. Caine had in his lifetime prescribed "the exact model and pattern" to which his celebrated Gate of Honour (completed in 1574, after the doctor's death) was "enviously worked" in "squared and hard stone." I need scarcely recall to my readers the strict and pure classicism of this interesting specimen of pedantry. It is a singular illustration of the *multum in parvo* system which may frequently be found in Flemish work, and is strictly and perfectly monumental in every respect except size.

With Have's work and Caine's death, with Shute's return from Italy and the speedy dissemination in England of the general treatises upon architecture which began to be multiplied on the Continent after the middle of the sixteenth century, the necessity for the employment of foreigners in this country as architects and designers no longer existed, and in their place there grew up the native school which, headed by John Thorpe, soon increased: so that before the end of the century, numerous as the foreigners may have been who were employed as painters and in some other branches of art, none of any great importance beyond those already alluded to seem to have practised as general designers or architects. Still, although not so practising, many foreigners helped to maintain the "prestige" which all the forms of Renaissance art popular in the other countries of Europe had come to be regarded in England. A brief allusion to the principal amongst the great family may, therefore, suffice for our immediate purposes. Those who wish for full details may be referred to the pages of Walpole and Dallaway, with the admirable corrections of Messrs. Franks, Gough Nicholls, and Scharf in a recent volume (the thirty-ninth) of the "Archæologia." The leading foreign painters to whom the portraits supposed to have been painted by Holbein between the year 1543, in which he has recently been proved to have died, and the year 1554, in which until recently he had been supposed to have died, were the three following: Johannes Corvus of Flanders, Gherardus Plecoens—or, as he is occasionally called, Gervas Flicx, Flicens, or Flicious—of Germany, and Guillim Stretes, a very able artist, whose principal works may be referred to the reign of Henry's successor. From the great care and accuracy with which personal jewelry, the patterns of dress and embroideries, and even architectural backgrounds of Renaissance character, were painted by these artists, there can

be no doubt that they were well acquainted with ornament and decoration; but we remain without evidence of their having ever practised design, or influenced contemporary architecture otherwise than as skilful draughtsmen cannot at any time avoid doing. Their main efforts were certainly devoted to portraiture, and there was unquestionably a falling away from the grand activity in monumental art which distinguished the whole reign of Henry VIII. Even decorative painting flourished but little under the auspices of Edward VI.

In Queen Mary's reign we come to Sir Antonio More, who was a native of Utrecht and scholar of Jan Schorel. Originally in the service of Philip II. of Spain, he was sent to England to draw Queen Mary's portrait, which he did in a very courtier-like manner. At the end of her reign he followed Philip to Spain, whence ultimately, getting into disgrace, he returned to the Netherlands, under the patronage of the Duke of Alva. He is believed to have died in 1573. He painted in Holbein's manner, but often neglected to put his name to his performances. They are consequently difficult to recognize. He principally painted portraits, but also executed some few historical pictures.

In Queen Mary's reign we had another excellent foreign artist here for a short time, who was by many of his contemporaries regarded as rivaling Titian, even as a colourist, in spite of the strange extravagancies of disposition and manner which gained him the cognomen of "zotte," or fool. Our hero, Justus van Cleef, Mr. Worman believes to have died in 1556, and not in 1536, as has been usually supposed. Van Mander's story of the artist's insanity having been occasioned by his disappointment at the failure of his introduction by Antonio More to Philip II. of Spain when he came to England to marry Queen Mary, and which event took place in 1554, furnishes a strong corroboration of the probability that his death did not occur until the later of the two above-mentioned dates. Don't has arisen as to the nationality of a contemporary of Van Cleef's, the Nicholas Lyzarde (probably Lizardi), who was a leading court painter from 1547 till his death in 1571.

Lucas de Heere, whose allegorical picture of Queen Elizabeth at Hampton Court with the date of 1569, will no doubt be remembered by my readers, was born in 1534. His father was a good sculptor and architect, and ultimately placed his son under Franz Floris. He became a good designer, and worked for the tapestry weavers and glass-painters. I cannot find, however, that he did anything but paint portraits in this country.

Although after Lucas de Heere many distinguished foreign artists worked in England up to the end of the century—such as Frederigo Zuechero, a decorative painter of great facility; Cornelius Ketel, who painted in public with his feet; and Mark Gerrard, a clever general designer, whose portraits of Queen Elizabeth will be in your memory; Henry Cornelius Vroom, who made the cartoons for the Spanish Armada tapestries burnt in the fire of the Houses of Parliament; Petruccio Ubaldini, the last of the illuminators attached to the Court, &c.—it would profit us little to dwell upon their works or merits. It is enough for us, as architects, to note their residence amongst us. Happily, the rapid formation of the great English school of architects, to whom we are indebted for the creation of so many of those heartily picturesque old buildings which we generally call Elizabethan, and which Mrs. Hemans had no doubt in her "mind's eye" when she so well apostrophized—

"The stately homes of England,
How beautiful they stand,
Amidst their tall ancestral trees,
O'er all the pleasant land,"—

released us from dependence upon foreign aid, and kept alive the flame of that lamp of symmetry and comeliness in structure which ultimately, through Jones and Wren, shed its rays far and wide; not through England only, but to every land and clime in which such noble and right royal architecture as theirs will and must be cherished as long as arts may flourish and mankind endure.

In conclusion, pardon me if I have dwelt at too great length upon my theme. You will certainly do so if I may have succeeded in imparting to you a tittle only of the interest and enjoyment with which I have tried to live again through memory with the pioneers who cleared the way for the onward march of the revival of Classical architecture in this our native land.

THE SANITARY HISTORY OF CROYDON.*

The sanitary measures to which the inhabitants of Croydon were driven in past years, by ill health and great mortality, complemented, as they were, by the legal compulsion under which they were obliged to act in cleansing the local stream, which their sanitary measures had fouled, afford altogether a most instructive sanitary history, to which we have often adverted, and which is likely to form the key to the deadlock into which the sanitary question has got, so far as regards the disposal of Sewage. Mr. Latham, the engineer to the Croydon Board of Health, has given, in his report, recently issued, a concise sanitary history of Croydon; and although this history is nothing new to our readers, it may be worth while to condense the particulars by way of refresher to the memory from Mr. Latham's report.

The average mortality of Croydon for the seven years prior to the construction of works of sewage and water-supply was 23.66 per thousand; but, in 1848, the year previous to the adoption of the Public Health Act there, the mortality had risen to 28.16 per thousand. In 1848 the population of Croydon was 19,880; in 1851, 20,855; in 1851, 30,240; and in 1857, 50,755. The rate of mortality for the last thirteen years (viz., since the works have been completed and in successful operation, in 1855) has been only 18.64 per thousand; and the mortality for the past year (1867) only 16.6 per thousand; and without the Union-house, which contains the aged and infirm from thirteen parishes, it has been only 14.73 per thousand! The birth-rate has increased from 29.1 per thousand before the construction of sanitary works, to 31.4 per thousand, on the average of years since; but during the last year it was 34.0 per thousand. Thus the birth-rate by its increase, and the death-rate by its decrease, show, beyond dispute, the great value of sanitary works. Between the years 1855 and 1867 there has been a mean population of 37,375 persons living in Croydon, and the mean saving of life has been a reduction from 23.66 per thousand to 18.64 per thousand in thirteen years, or a reduction in the death rate of 5.02 for every thousand people of the mean population, which, in the thirteen years, equals 2,439 lives saved.

The benefits that were first conferred by the execution of sanitary works in Croydon were purchased at the expense of fouling the river Wandie, and other streams. The evils arising from the practice of turning the sewage into the river, and the serious effect of nine actions or injunctions, either restraining the Board from following the practice, or obliging them to make satisfaction for the damage caused, had the effect of hastening a remedy which has been found in the application of procuring suitable land for the purpose have been very great; but, on two occasions an opportunity offered, and about 130 acres of freehold land have been bought for the purpose of securing an outfall in the natural drainage valley of the district. Other land has been taken on lease; and the sewage is now constantly applied both at Beddington and South Norwood. By a process, therefore, perfectly natural, the foul contents of the sewers, instead of polluting the rivers and streams, the soil and the wells, are adding vitality and richness to vegetation, and, at no distant day, will add materially to the wealth and prosperity of the parish.

The results of the application of the sewage to the soil are extraordinary. Large and luxuriant crops are grown, while the foul streams are converted into comparatively pure water. The following analysis by Dr. Odling, of the effluent water after purification by irrigation on the land, will show the result. It is an analysis of samples taken every quarter of an hour by the doctor's assistants on the 23rd and 24th November, 1867; and this was not a very favourable period of the year for demonstrating the success of the system.

The sewage at the time was flowing over 30 acres of land, on which it had been continuously flowing for about two days; the volume of sewage passed on to the area in the twenty-four hours, was 3,274,300 gallons, and the effluent water, flowing off after purification, was 2,245,200; so that 31½ per cent. of the whole

volume was lost by evaporation and absorption. As the land was completely saturated prior to the experiments, it may fairly be taken that 15.75 per cent., or one-half the entire loss, is due to evaporation through the plant and from the water surface. This would tend to condense any impurities that remain in the effluent water in the proportion of the reduction of volume. In the analysis given, the result that would be obtained by condensing the water-supply, is shown in the second column:—

	Sewage of Croydon after purification by irrigation. Nov. 24, 1867. Grains per gall.	Water supply of Croydon, condensed to same extent as sewage. Grains per gall.
Total solid residue	26.180	25.233
Mineral matter	25.025	24.877
Volatile matter	1.155	.422
Chloride of Sodium	3.400	1.081
Ammonia .....	.012	.037
Nitrogen as ammonia .....	.033	.039
" oxides .....	.413	.281
" organic matter .....	.144	.0023

A comparison between the two columns will show how nearly the sewage has returned to the state of the pure water as supplied to the town. It may be observed, that the total amount of organic and volatile matter contained in the effluent water after passing over the land, is less than the average amount contained in the water supplied by any one of the existing London water companies; and, therefore, it may safely be laid down that sewage, after such purification, is fit to be turned into any stream or river.

Some doubts have arisen as to the probable effect of spreading large volumes of sewage over areas in the immediate vicinity of populous places; but the result, in a sanitary point of view, of the application of sewage to land, is equally assuring; for we find, upon examination, that Norwood, with its irrigation area close to the inhabited district, during the three years that the system has been applied to the land, has had a mortality of 18.17 per thousand in 1855, 15.13 in 1856, and 14.21 in 1857; while the same area, but inclusive of more distant localities, has had, during the same period, the respective mortalities of 21.26, 20.04, and 16.60; so it appears that, in the rapid growth of the plant, the assimilation of nitrogenous and carbonaceous matter, and the elimination of large volumes of oxygen by the plant, we have the antidote for what might have been thought to prove harmful in its effects.

How much society loses annually by preventable diseases it is impossible fully to estimate, as health is so essentially connected with the labours and duties of every-day life. We know full well that the power of physical ability forms the basis of every description of labour, whether bodily or mental, and that the full value of work cannot be obtained from a sickly, and, therefore, a feeble population. Those communities, therefore, that are in a bad sanitary condition are great losers. The national prosperity of the country is impeded by any undue amount of sickness or loss of human life. If there were no higher motives, it would be true economy to spend some of our earnings on sanitary works. Some estimate of the probable result of the value of sanitary works can be formed in the following manner:—1st. The saving in the cost of funerals, inclusive of mourning and fees, which may safely be set down at 5*l.* each. 2nd. The saving by the escape from sickness, with its cost, and its loss of labour; and it may safely be taken that, for every life saved by sanitary works, twenty-five persons escape sickness, and that 1*l.* per case would represent a moderate value of the result. 3rd. The value of the labour saved to the country by prevention of premature death. For every adult female, 5*s.* per week, and for every adult male, 10*s.* per week, or a mean of 7*s.* 6*d.* per week, may be taken as the value of labour over and above the cost of maintenance.

Comparing such savings in Croydon with the expenditure that has achieved them, we shall see at a glance the pecuniary benefit resulting from sanitary operations. The total expenditure, as set forth in the schedules accompanying the report, for the purchase of freehold lands, public baths, construction of water-works, sewers, sewer irrigation works, shafts, and general improvements of all kinds, has been 196,135*l.* 6*s.* 5*d.* But, though outlay of this kind is generally called "expenditure," as if, like personal expenses, it were spent and gone, leaving nothing in hand in lieu; yet, for the above-

mentioned outlay, the more proper name for it would be "investment," as I shall show hereafter that the parish has in hand permanent improvements and possessions of a larger amount of value than the total sum thus expended. But had the money been all spent without the acquisition thereby of permanent possessions in water-works, land, baths, slaughter-houses, sewers, kerbing, &c., still there would have been a sufficient *quid pro quo*, an acquisition of advantages, or, in other words, a saving from losses of greater amount of value than the outlay. It has been shown that 2,439 lives have been saved. Of this number six-tenths, or 1,463, would be adults, or persons above the age of twenty years, and probably one-tenth of these would be infirm from age. By making this deduction we have still 1,317 lives, in the full vigour of life, saved. By using the figures before quoted in connexion with the lives saved, we shall get the money value of the benefits conferred by the works:—

2,439 funerals less, at 5 <i>l.</i> each	£12,195 0 0
2,439 × 25 = 60,975 cases of sickness prevented, at 1 <i>l.</i> each	60,975 0 0
1,317 value of labour, at 10 <i>s.</i> 10 <i>d.</i>	166,828 5 0
for 13 years	£239,998 5 0

In the short space, therefore, of thirteen years, a saving in money and labour, exceeding in value by 25 per cent. the total expenditure for all purposes, has resulted from the outlay on sanitary works. And although it has been here attempted to put a money value on the expenses and labour lost by the loss of life, yet this is exclusive of the value of life itself. But who shall value the lives? or who can estimate even the improved health, in point of enjoyment, of the living? These 2,439 persons, saved from the jaws of death in this parish, are living testimonies of the great value of the sanitary works that have been carried out.

It should not be forgotten, too, that the cost of the various works has principally been spent in the parish, and additional employment has thus been given to a large number of parishioners. The money has been circulated, both directly and indirectly, among those who will have to pay the cost of the works. In the winter of 1856, employment was found for some hundreds of men out of employ, in pushing on the new public works; and thus a number of men were employed for the good of the parish, who would otherwise have been a burden to the ratepayers.

Much misunderstanding exists with regard to the supposed increase of the rates of the parish, occasioned by the permanent works. The local Board's rates are made twice a year; and, if we assume that all the monies now secured on both special and district rates, were to be levied as a separate rate, the two half-yearly rates of 7*½d.* each would pay off the interest and principal in thirty years. At the end of thirty years from this time, by the payment half-yearly of 7*½d.* in the pound on the rates, the water-works, freehold lands, public baths, shafts, and every other property or work of the Board will be free of any charge.

NOW AND THEN.

ANY person who is addicted to the harmless practice of "moralising" may find food for reflection in the gradual disappearance which is now taking place of the most ancient portions of the metropolis. So imperative are the requirements of commerce that all other considerations have to give way; indeed, if we continue pulling down at our present rate for a few years longer, there will not be a carved doorway or oriel window within the hills of mortality. Londoners will have little left to them but the Tower and Westminster Abbey as connecting-links between the present and the past.

I am induced to make this remark by the metamorphosis of a favourite old street of mine in the heart of the City,—a street savouring somehow of South Sea bubbles and kindred associations,—I mean Winchester-street, the thoroughfare conducting from Broad-street to London-wall. That part of my street dehonouring into London-wall had a certain historic interest, for it was one of the spots which escaped the Great Fire, and was an admirable specimen of Tudor street architecture. There is not much of it left. A tall, staring, prosaic, though no doubt useful structure, containing a range of offices, has taken the place of the tenements where tradesmen cried, "What d'ye lack?" and there Dick Whittington rose to be Lord Mayor of London. Other and scarcely less

* Report on the Permanent Sanitary Works and their Cost, executed in the Parish of Croydon, under the authority of the Local Board of Health, by Baldwin Latham, C.E., Engineer to the Board. Printed by F. Baldwin, Croydon, 1868.

ancient buildings here are coming down apace; burgher houses of the good old times when "country residences" were unthought of. These, also, will soon be probably replaced by gigantic combinations of iron and stone, to be filled presently from roof to basement with the busy sons of commerce; but if, dear reader, as you watch the progress of reconstruction, you should detect a faint murmuring sound, put it down as the groan of an amateur archaeologist sighing for the days that are gone.

But happily there are not many ancient quarters where utilitarianism has not found it necessary to intrude. Which shall we select for a visit? From Sir Paul Pindar's in Bishopsgate-street, to the craziest old tumble-down in Westminster, the mine is rich and varied. Take, for instance, the Strand, as the most conspicuous thoroughfare in which to look for examples of "Now and Then." There you shall see splendid modern shops surmounted by venerable old-world houses, of various styles and dates, the conjunction presenting, in the majority of cases, the most incongruous appearance, such as diamond panes versus plate-glass, or slender iron pillars substituted for the huge wooden beams which sustained the structure in former times. On nearing Charing-cross the buildings become more modern. The town residences and grounds of the nobility being in this direction, the "building mania" was held in check for a while; but the mightiest magnate must eventually give way before the popular need, so pleasure and earthiness had to make place for shop and printing-office, till the eloping banks of the river were covered with streets, marking by their names the situation of the former domains. As an instance of this, there are (or were) the four thoroughfares perpetuating the memory of John Villiers, Duke of Buckingham. Other streets remind us of the Dukes of Norfolk, and the Earls of Arundel, and so on.

One of the quaintest old corners in London, and appearing quaint still by comparison with its modern neighbour, Victoria-street, is Queen's-square, Westminster, where the wood-carving on the doorways is a sight for the curious. Indeed, in all parts of the metropolis having the least pretension to age this art is both abundantly and beautifully exhibited. You may spend a week in inspecting the doorway of the eighteenth century, and then you will have to begin again to arrive at a true comprehension of the different styles; for the earlier the date the more elaborate the carving. Speaking generally, there are three separate varieties, viz., the angular, the arched, and the flat surface supported by ornamental brackets. These are exclusive of those many specimens in which the doorway is flush with the wall of the house. So unmeritorious, however, are the modes of treatment that this classification only gives an idea of the outlines employed; the details are multifarious in the extreme. Among these a very common, though very singular, conception for such a purpose is a Gorgon's head surrounded by the traditional vipers. Faces of all sorts are very prevalent, and sometimes there occur series of figures joined together by festoons of flowers—a beautiful device. Sometimes figures are altogether dispensed with, and the entire affair takes the form of a sort of fluted radius, as in the well-known house in Sherborne-lane. I do not remember any of these designs depicting mythological subjects, probably from the smallness of the field at command.

If any one will take the trouble to compare this durable woodwork with the feeble etrusco which modern builders dash on our dwelling-houses, he cannot help awarding the palm to the designers of old. There is no "peeling" here. These old doorways seem unaffected by the acids of our London atmosphere; every line and curve remain as perfect as the day they were traced, in many cases nearly two hundred years ago. Is there any reason why we should not have carved wooden doorways now? The ductibility of the material is greatly in its favour, and enables the workman to arrive at beautiful results. Of course, if a gentleman can afford polished granite for his vestibule, by all means let him have it; but the next best substitute is wood, in which the orders of architecture can be easily and lastingly imitated. I am not a timber-merchant, though my observations may seem to indicate that there is "nothing like wood."

In the matter of churches our ancestors displayed great piety and liberality; though it is happily out of any one's power to make unfavorable comparisons between "now and then" in this respect. Yet it would be unjust

not to admire the strong religious feeling which in those days did duty for church holding societies and modern organization. The gifts, it is true, were in many instances of a decorative character—such as altar-pieces, stained glass windows, or rood-screens; still I think that the many charities and schools connected with our ancient churches attest that at the bottom of it all there was a spirit of true practical Christianity. There is an irresistible romance, too, about the history of those self-made men in the olden time. Of course, I am not going to deny that in our own day there are many poor boys who come to London with three halfpence in their pockets and begin by sweeping warehouses and end by becoming heads of firms; but in the former case there was more elbow-room; the battle of life was less feverish, and coolity was less artificial. Hence people had more time to be good. If this proposition be disputed, I can only ascribe my preference to the halo of distance. Most of the City churches, as successors of former edifices, date, as every one knows, from the Great Fire, which, among other things, made the reputation of that very hard-working man, Sir Christopher Wren.

Speaking of the public spirit of merchants and others in former times, it must not be omitted to be pointed out that our own age has been splendidly vindicated from the imputation of selfishness. A single leading example will occur to every one's mind.

Bridging over only from the seventeenth to the nineteenth century, vast is the difference between the London of now and the London of then. An ancient prophecy foretold its increase till a period when Highgate-hill should form its centre. Whether this prediction will ever be verified is of small moment to the Londoners of to-day, who have ample matter for study in the comparison of the present and the past of their huge metropolis.

If many a beautiful legend of our childhood, crushed by the stern heel of truth, has altered its character as much as the antipastoral thoroughfare of Drury-lane, let us still be thankful that there is before every one of us an extensive sphere of Christian work and usefulness.

FRANCIS ALLEN.

SANITARY MATTERS.

The Application of Town Sewage.—At a recent meeting of the Maidstone Farmers' Club, Mr. Thomas Cargill, C.E., delivered a lecture on "The application of town sewage to general farm crops." Messrs. Bridgland, J. Payne, Wm. Payne, Stonham, Plomley, Ely, Chittenden, Waterman, Day, Wyles, Thos. Reeves, jun., Jesse Killick, Punnett, Austin, Killick, Hodgson, Berling, Foster, Else, Still, Harris, Allfree, G. Chambers, Wm. Reeves, Thos. Hayes, Bridgland, jun., Marley, and Fauchon, were present. Mr. Cargill said in the outset that to the question, "What is to be done with our sewage?" there was but one answer, "Apply it to the land," but to the question, "How to apply it?" or rather, "How to apply it in the most economical and remunerative manner," the answer was not so simple, owing to the fact that it had not received that thorough investigation which it demanded, and which must be accorded to it. Sewage had always been considered by us as a nuisance, and as a thing to be got rid of somehow and somewhere at any price, and men continued to shun and avoid the evil instead of grappling with it, until it assumed a character so alarming and proportions so gigantic that at last self-defence urged them to adopt measures calculated to mitigate what was fast becoming a national scourge. Even at the present time this was the view entertained most unfortunately by the majority of Local Boards and Corporate authorities, who, as a rule, have accomplished little or nothing regarding the disposal of their town sewage. Sewage must be taken as it came from the sewers to impart the greatest benefit to crops. At Tottenham, Leicester, Birmingham, and Manchester, various disinfecting and decolorising schemes had been tried, which had all resulted in complete failure. At one place 4s. per ton were barely obtained for that which was expected to realize 4l., while at Birmingham scarcely 6d. per ton could be got for the solid residue left after decolorisation and evaporation. It must not, however, be understood that in some instances, as at Beddington, abundance tanks could be altogether dispensed with. From the facts laid before the meeting, the lecturer said,

in conclusion, it is manifest that the future system of sewage farming will be a combined one, and will consist in so proportioning the relative amounts of grass and arable land as to dispose of the sewage in the most effectual manner.

"The Utilization of Sewage Irrigation."—A letter on this subject has been addressed to the town council of Doncaster, by Mr. J. Hindle, of that town. In extracting so much matter as he has done from the elaborate papers "On the Utilization of Sewage by Irrigation" in late numbers of the *Builder*, Mr. J. Hindle might have made some reference to the papers to which he was indebted.

LAYING CHIEF STONE OF GATESHEAD TOWN-HALL, AND SERIOUS ACCIDENT.

The foundation-stone of the new Town-hall for Gateshead has been laid. The style of architecture will be Italian, treated with some freedom in the details. The architect is Mr. John Johnston, of Newcastle-upon-Tyne; the contractor, Mr. Hulman, of Hexham; and the clerk of the works, Mr. W. Burnip, of Gateshead. The building, when completed, will afford accommodation for the mayor and town council, and for the whole of the municipal officials, including the police, besides a court-room for the transaction of police and county court business, and a music-hall for the public. There will be three distinct entrances from Swinburne-place, and the numerous entrances throughout the structure have enabled the architect to completely classify and isolate the various departments of the corporate business. The principal front of the building will stand back from West-street some 30 ft. or 40 ft. The main floor of the building may be described as consisting of a centre and wings, each having its distinct entrance from the front, but communicating internally by means of spacious and well-lighted corridors. The cost of the edifice will be about 12,000l.

At the laying of the foundation-stone, according to the local *Observer*, from whose report we quote, there was an extensive platform erected for the accommodation of about 500 persons parallel with Swinburne-place; and at a right angle with it, backing West-street, was a second wooden gallery for the accommodation of ladies, of whom there was a fashionable assemblage, numbering not less than 250. At the north-west corner, at the angle of the two platforms, the stone was laid. Near the apparatus were a number of stone buttresses and walls newly built, and from one of those points of supposed advantage, immediately adjoining the scene of action, deal planks were placed flatly across at a height of about 7 ft., so as to connect the general platform, which was supported by 2½ in. deals, driven at intervals of about 6 ft. or 7 ft. into the ground. Across the uprights were placed planks, chiefly with their edges turned up, to impart additional strength, and from the main points of the foundation of the fabric thus reared timber stays were inserted obliquely from the front to the rear elevation. The space underneath was partially filled up with props, at distances of 6 ft. or 7 ft. square.

In the midst of the proceedings a loud creaking noise became audible from Swinburne-place, and the general platform was noticed to be slightly swaying, and in a moment a terrific crash was heard,—the platform had given way at the top and centre, and its occupants were thrown into a confused heap below. The pressure on the platform had forced the screws out behind, and there being only a few deals underneath, the forward pressure had had such an effect that the timber after twisting and wrenching had been forced to snap, and the structure in the centre gave way. Happily, the ends of the platform remained firm, otherwise the result would have been much worse. A part of the platform remained standing, and this is accounted for by the fact that it was impossible for it to give way in front, as it rested altogether against the stonework of the building, and the occupants of this portion, perhaps fearing that they might share the fate of their unfortunate brethren, quickly got down to the ground. On making an examination of the place after the accident, it was at once evident that the pressure on the platform must have been very great, for the wall of the hall against which the part of the platform which gave way rested, is broken away. Several of the 3-inch deals, of which the stand was formed, were snapped in the centre; and the deal which sup-

ported the front of the platform, was not only broken, but forced out, showing that the pressure must have come from the back, which was but natural, as all the people would press forward in their desire to hear the various speakers. On the platform giving way the centre ends of the deals fell to the ground, and the other ends remained firm, thus forming, as it were, a hollow in the shape of the letter V; and to this is attributed the fact that no lives were lost. Those who were in the middle of the platform fell down heavily, a depth of about a dozen feet, but those at the sides had their falls broken. Altogether about 500 persons fell down. The people were all thrown in a heap, and those who were uppermost being uninjured soon succeeded in getting up and arriving safely on to the ground. Those who were at the bottom were found generally to be more or less injured, and had to be assisted.

The other platform, for the ladies and the corporation, was erected from a plan by Mr. Johnstone, architect, and when finished was carefully examined by the mayor and the townhall committee, who also would have examined the other platform had it been completed in time.

Certain superstitious individuals attributed the accident to the fact that three of the banners were hoisted in the reverse manner, thus signifying distress, amongst which was the British Ensign!

Somebody is, without doubt, to blame for the platform not being substantial enough for the purpose for which it was intended. "We are given to understand," says our authority, "that Mr. John Johnstone, the architect, is entirely free from blame, an assertion which we hope may be correct. The structure of the stand was most inadequate to the pressure which was universally expected, a fact which any competent builder ought to have been aware of. We understand that a special meeting of the council will be held on Monday, when the matter will be thoroughly investigated."

This case just affords another proof of what we have so often urged, that no such platform ought to be allowed to be erected or used except under competent supervision and certificate of sufficiency.

THE INSTITUTION OF SURVEYORS.

The first preliminary meeting of this Institution was held on Monday last, at the Westminster Palace Hotel: Mr. John Clifton, in the chair. Among the London surveyors were present,—Messrs. T. Horsey, T. Chafield Clarke, F. & E. Vigers, E. Ryde, R. A. Withall, D. Watney, F. Chinnock, H. Clutton, J. R. Bonny, J. Bailey Denton. Of the country surveyors, were Messrs. C. M. Bidwell, Ely; T. Huskinson, Epperstone, Notts; T. S. Woolley, Newark; T. Statter, Knowsley; &c.

The chairman, after recapitulating the proceedings already taken, in the formation of a Provisional Association, shortly stated the objects of the Institution, which were,—1st. To secure the advancement, and facilitate the acquisition of that knowledge which constitutes the profession of a surveyor; 2nd. To promote the general interests of the profession and attend its usefulness for the public advantage. He said the proposal to establish this institution had met with very considerable support, and that if all devoted their best energies to the work they could not fail to raise the status of the profession and ensure its advance in the public estimation.

It was then resolved, "that the institution be forthwith organized and placed in a position to commence operations."

The following gentlemen were chosen by ballot to be members of the council for the first year, viz. :—

Messrs. W. J. Beadell, E. N. Clifton, Henry Crawford, R. C. Driver, H. A. Evans, E. Ryde, W. Sturge, F. Vigers, F. J. Clark, J. Clutton, J. B. Deuton, R. Hall, T. Huskinson, J. Oakley, E. J. Smith, G. Trist.

The honorary secretary, Mr. J. W. Penfold, read the heads of the bye-laws, which provided that the institution should consist of three classes, viz.—Members, Associates, and Honorary Members, with a class of Students attached. Members to be more than twenty-five years of age, and in practice on their own account for more than five years, or members of a firm established upwards of ten years. Associates to be more than twenty-one years of age, not necessarily surveyors by profession, but their pursuits to be such as to

qualify them to concur with surveyors in the advancement of professional knowledge.

Honorary members to be persons who, by reason either of their position or eminence in science and experience, may be enabled to render assistance in promoting the objects of the institution.

The various regulations for election of members and officers, the constitution and government of the institution, the conduct of meetings, &c., were fully set out. These bye-laws were adopted; and, after a vote of thanks to the chairman and honorary secretary, the meeting separated.

THE TRADES MOVEMENT.

Birmingham.—In compliance with the invitation of the council of the local Chamber of Commerce, representatives of the Builders' Association, and of the Stonemasons' Union, met in the Exchange buildings, New-street, to endeavour to promote an amicable settlement of the strike. Messrs. Briggs, Creswell, and Hardwicke represented the employers; Messrs. Harding, Hatch, and Bradley, the operative masons. The principal points in dispute were discussed in a tone which encouraged the deputies on both sides to hope that an agreement may be arrived at. The meeting was adjourned for further conference. The masters have been endeavouring to introduce non-union labour; and it is said that, within two or three days they succeeded in engaging twenty men, who are carefully guarded from any approach on the part of the masons on strike.

Huddersfield.—The local Chamber of Commerce are taking steps with a view of founding a court for the settlement of trade disputes. A meeting of trades' delegates held recently in the town, passed a resolution in favour of the establishment of a court of arbitration, and the Chamber of Commerce appointed a sub-committee to bring about a meeting of representatives of employers and employed, with a view of giving effect to wishes which seem to be entertained on both sides.

PARIS NEWS.

The buildings on the Champ de Mars have nearly all disappeared, and the ground is being levelled; the only structures upright being the Commissariat offices, the Creusot shed, the International Club, in course of demolition, and one of the Eastern kiosks. All the ground between the Military School and the Palace is to be completely levelled by the 15th of August next.

The demolitions in the Faubourg Saint-Marcel for the boulevard of the same name have brought to light innumerable remains of old Paris, portions of the collegiate church of St. Marcel and the parish church of St. Martin, and an immense quantity of human remains. St. Marcel died in 436, and was buried in a place called Mont Cetary (*Mons Cetaryus*), corrupted since into Moutfard, and a chapel was built over his tomb. Sacked and pillaged by the Normans, it was rebuilt and enlarged in the eleventh century, and it was not finally demolished till 1806. The Abbé Lebeuf was of opinion that the crypt of St. Marcel dated from the ninth or tenth century, and the upper church, in its most ancient part, from the first half of the eleventh century. The tower had been built about A.D. 1040. Nothing remains of this but a Gallo-Roman hull, a bas-relief on one of the quoins, now to be seen in the Museum of Cluny. At the Ecole des Beaux Arts may be seen some of the capitals of the choir. The portion recently laid bare appears to be the extremity of one of the transepts; it was covered with flag stones, in the midst of which we observed some small trees. There is some talk of preserving this relic by putting a garden round it, bordering on the boulevard Arago.

At Montrouge the new chroch of Saint Pierre is almost terminated, and is shortly expected to be opened for public service. The tower, of cut stone from its base to the summit, commands a magnificent view of all Paris. The last finishing touch is being given to the ornamentation of the edifice, and, at the same time, the decoration of the choir is being terminated.

In the 20th arrondissement, at the south side of the Place Ménilmontant, the church of Notre Dame de la Croix, commenced three years ago, and destined to replace the chapel of the ancient village of Ménilmontant, has its rough masonry

completed. It consists of a grand nave, a vast transept, side aisles resting on columns and lateral chapels, and covers an area of 37,000 square feet. The steeple, placed over the porch, is 137 ft. high, and the porch will be approached by a monumental flight of steps.

One of the most interesting churches of old Paris, that of Saint-Merry, founded in the ninth century, and reconstructed under François I., is being restored. Commenced in 1520 to 1530, it was not terminated till 1612. The successive architects seem to have adhered to the original plan, as we remark none of those out-of-the-way changes so commonly seen in buildings for a long series of years under construction. The rich ornamentation of the western façade is well known to all lovers of architecture. The venerable crypt, in which the body of Saint-Merry, who died in A.D. 700, was deposited, has been restored.

BOATS FOR RAISING SUNKEN VESSELS.

Two new boats for raising sunken vessels have just been launched,—the *Persévérant* and the *Bon-Espoir*,—at the Quai de la Marne, La Villette, Paris. They have been both designed and constructed by M. Casimir Deschamps. They are 59 ft. long, 9 ft. 10 in. broad, and 10 ft. 6 in. deep, the burden of each being 250 tons. Commenced on the 1st of October, 1867, they were launched on the 25th of May, 1868, completely finished, masted, and rigged. What is most extraordinary is that these vessels of timber, strengthened by iron ribs, covered externally with iron plates, riveted together, and coated with Norway tar, were put together without the aid of any naval or mechanical engineer. M. Deschamps made his drawings on the spot, and executed them himself, aided by simple Parisian workmen,—carpenters, joiners, and smiths. The whole work cost 4,800*l.*, whereas in the ports of Havre, Cherbourg, and Nantes they asked him 6,000*l.* to 6,400*l.*

These boats are constructed on a new principle. Their rounded forms, which give them volume and stability, call to mind those of the steamers which ply directly between London and Paris. The hull is divided longitudinally into two parts, containing each thirteen strong iron plate-lined compartments, which can be filled with either water or air. Absolutely air and water tight, even under a pressure of five atmospheres, they remain separated or can be made to communicate according as is desired. Two series of tubes, furnished in front of each chamber, are laid down along the centre line of the deck, and place each chamber in communication with the pumps, either for removing the water or for driving in compressed air. Each chamber has, moreover, openings, through which the floor can be seen or a boy can descend. In the interval between the two rows of chambers, at certain distances, watertight pits or tubes descend from the deck to the sea, and serve for the passage of chains to be passed under the sunken vessel to be raised. The ends of the chains are to be wound round the very massive drum of a hoisting engine, worked either by manual or steam power, and capable of exerting a power of 25 tons. The interior working portions and accommodations are admirably arranged. At the fore is the captain's cabin, 13 ft. square; in the middle, the watertight air and water compartments; at the aft we have the boilers, engines, of 15-horse power, with Giffard's injector, &c., and an American motor of 10-horse power.

The life of M. Deschamps is a very eventful one. He was bred up as a sculptor, but his ruling passion was the raising of sunken vessels; for this he succeeded in creating a small fleet of lifting-barges; but they became the prey of a storm, and he lost all. Not discouraged, he became a simple bargeman, and up to his waist in water, axe or boat-hook in hand, he worked as a labourer. Still he thought on his invention. Friends and capitalists having come forward, he has now succeeded in constructing these vessels.

SOUTHWARK BRIDGE.—The Corporation of London have paid for rent of the Bridge, during about three years and a half, 18,868*l.*; and now pay for purchase of the Bridge, 200,000*l.*; making a total of 218,868*l.* The chamberlain has given cheques to the comptroller for the completion of this purchase, and the Bridge is now handed over for the public use.



MIDDLESBROUGH EXCHANGE: INTERIOR OF HALL.—MR. C. J. ADAMS, ARCHITECT.

EXCHANGE AND CLUB BUILDINGS,
MIDDLESBROUGH.

IN connexion with the illustrations of these buildings already given,* we add a view of the interior of the Hall. This apartment is about 120 ft. long, and 60 ft. wide, with a semicircular end 20 ft. deep. On each side of it are offices. The hall is partly lighted by openings in the roof, which are not quite so obvious in the view as might be desired.

REPORTS ON PARIS EXHIBITION BY
MASTERS OF SCHOOLS OF ART.

WE mentioned in our last that the first prize offered by the Committee of Council on Education for Reports by Art-Masters or Mistresses on the Paris Exhibition had been awarded to the Head-master of the Manchester School. We have now to add that the second has been awarded to Mr. Walter Smith, head-master of the Leeds School of Art (whose report appeared in our pages), and the third to Mr. Dewar Campbell, master of the Bridport and Dorchester Schools of Art. The International Exhibition was visited by 101 art-teachers, of whom twenty-eight made reports approved by their lordships.

* See pp. 374, 375, ante.

ANCIENT EARTHENWARE STOVE IN THE
RATHHAUS, OCHSENFURTH.

WE have several times mentioned in these pages the very remarkable and interesting Rathhaus existing at Ochsenfurth, near Würzburg. We must remind our readers that this is a building of the latter part of the fifteenth century, and is of the greatest value to the historian of ancient civil architecture on account of its having entirely escaped modernization; in fact, both internally and externally it remains much in the same condition as it was left by its fifteenth century builders. But what is still more remarkable most of the ancient fittings and furniture remain.

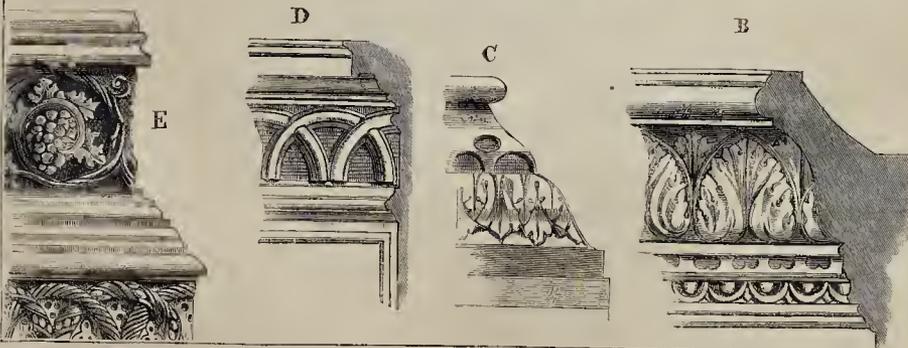
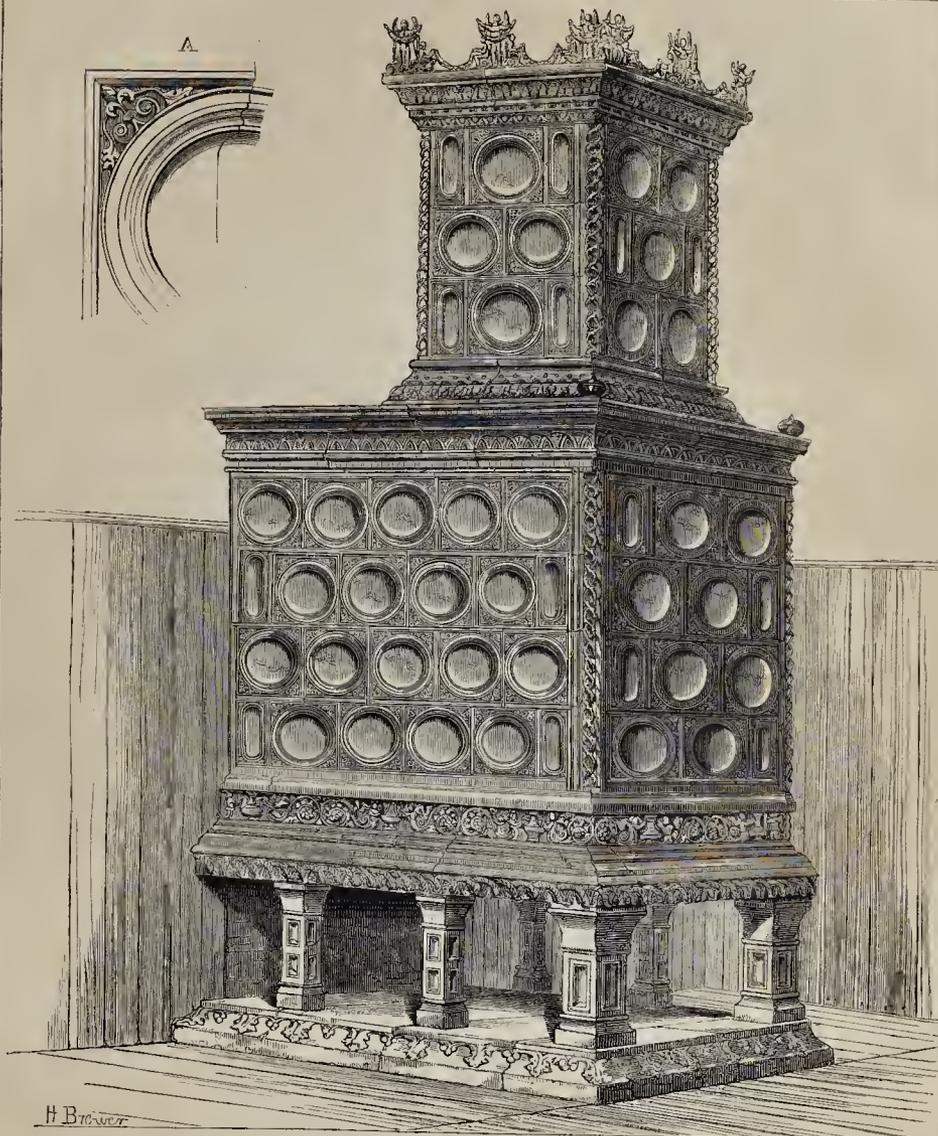
Our present illustration represents a large stove standing in a room in the upper story of the Rathhaus. This stove is of large dimensions, its entire height being not less than 9 ft.; it is placed near to the angle of the room, and the fuel is supplied to it through an opening in the wall from a passage at the back of the room. The materials made use of in its construction are green tiles and brown porcelain, both highly glazed, the plinth upon which it stands is stone. It is probable that this stove is coeval with the building, which was finished in the year 1499, or, at any rate, very little later. It is in a very perfect condition. All the details are beautifully modelled, and are singularly original in design. The curious mixture of Italian and Gothic ornaments is very noticeable; they are, however, all

used with such judgment and taste that there is not the least effect of incongruity. Portions of the cornice D, and the lower part of the base E, bear a remarkable resemblance to our English Norman work. The stone plinth has the regular "Tudor flower" so conspicuous in Henry VIII's Chapel, King's College Chapel, Cambridge, and other late Perpendicular buildings. The cornice and base, B and C, are nearly Classical; and the tile A is like a piece of Italian Cinque Cento work. On the whole, it would be difficult to find such a jumble of styles in one object anywhere else; and what seems singular is the fact that there is nothing crude or inharmonious in the design. The lamentable failures we usually make when we attempt any mixture of the kind shows that we are ignorant of the principles on which the old artists worked. In the Castle of "Transnichts," at Landslut, are several stoves of a very similar description to the one at Ochsenfurth, and they are probably of the same date.

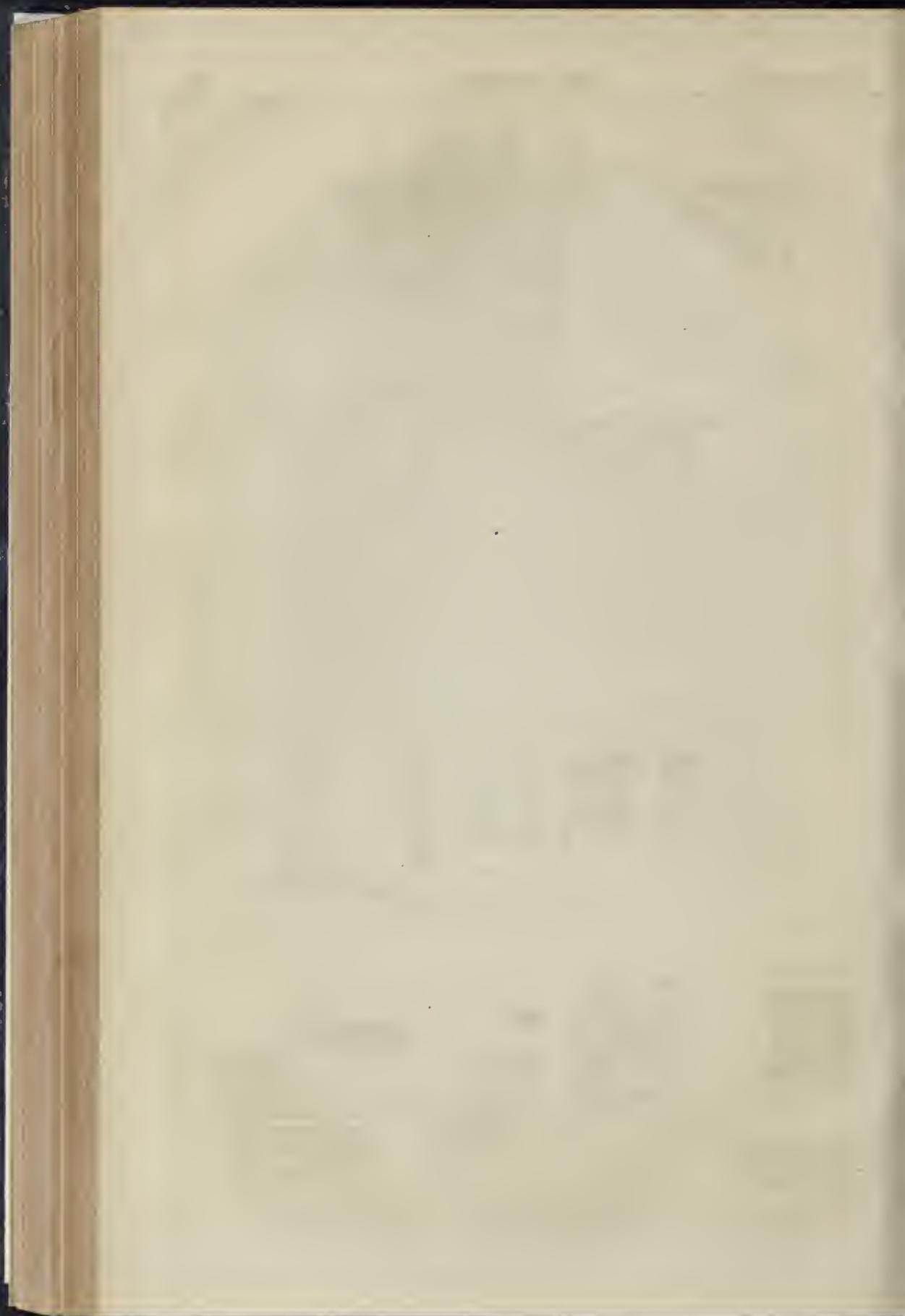
On another occasion we shall give illustrations of the ancient tables and other furniture remaining in the Rathhaus of Ochsenfurth.

REFERENCES.

- A. Detail of tiles (green earthenware).
- B. Cornice at the top of stove (green).
- C. Cornice at base of upper part of stove (green).
- D. Cornice of lower portion of stove (green, with intersecting arches brown).
- E. Base of lower portion of stove (green and brown).



ANCIENT EARTHENWARE STOVE IN THE RATHHAUS, OCHSENFURTH, GERMANY.



EARLY BRICKWORK.

ARCHITECTURAL ASSOCIATION.

At a meeting of this Society, held on Friday, the 6th inst., the Rev. E. L. Cutts, made some observations on the subject of "Early Brickwork." He said Mr. Gladstone had once remarked, that the three great inventors were those who discovered the ear, the wheel, and the plough; but he (the lecturer) hoped he might be allowed to add to these the name of the man who invented the brick. He was not going into the whole subject of brickwork, but intended to confine himself to England. Now, Britain was a Roman province for a long time. Many of the houses were then composed of brick; and as villas built in this way were very numerous, the country must have presented a very civilized aspect. Then came the Saxon invasion, and all those villas which had been erected were swept away. Some Roman remains, however, still remained, and perhaps the best specimens were to be found at Colchester. There was, he thought, very little doubt that much of the earlier Saxon and Norman brickwork was nothing more than the remains of the Roman bricks. Some parts of the monastery of St. Alban's had doubtless been erected in this way, the old brick having been utilised with good taste and effect. At Brodwell there was a church made out of these remains,—at least, he thought so,—although some of them might think it was of Roman origin, in which case it would be a most interesting structure. At Coggeshall Abbey there was to be found some moulded brickwork. It did not appear that it was looked down upon as an inferior material, because effect in the arrangement was a good deal studied. At Hull there was a good deal of brickwork, executed during the sixteenth century. In the time of Edward III. bricks were 6s. a thousand, and in the time of Richard II. they were 6s. 8d. for the same number. In the sixteenth century it became fashionable to use brick, and many important buildings were to be found made of that material. Sometimes the brickwork was found covered over with plaster to imitate stone. He thought it was a great mistake to use brick in such a building as St. James's Palace, and Queen's College, Cambridge. Stone ought to be employed where it was possible. But how was it that houses built of brick in old times looked better than those of the present day composed of the same material? He thought it was owing, in some respect to the difference in the shape of the bricks, and also of their colour. A brick house, if relieved by trees, generally looked well. Could they not, by studying effect, render a common brick wall of the present day more presentable? Moulding in this material should be of the simplest possible kind; it should be merely geometrical, and very plain in character. He protested against the introduction of coloured bricks into the façades of their street architecture; he was afraid, however, such a protest would bring him into disgrace, as the custom was very general. They were gradually turning London into a really beautiful city, and thus were beginning to use brick artistically; for instance, All Saints', Margaret-street, amongst others, showed it might be employed with advantage. But the common buildings ought to be more looked after, and by studying effect they ought to be able to make a common brick house not altogether, as it was now, an ugly object.

Mr. Edis did not agree with Mr. Cutts in his theory that the Saxon and Norman brickwork as handed down to us was made out of the ashes of the Roman remains. He thought it had an originality of its own. Modern brickwork had a tendency to get dreadfully dirty in cities; and whether or no it was that, like the Romans, we were becoming very rich, architects found it very difficult to persuade their clients to use brickwork, because a good many of the houses, and especially those intended for business, were built for the sake of show. The shapes and sizes of the bricks, too, were very bad, and capable of much improvement. If, however, members of their profession could only obtain good brickwork at reasonable prices, they would endeavour to make more use of it.

Mr. Blashill thought that economy was studied in the olden times, and that brickwork was used when stone could not be procured, for it must be recollected that most of the brickwork was found in the eastern part of England, where stone was very scarce. He did not approve of red brick and Bath stone being used together, as the contrast was very great, and a very crude

effect was thereby produced. He thought that the present size of brick was the correct one, and that any departure from it would increase the expense.

Mr. G. R. Redgrave differed in opinion from Mr. Cutts as to the superiority in the colour of the Roman bricks: he considered they were too light a shade. He had examined the chimneys of Hampton Court, and he believed they were not moulded, as the brick bore evident traces of having been out. With reference to the ancient bricks which were from time to time discovered, he believed they were Roman, and that the Saxons and Normans had adopted them. He came to the conclusion from the fact that the names of Roman makers had actually been discovered on some of the existing specimens.

Mr. Edis thought the chimneys at Hampton Court Palace had been originally moulded, but had been renewed by cutting.

After some remarks from Mr. Ridge and Mr. Birch,

Mr. Mathews said he believed that it was owing to the narrow frontages allotted to houses in cities of the present day that architects were unable to produce so good an effect in brickwork as was to be found in old houses built of the same material.

Architect-Volunteers.

Before the commencement of the business, it was stated that it had been proposed to form a volunteer company composed of members of this Association, in conjunction with the corps of the Artists' College. Moreover, that the proposal had now become *un fait accompli*, about seventy having been enrolled. The matter was brought under notice with the view of inducing others to join: the only expense attendant on their doing so would be an annual subscription of one guinea.

STEAM HOUSE-FACADE WASHING ENGINE.

We learn with reference to this process that, though it has been patented by a Frenchman, the priority and the merit of the invention are due to one of our countrymen, employed for upwards of thirty years on the Eastern Railway of France. His first experiments were made upon stones and pieces of sculpture, which were perfectly cleaned, on being simply exposed for a few seconds, to a stream of mingled steam and water from the water-level cock of his locomotive. He afterwards, by means of Giffard's injector attached to his engine, cleaned the arch of a bridge, at Longueville, on the Eastern Railway. These experiments took place in the year 1862, four years previous to the date of the French patent, as is testified by a stamped document, signed by fourteen *employés* of the Eastern Railway, who were all eye-witnesses of the fact. We learn that the inventor, who is a poor man, has gained the friendly support of wealthier persons. By their aid he is commencing a suit to settle the question.

THE NEW DOCK AT NEWPORT.

The ceremony of cutting the first sod of the new dock at Newport, to be called the Alexandra Dock, has been performed by Lady Tredegar, in the presence of a great concourse of people. The original estimated cost of the scheme, according to our authority, the *Bristol Times*, was about 600,000*l.* The cost of the moiety of the works commenced will be 240,000*l.*, of which about 150,000*l.* have been subscribed. The company's engineer is Mr. James Ahernethy. Vessels will pass from the tideway into the dock by a "trumpet-mouthed" entrance, the dimensions of which will be 350 ft. width between the pier-heads, and 300 ft. between the line of the river-front and the outer gates, with a depth of 37 ft. of water on average spring tides, or 27 ft. neap. The length of the outer lock between the gates is 350 ft., breadth 65 ft., divided by a pair of intermediate gates, so as to form two locks, or one great lock. The sills will be laid 4 ft. 9 in. below those of the old dock, by which vessels of all classes will be worked in and out at a much easier stage of the tide. Provision is made to receive the largest class of vessels and steamers afloat. Vessels of 1,800 tons, or steamers of 2,500 tons, drawing 23 ft. of water, will be enabled to enter or leave these docks over an average period of three hours on every tide throughout the year. The outer dock is

proposed to be 350 ft. in length and 550 ft. in width, having an area of 8½ acres. The depth of water over the sills will be 35 ft. average spring tides, and 25 ft. neap tides. The inner lock, communicating between the outer and inner dock, is to be 350 ft. in length between gates, and 65 ft. in width, also divided by an intermediate pair of gates. The inner dock is to be 2,150 ft. in length and 550 ft. in width, giving an area of 27 acres, and having a working depth of 27 ft. of water over sills. The graving dock is 350 ft. long and 65 ft. wide, communicating with outer dock. On the north side will be erected warehouses for bonding import cargoes. On the west side and north end of the inner dock will be erected ten staiths for shipment of coal, all on the high level. Lines of railways will also be constructed all around the quays, on the low level.

DRAINS, SINKS, AND TRAPS.

ONE-HALF of our annoyances through life spring from petty causes; at least, they appear petty on the instant; but many of them, when rigidly examined, are found to be the reverse. So it is with the annoyance experienced by "M. A. B.," whose servant, by negligently removing the bell-trap grating in the sootley sink, allowed the noxious gases in the drain to escape into the house. This matter looks somewhat petty, but disease and death have often resulted from this cause. Let me try to mention a remedy for the evil.

The decomposing matters continually discharged into the sewers by the house-drains, as continually generate carbonic acid and sulphuretted hydrogen gases. The former, from being heavier than common air, accumulates along the bottoms of the sewers; while much of the latter, from being considerably lighter than atmospheric air, enters the untrapped drains, and rises to the highest levels, under the sinks and closets; so that when the sink-gratings are removed, or the closet-handles are lifted, the noxious gases escape into the houses and contaminate or poison the air therein. Thus, the drains act like the necks of retorts, and serve to convey the deadly gases engendered in the sewers into the dwellings. Many poor little children, and other near and dear ones, have been and are being sacrificed by typhoid and scarlet fevers, and other zymotic diseases, from inhaling the virulent gases brought into the houses in the manner I have pointed out. For the negligence of servants in not replacing the bell-trap gratings after clearing the stoppage in the traps, there is no excuse, except ignorance of the insidious enemy they unconsciously permit to invade the premises. But as all unpleasant smell points to disease, that monitor should induce all persons to be on the alert against the common enemy.

These traps, however, should not be placed in the sinks at all, but under the paving beneath them, or under the paving outside the walls in the area and yards, where the inlets and traps generally should be placed if possible, and pipes should be laid direct from the sinks into the traps, with fixed gratings in the sinks. But the best remedy would be to cut off the air-connection between the sewers and the houses. This could be done by placing syphon traps at the outlets of the drains in the side walls of the sewers, and ventilating pipes should be carried from the highest points of the drains to the tops of the houses, so as to conduct the drain-air to the upper atmosphere, and the several inlets and closets should be trapped with syphon traps. Too much attention cannot be given to the arrangement and construction of the drains of houses, so as to make the fall regular, and the joints of the pipes water-tight; and if the inlets be properly trapped, and ventilating pipes carried from the drains to the tops of the houses, there would be little or no escape of noxious gases from them into the dwellings.

Under existing arrangements, however, the root of the evil is in the sewers. There an effectual remedy could and should be applied. It is lamentable to think that the sewers of the metropolis are in no better condition, in regard to provisions for cleansing, trapping, and ventilating, than they were twenty years ago. This arises from divided authority; from ignorance or passiveness on the part of those whose duty it is to study and bring forward improvements; or from the want of a properly-qualified visitor, or superintending inspector, to advise and plan

the requisite improvements in a scientific, systematic, and economic manner.

The main-drainage of the metropolis, which consists merely in preventing the sewage from falling into the tidal Thames opposite London, and pouring it into the estuary below Barking, and "out-of-the-frying-pan-into-the-fire" process,—has nothing whatever to do with this question. In fact, the main drainage is insignificant compared to the influence the "small details" I insist upon have on the health and comfort of a congregation of 3½ millions of human beings,—the population of London.

JOHN PHILLIPS.

LET "M. A. B." do as I have just done—without one. I put a grating to the sink soldered down; below sink in scullery-floor I put a square lead trough without any trap or grating, the waste from sink above and from cistern emptying into this trough, and from which I take a 4-in. drain-pipe outside the wall, and then empty into a brick 12-in. square trough, lined with asphalt, and having at the bottom a 12-in. grating, with the usual square trap, dip-stone, &c., to prevent smell rising from the drains. At the end of my pipe, which empties into this trough, I put a hinged flap to prevent the cold air ascending to scullery. It will thus be seen that the scullery sink is not connected with the drains at all, and that, therefore, it is impossible to get any smell into the house, as that which is forced through the drains passes into the open air at once; neither does any smell come up the waste of cistern, which is often the case.

I believe my plan will answer admirably; and now, if some one can hit upon a similar plan to prevent our closets being connected with the drains, although emptying into them, he will do a deal of good.

G. T.

Messrs. Gallichan & Co. advertise "Cottam's patent Effluvia-intercepting Stoneware Trap," which has been illustrated in our pages, as effecting the object required; and Mr. Honeyman, architect, Glasgow, has invented what is called "The Somerset Trap," for the same purpose. The subject has been treated of in *The Builder* before now, by Mr. Rawlinson and others.

SIR.—The London sewage has become an intolerable nuisance to the inhabitants lower down the Thames, and "Veto!" is the cry. All floating substances are easily intercepted and sedimentary particles are quickly precipitated, but the noxious sulphuretted hydrogen baffles our best men.

Allow me to suggest a remedy to meet the great requirement. Powerful and continuous electricity from a few of Cruikshank's coil apparatus would liberate all the hydrogen, which, evolving into a dome, could be burnt through a tube.

This process is termed *recomposition of water*. Thus the vast volume of water would be discharged comparatively innocuous.

R. T.

THE MACHINE CALLED "LEWIS."

A DISCUSSION on the machine called "the Lewis," used for lifting large stones, appeared in your pages in 1862 (vol. xx, pp. 67, 96, 160, and 278). It noticed the generally received tradition that the form at present in use was revived by a workman in the reign of Louis XIV., who occupied the throne of France from 1643 to 1715, and that the machine derived its name from that monarch. It has also been stated that the name is derived from the French *Levis*, as in *pont levis*, a drawbridge.

The present form was, however, in use as early as 1567 and 1588, being represented in the woodcuts to Barbaro's edition of "Vitruvius," of the first date; and in Ramelli's work, as quoted in your previous pages, of the second date. Hudson Turner's work on "Domestic Architecture," 1851, p. 32, states that this machine is called in the early accounts a "lowes," and that it was well known in the thirteenth century. He does not give any reference; but upon looking into the "Fabric Rolls of York Cathedral," published by the Surtees Society in 1859, there appear in pages 12, 27, and 100, under the dates of 1371, 1404, and 1525, the passages "In xviii lowers emptis pro fabrica," "In cordis emptis pro loners, 10d.," and "Pro viii les loveres, 4s.," all

of which terms more probably refer to the "Lewis" than to a *louvre* or lantern-light, as suggested in the *Glossary* at the end of the volume.

The "Dictionnaire d'Architecture" of Roland le Virloze, published in Paris, 1770, p. 14 shows several forms of instruments for a similar use; and in the description of the Lewis are given the technical terms for the middle limb and the side ones, namely, "lonve" for the former, and "louveteau" for the latter. It is curious that the former is also the French word for a she-wolf, and the latter for a wolf's cub, and these might have been applied to the machine in token of the grip, taken by the parts, being similarly efficacious to that of the beasts in question.

Could our workmen have taken the term Lewis from the plural of the French "lonve," through the three loaves, so to Lewis for a plainer sound? or does it come down to us from the terms used in the earlier centuries?

WYATT PAPWORTH.

TO DETECT THE BED-WAY OF GRANITE.

SIR.—In your impression of April 4th there is a short article on the bed of building stone, in which the writer says that he does not know the natural bed of stone when taken from the quarry; and further, that he never met with a working mason that could tell more than the vertical and horizontal bed. Being a granite mason, I would beg to offer my opinion on the natural bed of granite. In the first place, I may state that I believe granite has been formed by the action of running water, viz., that the different substances composing granite have been brought together by the action of water.

You will observe in examining granite minutely that the particles of mica are all standing in one direction, viz., vertically before the granite is quarried; and the natural bed of it in the rock runs horizontally, and the natural bed of our Aberdeenshire granites is the way that it cuts or splits best,—that is across the vertical bed or the way the mica lies; and the reason of this is that in a running stream the particles that are being carried along with the current are carried on their edges, and not on the flat side, so that particles such as mica, drifting in the current would come to be deposited exactly as we find them in the granite, viz., in a vertical position, and the natural bed is consequently at right angles to the mica. I have no doubt but this theory will account for the beds of other stone than granites.

GEORGE GELLIE, Mason.

DUST-BINS AND DISEASE.

You kindly inserted a few lines for me last week on the subject of "Suck-traps." I have now to offer a suggestion respecting "Dust-bins," a matter of equal importance as regards the health of households, and, indeed, of the public generally. If individuals only suffered from the effects of their own neglect, they might be left to pay the penalty in their own case, and that, perhaps, would be the readiest remedy; but it cannot be permitted that those persons who neglect the observance of the laws of health in their own dwellings should subject their neighbours to the risk of infection and disease from a contaminated atmosphere. I do think it would be well if it could be made one of the duties of the sanitary inspector in each locality to visit the basement of every dwelling-house occasionally, for the purpose of ascertaining the condition of the dust-bins, drain-pipes, and other matters, which are so generally neglected, even in the houses situated in the best localities.

But my special suggestion with regard to dust-bins is intended to prevent the admixture of vegetable and animal matter with the cinde-ash, a very prolific source of fever and diarrhoea at this season of the year. My plan is, for an iron grating to be made to fit the top of the dust-bin. It should be affixed as a lid, and have a padlock, to prevent servants from removing it, excepting at stated times, for the dust to be taken away by the carts. This would be found by householders to promote both health and economy, and the grating being small, or, rather, fine enough to allow the dust only to pass through, the cinders would remain on the top, and could be collected and replaced in the cinder-scuttle for household purposes; thus, the

lazy, extravagant habit of servants, who rarely sift cinders, would be obviated.

Dr. Aldis last year suggested the plan of portable boxes for holding and removing the cinde-ash: that would certainly be an improvement upon the ordinary mode of keeping the dust, which is generally so impregnated with decaying matter that the dust-bin is a complete fever-nest to the dwellers and passers-by.

Perhaps the public may not be generally aware that much of the evil as regards dust-bins is kept up through the understanding between the dustmen and domestic servants; the dust-hole is a ready receptacle for all kinds of refuse and for heterogeneous commodities of more value; the dustmen are fed by the servants for the removal of what they are too lazy to dispose of in a legitimate manner, and their employers of course are taxed accordingly. On the other hand, the dustmen can well afford an occasional gratuity to the servants who "make the dust good," not only by neglecting to sift the cinders but by dropping into the dust-place sundry large pieces of coal and various other articles for which the collectors find use or seek customers on the way to the yard.

Thus, from our ignorance of what is going on in our own households, we are often contributing, unknowingly, to great social abuses. It is time that we stirred ourselves to look after our own affairs in such matters; for by our vigilance and determined action in those things which concern the health of the home, we are performing, at one and the same time, a duty to ourselves and our neighbours, and are thereby contributing what we can as good citizens to the maintenance of public health.

M. A. B.

A QUESTION IN RESTORATION.

AFTER reading Mr. Pritchett's and Mr. Armfield's answers to my queries, I deemed the points I had raised were as undecided as ever, so completely had Mr. Armfield combated Mr. Pritchett's arguments. It was with every feeling of reverence for those edifices which have been left to us by God-fearing, art-loving, and practising men, that I proposed the questions I did. I know how dangerous it is to encourage restoration through destruction, and am painfully impressed, upon looking at some so-called restorations, with the fact that many pages of history, as written in our buildings, have been wiped out for ever. I am, therefore, thoroughly convinced that "conservation, not destruction" must not only be the motto of the archaeologist, but also of the architect; but, as Mr. Armfield very forcibly puts it, some line must be drawn, some clear definition given of what conservation means. Putting all questions of art and archaeology on one side, it seems a safe doctrine to follow that every ancient building should be left by us in as sound a state as we found it, without alteration of any kind; but where rebuilding portions or the whole is absolutely necessary, something more than cutting out or patching is required. I cannot find that Mr. Pritchett has by any means disposed of the one matter under consideration. He says, "If I reproduce the tracery as well as jambs, as I find them, copying each stone with its defective arc, I shall completely destroy the old work." He then says, "If, however, the work is so utterly gone that it cannot be reset, reuse at least one or two of the best pieces of each section, no matter how decayed, to perpetuate the history, and to show that you have read it aright, and reproduce the rest, stone for stone, 'defective' arc and all." I have italicised a portion of the above, because it appears to me to shelve the question, and to be a complete contradiction of the former passage quoted; for supposing not one stone or portion of a stone can be reused, I must certainly fall back upon the first but condemned method of reproducing everything in new work as I found it, by which means I shall, he says, "completely destroy the old work, and the sermon in stones cannot be read without a verbal exposition." Again, by building in a decayed stone, how do I perpetuate an historical fact? Is it not natural to suppose such decayed stone will soon drop out, and be entirely lost hundreds of years before the new portions? Then what a "sham antiquity" will be left, which "having no value as a thing of beauty has consequently no value whatever." Thus truly says Mr. Armfield.

I ask, therefore, if under these circumstances the most correct reading of conservation would not be to perpetuate a work of pure art and a

noble piece of architecture; for should I not he as completely blotting out the interesting fact that such a building was ever completed, as that it was defaced in the fifteenth century? An architect cannot add to his reputation by either course--he is not called upon to create: personal feeling, apart from his love of the beautiful and venerable, does not enter into the matter; but were any cases, and the one under consideration I think will be admitted to be one, where artists are much entitled to reverence as the fact that a work of art was partly defaced in the fifteenth century.

Unless a building is in a dangerous condition it ought not to be taken down, but the decayed parts carefully cut out and new inserted, "similar to the old," so as to prevent the whole from falling. No scraping or chiselling of the old portions should be permitted--simply a breathing of new life into the edifice. And this course now is generally followed. But where men begin to talk of history and archaeology, seemingly forgetting that a thing of to-day may be historical to-morrow, and in due time have its archaeological interest, it is but right that they should be asked to "draw a line" somewhere.

If art be admitted into the question, short work can be made of it; for, taking any masterpiece, either in architecture, painting, or sculpture, that has been defaced by additions or restorations, the course of action seems clear. For instance, if an architect were called on to restore one of the temples of Greece, and that in an Ionic portico he find several Corinthian capitals surmounting the columns, the columns having been shortened and adapted, should he leave them there as an interesting historical fact? I do not think any Classic architect would say yes. But the Greeks were not such Goths as to do a thing so entirely adverse to all notions of art propriety. Again, a sculptor, upon examining a statue of Apollo, finds that it has been "mended" with a leg, without anatomy; if called upon to restore (if such thing can be possible in sculpture) such statue, would he preserve the leg in question as his interesting historical fact? I do not think he would; and few archaeologists would be bold enough to advise such a course, however old such leg might be proved to be. How, therefore, shall the line be drawn, and where?

M. UNDERWOOD.

HYDE PARK.

THE Hyde Park banks of the Serpentine are disfigured by numerous dilapidated boards, with notices thereon, in more or less ungrammatical English, signed by one George Ranger. Could not these notices be codified,--expressed in terse, good Anglo-Saxon, and fixed to one or more trees where necessary? The foot entrance to the gardens, opposite Westbourne-street, is disgracefully shabby.

P. H. B.

NEW ROAD FROM BAYSWATER TO KENSINGTON.

As some change is now being made in the Park drive between the Prince's and Queen's Gates, opposite the new Hall of Science and Arts, and a more direct issue is about to be given by the Exhibition-road, it is happily opened to the public across the Park, it may not be inappropriate to suggest, through the Builder, the expediency of making the road for public traffic shorter, and at the same time of improving this portion of the Park, which alone has been hitherto neglected.

A new road, from the Park, from Victoria Gate, Bayswater, to the Exhibition-road, would be but half a mile and 100 yards; whereas by the present road, which diverges south-westward along Kensington Gardens lower, it would be nearly one mile.

The whole range of Park and gardens, from the Marble Arch to the extreme end of Kensington Palace gardens, is two miles, the distance being the same on the southern side of the Exhibition-road, so that a road cut direct from Victoria Gate, opposite Westbourne-terrace, to the Exhibition-road, would bisect the Park and gardens in two nearly equal parts, thus opening to the public the best route of communication between Paddington and Bayswater on one side, and Brompton, Chelsea, and South Kensington on the other.

With reference to the two points of junction, it is obvious that the two great boulevards of Westbourne-terrace (120 ft. wide) and of the Grand Junction-road (100 ft. wide) are of the same width, and that the Exhibition-road leads into the Cromwell-road, now extended half a mile westward, and to be opened as a boulevard, or rather, to Belgrave.

It would be requisite to shift the Victoria Gate from the west to the east side of the lodge, in order to make the way straight and continuous from Westbourne-terrace and thence to strike direct for the broad promenade and the bridge across the Serpentine; and thus which there can be no more beautiful or picturesque drive; the deviations from the level being scarcely perceptible, and from the straight line only sufficient to assume the pleasing effect

of slight curvatures, without adding fifty yards to the extent; whilst it would secure, in its passage through grown forest timber, what gardeners term the line of beauty.

The proposed road would first strike over an angle of the park for about 250 yards, crossing the fosse or ha-ha at the second semicircular projection, or mimic fortillage, and then be formed continuous along the elevated and open promenade, and so onward over the bridge, clear of the magazine. At this point South of the Serpentine it would cross direct, or nearly so, by the line already staked out and called off, to Prince's Gate, at the top of Exhibition-road. By this arrangement the dusty road along the lower walk might be abated, and added to the acute angle of the park, as far as Queen's Gate, the present iron railing being removed, to establish a fence between park and gardens, and the beautiful Albert Gates re-erected at a suitable point for access to the memorial monument, and to hortian grounds, which might be made ornate and suitable to their position.

In return for the use of the road and bridge within the gardens, a good scope of land, of say, at least, 12 acres, might be added to the gardens, and to those grounds now so tastefully planted, which were not long since an unsightly barrack.

For the completion of this great public benefit it would not be necessary to remove more than three old pollard trees (one of them decayed), and all decently, but I should recommend the removal of the iron railings which divide the bridge longitudinally, and the laying down of a paved canopy, 10 ft. wide, on either side, to afford a clear promenade and carriage drive, commanding homely views rarely equalled in any city.

The present temporary public thoroughfare, while it is tedious, also interferes with the inner circle of Park-drive; it descends the hill to nearly water level, and sweeps round the magazine, reascending to the bridge by a soft, sandy, and dusty width of waste.

As to the unsightly fosse, its abatement, or the treatment of its rugged precincts, although I might give a professional opinion, I leave it to the management which has shown so much skill and taste in adorning the borders of Park-lane, and the fairy wilderness between Anley House and the Serpentine.

JOSEPH NAYLOR.

THE LECTURES FOR WORKING MEN.

Sir,--I attended a lecture delivered at the Mechanics' Institute, Southampton-buildings, by Professor Calvert on Iron,--though not employed in any of the metal trades, and consequently shall not in my work require so constant an application of the knowledge I may have gained. Thinking it may help to induce others like myself, for whose benefit the lectures were designed, to attend others, I beg leave, through your columns, to express my hearty thanks for it, and to echo a sentiment expressed by a speaker that it was one of the most interesting lectures he had heard; (for myself not altogether for the scientific truths to be learnt, but for the genuine love the lecturer seemed to have for his subject, and the delight he evidently felt in imparting his knowledge to others. It would be well if we could say that of all the teachers in other walks of life. What we have so often heard lately was repeated, that we, as a nation, are behind others in the requisite scientific knowledge bearing upon our different callings that prevents us from competing with them in the market. If this is true, to look at the audience and see the small responses they were to the committee's invitation was rather disheartening. It must never be lost sight of by us that we, the so-called working portion of the community, living from hand to mouth, are more immediately affected by the prosperity or the reverse of our country than any other, so that our interest should impel us to make an effort to acquire the knowledge we are in need of, and encourage by our presence gentlemen like Mr. Calvert and others (who, I believe, give their services gratuitously) for their generous efforts to do good.

S. C.

We have received comments on another of the lectures (Mr. Reed's), not so flattering, but do not think it necessary to print them.

(Late). Chapter-house c. 1232
West Porch of South Transept c. 1230
Crossing and Central Tower (lower part) c. 1235
Two West Doorways of Choir Aisles c. 1240
GEOMETRICAL PERIOD. A.D. 1245--A.D. 1315.
(Early). Retrochoir, with South Porch c. 1258
North, South, and East Screens of Choir c. 1280
West Towers c. 1280
Cloisters and Passage c. 1285
Central Tower (upper part) c. 1307
CURVILINEAR [DECORATED] PERIOD. A.D. 1315--A.D. 1380.
South [Transept, South end (upper part)] c. 1325
Parapets of West Front, Nave (south side) and South Transept c. 1325
Screen in South Aisle c. 1325
Monument in Retrochoir (Burgheis) c. 1356
RECTILINEAR [PERPENDICULAR] PERIOD. A.D. 1380--A.D. 1500.
West Towers (interior of lower stage) c. 1365
Monuments (Bishop Fleming) c. 1432
West Towers (upper part) c. 1450
West Windows of Nave and Aisles c. 1440
Parapet of West Porch of South Transept c. 1450
Screens of Chapels of North and South Transepts c. 1450
Chantry Chapel on South side of Retrochoir of Bishop Russell c. 1480
Chantry Chapel on South side of Retrochoir of Bishop Longland c. 1521

It will thus be seen that every portion of the history of English architecture is illustrated in this remarkable building, but more especially that part which belongs to the Lancet and Geometrical periods.

THE ARCHITECTURAL ALLIANCE.

THE seventh annual meeting of this association is to be held on Thursday, July 2nd, at No. 8, Montague-street, Russell-square, London. The following delegates are appointed to attend:--

- 1. London Architectural Association--T. Roger Smith, F.R.S.A.; Thos. M. Rickman, F.S.A., A.I.B.A. (Secretary pro tem. of the Alliance); J. Douglass Mathews, A.I.B.A.; H. Flind Spiers, A.I.B.A.
2. Architectural Institute of Scotland--J. D. Peddie.
3. Birmingham Architectural Association--J. H. Chamberlain, F.I.B.A. (president of the Alliance); T. Plevins, W. Harris.
4. Glasgow Architectural Society--Alexander Thomson, John J. Stevenson.
5. Liverpool Architectural Society--G. E. Grayson, H. H. Statham, Jun.
6. Manchester Architectural Association--Lawrence Booth, A.I.B.A.; Peter B. Alley, Jun.; Alfred Darbyshire, A.I.B.A.
7. Northern Architectural Association--R. J. Johnson, F.I.B.A.; Thomas Oliver, F.I.B.A.; Francis Charlton, C.E.
8. Nottingham Architectural Association--T. C. Hines (treasurer of the Alliance); Frederick Jackson.

PROTECTION OF WORKWOMEN.

We are glad to see the Workshops Act in force in favour of workwomen. At Marlborough street Mr. Studer, milliner and dress-maker, of No. 9, Bruton-street, has been summoned before Mr. Knox, by Dr. Aldis, the medical officer of health for St. George's, Hanover-square,--first, for an infringement of the Workshops Act, by employing certain young women after half-past four o'clock on Saturday; and next (a second summons under the Nuisances Removal Act) for having his house so crowded as to be prejudicial to the health of the inhabitants.

Mr. Edward Lewis appeared for the defendant, and stated that with reference to the first charge his client wished to plead "Guilty." Dr. Aldis said he had to complain of the defendant employing his young women on Saturdays beyond the lawful hour, and on other days with only fifty minutes for meals instead of an hour and a half. The defendant was convicted on the 27th ult., and there was a repetition of the offence on the 30th. Mr. Lewis said that during the season a vast amount of work was required to be done, but customers failed to show a proper amount of consideration towards those who were required to perform it. Mr. Studer had not yet been able to perfect certain arrangements which would prevent him from infringing the law. Mr. Knox said the Act came into operation on the 1st of January last. He would make the penalty 40s., with an intimation that it would be 3l. in future. The second summons was then gone into. Mr. Grant, inspector of nuisances for St. George's, said on the 20th ult. he visited the defendant's house, and, on the basement, he found a small cellar, part of the area, without any fireplace in it. There was a window about 18 in. square, opening into the

THE STYLES IN LINCOLN CATHEDRAL.

FOR the members of the Lincoln Architectural Society, who met on Wednesday the 17th, in the cathedral, to hear papers read by Precentor Venables, "On the Tombs," and by Mr. Edmund Sharpe, on the building, the latter gentleman prepared a Guide, in brief, to the cathedral, which may be useful to others besides those who were present.

The principal works of the cathedral may be classed under the following heads:--

NORMAN PERIOD. A.D. 1066--A.D. 1145.
(Early). West Front (central part) c. 1075
Font c. 1140
(Late). West Front, Circular Arcade c. 1140
" Lower part of two West-towers c. 1140
" Central Doorway c. 1143
TRANSITIONAL PERIOD. A.D. 1145--A.D. 1190.
(Early). West Front, North and South Doorways c. 1148
LANCET PERIOD [EARLY ENGLISH]. A.D. 1190--1245.
(Early). Eastern Transept c. 1190
" Choir c. 1200
" Central Transept (east side) c. 1200
" Central Transept (west side) c. 1215
" Nave, with North and South Chapels c. 1220
" West Front, upper part, and North and South Wings c. 1225

* We are asked to mention that on Tuesday next a lecture on Mechanical Drawing, showing the methods of projecting plans and elevations, and the application of geometrical drawing to the work of masons, carpenters, engineers, metal plate workers, &c., will be given by Mr. Ellis A. Davidson, master of one of the science classes in the City.

area, where there was a most offensive dust-bin, which tainted the air coming into this cellar-room, in which was a bed (where two women sleep). The room was 74 ft. long, by 8 ft. wide and 8 ft. high. He cautioned Madame Studere at the time as to this place. Mr. Aldis said the place was too small for two persons to sleep in, and it was underground. There was only a cubical capacity of 240 ft., whereas, considering the situation, there ought to be 500 ft. He considered that persons sleeping in such a place were poisoning each other. Mr. Knox said on the assurance that the matter should be remedied he would not inflict a fine, and only required payment of costs.

THE HANDEL FESTIVAL AT THE CRYSTAL PALACE.

THE Handel Festival of 1868 is proceeding with the greatest satisfaction. All things go so smoothly that the difficulties overcome are not thought of. Yet every undertaking holds failure within it, and who shall tell of the pains taken and skill shown by Mr. Bowley, by Mr. Grove, by Mr. Costa, by the Directors generally, to keep this down and develop success. When the enormous building has been fitted for the transmission of pure sound, when some 4,000 executants have been drilled and put quietly and quickly into their places in the orchestra, when the solo performers—all great people—are brought together, and 22,000 listeners have been induced to spend their money, conveyed without inconvenience, and seated without squabble, everything seems so easy that the resultant success appears a matter of course.

The vast screens which, as suggested by the *Builder* some years ago, have been placed at the junction with the nave, on each side of the transept, from the crown of the roof down to within about 20 ft. of the floor, have greatly improved the acoustic qualities of this mighty concert-room, and every word uttered by, say, Madlle. Nilsson, who on Friday astonished and delighted every one, was heard with distinctness, by all within the enclosure. The effect of the choruses, too (the true speciality of the Crystal Palace) was immensely increased.*

The chorus from "Saul," "Every eldest-born of hell!" and the first half (only) of the double chorus from "Deborah" were never before sung with equal effect. "O ruddier than the cherry!" by Mr. Santley; "Sweet bird, that shunneth the noise of folly," by Mad. Lemmens-Sherrington, Mr. Radcliffe playing the flute accompaniment; and "Sound an alarm," by Mr. Sims Reeves, were other great successes. The performance, as a whole, will long live in the memory of those who had the good fortune to hear it. On this Friday, the 19th, "Israel in Egypt" will be given, and we advise all lovers of music and grand effects who may happen to see these words in time, to go if they can.

THE STATE OF THE ARMORY IN THE TOWER.

ON Saturday last Mr. Planché, Somerset Herald, met the members of the Architectural Association, by invitation, at the Tower of London, with the view of giving them some account of the national armory. Before going round with them Mr. Planché described briefly the first attempt at scientific arrangement of the armour in the Tower by Sir Samuel Meyrick, who transformed the chaos into something like order, but was compelled by the persons in authority to compromise with a system which should have been utterly destroyed, and which still existed, and could not be too strongly protested against in the name of good taste and the interests of archaeology. The collection was entrusted entirely to the control of the chief store-keeper for the time being, who, however equal to the regular official duties of his department, was not expected to know anything about ancient arms and armour, and was consequently at the mercy of dishonest dealers and casual advisers. In 1858, at the express desire of the late Lord Herbert of Lea (at that time the Right Honourable Sidney Herbert, Secretary of State for War), he (Mr. Planché) drew up a statement of the errors and confusion existing in the

armory; and pointed out that it was the only collection of objects of art and antiquity in England at the head of which there was neither an artist nor an antiquary! That forgeries and modern imitations had been purchased at large prices, and were still exhibited to the public at sixpence per head, while the most rare and valuable articles were lightly rejected, and allowed to leave the country. The death of Lord Herbert had prevented the steps being taken which that eminent and amiable nobleman had owned were necessary to be taken; and the same system was allowed to exist to the injury of the public, who paid annually thousands of pounds for admission, to the confusion of the student and the ridicule of the antiquary.

Mr. Planché then walked through the armory, describing its most interesting objects, pointing out various forgeries and imitations, the absence of classification, Waterloo cruises being crowded into glass cases with fine examples of the armour of the 15th century, and ended with observing that in the very entrance-porch two fine suits, one of the time of Henry VI. and another of the reign of Henry VII., had been placed upon pedestals bearing precisely contrary inscriptions!

We have before now, on several occasions, commented in strong terms on the unsatisfactory state of the collection at the Tower, and insisted on the necessity for the appointment of a duly qualified person to superintend it. If this visit of the Architectural Association should serve to draw public attention to the subject, and lead the Government to apply to Mr. Planché himself (a member of the College of Arms, and, so far as we know, the fittest man in England for the post), it will have effected great good.

THE LAW COURTS COMPETITION.

IN the House of Commons on Monday last Mr. Waldegrave-Leslie, pursuant to notice, asked the First Commissioner of Works whether the statement in the *Builder* of the 13th of June, "that Mr. E. M. Barry, A.R.A., has protested against the appointment of Mr. Street as architect of the new Law Courts, on the ground that such appointment is at variance with the letter and spirit of the conditions of the competition entered into by the architects, be a correct statement; and whether such protest was made before or after Mr. Street's appointment; and whether the plans of the buildings as they are to be erected by Mr. Street will be exhibited in the library of the House of Commons." The reply as to the correctness of our statement was, of course, in the affirmative. Further, it was answered that the plans would not be exhibited again, as they were not likely to be carried out; and that the protest was made after the appointment.

We are not surprised to hear that Mr. E. M. Barry has petitioned Parliament for the appointment of a select committee to inquire into the case.

We have received letters from several correspondents impressed with our own conviction that the reversal of the shameful injustice threatened is not so important even as a personal matter as it is in the broader interests of the public and the profession.

PROVINCIAL NEWS.

Sunderland.—The foundation-stone of a new workmen's hall has been laid in Monkwearmouth, by Sir H. Williamson, bart., M.P. The present Workmen's Hall has been found too small, and a new building has been determined on, a site being presented by Sir H. Williamson. A stone building, designed by Messrs. Potts & Son, architects, will be erected, at an estimated cost of 1,600l. On the basement story will be reading, smoke, game, and club rooms; and in the upper part a lecture-hall, to hold 600 persons, well lighted, and 26 ft. in height.

Great Yarmouth.—The new buildings erecting at the south end of the town (near the fish wharf), for the Trinity Corporation, are now rapidly approaching completion. The total cost will be from 6,000l. to 7,000l. The buildings comprise a store, 100 ft. in length, by 50 ft. in width, and 35 ft. in height, in which will be placed the huys belonging to the Trinity Brethren, and suitable machinery for lifting

these sea marks, each of which weighs at least 10 tons. A tramway leads from the stores on to the Trinity wharf. Springing from the roof of the stores is an octagonal tower or observatory. This "look-out" is 75 ft. above the level of the road, and the ascent is made by means of a spiral staircase. The tower, which weighs about 7 tons, has been raised to its position. Adjoining the stores are a smithy, cooperage, &c. Commodious offices are also built for the use of the various officers attached to the establishment; and a house has been erected for the superintendent. Close to the quay a powerful crane is in course of erection. The foundations for this machine are formed of blocks of Yorkshire stone, varying in weight from 4 to 5 tons each. The Trinity quay has also been extended 33 ft. Mr. J. J. Bennett, of London, is the contractor.

East Retford.—The new markets, Corn Exchange, &c., at Retford, have been formally thrown open to the public. The frontage shops have let at high rents, and the stalls and shops inside have let well. The Court-house, in which the Quarter Session and County Court will be held, and magisterial business conducted, is commodious. Under the townhall is a poultry market, with stands for 200 persons. There is also an open space for a cattle market.

OPENING OF THE NEW DOCK AT SUNDERLAND.

THE Hendon Dock, eleven acres in extent, formed by the River Wear Commissioners, in addition to the previous dock accommodation, has been opened. The dock has cost about 110,000l. It was originally designed to be six acres in extent, and when the tenders were sent in the lowest of these was found to be double the estimate of the engineers, an enormous sum having been added for sea risk. Mr. Meik, the engineer to the Commissioners, advised that he would undertake the work themselves. This was done, and it being subsequently determined to enlarge the dock to eleven acres, this was accomplished at the cost of the lowest offer for the six-acre dock. The Commissioners have a total of 75 acres of dock and harbour, and 90 acres of land, all of which have been forced out of the sea. The great advantage of the dock is that vessels may leave their loading berths and in seven minutes be off to sea, having no long river channel with the difficulties of river navigation to encounter. The new dock is of an irregular square shape, 830 ft. in length from north to south, and an average of 600 ft. in width from east to west.

ALTERATIONS AT THE INSTITUTION OF CIVIL ENGINEERS.

THE contract for the additions to and alterations at the Institution of Civil Engineers, has been let to Messrs. Holland and Hannen. They have undertaken to complete and deliver the whole of the buildings in five months, so as to be ready for the next session, which will commence in November. In the meanwhile the temporary offices of the institution are at No. 1, Great George-street, Westminster, S.W.

INSTITUTION FOR THE BLIND, BRADFORD.

THE inauguration of this new building took place on the 3rd inst. It has been erected at the corner of North Parade and Cambridge-street, and is intended for the employment and instruction of blind work-people. The style of architecture is plain Gothic, from the designs of Messrs. Knowles & Wilcock, of Bradford, architects. The building is four stories in height, and has a frontage of 60 ft. to North Parade, and 136 ft. to Cambridge-street. The premises include a series of large work-rooms for the blind of both sexes, who are employed in knitting, brush, basket, and skep making, &c. On the ground-floor there are parlour, kitchen, and scullery, with four bedrooms over the same, for the accommodation of the resident matron. The upper rooms are approached by open and separate staircases, which are of stone. The ground-floor also contains a library, with shops and offices for the sale of articles they manufacture. The following are the several contractors:—Messrs.

* These screens, which include 2,000 yards of canvas, were put up by Messrs. Unite, of the Edgeware-road.

J. Burnley & Son, masons' and bricklayers' work; Garforth & Walsmsley, carpenters' and joiners' work; John Schofield, plumbers' and glaziers' work; Michael Nelson, slaters' work; Thos. Cordingley & Sons, plasterers' work; and Lishman Lupton, painters' work. Mr. Alner Rhodes was clerk of the works. The total cost of the building, which has been raised by subscription, is 6,533l.

CHURCH-BUILDING NEWS.

Melton.—The new parish church has been consecrated. The site is close by the Horse and Groom Inn. The architect was Mr. F. Barnes, of Ipswich, and the contractor Mr. H. Luff, of Ipswich, whose tender amounted to 2,700l., but the total amount was increased by raising the tower and spire, and other extras. Mr. Callington, of Woodbridge, acted as clerk of the works. The style is Early Decorated, and the material is Kentish rag with Bath stone dressings. The site is surrounded by a battlemented wall of the same material, a pair of iron entrance-gates being placed opposite the south porch. The church consists of nave, north aisle, and chancel, with a tower and a spire of Bath stone, about 100 ft. high, whilst the organ chapel to the north and the vestry to the south of the chancel give the appearance of a transept. The tower forms the south porch. The original design contemplated both a north and a south aisle, that the nave should be higher, and that there should be a clearstory; from motives of economy, however, the south aisle was done away with, and also the clearstory, and the roof of the nave is continued, at a more gradual slope, as the roof of the north aisle. This renders the north side of the church less attractive than would have been the case had the original plan been carried out. The wall of the aisle being necessarily very low, light is admitted by small circular windows, with foliated stone work, similar to those at first designed for the clearstory. The roof is slated, and surmounted by an ornamental ridge, with stone crosses at the ends.

Conewry.—The chief stones of two churches have been laid here on the same day, with masonic ceremonial. The edifices are to be similar, and to accommodate the same number of persons at the same cost. The architects for both are Messrs. H. J. Paul & C. T. Robinson, and the contractor for both is Mr. H. Lovatt, of Wolverhampton. The one is to be called All Saints', and the other St. Mark's. The total length of each is about 110 ft., and their internal breadth about 46 ft., and each will accommodate 346 persons. Both are in the Geometrical Early Decorated style, and built with the local stone, having their internal dressings of Bath stone. They consist of nave, aisles, and chancel, each about 32 ft. long and 20 ft. wide. Here, however, the similarity ceases, for the one in Far Gosford-street, which is All Saints', has gabled aisles, each pierced with a simple single-light window, separated by complex buttress, and surmounted by a simple clearstory. The south side has a porch, crowned by a bell gable; and the west end consists of a complex doorway, having a large rose-window over it. The other church, opposite the new hospital, that is, St. Mark's, has a more advantageous site. This church has aisles divided into bays, by large buttresses, entered by two-light traceried windows. Both are extremely simple, as the object has been to obtain the largest amount of accommodation of the best kind, without trenching too far on the extremely limited funds of the committee.

Stockton-on-Tees.—St. James's Church has been consecrated. The church occupies a site on the north side of Portrack-lane, opposite the union workhouse, and adjacent to the cricket-ground. The building is designed in the Early Decorated style of Medieval architecture, consisting of nave, north and south aisles, chancel, vestry, organ-chamber, with tower and spire, at the south-west angle of the nave. The extreme external measurements are—nave and aisles, 73 ft. by 47 ft.; chancel, 25 ft. by 20 ft. There is no gallery, but accommodation is provided for about 550 persons. The building has been so designed and constructed as to afford provision for future enlargement by the addition of north and south transepts, making it of a cruciform shape, and an extension of the nave; thus giving, if necessary, at least 180 additional fittings at a comparatively slight cost and but little inconvenience. Externally, the design presents, on the south side parallel to Portrack-

lane, at the west corner, a square tower rising 50 ft., surmounted by an octagonal lantern rising 30 ft. more, and finished with a spire rising to the total height of 130 ft. from the ground to the top of the vane. The churchyard is fenced by a low stone wall, surmounted by an ornamental railing. The whole has been designed by Mr. J. P. Pritchett, of Darlington, and carried out under his superintendence, assisted by Mr. Law, as resident clerk of the works. The contract for the building has been executed by Messrs. J. Simpson & Co., for the sum of 3,648l. The carving is by Burstall & Taylor, of Leeds; the ironwork by Messrs. Thomason, of Birmingham; the brasswork by Messrs. Brown & Downing, of Birmingham; and the cost, including lighting, warming, fencing, draining, gasfittings, carving, furnishing, professional charges, clerk of the works, and all other expenses, about 4,800l., exclusive of site.

Willesborough.—The parish church has been re-opened, after having undergone a restoration and considerable enlargement, from designs by Mr. I. Pearson. It is enriched with several stained-glass windows. The east window, by Messrs. Clayton & Bell, is the gift of Mrs. Gregory.

Holdenby.—The parish church of Holdenby, popularly known as Holmby, has been re-opened. The church has been undergoing restoration for the last twelve or fourteen months, under the superintendence of Mr. G. G. Scott. It has been entirely re-roofed, and new open seats of plain, unvarnished oak had been put in. The nave and aisles of the church have been floored with tessellated pavement, red and yellow tiles being placed alternately. The chancel has been inlaid with Minton's unglazed tiles, under the superintendence of the Rev. Lord Alwyne Compton. The floor within the altar-rails has been inlaid with glazed tiles. The church has been generally renovated. The coloring on the chancel-walls was done by Mr. Lee, of Lutterworth, under the superintendence of the Rev. Mr. Sutton, rector of Theddingworth. Mr. Thompson, of Peterborough, was the builder employed for the restoration.

Eye.—The proposed restoration of the church here has been divided into two portions—the repairs to the roof (the expense of which has been estimated at about 759l.), and the substitution of more comfortable and sightly seats for the existing plain pews, and various other matters of restoration, the estimated cost being 1,183l. 4s., making the total sum to be provided 1,942l. 4s. Mr. Colling, of London, is the architect. Tenders have been received, and the work will shortly be commenced.

Haregrave.—The Early English church of this village is now undergoing a restoration, under the hands of Mr. W. L. Baker, C.E., and architect, of London. Owing to the extremely dilapidated condition of the fabric, much new work throughout the whole building has been found absolutely necessary, including the rebuilding of the tower and spire, these latter, however, being replaced stone for stone. The plans are said to have passed the friendly criticism of Mr. Butterfield, and have likewise been formally approved of by a committee of the Northamptonshire Architectural Society. The contract for the restoration has been taken by Mr. Henson, of Finedon, builder. The foundation stone of the new tower has been laid.

Hereford.—The chief stone of St. James's Church for St. Owen's parish, has been laid. In plan the church is cruciform, consisting of nave, north and south aisles, transepts, chancel, chancel aisles, vestry, with warming crypt under, and south porch forming the substructure of a future tower and spire. The total length of the church over all, is 120 ft.; the total width, 80 ft.; the height of the nave, 45 ft.; and of the tower and spire, 140 ft. The style of architecture adopted is the Early Geometrical. The nave is divided from the aisles by arcades of four arches on each side, the arches before the transepts being 20 ft. wide. The chancel arch is 17 ft. wide and 30 ft. high. The transepts are filled with four-light windows, the east and west ends with three-light windows, the aisles with two-light windows, and the clearstory is pierced with eight foliated sexfoils. The walls are being built with native stone, and faced internally with squared and axed masonry, random jointed, and relieved with blue stone bands, voussoirs, &c. The roofs are to be constructed with pitch pine, intended to be left its natural colour. They will be boarded, covered with felt, and slated with green Pembrokeshire slates. The seats, which are arranged for 600

adults, are also out of pitch pine, varnished over. The church is being carried out from the designs and under the superintendence of Mr. Thomas Nicholson, of this city, the diocesan architect, and Mr. Gongb, of Bishop's Castle, is the contractor. The walls have already been considerably advanced. The estimated cost of the edifice, exclusive of the tower and spire, is 3,500l.

Newtown, Wem.—The foundation-stone of the new church was laid on the 22nd ult. The building will be in the Early English style, and consist of nave, chancel, vestry, and south porch. There will be a bell-turret at the west end. The material used for the walls and dressings is Grinton stone. The roofs will be covered with Staffordshire tile. The cost, including warming apparatus and all fittings, is estimated at 1,170l. Accommodation will be provided for 220 persons. Mr. E. Haycock, jun., of Shrewsbury, is the architect, and the contractors are Messrs. Nevett, of Ironbridge.

Chester.—A meeting has been held to promote a movement for the restoration of the cathedral. It was stated that the Ecclesiastical Commissioners had offered to give 10,000l. for the purpose; that another 10,000l. had been promised in response to circulars; and that the Dean and Chapter would devote 2,000l. to the object. At the meeting Mr. Antrabus, high-sheriff of the county, presided, and Mr. W. H. Gladstone, M.P., Lord Egerton of Tatton, Earl Grosvenor, and other gentlemen, were present. About 600l. were promised in letters read.

SCHOOL-BUILDING NEWS.

Morrison (Swansea).—New schools have been erected and opened here for the district. Mr. H. H. Vivian, M.P., contributed 1,000l. towards the building. Mr. John Humphrey, of Morrison, was the architect, and the total cost has been about 3,800l. The schools are capable of accommodating from 1,000 to 1,200 children; whilst adjacent are extensive playgrounds and dwelling-houses for the master and mistress and the principal teachers. There has been no attempt at architectural display or ornamentation; but the whole buildings are lofty and of good general exterior, the school-rooms being well ventilated. The whole of the buildings have been erected with plain native stone, with appropriate dressings. The roofs, which are high-pitched, are relieved by a number of gables, and the windows are of Gothic head ones. Lantern lights are fixed in each school, and these, as well as the windows, are made to open for ventilation.

Acton, near Wrexham.—An infant-school, with mistress's residence, has recently been built at this place. The dimensions of the schools are 33 ft. 6 in. by 17 ft., with a porch of suitable size. The mistress's house comprises a bay-windowed parlour, a kitchen, and two bedrooms, with the usual appearances. The walls are almost entirely built with the red bricks made in the locality, with a few Ruabon stone dressings. Courses of blue Staffordshire bricks are sparingly introduced. The roofs are covered with Broseley tiles, banded with some of a darker shade. There is a bell-turret, covered with oak shingle, which surmounts the school roof. The expenses incurred in these buildings have been defrayed by the family of Sir Robert Cunliffe, bart., of Acton Park. Mr. Ferrey was the architect employed, and the contractor was Mr. Richard Yates, of Shiffnall.

Great Horton.—The memorial stone of new congregational schools has been laid here. Messrs. Paull & Robinson, of Manchester, are the architects. The area to be covered is about 550 superficial yards, and the dimensions of the buildings will be about 120 ft. by 41 ft., the height from the floor of the lower story to the roof ridge being 52 feet. The structure will be three stories in height on the north-east side, but only two at the front and on the side facing the chapel. A feature of the design is a tower, 80 feet high to the top of the vane. Internally, on the ground floor, there will be an assembly-room, 65 ft. by 38 ft., and 16 ft. high, capable of seating 600 adults, and adapted for concerts, public meetings, lectures, &c.; and in the rear a lecture-room, 36 ft. by 26 ft., to seat 230 adults, of the same height as the assembly-room. Above will be the class-rooms, sixteen in number, averaging 180 superficial feet, and 12 ft. high, and a room for the superintendent. The principle of separate class-rooms has been chosen in view of the results which have attended the

adoption of that system elsewhere. On the lower ground floor, and underneath the lecture-room, will be a class-room, 25 ft. by 20 ft., and 14 ft. high, containing a raised gallery for infants, while on the same level are two class-rooms for adults, specially arranged, with fire-places, &c., for week evening purposes, but available for the Sunday school. Externally the building will have dressed wall-stones in regular course, and the architectural features will be of hewn or ashlar stone. The works have been let by contract for 3,000*l.*, in addition to which 150*l.* to 200*l.* will be required for warming apparatus. Add to this the architects' commission, furnishing, &c., and over 5,000*l.* will be needed to complete the undertaking.

STAINED GLASS.

St. George's, Newport.—The memorial window to the late Bishop of Lichfield, in *St. George's Church*, near Wellington, has been formally opened. The window is the production of the Messrs. O'Connor, of London. It is the east window in the church. The subjects treated are as follow:—In the lancets, the Agony, Christ hearing His Cross, the Crucifixion, the Descent, and the Entombment; in the circular lights, Christ the Lord of all, the Good Shepherd, and giving His commission to St. Peter, "Feed my sheep."

St. Giles's, Northampton.—A memorial window has been erected in the south chancel aisle of this church, by Mr. C. Britten, in memory of a son, who died in February, 1854. The window is the work of Messrs. Powell, of Whitefriars, London. The first compartment contains a representation of Christ raising to life the dead and only son of the widow of Nain, the part of the scene depicted by the artist being that described in Luke vii. 15.—"And he that was dead sat up and began to speak. And he delivered him to his mother." The second compartment contains a representation of Christ admonishing the youth who said he had observed all the commandments, in the words of St. Mark, x. 21.

Bishop's Castle Church.—A stained-glass memorial window has been executed by Messrs. Done & Davies, of Shrewsbury, for this church. It consists of two openings with tracery. In the upper part of the openings are the figures of St. Matthew and St. Mark, with their emblems, the Angel and the Lion, each inclosed in a trofoil, which forms part of a decorated canopy under which they stand. Beneath them are St. Luke and St. John, also under canopies, displaying their emblems, the Bull and the Eagle, which form pedestals for the figures above. The window is surrounded with a narrow border. The large quatrefoil in the tracery is filled with the arms and crest of the donor, surrounded with foliated ornaments.

Books Received.

Photographic Illustrations to accompany the Architectural History of Canterbury Cathedral. By the Rev. R. WILLIS, M.A. Selected and arranged by J. H. PARKER, F.S.A. Printed by Jas. Parker & Co. Oxford. For private circulation only.

MR. PARKER is making good use of the facilities afforded by photography for complete archaeological illustration,—such illustration indeed as no pencil can afford. The great value of Professor Willis's "History of Canterbury Cathedral," founded as it is on the minute account left by Gervase of the changes made in the building, is universally admitted: such a series of accurate representations of the various parts as these photographs give were alone wanting to make it complete. The difference between the older parts and the alterations or additions is shown very strikingly.

Although the complete work as now before us is marked "for private circulation only," we trust the set of photographs is obtainable by those who possess the work as originally issued.

Photographs Illustrative of the Archaeology of Rome. Oxford.

WE may mention, in connexion with the above, that Mr. Parker has issued privately a catalogue of the long series of photographs illustrative of the Archaeology of Rome that has been prepared

under his direction. A fund is being formed to pursue important excavations in Rome, the British Archaeological Society of Rome having undertaken to act as trustees and apply it, with the consent and approbation of the Government.

The Great Architect: His Plan of Salvation in the Temple of Dead Stones and Living Stones, God and Man. London: Longman & Co. 1868.

THE "master builders" to whom this work on "The Great Architect" is dedicated, are no doubt the clergy—not of the Roman Catholic persuasion, nor of ritualistic tendencies, who are denounced in no very measured terms. Much of the volume, however, relates to the question of official arrangements in churches; and, if we mistake not, the author, before the publication of it, broached the subject in the *Builder*, in the end of 1863. His idea is that the primitive Christians cast aside all ancient temple arrangements, and simply adopted the hædæan form of edifice as a meeting-house, with cancelli or low railings along the edge of a platform, whence the speakers were to address the meeting. He therefore finds the origin of the chancel, not in the vailed holiest place or penetralia of the temple, but in the screened platform of the Roman judges; and the symbolism which reconverted the chancel into the penetralia of the temple he regards as a subsequent retrogression to Pagan ideas.

VARIORUM.

"On Social Life among the Teutonic Races in Early Times." By J. A. PICTON, F.S.A. Mr. PICTON here appears to have been expending a portion of his learned leisure in an analytical inquiry into the primitive elements of our modern civilization. The subject is a curious one, and Mr. PICTON has made an interesting paper of it, which was read before the Liverpool Literary and Philosophical Society in January last. We give a slight specimen of his mode of dealing with the subject, from what he says of the ancient Franks and Alemanni:—

"By the Alemannic code it was not lawful to erect a building more than three stories high without the consent of the *Lantfrater*, or magistrate of the district. A wall might be built round the court, but not of greater height than could be reached by a man sitting on a horse; nor was it allowed to have the wall crowned with a battlement or parapet."

Even at this early period the vexed question of injury to light by adjoining buildings was the subject of legislation.

"Und zimmert ein man ein haus, so soll er ein nachbar sein haus in ein zimern, so solerz in der hehe ritten das ein licht nicht verzimern werde."

"If a man builds a house, and his neighbour builds another adjoining, the latter shall so carry it up that the light of the first be not injured."

Then follow directions as to procuring satisfaction. Connected with this is rather a quaint, but effective law. "If any one shall build a boat or anything else with another man's timber, the boat shall belong to the man whose timber has been used."

The king's highway (*kunigaz straz*) was to be 10 ft. wide, for the alleged reason that two vehicles might pass each other. The bridges were so narrow that it was necessary to enact a law that the first comer, whether loaded or unloaded, should have the right of way.*

—The Seventeenth Annual Report of the Amalgamated Society of Engineers, Smiths, &c." Printed by Kenny, Camden-road. This report contains the transactions of the society from December, 1866, to December, 1867.

At the date to which the report comes down, the society consisted of 33,325 members, who were divided into 313 branches, of which 240 were in England and Wales, 34 in Scotland, 11 in Ireland, 14 in the British Colonies, 12 in the United States, 1 in Constantinople, and 1 in Croix, in the north of France. The entrance fee to the society ranges from 1*5s.* to 2*l.* 10*s.*, according to the age of the candidate, and the subscription is 1*s.* per week so long as members are in employment. The total income for the year amounted to 86,225*l.* 2*s.* 7*d.*; but, owing to the unparalleled depression of trade that prevailed throughout the year, even this large sum was not sufficient to meet the expenditure, which came to a grand total of 99,105*l.* 5*s.* 8*d.* The 12,000*l.* odd in excess of income required to make up this sum was drawn from the reserve fund, which at the end of the year still showed a balance of 125,263*l.* 2*s.* 7*d.* The out-of-work donations show a total of 58,243*l.* 0*s.* 8*d.*, distributed under a rule which provides that any member who shall be thrown out of work under circumstances satisfactory to the branch to which he belongs, shall receive 10*s.* per week

for fourteen weeks, 7*s.* per week for thirty weeks, and 6*s.* per week for whatever further period he may be out of employment. Of this large sum, it is stated, only 7,000*l.* were expended in supporting members out of employment through trade disputes. The sick benefit, which allows 10*s.* per week for twenty-six weeks, and 5*s.* per week for any greater length of time that he may be ill, to any member who, through sickness or accident, is unable to follow his ordinary occupation, came to a total of 15,577*l.* 18*s.* 0*d.* The superannuation benefit of from 7*s.* to 9*s.* per week, paid to members of upwards of fifty years, who through old age or infirmity are unable to obtain the ordinary wages of the trade, and who have been in the society for eighteen or more years, amounted to 5,982*l.* 13*s.* 10*d.* The funeral benefit, under which the representatives of a deceased member are entitled to 12*l.*, was 5,282*l.* 14*s.* 0*d.*; and ten grants of 100*l.* were, in accordance with one of the rules of the society, paid to members who were by accident or disease permanently incapacitated from working at their trade. Apart from the general fund there is a benevolent fund, which is replenished from time to time,—generally about once a year,—by a small levy. From this fund exceptional cases of distress are relieved upon the recommendation of the branch to which the distressed member belongs. During the year there were 500 grants from it, ranging from 7*l.* to 2*l.* each, and coming to a total of 2,249*l.*—"Report on the Sanitary Condition of the Parish of St. Mary, Islington, 1867." By Edward Ballard, M.D., Medical Officer of Health. The year, according to Dr. Ballard, has been a comparatively healthy one for Islington. The population was estimated at 200,541 in 1867, and the death-rate was 199.9 per 10,000 living; that of London generally being 229.8,—a lower rate than during the five previous years. A small-pox, however, has been gradually on the increase. Dr. Ballard appends to his report the results of personal researches as to the influence of the weather on health, in which, on some points, he differs from the Registrar. He finds it to be an error to suppose that sudden changes in temperature, as a rule, are damaging to public health,—at least, a sudden change from hot to cold. An increase of atmospheric temperature he finds normally associated with an increase of general sickness, and a decrease with its diminution. A fall of rain, especially in summer, lessens sickness generally, and sometimes immediately, while drought augments it. Weather, however, which lessens sickness amongst the healthy, tends, Mr. Ballard says, to hasten the death of those who are sick, and vice versa.

Miscellaneous.

MANCHESTER ROYAL EXCHANGE.—The foundations for this building, consisting of two stories of arched and fireproof ceiling, have been for some time in active progress, and are now nearly brought up to the street level. Messrs. Neill & Sons have executed the work at a schedule of prices. The contract for the main portion of the building above the street, but exclusive of internal finishing, &c., has just been let in a limited competition to Messrs. Parker & Son, of Liverpool, whose tender was the lowest. Messrs. Mills & Murgatroyd are the architects.

BRIGHTON GRAMMAR SCHOOL.—The new building just opened, which is to be called "The Proprietary Grammar School, Buckingham-road," was designed by Mr. Nunn, architect, and it has been erected by Mr. Chappell, of Steyning, whose tender (the lowest) amounted to 2,430*l.* The directors dispensed with the services of a clerk of the works. On the basement is the porter's living-room and bed-room; heating apparatus; open play-ground, 30 ft. by 28 ft.; covered play-grounds, 56 ft. by 24 ft. There are stone staircases throughout the building, with wrought-iron handrail and balusters. On the second floor is the entrance-hall and reception-room, corridor, 35 ft. by 6 ft.; schoolroom, 56 ft. by 24 ft., 14 ft. high. Upper floor, corridor; schoolroom, 56 ft. by 24 ft., 18 ft. high; class-room, 25 ft. by 12 ft. Both schoolrooms, corridor, and class-room will be warmed by hot water. The whole is well lighted and ventilated. A large piece of ground to the south has not yet been appropriated, but will be used if the school should so increase as to render it necessary, of which there appears to be very little doubt, to build a new wing for school purposes.

* Jus. Aleman, c. 132.

GAS.—The Woodbridge Gas Company's shareholders are to receive 8 per cent. upon their shares, but the profits of the year would afford 5 per cent., leaving 7 per cent. undivided. This may be very satisfactory to those interested in the dividends, but not to the consumers, and we understand unless the company reduce their present price it is the determination of several of their customers to discontinue the use of gas, and to substitute for it paraffin and other lights, the same as the Beccles people did, and which had the effect of causing a considerable reduction.

SOCIETY OF ARTS' PRIZES.—The Prince Consort's prize of twenty-five guineas has been awarded to Robert Creaser Kingston, aged twenty-one, of the Royal Polytechnic Institution, gardener, who, in this and the three preceding years, has obtained the following first-class certificates:—1865. Arithmetic—first-class certificate; 1867. Botany—first-class certificate, with first prize, and the Royal Horticultural Society's prize of 5*l.*; floriculture—first-class certificate, with first prize, and the Royal Horticultural Society's prize of 5*l.*; 1868. Chemistry—first-class certificate, with first prize, and vegetable culture—first-class certificate, with first prize, and the Royal Horticultural Society's prize of 5*l.* (together with a second-class in mensuration) the *Gardener's Chronicle's* prize of 3*l.* This is a gardener who has cultivated more than his garden.

TENDERS FOR THE SUPPLY OF WATER PIPES.—At the meeting of the Hereford Improvement Committee, the tenders for supplying 1-inch and 8-inch iron pipes and bends for the intended extension of the water supply were opened. There were seven tenders, *viz.*—Mr. Spittle (Newport), pipes, 5*l.* 10*s.* 6*d.*; Messrs. Cockrane & Co. (Woodsale, Walsley), pipes, 5*l.* 7*s.* 6*d.*; bends, 8*l.* 10*s.* Mr. Leybourne (Newport), pipes, 5*l.* 7*s.* 6*d.*; bends, 7*l.* 7*s.* 6*d.*; Mr. Jordan (Newport), pipes, 5*l.* 5*s.*; bends, 7*l.* 1*s.* Mr. Meredith (Kington), pipes, 5*l.* 5*s.*; bends, 6*l.* Mr. Abell (Worcester), pipes, 5*l.* 1*s.* Messrs. J. & S. Roberts (Westonchurch), pipes, 4*l.* 1*s.* 6*d.*; bends, 7*l.* 10*s.* The tender of Messrs. Roberts was accepted. In laying the pipes, the tender of Mr. Welsh, Hereford, was accepted, the pipes being 4-inch, 8-inch pipes, 2*l.* 4*d.*; 7-inch, 2*l.* 1*s.* 8*d.*; 3-inch, 1*s.*

A NEW LONDON MARKET.—In a few weeks the King's-cross Market will be opened to the public, and the populous districts of west, north-west, and north London will thence receive supplies of fish, meat, poultry, vegetables, and fruit. The King's-cross market covers more than a square mile of ground, and comprises the following:—1. A wholesale fish market; 2. A wholesale meat market; 3. A wholesale poultry market; 4. A wholesale provision market; 5. A wholesale fruit and vegetable market; 6. A spacious covered retail market containing about sixty stalls. As the new market is in close connexion with the Great Northern Railway, and in the immediate vicinity of the Midland, Metropolitan, and Great Western, the Metropolitan communication with the Great Western, and London and North Western stations, fish and poultry, the produce of the great food-producing districts of the north, fruit and poultry from the continent, and Irish eggs and butter, will reach the dealers and consumers three or four hours earlier than they do at the present time.

PROPOSED TUBULAR WAY ACROSS HYDE PARK.—A new scheme for a pneumatic tubular way has been submitted to the Metropolitan Board of Works by Mr. Rammall, C.E., who asked permission to convert for that purpose a disused tunnel, conduit belonging to the Board, formerly known as the Bayswater tunnel. The conduit crosses the park in a nearly straight course from Albion-street, in the Uxbridge-road, to Albert Gate, Knightsbridge; and to effect its conversion it will be necessary to open and under-set the side walls, and put in a new invert, rendering the greater part of the interior in Portland cement, by which a substantial and durable way would be formed; the height being 8 ft. 9 in., and the width 5 ft. 5 in. The increased gage of the tube thus proposed would be both high and wide enough to carry more roomy than the ordinary omnibus. The road would be lighted with gas, and have a clear gangway through from one end of the tunnel. The carriages would support a pair of light steel rails of 3 ft. 6 in. gauge, to be laid on wooden sleepers embedded in the invert.

COMPETITION DRAWINGS FOR THE ART-UNION OF LONDON.—With the permission of the Committee of Privy Council for Education the various sets of drawings submitted to the Council of the Art-Union of London in reply to their offered premium, are hung for exhibition in the South Kensington Museum. They will be found in the narrow gallery to the left of the entrance. The award is not yet made.

HAYMARKET MEMORIAL TOWER, LEICESTER.—A dinner in celebration of the completion of the Haymarket Memorial Tower, Leicester, has taken place at the George Hotel. The whole of the workmen employed were invited; and among the company present were Mr. W. Kempson (in the chair), Mr. J. Allen (in the vice-chair), Mr. Joseph Goddard (the architect), Mr. Barfield (the contractor), &c. A glee party was present, and added materially to the enjoyment of the evening.

ANTIQUITIES IN DORSET.—Interesting ancient British remains have just been discovered at Maiden Castle. Whilst some men were excavating on the summit of the mound, for the purpose of forming a pond for sheep, they came suddenly upon several large pits, regularly constructed, from 4 ft. to 10 ft. in depth, and on removing the loose soil fragments of coarse pottery, a pair of urns, a rude copper ring, several hoars' snags, sling-stones, and several carved bone spear heads were discovered.

VENTILATION OF SEWERS.—At the meeting to be held this Friday, the 19th inst., the Metropolitan Board of Works will consider notice of motion given by Mr. Cook:—

"That the question of the ventilation of the sewers belonging to this Board be referred to a special committee for consideration, especially to advise the Board as to the desirability of offering a premium (by public advertisement) for the best practicable plan by which the escape of injurious gases from the sewers shall be prevented, and at the same time the safety of those who work in them be preserved."

OPENING OF THE PALACE HOTEL, BUXTON.—The Palace Hotel in Buxton has been formally "opened." It is situated on an elevation near to the railway stations, within easy distance of the baths, gardens, &c., and stands within its own private grounds. The architect was Mr. Henry Curvey, of London. The dining and coffee rooms are each 52 ft. by 30 ft.; drawing and reading rooms each 45 ft. by 21 ft. There are also smoking and billiard rooms. "The Palace" and its detached offices,—kitchens, larders, pantries, &c., &c.,—stand on nearly 4,000 square yards of land.

SCIENTIFIC INSTRUCTION IN FOREIGN COUNTRIES.—In the Commons, Mr. Samuelson asked the Vice-President of the Committee of Council on Education what was the cause of the continued delay in the production of the information received from our legations abroad on scientific instruction in foreign countries. Lord R. Montagu said the delay complained of was not on the part of the translator, but arose rather from the immense mass of matter to be translated. As soon as the translations were prepared they were forwarded to the Foreign Office, in which department the responsibility of printing the papers rested. Lord Stanley said he believed a large portion of these papers were already in print. Lord R. Montagu said the reports received from the secretaries of legation would be laid on the table at once, leaving the other documents to follow as soon as ready. He believed that 260 pages had already been printed.

THE THAMES EMBANKMENT PAVING, LIGHTING, &c.—At a recent meeting of the Metropolitan Board of Works, the Works Committee reported that they had considered the matter as to the lighting, paving, &c., of the Thames Embankment by the several parishes coming into the line of the embankment, and recommended that it is not expedient for the Board to undertake the same, but that the duty should devolve on the vestries and local Boards before mentioned. Mr. Phillips moved an amendment to the contrary effect. The amendment was negatived by a large majority, and the recommendation of the committee agreed to. Mr. Newton moved,—

"That on the expiration of twelve months from the completion of the Thames Embankment roadway, during which time the contractors will have to maintain it as a macadamised road, the Board will (after that period of experience) again consider the question of how the roadway should be formed before being handed over to the commissioners, district boards, and vestries, who will have hereafter to maintain it."

The resolution was agreed to.

CONVERSAZIONE OF THE INSTITUTE OF ARCHITECTS.—The President and Council of the Institute of British Architects have issued invitations to a *conversazione*, to be held on the 1st of July.

OPENING OF THE ABBEY MILLS PUMPING-STATION.—At the last meeting of the Metropolitan Board of Works, a report was brought up from the Works and General Purposes Committee, recommending that the works at the Abbey Mills pumping-station be publicly opened on or about the 23rd of July next; and that his Royal Highness the Duke of Edinburgh be invited to perform the ceremony. The report was agreed to.

OPENING OF THE WESTERN ENTRANCE TO MANCHESTER CATHEDRAL.—The new tower of this cathedral is now completed, and formally opened. The tower on its eastern side opens to the nave, forming the vestibule, or principal entrance to the church. Above the western door is a painted memorial-window to the late Mr. J. C. Harter, of five lights, divided by a transom. A band of ornate mouldings runs underneath the window and is continued along the two sides, dividing the open portion of the tower into two stages. The interior of the tower is of stone, and is completely covered with panel-work tracery, carved. The tracery of the second stage on the north and south sides of the tower is made to assume the form of a pointed perpendicular window similar to that in the western face; and from the spandrels rises the fan tracery of the vaulting, the centre of the vault being filled with a large circle, within which are smaller circles filled with tracery, except the centre one of all, on which there is a heraldic device.

THE FALL OF "METEORIC STONES" IN BIRMINGHAM.—Some of the stones collected from the great thunderstorm on the 29th ult. were sent to the borough analyst for examination. Dr. Hill, in his report, says,—“They possess the character, colour, fracture, hardness, specific gravity (about 3), and the property of being feebly attracted by the magnet, of basaltic rock, and are similar to, if not identical with, the well-known Rowley rag stone. . . . The proximity of the Rowley rag to us, and the fact that our streets are made of and mended with it, add probability to the hypothesis that they have been carried up from the surface of the earth by a cyclone, to be showered down at a distance from the spot where they were raised. This is not only plausible, but probable; but the hypothesis must not be accepted without reserve, for the reason that cases are on record, and apparently well authenticated, of the fall of innumerable fragments at different times, possessing, as far as I can learn, exactly the characters of those which have been submitted to me, and which are believed by high scientific authority to be aerolites or asteroids.” The occurrence, as we remarked, of such a fall upon two similar occasions, if not often, in one and the same town, and in a locality near to a quarry where such stones exist, is almost conclusive as to their origin.

THE ENGLISH CHURCH OF ST. ANDREW, COMPIÈGNE.—The designs for this lately consecrated edifice were prepared by Mr. Thornton Shields, of Edinburgh, and the execution of the work was seen to by M. Louis Culla, of Paris, architect. The church is of Early English character. The steeple rises at the side of the church. The nave is of a simple character, and capable of containing about 200 persons. All the woodwork of the building is open, and is of red deal, varnished like the benches and wainscot of the nave. At the right hand of the choir is the vestry, also wainscoted and furnished to harmonize with the style of the church. The windows are decorated with the armorial bearings of the foundress, Mrs. Russell Barrington, and of St Andrew on the left—the place appointed for the organ and the singers. The whole interior is in the English Gothic style. The tower is octagonal, and terminates by a St. Andrew's Cross, with a weathercock of gilt bronze, bearing in the carving the Royal Lion of Scotland. A spiral staircase conducts to the clock and the belfry. The church stands back a few feet from the avenue, and an iron gate or railing encloses the space. This gate is ornamented with four pillars, the two centre ones being surmounted by lions, holding shields with the emblems of St. Andrew. In the garden are placed benches of varnished oak of an original design.

THE ARCHEOLOGY OF FREEMASONRY.—We are told that a Masonic Archeological Society has been established, in order to elucidate and popularise the antiquities and history of Freemasonry. If taken up by proper hands, advantage could not fail to result.

SAFETY IN THE MINE.—One of your correspondents suggests that steam power be adopted to ventilate coal mines. The extensive and intricate labyrinths, sidings, cuttings, drifts, and cavities in the roofs, where the dangerous gas accumulates, there being no through draught, would render his plan ineffectual. The gas could be easily drawn off if cupola-formed, or like nuto the Thames Tunnel; but a mine is a very different place. My plan of igniting it by the electric spark every moment is the only effectual method to secure safety in the mine. I should like to fix the wires in any mine in the kingdom that is considered the most "fiery," for I feel confident that explosions will be events of the past.—R. T.

MONUMENT.—Some time since a proposal was made to place a marble statue of the ex-Chancellor of the Exchequer, Mr. Gladstone, in St. George's Hall, Liverpool, and a considerable sum of money having been raised, the commission was given to Mr. G. G. Adams, sculptor. The statue, the execution of which has been delayed owing to the indisposition of Mr. Adams, is now near completion.—Digging operations have been commenced in front of the Midland Station, at Bradford, for the proposed monument to Richard Ostler, "The Factory King." Upon observing this fact a correspondent of the local Observer says:—"The site is the finest in all the borough, if not in Yorkshire; and, if it must be occupied by a statue, it is worthy of a noble subject,—a man whom the nation honours. Such a man was Cobden, a world-wide patriot. Such a man was not Ostler, a narrow, blatant reviler. He was the opposite of Cobden—the opponent of free-trade and all reform in legislation on civil and religious matters. Surely, Ostler is not the man whom Bradford most delighted to honour."

VALUE OF LAND IN LIVERPOOL.—An inquiry was held before Mr. Aston and a special jury, for the purpose of assessing the compensation to be paid by the Corporation for a property in Jordan-street, belonging to Mr. Wilson, and required for the purpose of making a new street from Parliament-street to Wapping, under the Act of 1855. Mr. Samuell, barrister (instructed by Messrs. Norris & Sons), appeared for the claimant; the town clerk for the corporation. The property consists of about 720 square yards of freehold land, with workshops, sheds, &c., upon it, now used as a boat-building yard, and a portion suited as a smithy. For the claimant, Mr. Wordley, architect, was called, who valued the property at 3,600*l.*, and the usual 10 per cent. for the property being taken compulsorily. Mr. Hornblower and Mr. Wylie agreed. For the corporation, Mr. Culshaw's valuation was 2,792*l.*, Mr. James Holme's 2,834*l.*, and Mr. Scott's 2,430*l.*, all adding 10 per cent. for compulsory taking. Mr. Samuell and the town clerk addressed the jury. The assessor summed up, the jury retired, and, on returning, gave a verdict for 3,700*l.*

THE NEW CHURCH IN POST VALE, HERTFORD. The chief-stone of this edifice has been laid. It is intended for the convenience of the inhabitants of the parish of Bengoe in the district of Post Vale. The new church, which is to be erected in the Early Decorated style, will contain sittings for 400 persons, and the contract for building it has been taken at 3,200*l.* It is to be built of Kentish rag, with dressings of Bath stone. The plan is cruciform, with nave and one aisle, and when the population has increased and more room is required, it is contemplated erecting a second aisle, corresponding with the first. The chancel has an apse, which will be lighted with three single light windows, with an additional window on the south side. The west window is formed with four-lights, with trefoil heads and trefoil intersections, with a rose window finishing the top. The spandrels are enriched with carvings. Near the apex, or gable, there will be a circular window, with three quatrefoil lights, each within a circle. The roof is an open timbered one. At the north-west angle are two large ornamental buttresses, with three columns at the angle, which will carry the corbels, supporting a turret of stone, terminating with a spire, the entire height being about 70 ft. The seats will be open.

TENDERS.

Table listing tenders for various construction projects including Union Chapel, Wilton Parish Schools, alterations to parish schools, and rebuilding premises. Includes names of architects and contractors like Mr. John Birch, Messrs. Webb & Sons, and others, with associated costs.

Table listing tenders for workshops, alterations to the Duke of Sussex, rebuilding Deepish Cottage, and other projects. Includes names of contractors like Messrs. Turner & Sons, Messrs. Messer, Scoble & Son, and others, with associated costs.

TO CORRESPONDENTS.

Church Clerk (cont. from p. 459) or better still, thin slate slab, we remedy the evil.—A Country Gentleman (we have a good set of the tube-pumps from some who have used them, where water is near the surface, and the soil gravelly. In the London the result is not so good)—Fenshawe (Herron is not required making out artificers' bills. As to joining Institute, address the hon. secretary, J. D. M. (too late).—E. B. F. (in 1864).—A. L. J. (too late).—S. W. A. (we have not seen the paper referred to).—M. F. (Mr. R. D. W. F. H. F. C. W. H. A. B. T. N. J. J. Messrs. O. J. F. Mr. W. L. J. J. F. J. W. H. J. O. M. T. R. G. S. O. B. & Co. T. H. H. J. H. P. T. W. S. & R. B. J. J. W. W. F. D. P. H. W. A. R. W. L. W. L. J. W. H. P. J. M. W. P. R. & Son. R. L. S. R. T. B. J. J. J. E. H. C. W. A. B. E. J. L. R. L. C. H. & Co. J. H. L. F. We are compelled to decline pointing out books and giving addresses. All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily publication. Note.—The responsibility of signed articles, and papers read public meetings, rests, of course, with the authors.

The Builder.

VOL. XXVI.—No. 1325.

Sacred
Archæology.



WHEN we consult a dictionary, the first thing we require in it is method; the second, correctness; and the third, fulness. If we cannot find the word we seek, the fact that it is correctly given, and the explanation full, is of no use to us. And supposing that we can find the required word easily, and its definition is sufficiently full, neither circumstance is of much value if we cannot rely upon the minute accuracy of the explanation: hence, the requisites for a work of a lexicographical character must always be arranged in the order in which we have set them down. Most especially, however, do we require order, exactness, and amplitude in works intended for the assistance of advanced scholars. These three points are not wanting in the Dictionary of Sacred Archæology we are about to notice,* although a little elaboration of each of them in a future edition would be an improvement, as we will presently show. The author is known as a writer on archæological subjects. In the prosecution of his numerous works he occasionally met with difficulties which he never passed over without solving; and the notes made on these occasions, combined with selections from the stores of facts and illustrations that accrued in the prosecution of his studies, form the basis of his volume. He takes an early opportunity to remark,—“Those who are experienced in literary labour will know that this volume is no mere compilation of fragmentary and disjointed extracts, but has been slowly and with critical effort, constructed out of a mass of conflicting evidence, and has been elaborated as much amid historic monuments and the archæological wealth of museums as under the shadow of bookshelves” which, perhaps, pardonable, though somewhat vainglorious, boast, has the effect of raising our expectations beyond patient tolerance of contradictions, repetitions, mistakes, and misplacings, when they occur. But it is a world of change. “Once,” said St. Bonifacio, “golden priests used wooden chalice; now, on the contrary, wooden priests use golden chalices.” It remains to be ascertained whether the peripatetic mode of compiling a dictionary is superior to that formerly practised. In the present instance, it has certainly produced a valuable work.

But before we proceed to give our readers a general idea of the nature of the contents of the

dictionary, we will take leave to suggest some improvements in its arrangement. Look at the word “Church.” Under this heading we are told of the blending of the Greek *kyriake* and Latin *dominicium* in the German *dom kirche* and Lancastrian *church-kirk*; of the earliest mention of church property; the form of the original Christian churches; the neglect of church repairs and cessation of church building about the year 1000, when the millennium was supposed to be at hand; the restoration of confidence in the eleventh century, and renewal of church building; of the correspondence in the form of churches, with their nave, choir, and sanctuary, to the arrangement of the temple with its court of the Gentiles, worldly sanctuary, and Holy of Holies; and finally there occurs the following paragraph:—“Churches are distinguished into various grades—the patriarchal, primatial, and metropolitan, according to the rank of their presidents: cathedral, as containing a bishop’s cathedra or see; collegiate, which are composed of a chapter and dean; conventional, if belonging to a religious community; abbeys, those under an abbot, or priories, if governed by a prior; ministers, when attached to a monastery, or of imposing size; parochial, if furnished with a font.” By and by as page after page flutters over, we come unexpectedly upon “round churches,” further on to “double churches,” in another place to “fortified churches,” in a fourth to “parish churches.” We suggest that a reference should be made to these divisions of the subject under the first heading. Concerning fortified churches there is an error we may correct here. Mr. Walcott says, “In Northumberland, churches in the vicinity of a castle were seldom permitted a tower, lest it should be occupied by the troublesome moss-troopers; and pele towers were built along the coast, at the cost of Furness Abbey.” The reverse of this is the case in Northumberland. The church nearest to Danstanborough Castle, Embleton, has a fine open parapetted Edwardian tower, and there was, and is now, a second square strong pele tower close to the church for the vicar; Bamborough Church, within bow shot of the stupendous castle, has a strong tower; Edlingham Church, situated not further from Edlingham Castle, has another sturdy tower; Warkworth Church has another. Alnwick Church has not only a strong tower, at the west end, but a curious look-out turret, at the south-east angle. Ancroft church has an Edwardian pele tower, superimposed upon the original Norman fabric, as we illustrated in a former number of the *Builder*; and reference to our columns, where we have treated at length of Northumbrian castles and peles, would have shown that the ohrebes were part of the great Edwardian, and post-Reformation system of fortification, against the Scotch and the moss-troopers for the whole of the county. To return to the arrangement of the work, we will take the word “hell.” The information here, again, must be sought under numerous headings, which are all independent of one another, and unfurnished with references. The sacring hell is in one place; the passing hell in another; the pardon bell in a third; and so on with many other subjects. It is, however, still more inconvenient to have to seek information upon a subject under a heading ostensibly devoted to something else; as, for instance, the presence of candlesticks upon the altar, of which we find an account under the word “Gradin,” as well as in their more legitimate connexion with caudles in their proper sequence; or the occurrence of two churches in one church-yard enumerated in the paragraph on cemeteries. This is not so bad, though, as finding a statement on one page that is contradicted on the next, because though this arrangement may leave us only half-informed, it does not set us wondering to the exclusion of power to progress with the subject in hand. Yet such contradictions have

crept in. Among the really plentiful account of guest-houses, for instance, our author says, “The Benedictine abbot received at his own table the guests of superior degree; the Cistercian abbot modestly dined with them in the hostel, whilst the Clugniac abbot took no notice of their reception.” On the next page he says, “The Clugniac abbot dined with guests in hall.” In a third place, he says it was the custom of the Clugniac abbots “to dine always with the brethren;” and in a fourth, “the abbot entertained his guests, and any monks whom he invited, in the hall.” Again, he says, p. 165, the dress of the Clugniacs “was a black frock, a pelisse, a hood of lamb’s wool, red hose, a white woollen tunic, and black scapular; and in choir, copes of linen; in cloister and refectory, a white pall; and in times of labour a white scapular.” And, p. 166, he says, “The Clugniacs wore a pelisse, a frock, and a cowl of scarlet cloth, to show their readiness to shed their blood for the sake of Christ.” Another form of inaccuracy occurs in the mention of wayside chapels, which, by the bye, is separated from the heading “chapel” by two-thirds of the book. After stating that these structures were commonly attached to bridges at the entrance of towns as at Rochester, Stamford, Elvet, Durham, Exeter, Newcastle, and London, Mr. Walcott says, “two still exist at Castle Barnard and Wakefield, the latter being of the fourteenth century; it has a remarkable carving of the Resurrection.” In the first place, the ancient piece of sculpture thus indicated, with the whole of the west front on which it appeared, was taken down twenty years ago, when the chapel was renewed, and rebuilt on the margin of a lake in the grounds of Kettlethorpe Hall, near Wakefield, where it now forms part of a summer-house, or boat-house; and, in the second place, it was not a carving of the Resurrection, but a series of five alto-reliefs placed in niches beneath canopies. These are, doubtless, like clerical errors, of which there are also specimens, trifling matters; but we prefer to point them out rather than gloss them over, hoping that by doing so we may conduce to the exactness of a future edition of what appears likely to be, saving these and similar drawbacks, a very useful work.

The subjects treated as sacred archæology belong to two distinct classes. All religious buildings and their respective parts and ornamentation, including sculpture, paintings, carvings, stained glass, sacred vessels, effigies, gems, tombs; all the furniture, plate, vestments, hangings, and ornaments of the altar, or everything, in fine, upon which the resources of art have been lavished for the embellishment of divine service, are mentioned; to those are added a mass of particulars concerning practices, ritual, tradition, and customs; and lest these may be undervalued, we enumerate the distinctions as given:—The orders of the sacred ministry, and the office of minor clerks; ecclesiastical dignities, offices, and ministries in the service of the church; religious communities, rules, and conventual arrangement of buildings; distinctions of the faithful, catechumens, and penitents; divine service, sacraments, rites and ceremonies in all their details, their administration and accessories; discipline and ordinances; Sundays, festivals, and fasts; usages and institutions. In most instances, however, the two classes of facts are inextricably interwoven. As every one is a “parishioner” we select that word as one of general interest that illustrates this tendency.

* Parishioners, in 1250, 1281, and 1305, were required to find in every church a chalice, principal vestment, a silk cope for principal festivals, two others for rectors of the choir on those days; a processional cross, a cross carried before the dead, a bier, a holy-water vessel, with salt and bread; osculatory, paschal candlestick, censor, lantern, and little hand-bell (for preceding the viaticum); two candlesticks for acolytes before the gospel; a legendary, antiphoner, grail, psalter, tropar, ordinal, missal, and manual; high-altar frontal, three surplices, a pyx, rogation banners, bells and ropes, a font with lock and key, christomatory images, the image of the patron saint, the church light (before the altar), the repairs of the nave

* “Sacred Archæology: a Popular Dictionary of Ecclesiastical Art and Institutions, from Primitive to Modern Times.” By Mackenzie E. C. Walcott, B.D. London: L. Reeve & Co, 5, Henrietta-street, Covent-garden. 1868.

and tower, glass windows, aisles, and churchyard fence. In 1014, prisoners were called the priest's hymen, or hymen. In 994, the only church furniture expressly required comprised holy books, house, vessels, and mass vestments. The sovereign is the prisoner of the Archbishop of Canterbury.

In the personal of this specimen of the dictionary a conviction will be felt of the advantage a work of the kind promises to be. We could have wished that the authority for the statement was given, and that it was expressed with a little more precision, so that we might be informed whether these requirements from prisoners were local or general; but our author has omitted references, except to Holy Scripture, he says, for the sake of conciseness and with extreme reluctance. As some amends for this short-coming, he gives a list of "general authorities," which is a catalogue of archaeological works, belonging to several centuries and countries, that is formidable enough.

King Richard I. said he would bequeath to the Black Monks his luxury; to the Grey his avarice; and to the Templars his pride. Interesting accounts are given in the volume before us of these logeates and their architectural possessions. The first-mentioned "held all the cathedrals of the new foundation in England except Carlisle. The magnificent churches of Tewkesbury, Battle, Pershore, Glastonbury, Tynemouth, Selby, Sherborne, Milton, St. Mary's (York), Crowland, Ramsay, also belonged to them." Of the buildings of the Cistercians, or grey monks, only one abbey-church, that of Scarborough, remains in use; all the others, among them Buildwas, Jorvaulx, Melrose, Byland, Biewaulx, Ford, Merevale, Boyle, Tintern, Littlehull, Kirkstall, and Netley, are in ruins. These brethren, says our author, "erected their abbeys in lovely places, usually well-wooded and watered valleys, far away from human habitation, and were principally noted by their success as graziers, shepherds, and farmers. The short choir, the transeptal side, divided into certain chapels, the low central tower, the grisaille glass in the windows, the solitary bell, the absence of tessellated pavements, pictures, mural colour and many lights in their churches, the almost invariable arrangement of the conventual buildings, with the dormitory at the eastern side of the cloister, communicating with the transept by a flight of stairs; the refectory set at right angles to the cloister; the chapter-house divided into aisles, except at Margam in Wales, are un-failing notes of the houses of the order." The absence of an eastern lady-chapel is also pointed out as observable in the churches of these brethren; the edifice was dedicated to St. Mary; no chapel was, hence, required for her especial service. Of the remains of the buildings of the brotherhood, to whom King Richard declared he would bequeath his pride, there is not so much account. Sir Walter Scott, whom we may credit with having searched every kind of memorial of this order with great industry and acumen, seeing the large part the brotherhood played upon his marvellous canvas, says the establishments of the Knight Templars were called Preceptories, and the title of those who presided in the order was Preceptor; as the principal Knights of St. John were termed Commanders, and their houses Commanderies, although the terms were sometimes used interchangeably. Mr. Walcott, however, alludes to no such distinction:—

"Commandery (*comenda*, a benefice), or preceptory (*precepto*, a first share). A cell of the Templars and Hospitaliers for collecting demesne-rents, and a home for veteran members of those orders; the president paid himself first his own pension, and then accounted for the residue. These houses remain at Swinfield, Clibbourn (or Chibbourn?), and Worcester."

The strong point of the book is that which is built upon the author's acquaintance with the writings of the early fathers of the church. It is the learning of the library rather than a knowledge of practical construction, that we may call his shield and his defence. His histories of the litantes, the liturgies, the kyrie elson, the mass, the martyrologies, all customs in connexion with the services, feasts, fasts, the use of insignia and articles of costume are admirable. It is pleasant to see renewed upon a modern page the pithy, incisive, and decisive wisdom of men whose impressions upon their fellow-men are felt nearly a thousand years after the conclusion of their labours. Hear King Edward: "Ceremonies be no workers nor works of salvation, but only outward signs and tokens, to put us in remembrance of things of higher perfection." Hear, also, what the faithful said of images: "Eusebius mentions a statue of our Lord erected by the woman who was healed (St.

Matt. ix. 20). Tertullian speaks of etchings of the Good Shepherd on glasses, such as are preserved still in the Vatican; and St. Gregory, of Nazianzum, Pope Damasus, and St. Augustine, frequently allude to paintings and sculptures as common in their time. St. Basil says that by 'the beauty of the image the eyes are raised to the fairer vision of the archetype' and St. Gregory of Nyssa declared that he never passed the inscriptions of images without tears, and regarded them as efficacious in stirring the heart and elevating it to virtue; whilst Bede calls them 'the living history of divine history' and Belet, 'the literature of the laity.'" But although these pure souls could see only the means of attracting attention to the highest things in these representations, there have been from the earliest times those who have dissented from their use. We read that Epiphanius, seeing a church at Anshathla lighted up, approached it and was about to enter, when he found a "curtain-veil," painted with the image of Christ or of a saint, drawn before the doors, whereupon he desired the churchwardens to remove it on the ground that it represented the human form, and gave them another veil. As aids to the dissemination of information concerning Scriptural facts, "images," in their broadest sense, have been considered useful by the most pious and simple of teachers. "In paintings on walls," says Gregory, "they who cannot read books can read that which in books they are unable." Mr. Walcott pursues this subject through its labyrinth with much research. He gives, too, an interesting account of emblems. We quote part of his notice of the transitions in the representation of the Lamb:—

"In very old sepulchres the lamb stands on a hill, amid the four rivers of Paradise, or on the Baptist's hand. It sometimes carries a milk-pail and crook, to represent the Good Shepherd. In the fifteenth century it is mimbed. In the fourteenth century its head is crowned with the cross and monogram. In the sixteenth century it bears a spear, the emblem of wisdom, ending in a cross; or appears, bleeding from five wounds, in a chalice. At last it is grided with a gold zone of power and justice (Is. xl. 6), bears the banner-cross of the Resurrection, or treads upon a serpent (Rev. xviii. 14). At length, in the eighth and ninth centuries, it lies on a throne amid angels and saints, as in the Apocalyptic vision. When fixed to a cross it formed the crucifix of the Primitive Church, and, therefore, was afterwards added as the reverse of an actual crucifix, as on the stationer's cross of Valerius. In 692, the Council in Trullo ordered the image of the Saviour to be substituted for the lamb."

Another feature of interest is the notice of the behaviour of congregations during the performance of divine worship. Mr. Walcott reminds us that "murmuring" was once a common mode of expressing approval or displeasure in the course of the service. Bishop Burnet and Bishop Spratt were both murmured at when preaching at St. Margaret's, Westminster, to the delight of the first, who sat down and enjoyed the manifestation, rubbing his face with his handkerchief the while; and to the annoyance of the latter. At Hereford, every person arriving late in choir was thus hummed at. This was, doubtless, the last vestige of the primitive custom of applauding and clapping hands deprecated by St. Chrysostom and St. Jerome. The former of these commentaries says the custom took the place of the Greek acclamation of the orator by his audience. The latter says,—"In church, at the tombs of the martyrs, the amen, like the heavenly thunder, hooms again." St. Justin tells us the people cried out amen after the Holy Communion; and other early authorities frequently refer to this custom. By the reign of Queen Anne, the practice of expressing sentiments by murmuring was not quite obsolete. A witty preacher, at St. Mary's, Cambridge, addressed his congregation as "*Hum et hissimi auditores.*" Elsewhere, in Mr. Walcott's work, we read people need to cross their legs when the Gospel from the first chapter of St. John was read; and to rise when the Lord's Prayer was read in the second lesson. As early as the sixth century, the congregation stood while the Epistle was read, as well as during the reading of the Gospel. All who value precedent will be gratified with a perusal of Mr. Walcott's work. Ancient usage, with regard to candlesticks on altars, floral decorations, banners, and all proceedings and circumstances connected with church arrangements, will be found treated at large. The Pope, who directed the Cistercian abbots to buy up every specimen of English embroidery they could obtain, said, "England is our garden of pleasure and delight; its treasure is inexhaustible, where much is, thence much may be taken." In the same way we feel there is so much in this dictionary of sacred archaeology that much can be taken from it by most students with great advantage to themselves. Take the floral decora-

tion of churches at Christmas, Easter, and Whitsuntide as a sample. This class of embellishment, if undertaken without proper guidance and due feeling, is often ill-done. Mr. Walcott gives early precedents, and a list of the sacred flora suited for this purpose:—

"George Herbert had his church, on festivals, 'strewed and stuck with boughs,' and perfumed with incense; flowers and ivy, on Whit Sunday, adorn St. Mary's Redcliffe, which is strewn with rushes, like the cathedral on Mayor's day. At Christmas, Easter, and Whitsuntide churches were always decked with evergreens (Is. ix. 13; St. Matt. xxi. 8); box, holly, ivy, and rushes, no doubt in memory of the Gardener of the Resurrection (St. John xx. 15), the second Adam, who keeps the paradise of the departed, and also in anticipation of the renewal of all things (Solomon's Song ii. 11-13); birch and broom were used on St. John the Baptist's day. St. Jerome says that Nephtalia shadowed the hassies and martyrdoms with divers flowers, foliage, and tendrils of the vines. St. Severus decked the church walls with lilies; and Fortunatus speaks of crowns and pendant garlands. St. Paulinus alludes to the same custom; and Frutkinus, who also describes the lamps hanging by ropes, and their quivering, glittering light cast on the ceilings, says, picturesquely:—

"With flowers the pavement strewn,
The doors with garlands wreathed;
Before its day the year shall bloom anew;
And purple spring in winter breathe."

The list of sacred flowers is a curiosity. We can, however, only refer our readers to it. We pass on to mention what appears to be a little confusion of terms on our author's part. He does not seem to be clear as to the distinctions between a reredos, retable, frontal, and super-frontal. Thus, he speaks of the celebrated Westminster retable as a frontal, saying, at the same time, it was more correctly described as a tabula picture or table. "The true frontal, like the modern antepane, or antependium, and the ancient pall, was a hanging of embroidery,—a drapery of the colour of the festival. . . . The super-frontal, called the reredos, at Durham (1081), and the super-altar, by Matthew Paris, hung at the back of the altar as a dorsal. . . . The frontal was the fringed upper covering, or parafront, hanging over the frontal or surfont of an altar." The earliest retable he describes as moveable, and set on the altar, to contain relics at certain times; and when, at the beginning of the twelfth century, it became a fixed appendage, he speaks of it as a mere upright slab of stone, masking a little shrine behind it. M. Viollet-le-Duc, however, specially cites the Westminster retable as one not worthy of mention by the side of the famous *pala d'oro* of the church of St. Mark, Venice. Mr. Walcott says, before the thirteenth century no candles or crosses were permitted to be permanently set on altars, but were invariably brought in by two acolyths when mass was to be said, and that the next step was to bring in, in the same way, portable retables or diptychs; "and then, in the fifteenth century, the contratable appeared, a wainscoted decoration above an altar, designed to receive the altar-piece or retable." We do not see why the Westminster retable should be given as an example of a frontal.

Next to close a book with blame when there is much to admire, we turn to the author's account of the diptychs mentioned above. Long before the name was given to a painting or carving that folded together it represented two tablets joined together, on which were inscribed the names of benefactors and worthies of the church, the living on one tablet, the dead on the other. When from the accumulation of names, which eventually included those of the magistracy, clergy, saints, martyrs, confessors, and the faithful dead, more leaves were added, they were enclosed in two ivory tablets as a cover. These lists were "read out by the deacon during the Holy Communion from the fourth century, until the names became too numerous for recital, and only a general commemoration by St. Angustin was made. The use of the diptych, if not of apostolical date, is to be traced to the second century. St. Cyprian alludes to it in the third. The practice was continued until the twelfth century in the Western church, and until the fifteenth in the Greek. It is clear, however, that a Book of Life stood on the altar of Durham and St. Alban's until the Reformation; and even in the seventeenth century, at Chichester, SS. Wilfred and Richard were commemorated, and a list of benefactors set up in a public place in the cathedral." The reading of these names of the dead must have been a solemn scene, as the deacon stood at the foot of the altar and the celebrant cried, "O Lord and Master, our God, grant these souls rest in Thy holy tabernacles," in the hushed assembly. The author adds, "Sometimes names were erased, and heretics in this way retorted on Catholics. So

Theodoret attributes the reconciliation of the churches to the restoration of St. Chrysostom's name upon the diptychs of Constantinople thirty-five years after his death." With this sample of the class of information in the work we must content ourselves. Mr. Walcott estimates his undertaking in Lord Bacon's words as "a thing of exceeding great weight, not to be compassed without vast labour" and this valuation we will not attempt to controvert.

OPENING OF THE NEW CONGREGATIONAL COLLEGE, NOTTINGHAM.

THE New Congregational College or Institute, just completed on the Forest-road, has been formally opened. The college has been erected for the purpose of training young men as clergymen of the Independent denomination. The style of the structure is Gothic of the fourteenth century, and the materials are red bricks with stone dressings. The inside of the building contains on the ground-floor a large entrance-hall, staircase, reception-room, a large class-room, and library. The second story is occupied by the lecture-hall, which is 60 ft. by 30 ft., with open-timbered roof. The houses of the tutors are situated at either end of the building. The front of the erection has been "broken up," and the Gothic windows are doubly recessed. Bands of black bricks are carried at intervals along the brickwork. A porch stands out at the entrance to the main building, and on the other side there are traceried windows, above which runs a band of ornamental brickwork, and above all are formed five upper windows. The centre of these is a large three-light traceried window, running into a gable, which forms the central feature of the building. The high-pitched roof is surmounted by a bell-turret of ornamental design. The structure is situated on an eminence. The architect was Mr. R. C. Sutton, of Bromley House, whose design was selected by the committee out of a large number sent in for competition. The builders were Messrs. Bell & Wood, and the contract for the woodwork was executed by Messrs. Stevenson & Weston. The total cost of the building, without the land, has amounted, including extras and furnishing, to 5,400l.

SOMETHING OF SUSA.

Few are the travellers who linger at Susa, unless to sleep through the interval between the arrival of train and departure of diligence for the Mont Cenis pass, or to sit, sally or sorrowful, through the hours of half-light darkness before the train that was missed by the late diligence has its work taken up by a successor next in order. Post-bags and travellers have alike to wait, and anxious correspondents, and all may freely indulge in the ill-conditioned *salomon miseris* of having companions in discomfort. Until the mountain is pierced by the tunnel, or the post-bags assert their consequence more importantly, such contingencies must occur upon the Turin line. Not even the high summit railway can be expected to be absolutely punctual,—may its arrival at all be in every case a certainty! The works go on with a resolution that declares that success is intended and positively counted on; and now pushes on rapidly with ordinary appliances of the steam-horse, and now betakes itself again to its higher central third, to grapple with seemingly impossible gradients. Shielding arches of massive work show where encumbering, not to say demolishing, avalanches are provided against; and long after the ascending diligence may flatter itself that it has shaken off its presumptuous rival, it is found dogging it pertinaciously again, like "the hound of spring upon winter's traces," and only nightfall makes it uncertain whether the new power has yet attacked the last steep height, which alone, after we have been climbing for half a day, is dignified by the muleteers with the title of "the mountain." In the mean time a single perverse rut in the icy road makes all the difference in effective punctuality of arrival, though not much in the interest or pleasantness of the journey. With the happy unconsciousness of travellers who have never met with an accident, and who regard such events unconsciously with the feeling avowed by the philosopher who noticed that fatal accidents always had a way of befalling somebody else,—

we looked down all the afternoon from coupé, and even from hanquette, at the most desperate precipices. Quite at ease in our wraps, and comforted with a carpeted foot-warmer, a certain sense occurred sometimes of the riskiness of a railway that, always running on the outer side of the road, would afford its travellers a sheer look over. None of us disturbed ourselves at the lurching of the cambrous vehicle, nor even at the excited exclamations and instructions of the guard, who, sitting just behind the driver, was as peremptory in his constant interferences as a Channel pilot might be with the captain on the bridge of a steamer. Picturageness, therefore, and not peril, colours the scene, when, at a turn in the road, where a welcome chance is given to the foremost travellers of looking back at the long train of sledges behind, it becomes apparent that, for ten minutes, all the noise and cracking of whips expired upon fourteen mules has only given the ponderous box a twist, sometimes one way sometimes another, upon an axial point, but never moved it an inch in advance. Of course power is brought up from behind, and of course we go on again all right; but we come to the place where baggage and bags and travellers have again to be transferred to the diligences, full one hour late. This is done at last in the midst of a wilderness of moon-lit snow, over a road of ice, cracking, if not tripping up, at every step. The rapid descent undoes in minutes the ascent of hours, but travellers uneasy about further progress are by this time resigned to the necessity of interrupting the journey from Liverpool to Palermo by a regular night's rest; and guards, who fretted before at every instant of delay, seem restored to a happy frame of mind now that the race is fairly lost.

Happier, as well as luckier, for the moment, are they who have predetermined to make a pause at Susa, and wiser also, it may be, if their errand does not make any lingering an idleness, are they to take a day or two to survey the scenery by which the steeper Italian side of the Alps breaks up and interposes some ranges and slopes of intermediate horror and loveliness before consenting to be lost entirely in the level plain of Lombardy. It is well worth while to familiarize the mind with the characteristics of both slopes of the great mountain barrier before pressing hurriedly on. Even if such impressions could be realized in a moment, and after a single excursion at a single glance, they will either prove but transitory or will interfere and intrude upon the next series of interesting impressions too suddenly succeeding them. Is this the self-deceiving argument of an idler? The truth will be found on trial of Hosioid's maxim, and appreciated no less by the artistic than by his exemplar of

"The sordid soul,
How much the half is greater than the whole."

Doubtless all this is more easily said by one who is not unfamiliar with much of Italy already,—not so easily adopted on a first visit,—with the whole peninsula stretching out in all novelty, and attracting most forcibly to its more interesting points. The suggestion of the interest of suspended travel at Susa may, then, be left to take its chance with those who are returning, and who may think it not time thrown away to explore its beauties and its monuments while awaiting the chance of making up a party and superseding diligences by a vettura.

The characteristics of the scenery may be sought on the walls of water-colour exhibitions, or at the Academy, more fitly than in this place, which has more claim to monumental notices. The cathedral of San Cinsto, and the wonderfully preserved Roman arch, are the principal, it may be said only, monuments of interest, but both worthy of considerable attention. The cathedral and its bell-tower are in true Lombard style. What we should call its west front—though here, in fact, its northern, for ecclesiastical Orientation is but lightly regarded in Italy, is strangely made continuous with the Medieval city wall, built apparently on earlier foundations. The city gate abuts upon it on the other side, flanked by towers, now dilapidated; and the road which leaves the city through it, and skirts the flank of the church in passing to it, is the same that once led direct to the steep ascent still spanned at a little distance by the Roman arch. Road and arch are now within an enclosure, but the keys are at hand, according to a conspicuous notice, and the *custode* is obliging and indulgent. The, so to speak, western entrance of the cathedral is now built up—has long been— and the front has been brought flush with the city-wall by the demoli-

tion of an advanced porch usual in the style, of which the ruined attachments are still unobliterated. The church is not remarkable among Lombard churches; and still, it is impossible to visit it without interest here, on the threshold of Lombardy, or to dwell on it without pleasure. There is a certain simplicity and sobriety about the design of these architects that is very engaging, rescued, as it is, by a sufficient indication of originality and inventive resource from taxation for meagre poverty. The exterior cornice has the usual enrichment of interlacing arcades in relief, very neatly finished in brick, and under the raking cornice. At the end the straightening lines of the arches are at right angles to the slope, but kept well to the vertical, and with excellent effect. Within the openings from nave to aisles are round arcades, of good proportions, inclining to the tall, through the wall that is pierced above with the small windows that suffice for illumination in Italy. These openings have an arch of second order, and a slight shaft rising in the centre of each pier. The vaulting is quadripartite; but only the piers at the extremities of the nave, west and east, have shafts on their face rising to the spring of the arch. This arch by the crossing is pointed, and harmonizes with the converging archivolts of the apse.

The first conclusion is, that this eastern arch and the apse are of later date than the general round-arched nave. It may be so; yet the details scarcely declare decisively, or even equivocally, for such a view; and if it be correct, they must have been inserted within the original shell of the primary structure, which declares itself from without as homogeneous from foundation to cornice, and from one end to the other. There is a difference of the same kind in the same position in a church of considerable elegance at Arona, and of the same apparent uniformity in general design. The question—unless it has been critically settled already—may stand over for illustration by more accessible examples.

At Susa, structural inquiry in the interior has been rendered difficult by the painting in distemper of every portion. Every surface at least has been covered with patterns, and in great variety; yet even when baffled by them as archaeologists, we may give a word of caudid praise to the artist. The shafts, with well-judged effect, have been left plain, and the tone of the whole is sober, for all its lavish diversity, harmonious in itself, and harmonizing with the purpose and dignity of the occasion.

Enough has been said, perhaps, to attract some other visitor to further scrutiny than even an idler had time for, with the Roman arch still to be examined. One other notice each successor may be thankful for. On the side doors by which the church is at present entered are two bronze perforated plates of Medieval execution—of neo-Medieval. They seem once to have been fitted with rings; as present, on the modernized doors, they are high up, and attached as ornaments. The diameter of each is about 11 in. The centre of one is a bull's head, with distinct teeth, perforated eyes, and one of single large head is continued on each side to two small bodies curled round, with complete legs and entwined tail. He would be rash who would say whether the head on the other is wolf or mere chinera, and whether the more freely executed little animals on either side are cubs or tiger-cubs, or what not. The central heads each protrude to form a boss in the centre of a foliated border, excellent subjects for photography, an art not flourishing as yet at Susa. It is curious to see in these grotesquely-treated heads a revival of the very same conventionalities in the expression of the curls on a bull's forehead or the mane of a lioness that meet us on early Greek coins and busts, on the lions of the Lycian room at the British Museum, and on the bas-reliefs of Assyria.

The campanile has the same general character that pervades so many examples in Italy of every degree of the secondary enrichments that culminate in the colossal mosaic of Giotto's tower at Florence. Fergusson has remarked on the propriety with which the openings advance arithmetically, sometimes from one to four in regular order, from below upwards. The success of this depends on a management that is not always forthcoming. Where the outlines of the structure are kept, as they usually are, to the true vertical, these ever-widening openings have an inevitable tendency to an appearance of a fan-like spreading that conflicts with the impression of verticality. Where walls so lofty have no inward incline, not only is this un-

pleasing conflict uncompensated, but the expression of lightning of load towards the summit lacks the confirmation that would be given by the implied reduction of the thickness of the walls towards the top. The beautiful structure of Giotto does not vindicate itself thoroughly against this criticism. What will be the result in case—as those who have lived to see the progress of Cologne Cathedral may well anticipate—it should ever be completed according to traditional design it is not easy to conjecture. Robert Browning, *vates sacer*, has predicted that it will still spring up its—

"full fifty braccia,
Completing Florence, as Florence Italy."

Meantime, we are sensible of a certain tendency to incongruous embossness above the highest and most open light, and a certain excess of unaccounted-for dead solidity in the unpierced height between the top of so generous a window and that of the cornice. The spires and spirals that now cover the tower of San Giuseto at Susa are, of course, modern in design as in execution. "In one of the chapels," says our guide book,—an old companion, doubtless, dated 1858,—"is a curious Medieval bronze group of our Lady of Rocca Melone, with St. George and Bonifacio Rotari, a Crusader of the twelfth century." This is, in fact, an engraved brass, of very perfect preservation; but that it has been thought worth the trouble to scrape off the armorial bearings from the shields, and of fine execution and florid design. It is of a size to be lifted in the hands, and of a style altogether to rouse painful regrets for the absence of tracing-paper and hellhal.

Reversing the order of chronology as it appears in the books, but following that by which we most advantageously quit our own standing-place in history to mount upwards to the past, we quit the monuments of feudalism, and of that well-knit ecclesiastical system that, dating earlier, had contests and compromises so remarkable with the feudal instincts, we turn our backs upon the Porta di San Giuseto to visit the slope to the celebrated, but too little visited Roman Arch of Susa. "From the Marble Arch to the Marble Arch," we exclaim, as we approach it, so similar is it in general aspect to our neighbour in Hyde Park, and so well preserved,—time only having conferred on the material that rich golden hue that never can be hoped for as a glory to be given by the atmosphere of London. The finest view of the arch is from the road above it when the campanile of San Giuseto is seen to the right, and beyond, for back-ground, the glorious distances of mountain slopes,—not too lofty to be dotted with villages, and flushing into the tender greens of an Italian spring. It is difficult to think that the gate was ever used for common passage and entrance into the city, so sharp are the angles of the lower haemese stones. Some traces of Roman construction behind intimate that it was rather erected in the dignified position which its English antetype held and has lost, of connexion with a residence on the same site where later stood the palace of the Countess Adelaide.

Antiquaries have recovered the inscription on the Attic sufficiently to establish that it was erected about B.C. 8, in honour of Augustus, by one of the chiefs of those Alpine tribes whom it was one of his latest personal military occupations to subjugate or pacificate. Julius Cotinus, son of Donnus, who called himself a king, succeeds as prefect, and by his erection acknowledges his gratitude to the irresistible power that deigned to make use of him in his reduced condition,—a condition, after all, that must have been of no slight importance to admit of the execution of such a work. The funds being given, there is little to astonish us in a monument so comparatively pure in taste having been erected by such a personage on the eastern foot of the Alps, when we remember how thoroughly classical in style and meritorious in execution is the coinage of our own Cunoehelin, a contemporary. "The general proportions," said Woods, "are not unpleasing;" but this praise is scarcely positive enough for proportions that are indeed particularly pleasing,—the general proportions, that is, of the structure with reference to void opening, solid supports, depth, mass, and general outline. By rough measurements under difficulties, the depth of the single passage (6.48 metres) seems to be somewhat less than the open width (5.80 metres) as that again is still more in excess of the joint width of the supports on either side (2.58 metres each). The effect is

given very decidedly of a passage much wider than deep, and well in excess of the supporting jambs.

The structure rests upon two oblong bases of rougher material, but very massive blocks that project some foot all round, within archway as without, beyond the proper plinth and base mouldings. Extending from front to back at outer sides of these bases extends on either side a long and high (6.43 by 1.23 dia.) pedestal with base moulding of Roman type, but well and holdly drawn and preserved by having been long covered with earth. The better cornice of this pedestal is less well preserved, but quite recoverable. These long pedestals project beyond the face of the structure at each end, and show as the proper pedestals of four fluted Corinthian columns engaged one at each angle; the bases of the columns are on plinths that are retained along the outside, but finish against the front. To the four columns thus engaged is given their proper entablature, with sculptured frieze running all round, and above the cornice is an oblong attic of corresponding plan, and about equal height, in three courses of which the two upper here the inscription: no trace of a superior cornice, which must have existed, as proved by the preservation of the inscription, now remains.

The architrave of the order has its projection necessarily governed by the degree of engagement of the capitals, and advances not only beyond the face of the wall, but beyond the hand of the archivolt of the arch, which is just in contact with it at the centre.

The fascias of the archivolt descend directly upon the very thin and curved abacus of an angle, pilasters of which the base moulding is very simple, both faces plain and unfuted, and the flat honeysuckle enrichment of the capital very fairly elegant. The level of this abacus is about the middle of the exalted engaged columns; there are no mouldings under the archway, but the lower vousoirs project about an inch from the plane wall, and thus mark the line of spring.

The solidity of the structure is complete, palpable, and very wonderful; it need not be said that no mortar is employed, and the joints are very fine. These have, as usual, been attacked at the points of bond for the sake of metal cramps, but without affecting the general pertinacious cohesion of the mass. There is not a trace of an open joint discoverable either from settlement, failure of materials, or shift from earthquakes. Some semblance of openings along the entablature are seen to be clearly due to constant percolation of water in places where the cornice has been violently damaged.

This permanence is readily accounted for by the serious simplicity of the construction. The marble employed is very hard, and in very large blocks; the masonry work is perfect in its order and execution. Up as high as to the third vousoir the courses of masonry ran through with continuous horizontal joints. Thus, of the plain wall of the interior of the arch, the four lowest courses correspond in height with, and are continued round into the course comprising both plinth and base moulding, the two courses of the ditto, the course of the cornice of pedestal. Above these the base and lowest drum of the column are carved out of a block that is continued in the ashlar, at a height that runs through and so upwards. The capital of the pilaster, again, is part of a course that becomes at the angle a drum of the column, and a joint runs even through the Corinthian capitals at mid height. The two lower vousoirs, of which the joints have but moderate inclination, are part of stones of the horizontal course,—those above become distinct. The central vousoirs of the vault from front to back are three only, the next line on each side has four, and then come, as it seems, three again.

The predominant effect of the Roman arch at Susa, then,—probably the best preserved Roman work in the entire peninsula,—is satisfactoriness in respect of general proportion and of conspicuous solidity, especially when seen from the angle, so that the bond of the continuous flank pedestal can be appreciated. Its points of weakness are,—First, a want of proper architectural expression of the articulation that should unite the system of columns and entablature with the plaster-borne arch; its walls and spandrels seem rather housed within it than rather its true core or outgrowth. The columns assert themselves as independent of the general supports in determining the projection of the architrave, but the architrave is dependent for sup-

port on the archivolt and ashlar below, manifestly, but with suppressed acknowledgment. True, that the continuosness of horizontal joints corrects the sense of primary disjunction to some extent, but covertly; and if recognised, only to protest against a neglect that it insufficiently makes up for.

The architrave by its projection—see it at what time of day we will—throws a dark shadow that interferes with the lines of the archivolt, while the contrast of the uncompensated curves of this inevitably cause the horizontal lines to appear to sag.

Various differences occur in the details and style of execution of the several capitals, and the lower torus of one of the bases is exceptionally as freely relieved from the plinth as those at Tivoli.

The sculptured scorifies on the frieze are rude enough. An enormous bull, as high as the priests who lead it to sacrifice, is even less remarkable than a sow that follows of equal height, and which an acolyte has to strain himself painfully to grasp by the ear with one hand, by the tail with the other. On the other hand, the cavalry-men and horses have the proportions of veritable pigmies; and yet the general scheme, sequence, and distribution, are really very fair. And so enough of Susa,—the Segesium of the ancients.

MAIDSTONE MUSEUM.

THE county town of Kent, nestling snugly in its verdant valley, with the winding Medway watering its skirts, and margined by gently-sloping and luxuriantly-clad hills, presents a very pleasant picture.

"Around the nurturing dale, embosom'd deep,
Contrasted hills extend their circling sweep;
Like battlements appear'd, on every side,
To screen its crops, and fence its lowly pride."

A notable place in its way is Maidstone. Few towns not metropolitan, have so varied a history. It fills a prominent page, not only in the chronicles of Kent, but in the annals of England. It was at Maidstone that the disaffected Sir Thomas Wyatt hatched his memorable insurrection in 1554, which threatened such dire disaster to the British crown, had it succeeded. For this daring escapade Wyatt was executed in London, while three of his followers, Sir Henry Isley, Thomas Isley his brother, and Walter Mantle, squire, met with a like fate at Maidstone. Mary showed her displeasure with the conduct of the inhabitants at that occasion by disfranchising them. The picturesque ruins of Allington Castle, the ancestral seat of the Wyatts, stands on the bank of the Medway, about two miles from Maidstone, and not far from the famous Kit's Coty House—hardest of antiquarian nuts, that nobody yet has been able to crack. In 1613 the town was stormed by the Parliamentarians, under Fairfax, who certainly did not show much mercy to the unlicky inhabitants. They have been peaceful and patriotic ever since. In ancient times the city of the Medway was a place of great ecclesiastical importance. As early as the reign of King John the Archbishop of Canterbury had a palace here, rebuilt in 1350 by Archbishop Ufford. There is an old palace here now, red-roofed and ivy-covered, an object of interest to antiquaries. The church of All Saints, known as "The Pilgrims' Chapel," is close by, and for centuries its pulpit was occupied by the most celebrated pulpit orators of their day from far and near. Indeed, to have preached at Maidstone at one time conferred a distinction, of which divines so honoured were not a little proud, and those less fortunate were not a little jealous. All Saints' was rebuilt in Richard II.'s time, and is one of the largest parochial edifices in the kingdom. It is 227 ft. in length and 91 ft. wide. Its steeple was destroyed by lightning in 1730. Ultimately the place settled down into an ordinary country town, easy-going, and quietly prosperous. At the beginning of the century, the population was about 6,000, it is now about 23,000, which is satisfactory for a special gin, which it brews, and for its manufacture of paper. The latter was begun in 1808. We also hear of the town periodically in connexion with the assizes, and the "good old institution of hanging" (the county jail erected in 1818, at a cost of nearly 200,000*l.* is a model prison); but it is chiefly known to us, of course, for its hops. The first English hops were raised here in the time of Henry VIII., and Maidstone is

now the first hop-market in the kingdom. It is the Maidstone of the past, however, that will afford most interest to the antiquary. The remains and traces are plentiful. The quaint, fantastically carved, gable-fronted timber houses, one meets with all along the High-street, and Stone-street, in Week-street, and St. Faith's-green, recall the old days very vividly. There are one or two long-roomed, wide-windowed, low-roofed, quadrangular inns built of wood, looking like miniature Tabard inns. And doubtless they, too, have had their local Chaucers, and their Canterbury tales, "told in the twilight" over beakers of ale at the hostelry's comfortable board. It is a pity that no really good local guide-book exists to tell us something of the history of the antique houses in Maidstone—numerous enough even now to cast an air of two centuries ago over the place. Not often do we see so many bits of old domestic architecture as one finds here. We wish to say a few words about one of these picturesque structures which has been converted into a library and museum of antiquities. It is something unique in its way, and merits a word of description.

Adjoining St. Faith's-green already alluded to, and in the street of that name, stands the Manor House of Chillington, anciently part of the possessions of the well-known family of Cobham, of Cobham, of Kent. John de Cobham, as we read, procured a charter of free warren for the manor, in the seventeenth year of the reign of Edward III. The present house is a large, irregularly built mansion, dating from about the time of Elizabeth, though some portions may be older, and others more recent. Similar family residences are to be met with throughout the country.

"The oaken wainscot richly graced
With gay festoons of mimic flowers;
The armorial bearings, now defaced;
All speak of proud and long-past hours.
The ceiling, quaintly carved and groined,
With pendant pediments reversed,
A bygone age recalls to mind
Whose glories song hath oft rehearsed."

There is the courtyard in front, and the terraced garden grounds behind. After passing through many hands, and experiencing a variety of vicissitudes, the building, about half a century ago, became the property of Mr. William Charles, of Maidstone, who occupied part of it as a residence, and carried on a felt manufactory, as we understand, in another part. It descended to this gentleman's son, Thomas Charles, a physician and enthusiastic antiquary. By his will, dated 1855, he bequeathed a valuable collection of books and antiquities upon trust for permanent preservation in his native town. At his death the Corporation purchased the mansion, and thus was founded "The Charles Museum." The collection has been largely added to since, chiefly through the liberality of Mr. Randall, a local banker, and executor of the donor, and Mr. Edward Pretty, F.R.S., the first appointed curator of the museum. It is well displayed, and carefully arranged in four rooms. No handbook of the museum has as yet been prepared. In the absence of such help, all we can pretend to do is to note some of the leading features of the collection gathered during a brief visit. On the ground-floor is the library, consisting of upwards of 4,000 volumes, with tables and chairs for the accommodation of readers. It is rich in works of local history, topography, and antiquities, as a country library should be. We also observed a complete set of the *Gentleman's Magazine*, and in a glass case are exhibited several manuscript works and specimens of early printing. Among these may be mentioned an illuminated miniature of St. Martin dividing his cloak with the beggar, from a grand choral book, date about 1300; a MS. illuminated Bible (the Vulgate), written about 1216, with very ancient binding; a MS. Book of Prayers of the latter part of the thirteenth century; and a good copy of "The Ship of Fools," printed at Friburg in 1498. There is a German Lutheran Bible, with engravings, by Godfrey Leigel (Wittenberg, 1551), and original binding; the Bishops' Bible, having Cramer's prologue, 1672; and a Geneva or Breches Bible—a copy of the edition printed in London in 1603. The furniture of the library is appropriate, high-backed baronial-looking old oak chairs, carved, and tables to match; also a beautifully-carved charter-chest of the same material. These ancient relics, we believe, formerly belonged to different families in the county. Their presence here is an acquisition. A plaster statue of her Majesty, and a portrait

in oil, by Mr. E. Pretty, of the Founder, are among the other objects which adorn this room. In another apartment we noticed a bust of the late Prince Consort, and a large equestrian statue (plaster) of Lady Godiva, by Thomas, the latter presented by the sculptor's widow. This statue occupies one end of what we may term the picture-gallery, a long, narrow corridor, on the second floor. The pictures include oil paintings, water-colour drawings, and engravings. As works of art many of them are really interesting. We can only catalogue a very few. A small oil painting of the Dutch fleet coming up the Medway in 1667, is curious. The name of the artist we failed to learn. There is a painting by Scott, of "Old London Bridge previous to the Removal of the Buildings in 1762," and showing the Traitor's Gate and Nonsuch House; another represents "The Morning after the Siege of Gibraltar." The artist is James Jeffreys, jun. "A Drowsy Sol," is a clever characteristic sketch by Rowlandson. One or two landscapes bear the names of Fred. Lee and Shelders, evidently early specimens of those artists; and there are some good portraits by S. Drummond, A.R.A. To come across here a copy of one of Schalken's works, by W. Shipley, the founder of the Society of Arts, was an agreeable surprise. The fact is interesting and the picture worth noting. "Maidstone Market, 1623," and "The Fish Market, Maidstone, 1780" are valuable as local sketches. We may state that the old cross, an octagonal structure, removed about fifty years ago, was latterly used as a fish market. Formerly it was called the Corn Cross, but ceased to be the corn market after the year 1609. Among the portraits is a noteworthy one of Dean Piers, Bishop of Peterborough, afterwards of Wells. It is dated 1623, but the artist's name is unknown. There is a lady by Sir Joshua, and a series of portraits of William Woollett, the eminent engraver. Specially interesting is one engraved by Sherwin. Woollett was a native of Maidstone, where he was born 27th August, 1735. He died in Mey, 1785. A series of plates, framed and glazed, of Hogarth's "Marriage à la Mode," and "Idleness and Industry," also hang on the walls. In the various cases distributed over the rooms, we found a good display of geological specimens, fossil flora, Roman remains and Saxon antiquities discovered in different parts of the country; a lot of glass articles found in earthenware vessels at the Roman Cemetery, at Lockham Wood; specimens of Samian pottery, of old china, and of majolica of Genoa manufacture, 1750. The museum contains besides a very large number of curiosities of a miscellaneous kind. Let us give a few specimen bricks. Here we have a mummy in a wonderful state of preservation. We joyfully asked our kind cicerone,—"Who's your *thin* friend?" He could only reply,—

"Perchance that very hand, now pinion'd flat,
Has hob-a-nobbed with Pharaoh, glass to glass;
Or dropp'd a hapenny in Homer's hat,
Or doff'd thine own to let Queen Bido pass,
Or held, by Solomon's own invitation,
A torch at the great Temple's dedication."

We passed on (strange and suggestive transition) to a cane-bottomed chair which was occupied daily by Napoleon in his prison home at St. Helena. This relic was bought at the sale of the great captain's effects by Sir Hudson Lowe's chaplain. It was presented to the museum by the benevolent banker aforesaid. Then we come to a lock of Napoleon's hair, which, be it remarked, is of a light colour, and duly authenticated; a copy of the *Maidstone Mercury* of 27th May, 1725, being the 25th issue of that print; an old sedan chair; bits of old oak carving, and blocks of old stone carving; an ancient cedar chest of the seventeenth century; a Chinese razor; a piece of lava from Mount Vesuvius; an oval metal watch, by Monk, two centuries old; a silver cross taken at the Battle of the Alma; a relic of the *Royal George*; and a model of Nelson's coffin. Unconsidered trifles these, and yet how full of interest to the dwellers in a country town! We mention one more object, and end this broker's catalogue. An old fly-leaf gives "a short but concise account of Eliza and Mary Chulchrest, who were born, joined together by the hips and shoulders, in the year of our Lord, 1100, at Biddenden, in the county of Kent, commonly called the "Biddenden Maids." There is a woodcut of Eliza and Mary, who lived in this bond of union for thirty-four years, "when one of them fell ill and died. The surviving one was advised to be separated

from the body of her deceased sister by dissection, but she absolutely refused the separation, by saying these words,—"As we came together, we will also go together," and in the space of almost six hours after her sister's decease, she was taken ill and died." This case of *ibusis natura* is well known to medical men. The great importance of local museums for the purposes of art-education, and industrial training, is now generally acknowledged, provided always that the objects collected are capable of imparting instruction,—and instruction too of a recreative kind, as they are in this instance. The many objects of interest in the Maidstone Museum, we are glad to bear, attract large numbers of visitors from the surrounding country; and although the institution is as yet only in its infancy, there can be no doubt that it will exercise an important influence on the future history of the town. What is wanted to make this a model country museum, is an intelligent curator, who has information and enthusiasm enough to appreciate the object for which it was founded.

OLD ST. PAUL'S CATHEDRAL, LONDON.

A FEW condensed notes concerning our former magnificent Gothic cathedral, St. Paul's, may not prove uninteresting to some of your readers, if only as a reminder. The first church dedicated in London to St. Paul was built in the time of Bishop Mellitus, by Ethelbert, King of Kent, A.D. 603, on the former site, in all probability, of a heathen temple, dedicated to Diana. In A.D. 625, Erkenwald, the fourth Bishop of London (who was afterwards canonized, and had a glorious shrine erected to his memory), expended large sums on this church, and procured many privileges for it. Our Saxon kings, Athelstan, Edgar, and Edward the Confessor, were all benefactors to the fabric in various ways. Our trustworthy authority, Dugdale, the chief historian of old St. Paul's, mentions that in the year 1075 the cathedral was held in great esteem, Maurice then holding the see of London. But during the Conqueror's reign a terrific fire occurred in the City, and the ancient edifice was burnt down. In 1083, however, measures were taken to raise the cathedral out of its ashes, and Bishop Maurice began (to use the words of Dugdale) "the foundations of a most magnificent pile, namely, all the body of the church, with the N. and S. cross aisles. So stately and beautiful was it, that it was worthily numbered among the most famous buildings, the vaults or undercroft being of such extent, and the upper structure so large, that it was sufficient to contain a great number of people." Richard de Beaumeis succeeded Maurice in the episcopate, and was so very zealous in his work of love that he voluntarily bestowed all his revenue on the new cathedral, and managed to support himself and his family by other means. Robert de Sigillo was the next bishop, and it seems by this time "the body of the church and the cross aisles were finished."

The choir, however, after its completion, was not thought sufficiently beautiful, and was accordingly pulled down, as also was the steeple, according to Dugdale. The rebuilding of the latter was completed in 1221, and the former in 1240. It seems very probable that an Early English clearstory and vault were added to the nave in 1255, as Dugdale mentions that the roof of the structure was then "made new or substantially repaired." The choir was lengthened out eight bays, and the Church of St. Faith constructed under this new part in the year 1256. The principal portions of the work would appear to have been completed in 1283. Among the numerous benefactors to the cathedral during all these years may be mentioned Henry Lecy, Earl of Lincoln; Bishop Baldo; Roger de Wulham, a canon of the cathedral; Sir John Putney; and many others. In 1332 the cloisters and chapter-house were commenced. At the east end of the churchyard stood a detached bell-tower, to which reference is first made in Henry I.'s reign, and which held four immense bells. St. Paul's Cross appears to have been built, A.D. 1370, by Godric, Abbot of Peterborough. Shiryngton's Chapel and the charnel-house were detached buildings in the churchyard, but were pulled down in the first year of Edward I.'s reign.

Pardon Church-hangh consisted of a chapel with a large and fine cloister, situated on the north side of the cathedral; but this also was unfortunately destroyed in the year 1549. The

spire (of timber, covered with lead) was nearly destroyed by fire, and the roofs of the church entirely burnt, in 1444. The latter were all repaired by the year 1556; but nothing was done to replace the steeple until 1620, when an attempt to procure funds for that work was set on foot; but not till 1683 was the rebuilding really commenced, under the direction of Inigo Jones, who also, as is well known, constructed the western portico of the nave, much admired at the time. But everything came to a standstill in 1642, when the Commonwealth was established, and the whole cathedral was suffered to lapse into a deplorable state of decay and neglect. At the Restoration, however, in 1663, the repairs of the church were begun again in good earnest; but the Great Fire of London put a stop to everything by destroying the cathedral; and though an attempt was afterwards made to patch up and restore it, this was of no avail, as the building was found to be in so weakened and ruinous a condition as to be quite unfit for proper repair. It was then determined to build a new cathedral.

Such is a brief outline of some of the principal points in the history of Old St. Paul's. I will now proceed to review some of its striking features. One of the most conspicuous of these was its immense length, about 596 ft. (these dimensions include the end walls), that is 66 ft. longer than Winchester Cathedral. The length, 630 ft., given in Dugdale's History (p. 17), together with other measurements of the heights, &c., appears to be incorrect in comparison with Hollar's Plates.

I believe the fine characteristic of twelve bays to both nave and choir to be unique, as far as regards English cathedrals: the perspective effect must in consequence have been grand. According to Timbs (see his recent work "London and Westminster, &c., vol. i, p. 261), there was at any rate one western tower; "the southern tower at the west end of Old St. Paul's, called the Lollards' Tower, was used as the bishop's prison for heretics, and was the scene of at least one foul and midnight murder, perpetrated in the month of December, 1514, on a respectable citizen, &c." Now, curiously enough, Dugdale nowhere mentions this in his history, as one would expect, supposing that such a tower or towers ever existed. The two-storied cloisters, enclosing the Chapter-house, which is octagonal externally but circular within (very similar, therefore, in plan to that at Worcester, but of later date), are remarkable, and, I believe, unique. There was a crypt under the Chapter-house as at Wells and Westminster.

Mr. Scott, in his recent Academy lectures, alludes to the circular triforium windows shown in Hollar's views, about which he is in doubt whether they were originally designed or not; but similar examples are to be found in the nave of Waltham Abbey Church. With regard to the vaulting of the cathedral, some believe that it was originally executed in wood, and it would appear to be represented so in Hollar's views. Many of your readers are, no doubt, acquainted with the curious painting of Old St. Paul's, in the possession of the Society of Antiquaries, of the time of James I., and therefore anterior to Hollar's engravings. It seems to be executed on a wood panel, and is a kind of bird's-eye view of the cathedral, but differs in a few points from the plates published by Hollar. For instance, in this painting Early English or Decorated pinnacles and flying buttresses are shown to the nave, which did not exist when Dugdale published his book. The span (about 38 ft.) of the nave must have been wider than that of any of our existing Norman cathedrals. The central tower was clearly never used for bells, as there was a detached clocher in the churchyard, as previously mentioned. The Norman transept appears not to have been entirely rebuilt in the Early English style, but to have been partially preserved. Although all Hollar's external views show the cathedral of the same height throughout; yet a careful examination of the internal views leads me to be tolerably certain that the choir was loftier than the nave.

One reason for this may have been the height to which the floor of the choir was raised above that of the body of the church. This would most probably necessitate the former being heightened to give it proper importance. The magnificent feature, the eastern elaborately-traceried rose-window is unusual for an English cathedral (Durham, I believe, possessing the only example of such). It does not seem clear whether the spandrels formed between the exterior of the circle and the enclosing square

were pierced and glazed or were merely stone panels. It is true they are perforated in the case of the transeptal rose-windows in Westminster Abbey; but then these were altered in the fifteenth century.

"St. Paul's," quaintly observes Fuller, "may be called the mother-church indeed, having one babe in her body (St. Faith's) and another in her arms (St. Gregory)." The latter was situated on the south side of the nave at the western end of the cathedral. Another striking feature in Old St. Paul's must not be forgotten,—the pinnacles and flying buttresses attached to the lower part of the tower. I cannot help fancying those were not parts of the original design, but were added during the progress of the building to strengthen the tower walls. The flying buttresses passing through the clearstories at Gloucester and Salisbury are contrivances of a like purpose; but at Old St. Paul's they are very much more accentuated. The piers, according to Hollar's views, are certainly small, considering the internal diameter of the tower, which was about 44 ft.

As Mr. Beresford Hope, referring to our subject, has said,—"Its noble length, the solemn Norman of its nave, the developed and rich Gothic of its choir, the majesty of proportion with which the English system of a square east end was carried out, must have made it more like Ely Cathedral than any other of our known great churches." E. B. F.

THE INSTITUTION OF SURVEYORS.

This institution, of which we spoke in our last, is established—

"1. To secure the advancement and facilitate the acquisition of that knowledge which constitutes the profession of a surveyor, viz., the art of determining the value of all descriptions of landed and house property, and of the various interests therein; the practice of managing and developing estates; and the science of measuring and delineating the physical features of the earth. And, 2. To promote the general interests of the profession, and to maintain and extend its usefulness for the public advantage."

The institution consists of three classes, viz.,—members, associates, and honorary members, with a class of students attached.

A member must be more than twenty-five years of age, and have acquired a practical knowledge of surveying in one or other of its branches as above defined, and so practised on his own account for more than five years; or be a member of a firm of surveyors established upwards of ten years.

An associate must be more than twenty-one years of age, not necessarily a surveyor by profession, but his pursuits must be such as to qualify him to concur with surveyors in the advancement of professional knowledge.

With the view of forming a library and collection, all members and associates are expected, within twelve months after their election, to deliver to the council an original paper on some subject connected with the profession, or to make a donation to the library or collection. At the ordinary general meetings original communications are read on some professional subject, and their merits fully and freely discussed.

LINCOLN DIOCESAN ARCHITECTURAL SOCIETY.

The annual meeting of this society took place at Lincoln, on Wednesday and Thursday last week; and, although the architectural features of the cathedral have been described, again and again, by the numerous authors on the subject; interesting, and, in some respects, original descriptions of the building and its accessories were given by the gentlemen who took an active part in the society's proceedings. The programme commenced with divine service in the cathedral, immediately after which the Rev. Precentor Venables lectured on "The Tombs in the Church."

The attendance of members of the society and their friends was large.

The party then proceeded to the County Assembly-rooms, where Mr. Edmund Sharpe delivered a preliminary lecture on "The Architectural Features of the Cathedral."

In the afternoon, a large number of the members of the society visited the following places of interest in the city, their architectural features being explained by the Ven. Archdeacon Trollope:—The churches of St. Peter-at-Corsets, St.

Mary-le-Wigford, St. Benedict, and St. Peter-at-Arobes, St. Mary's Conduit, and the High Bridge.

The evening meeting was held in the County Assembly-rooms, under the presidency of the Bishop of the diocese. There was a large attendance of members and friends.

The chairman opened the proceedings with a speech, and then called upon Archdeacon Trollope to read his paper on "The Ermine-street."

Mr. Gambier Parry then read a paper on "Polychromy."

On Thursday morning an excursion was made to Stow, the church at which place was described; and in the afternoon such places of interest in the city as were omitted on the previous day were visited. The public dinner took place in the County Assembly-rooms, and this was followed by the evening meeting, when a paper on "King Stephen's Battle of Lincoln" was read by the Rev. J. Green.

DINNER OF THE PROVIDENT INSTITUTION OF BUILDERS' FOREMEN AND CLERKS OF WORKS.

The members and friends of this Institution celebrated their twenty-sixth anniversary, by a public dinner, at the Freemasons' Tavern, on Wednesday, June 10th. Professor G. G. Scott, R.A., presided, and was supported by Mr. Digby Wyatt, Mr. W. J. Gardiner, Mr. John S. Lee, Governor Mr. G. Pincknett, Mr. W. T. Robinson, Mr. W. Macey, Mr. Earle, Messrs. Jackson & Shaw, and others.

The Chairman gave the usual loyal toasts, which were enthusiastically responded to, followed by that of the Army, Navy, and Volunteers; Capt. Gardiner responding on behalf of the Volunteers.

The Chairman, in proposing the toast of the evening, "Success to the Provident Institution of Builders' Foremen and Clerks of Works," directed attention to the necessity of all eligible men supporting such an institution while youth and prosperity were theirs, so preparing for the possible hour of adversity, accident, or infirmity, that all are able to, particularly the class belonging to this Institution, who, to use his own words, "carry their lives in their hands." The Chairman also spoke to the general ability, zeal, and fidelity which the clerks of works and builders' foremen brought to the assistance of architects and engineers in the superintendence and execution of their buildings, and strongly recommended the objects of the Institution as worthy of support.

The governor, Mr. Pincknett, replied on behalf of the Institution.

The secretary, Mr. J. Lucea, read the list of donations, headed by one from the chairman for twenty-five guineas, and amounting in all to over 200l.

Mr. Wyatt replied for the architects and engineers; Mr. Macey for the builders; and after some appropriate remarks from other gentlemen, and Mr. Kay's reply for the stewards, the chairman left the room, and the company dispersed.

NEW KNITTING WORSTED WORKS AT WAKEFIELD.

SEVERAL of the Wakefield manufacturers have just completed, or are in process of completing, new business premises. Messrs. Marriott have extensive premises. Messrs. Lee have also just completed new works. The same may be said of Messrs. Barker & Co., of Thornes, and of Messrs. Goldthorp, who, like Messrs. Lee, are located at the bottom of Westgate. The works of both are on the south side of Westgate, the Chald, or Ings Beck, honnds one side of Messrs. Lee's premises on the side next Halliley's yard. Part of their business is, indeed, conducted on the opposite side of the beck in Chald mill; but it is in the manufactory on the east side of the beck that the new buildings have been erected, though these, indeed, are only partially finished. There are yet to be a new chimney and warehouses, but the manufactory as it stands is complete in all its parts. The new buildings at present consist of an immense shed and a dyehouse, which abuts on the Ings-road. The shed and engine-house are built from the designs of Messrs. Lockwood & Mawson, of Bradford; and the dyehouse from the designs of Mr. Hamerton, of Wakefield, architect. The masonry in the shed has been executed by Mr. Binns, of Wakefield; the iron and millwright

work by Messrs. Teall; the carpenters' work by Mr. Beeth Illingworth; of Bradford; the plumbing by Mr. Keighley, of Bradford; the slating by Mr. Hill, of Bradford; and the painting by Mr. Briggs, of Bradford. In the dye-works the masonry was done by Messrs. Flower, and the carpentry by Messrs. Squire. The new shed (that part of it where the preparing and spinning is carried on) covers an area of about 4,500 square yards, and where the washing and blending is done, of about 1,500 square feet. The engine-house is in the Italian style. The approach from the outside is by a flight of steps, with ornamental palisades. The engine-house is lighted by large windows, and the walls and roof panelled in wood, and painted. The floor is in ornamental tiles; and out of this the engines, which are architectural in design and proportions, rise.

Messrs. Goldthorp's premises are extensive, and the mill which they have recently built greatly extends their power of production. It is four stories in height. The architect is Mr. Watson, of Wakefield; the masonry was done by Mr. Samuel Green; the joiners' work by Mr. J. Goldthorp; Messrs. Teall have furnished the ironwork; and Mr. T. Howden the new engines. The new buildings were chiefly in the shed form; and in the older parts of the manufactory, as well as in the new, there is that consecutiveness of arrangement in the fixing of the machinery which is a noticeable feature at Messrs. Lee's. On the engine-room of these works, like that already noticed, some cost has been lavished. The roof is panelled, and (as at Messrs. Lee's) immense iron bars run across immediately under the roof and rest on the walls, and, when the engine requires repairing, these bars are ready to help in slinging up the parts which have to be lifted. The new shed for drawing, preparing, and spinning is a large room. It is lofty, and the roof is in the shed form, in ridges, and the light is admitted from a northern aspect. The roof is delicately painted in light colours. There is to be a dining-room for the workpeople. In external appearance, Mr. Barker has made of Holmefield a mansion, architecturally considered, and it is the same with the new shed at Thornes. It is of brick, showing a series of windows; and the red brickwork is contrasted with bricks of other colours. The shed is flanked by low towers. On the Denby Dale road front there is ornamental palisading, in accordance with the general style of the building. On the river side the building accords with the decorated architecture of the railway bridge over the Calder. The architects are Messrs. Lockwood & Mawson, of Bradford. The masonry has been done by Messrs. Latham & Son, of Wakefield; the carpentry by Mr. John Jubb, of Thornes; the plumbing by Miss Drake, of Wakefield; the slating by Mr. Hill, of Wakefield; the painting by Messrs. Briggs & Mensforth, of Bradford; the plastering by Mr. Tattersall, of Wakefield; and the ironwork by Messrs. Bradley & Craven, of Wakefield.

VALUATION OF ST. GEORGE'S, HANOVER SQUARE.

The vestry of this parish has at length determined to have a revaluation of the whole of the property in the parish made for the purpose of the poor-rate, and in accordance with the Act 6 & 7 William IV., cap. 96, and Mr. Charles Lee has been appointed to make the same in time for the next rate. The parish has not been valued throughout for many years.

THE LIBRARY AND MUSEUM OF THE COMMISSIONERS OF PATENTS.

ATTENTION is directed by the Council of the Public Museums and Free Libraries Association to the want of proper accommodation for the museum and the public library of the Commissioners of Patents. A question has been asked with respect to these institutions by Mr. Layard, M.P., in the House of Commons; and the attention of Lord John Manners, M.P., has been called to the serious inaccuracy of the reply on the part of the Government. It is proposed, however, not to limit the action of the council to the little that may or may not be done or said in Parliament, but to convene, by circular, a meeting of those professional and working men who are warmly

interested in an immediate settlement of the Patent Museum and Library upon a satisfactory basis. The report to Parliament for 1865 very distinctly points out that the building at present devoted to the purposes of the Patent Office, is not new, nor can it ever be made to be, suitable for the requirements of the office. The new library rooms, opened April, 1867, though they are as spacious as it was possible to make them in so small a building, are already completely filled with books. Those making use of the two collections have also reason to complain of their separation—the one being within the city of London and the other at South Kensington. The appeals which have been made for the erection of suitable buildings have always kept in view the desirability, not to say the necessity, of placing the library and the museum under one roof. This is not a case where want of funds can be pleaded as an excuse. The surplus income of the Patent Office for 1866 was no less than 45,000*l.*

THE MARGATE DEATH-RATE.

A PAMPHLET by Mr. E. Mottley has been published by Mr. T. H. Kable, at Margate, titled "Statistical Examination of the Margate Death-rate for the five years 1863-1867, by order of the Council of the Borough." In this report the author says at the outset, "The heavy and continually increasing death-rate of the Isle of Thanet having caused the Registrar-General to ask, 'Why is the mortality of the Isle of Thanet, including Ramsgate and Margate, still 23?' It is the object of this report to answer the question so prominently advanced by the eminent authority at the head of the registration of the kingdom, so far as it relates to the town of Margate, and at the same time to rectify the reports so industriously circulated that the death-rate of Margate is the heaviest of all the health resorts in the kingdom.

Mr. Mottley, amongst other statistics into which he enters in order to prove his case, gives the following table of the mortality of the town and sub-district of Margate for the five years 1863-67:—

	Residents.	Visitors.	Hospitals.	Total.
Annual Average	873	265	177	1,315
	174	63	35	262

or 17 to 1,000 resident. This, he remarks, is Dr. Farr's standard of normal health. In the following table the mortality of Margate is compared with the general mortality of England and Wales:—

	England.	Margate.
General Mortality	22	17
Infant Mortality	20	10
Zymotic Diseases	40	32
Consumption	23	17
Respiratory Organs	31	17
Bronchitis	13	7

SANITARY MATTERS.

Health of St. Marylebone.—The monthly report for May, of Dr. Whitmore, the medical officer of health for the parish of St. Marylebone, has been issued. The mortality for the period was equivalent to an annual death-rate of 22.6 per thousand of the living population, and was less than the mortality of the previous month, but slightly in excess of the corresponding month of last year. But the most fatal of all diseases during the month was phthisis, to which no less than fifty deaths were attributed, showing that in every seven persons who died, one of them fell a victim to this ruthless malady. Referring to the sickness table, the returns from eleven charitable institutions in the parish give no less than 875 new cases of diarrhoea. The reporter says he is utterly at a loss to understand the cause of such a large amount of sickness from this disease at this early period of the year. It appears to prevail chiefly amongst infants and very young children. Happily the mortality from it is not at present large. Has not the dryness of the season something to do with it? It is to be hoped it is not ominous of the coming of virulent cholera in the autumn. Diarrhoea is apt to usher in cholera, and it is known that the driest summers are not the healthiest. Great

attention should be paid to cleansing operations. Sanitary work in Marylebone during the month has progressed satisfactorily. An additional duty recently imposed upon the inspectors of nuisances is the disinfecting of houses in which sickness from small-pox, measles, fever, and scarlatina is known to exist.

Whitechapel.—The report, by Mr. Liddle, medical officer of health for the Whitechapel district, for the quarter ending 28th March, 1868, has been printed. It states that during the quarter there were registered in the Whitechapel district the deaths of 657 persons, of whom 350 were males and 277 females. During the same period, the births were 703, viz., 360 males and 343 females. In the corresponding quarter of the previous year the births were 744 and the deaths 629. Epidemic diseases had been fatal to 89, small-pox occasioned 8 deaths, measles 15, scarlet-fever 9, diphtheria 3, whooping-cough 18, diarrhoea 7, and fever 29. A great increase had taken place in the number of deaths from fever, viz. 29 against 8, while the deaths from small-pox had diminished from 16 to 8. The mortality of children under 5 years of age was 231. This is 35.0 per cent. of the total mortality. In the Artillery sub-district the proportion of deaths of children to the total mortality was 50.0 per cent., and in the Spitalfields sub-district it was 60.0 per cent. A good deal of sanitary work had been done in the district during the three months ending with March.

THE NEW LAW COURTS.

The Marquis of Salisbury, pursuant to notice, in the House of Lords, asked if it was true that the Government had rejected the design for the New Law Courts which was recommended by the professional judges and the judges of designs, as the best for plan and internal arrangements, and had adopted the design which was recommended for elevation only; and further, if the competitors were instructed that utility and convenient arrangement were to be preferred to architectural effect. If counter influence, he said, was powerful enough to set aside the results of a public competition, it could not be expected that gentlemen of eminence and reputation in their profession would ever again compete for public employment. He most earnestly deprecated the decision which had been arrived at, and hoped it was not too late to alter it.

The Lord Chancellor, as president of the Commission, said that in the first place the Government had rejected no design, and it had accepted no design. His lordship, having stated the plan on which the commissioners originally proceeded, and how they had resolved to reject the idea of unlimited competition, explained their selection of the five judges of designs, namely, Chief Justice Cockburn, Sir Rondell Palmer, Mr. Gladstone, Sir William Stirling Maxwell, and Mr. Cowper, who were to be assisted by two professional architects—Mr. Shaw and Mr. Pownall. A distinct condition in the terms of competition was that each plan was to become the absolute property of the commissioners. It was, however, quite a mistake to suppose that the object of this competition was the selection of a particular design—the object was to test the relative superiority of the architects. The result was that the judges could not agree as to any one plan being the best, but they selected two, and made their award in favour of the combination. The other architects, however, objected to that, declaring that they had only been called upon to compete against single plans; and, upon reference to the Attorney-General, he decided in their favour, and ruled that the award of the judges was invalid. The whole proceeding, therefore, had come to an end. It was under these circumstances, therefore, that a single architect had been selected. Curiously enough, there had been a similar miscarriage as regarded the design for the new National Gallery. Mr. Street had been selected as the architect for the law courts, and Mr. Barry for the National Gallery.

Lord Stradbroke expressed the opinion that Mr. Barry had not been fairly dealt with.

Lord Redesdale reproached generally the manner in which matters relating to our public buildings were regulated.

Lord Overstone earnestly hoped that the erection of the National Gallery was not going to be treated as a secondary affair.

Lord Crauworth offered his testimony that Mr. Barry, when originally invited to compete for the Law Courts, was given clearly to understand that his design was to have reference to the internal arrangements of the building. He quite concurred in the opinion that not one of the competing architects had any legal rights; but, *primâ facie*, he should say, Mr. Barry ought to have got the Law Courts and Mr. Street the National Gallery.

The Earl of Harrowby hoped that in the interests of the public the Government would not select as the architect of the new Law Courts the gentleman whose design evinced the least ability in respect of what were laid down as the material points to be attended to. In his opinion the subject ought to be re-opened for consideration. He also thought that, if possible, the question of the site of the new buildings ought to be reconsidered.

The Earl of Carnarvon entreated the Government to reconsider a most ill-advised decision. He held that, once the conditions of the competition had been laid down, they ought to have been rigidly adhered to.

The Lord Chancellor, in explanation, reminded their lordships that the essential condition was, that the design to be selected must combine superior excellence, both as regards the interior and the exterior. There was no condition limiting the superiority to the internal arrangements.

The Marquis of Salisbury reiterated the charge that Mr. Barry had been most unfairly dealt with.

ACCIDENTS.

Mr. PAYNE has held an inquiry at St. Bartholomew's Hospital relative to the death of a painter, who was killed by the fall of a "cradle" suspended in front of a house. It appeared that the deceased was employed in painting the front of 30, Noble-street, and he and another man stood in a cradle suspended from the fourth floor by means of ropes 15 ft. long. The ropes broke, and the deceased was precipitated to the ground, receiving fatal injuries. It appeared that the ropes had been in use nearly six years, and Mr. Leyster deposed that a rope of that kind should last nine years. A practical man on the jury, however, dissented from this view, and said that the rope which broke was so rotten from age that the strands, instead of supporting half a hundred-weight, gave way under the pressure of a pound. The danger consequent upon the use of such ropes concerned not only the men in the cradles, but the public walking on the pavement underneath. The jury returned a verdict of "Accidental death," and added that there was great neglect on the part of the master in not providing proper ropes.

The whole of the floors of No. 92, Whitechapel, Liverpool, in the occupation of a colour merchant, have suddenly given way. The clerks and others engaged on the premises had just left for dinner, or serious loss of life must have resulted. The floors were over-weighted by the mass of goods stored on them. While the walls and roof were left standing with no apparent injury done to them, there was a blank open space from basement to roof. The damage is estimated at 1,500*l.*

THE ACCIDENT AT GATEHEAD TOWN-HALL.

At a special meeting of the members of the Gatehead Corporation, a long discussion took place on the subject of the accident by the fall of one of the platforms at the laying of the foundation-stone of the new Town-hall, from which it appears that the architect, Mr. Johnstone, sketched out a plan for the platforms, with steps to break the pressure; that the ladies' platform, which withstood the pressure, was carried out on that plan; that the managing sub-committee, with the mayor personally at the head of it, altered the architect's plan for the gentlemen's platform, in his absence, on business at Hexham, by ordering it to be made with a sloping floor, whereby, as the architect insists, the pressure on the front was increased, and the supports for the stepped plan rendered insufficient; that the sub-committee altered the supports of the stepped ladies' platform, which, in his view, did not need such alteration, but left the supports of the platform which they altered unstrengthened; and that the result was the fall of

the platform. There was a good deal of mutual recrimination; but of course, in a meeting of his masters, the architect got the worst of it; even the mayor, who personally ordered the alterations, holding the architect to be responsible! The architect, however, appears not to have informed either the committee or the mayor that he did not approve of the alterations, although he told the builder of the platform, Mr. Bell, that he would have nothing to do with it, as the sub-committee had intermeddled with his plans, and altered them in a way he did not approve of; and that if they went on with the work it must be under the instructions given by the sub-committee.

REPUTED FALL OF PSEUDO METEORIC STONES IN BIRMINGHAM.

The stones reported to have fallen were found on the surface immediately after the occurrence of very heavy rain (a thunder shower). Rowley rag-stone is largely used to make the roads of the district. The fragments found, and supposed to have fallen from the clouds or atmosphere, looked like fragments of Rowley rag-stone, and under test proved, as we have already said, to be of similar composition.

Heavy rain disintegrates the surface of a road, and the large round drops of a thunder shower strike with much mechanical force, and would cause small fragments of stone like those found to rebound, and in falling look as if they came from the clouds. It is not necessary to bring in cyclones, aërolites, or asteroids, unless it is quite settled that no other natural but more simple means will account for the phenomena observed. The exceptionally heavy rain did, no doubt, loosen and wash out small fragments of Rowley rag-stone.

BIRMINGHAM.

THE plans of Mr. Edward Holmes, of this town, for the erection of cow lairs, pig dormitories, and other improvements to Smithfield Market, Birmingham, which were submitted in limited competition, having been selected by the Markets and Fairs Committee of the Corporation of the Borough of Birmingham, were approved by the Town Council at their last meeting. The same committee have also selected a design by the same architect for a new fish-market, to be erected on a site opposite to the Market-hall in Bell-street. The report on those plans has been referred back to the committee, with a view to consider and report upon the adaptability of a site which is considered more suitable on account of its proximity to the central railway station.

FROM IRELAND.

Dublin.—The filthy state of the river Liffey from which a most dreadful stench arises in the summer-time, when the tide is low, has been long a real "grievance" to the citizens; but the corporation, whose duty it is to cleanse it, have hitherto turned a deaf ear to the loud complaints on the subject. At last, however, a pressure has been put on the town council which they cannot resist, and something is now to be done to remedy the evil. At a special meeting of the corporation a letter was read from the Lord Chief Justice to the Irish Government, complaining, on the part of the judges of the law courts, of the pestiferous condition of the Liffey at the present period. Dr. Thomas Hughes, sanitary officer of the troops in Dublin, wrote on the same subject to the assistant quartermaster-general, and this letter was also read at the corporation meeting. A lengthened discussion took place on these letters being read, and it was moved that Mr. Bazalgette's and Mr. Neville's plan for sewage be carried out, and that an application be made to her Majesty's Government for assistance. It was finally resolved that the Government should be requested to examine the various plans for the drainage of the city submitted to the corporation, and select the best.

Belfast.—The enlargement of the Imperial Hotel has now been completed. The architects employed were Messrs. Sherry & Hughes, and Mr. W. B. M'Master was the contractor. Mr.

Jury, according to the *Newsletter*, has expended upwards of 2,000*l.* in these improvements. They consist of two new stories, giving an addition of twenty-four rooms to the hotel accommodation, and increasing the total number to eighty. The Imperial is now capable of affording first-class accommodation to one hundred guests, exclusive of domestics, for whom ten extra rooms have been erected. Although this hotel is situated in the centre of the town, there is an extensive view from the upper windows.

PENALTY FOR NOT EMPLOYING A COMPETENT ARCHITECT.

Moore v. Denton & Shipney.—This action, tried in the Second Court of Exchequer, was brought by the widow of a bricklayer against the two defendants to recover damages for the death of her husband, which was caused by their alleged negligence. The defendants pleaded "Not Guilty."

It appeared that, in February last, the defendant Shipney, a publican at Finchley, employed a carpenter to design a building, and employ the defendant Denton, a builder, to carry out the design. In the course of the execution of the work a wall fell and killed the deceased, a working bricklayer.

The defence was that neither of the defendants was liable, inasmuch as Shipney had only employed Denton, who had employed the deceased, and Denton was merely engaged in carrying out the design of an architect.

The jury, after having retired, found a verdict against both defendants, on the ground that Shipney had employed an unskillful person to design the building, and that Denton was guilty of negligence in endeavouring to carry out a design which he must have known to be faulty. They assessed the damages at 650*l.*, to be apportioned thus—200*l.* to the widow, and 450*l.* to be divided among her six children.

WESTMINSTER ABBEY AND THE METROPOLITAN BUILDING ACT.

At the Westminster police station last week, Mr. Poole, the coroner, and Mr. Tylor, builder, appeared to receive the verdict of the judgment of the court in a summons taken out against them by Mr. James Tolley, district surveyor.

The facts have already been stated. Two summonses were taken out by the district surveyor of the district of St. Margaret, St. John, and of the close of the collegiate church of St. Peter, Westminster, complaining that the defendants respectively, the builders engaged in doing certain work at the building within the close of the collegiate church of St. Peter, Westminster, did neglect to give to the complainant, as such district surveyor, two days before such work was commenced, due notice in writing stating the situation, &c., of the building, &c., and the particulars of such proposed work, &c. These summonses were taken out under the 39th and 41st sections of the Metropolitan Building Act, which make it imperative on a builder to give such a notice, and impose a penalty not exceeding 20*l.* for neglecting to do so. The building under consideration is Westminster Abbey, and the question is whether that building comes within the operation of the Metropolitan Building Act. The defendants, or rather the Dean and Chapter of the Abbey, who, in fact, resist the application, contend that the abbey is, by the 6th section of the Act, exempt from its operation, as being either "one of her Majesty's royal palaces" or a "building employed for her Majesty's use or service."

Mr. Arnold delivered judgment. In conclusion he said—At whatever time and in whatever manner the Crown may have acquired its present rights with regard to the Treasury or Exchequer, there seems no doubt that at this time that portion of the abbey is employed for her Majesty's use or service, and it would appear not to be an inconsequential argument to say, if an integral part of a building is employed for the use or service of the Crown, that the whole building is so employed. But I think this argument will not hold good if pressed a little further. The Exchequer is not merely employed for the use of her Majesty; it is in the actual and exclusive occupation of the Crown, and it would certainly be a false argument that the whole abbey was in the exclusive occupation of the Crown, because a portion of it was so. I have felt bound, therefore, to come to the conclusion that Westminster Abbey is not exempt from the operations of the Metropolitan Building Act, either as a royal palace or as a building employed for her Majesty's use or service, and consequently that the defendants were bound to give the notice required by section 39; and having failed to do so, have incurred the penalty under section 41; but as the case has been brought into Court solely for the purpose of raising an important and curious question of law, I consider that a nominal penalty of 1*l.* in each case will be sufficient, and for the same reason I do not make an order as to costs. I am glad to see that under section 10 *et seq.* power is given the defendants to appeal to any of the appellate courts of Westminster, and they will of course exercise it in the manner pointed out by section 107.

The defendants gave notice that they should appeal.

"THE INFLUENCE OF EASTERN ON WESTERN ART AS SEEN IN THE ART RESULTS OF THE CRUSADES."

At the last meeting of the Architectural Association (19th inst.)* Mr. Thomas Wells read a paper on this subject. Having briefly alluded to a paper which he had read before the Association a year ago, and which treated of Eastern influence as exerted through Constantinople, he observed that their attention would that evening be confined to the fourth section relating to the Crusades. He quoted an observation made by Mr. Waring in his "Notes on Decorative Art," showing that the innate genius of the Norman race was so potent in guiding the instruments at hand, that we might date from the early period of the Crusades the commencement of a European style of decorative art distinct from that of the Byzantine, although in many features referable to it. Of this Medieval Renaissance there were two principal phases. Until the early part of the twelfth century, the Norman and Byzantine influences were seen gradually prevailing, and during the same period the Crusades were commenced. The second phase of this Renaissance was of much larger duration and importance; and chiefly to its consideration he invited their attention that evening.

In the twelfth century a formidable opposition, political in spirit, against the Papacy, arose in Christendom; but whether much of this revolutionary sentiment was or was not attributable to the experiences of the Crusades, this much was certain, that the general discontent was shared by many of the Crusaders, and especially by the Templars, the great builders of the age. He then alluded to the Armenian style of architecture, which had been treated by Mr. Fergusson, whose description of the cathedral of Ani, near Kars, was quoted as typical of that style. The Palace of Tigranes, at Diabeker (in the south-west corner of Armenia, Ani being in the north-east), was also noticed as the supposed work of the Sassanian architects, who were either its builders or their successors, and a description was given of the great Tâk Kerrah at Ctesiphon. Noticing the observation by Ducange, in his work on "Christian Constantinople," that the Emperor Theophilus built a palace on the Asiatic shore of the Bosphorus, which palace was remarkable for its arches of unusual construction, and for its mathematical tracery, Mr. Wells observed that it was remarkable that mathematical tracery should be mentioned in connexion with that building; for, although it was generally admitted that geometry was introduced into Europe by the Mahomedan Arabs, yet there were very few, if indeed any, existing examples of Saracenic geometrical tracery. But, apart from the engi- neering inquiry into the previous history of mathematical tracery, it would seem from Ducange's early mention of it that, in addition to the principal elements of Western Pointed architecture having at an early date been in general use in the East (as was shown by the existence of ruins of the style of the cathedral at Ani), one of the most notable of its minor characteristics,—viz., geometrical tracery,—was likewise known there some four centuries before it came into general use in Europe. Mr. Wells remarked that it was not always necessary to the adoption of Eastern forms for service in the Christian West that they should have been found originally accompanied by a Christian warranty. As an example of this, he noticed the existence of the church at Souillac in Aquitaine, about 100 miles due east of Bordeaux, which was in the form of a perfect mosque, a sketch of which he exhibited, pointing out that it conveyed a fair idea of the general impression received by visitors on entering the grand mosque of the Sultan at Cairo.

As evidence in support of his general argument, that Eastern influence had been produced by minor architectural details, the lecturer instanced the cathedral of Tarragona, in Catalonia, seventy miles south of Barcelona. On the apex of its columns and on the lintels of its doorways was the symbol of the Greek tau (τ);

it was also in the form of the Greek patriarchs' croziers. The Greek tau (τ), as a Christian symbol, was also noticed, on the authority of Sir Gardner Wilkinson, to be in use at Elkargeh in the greater oasis (in Upper Egypt, parallel with Thebes), where there are some Christian tombs and a church, which form a necropolis, and among the inscriptions on the stuccoed walls is the sacred tau, the Egyptian symbol of the generative and creative power of the Deity, adopted by those early Christians instead of the simple cross. Accessory pilasters and niches show these symbols to have been of the Christian era. The Cathedral at Serida, also in Catalonia, was next noticed, the general character of the building being Lombardic Romanesque. Mr. Wells then adduced examples of the very instructive manner of the change from the early forms of the Romanesque of the West to the Pointed style which followed, the word Romanesque being used in a geographical rather than in a technical sense, quoting as one of the earliest examples in England the employment of the pointed arch in the choir at Canterbury, at some time between 1179 and 1184; whilst, in 1220, the Pointed style had so far advanced that Salisbury Cathedral was commenced in it. The lecturer stated, that in referring to so much length the development of the Pointed Gothic style to the Crusades, he was but connecting the greatest intellectual, or perhaps, more correctly speaking, physical product of the time, with its greatest physical disturbance. Combating an argument which had been advanced against Gothic architecture having been introduced from the East, he said that the absence of the Crusading spirit being found together with the complete absence of the Pointed Gothic style, taken with the converse fact of the presence of that style in all countries where that spirit was a power, showed the true cause of the death of Pointed architecture in Eastern Europe, viz., that the spirit of that architecture was a product of the Crusades. General evidence, however, did not warrant them in drawing the conclusion that had the Crusades never been preached, the Pointed arch would, in the West, have been only exceptionally used; but there could be little doubt, from the evidence afforded by architecture, that Eastern influence received an exceptional impulse from the Crusades.

Mr. Wells concluded by touching briefly upon the armour and costumes worn by the Crusaders, and also upon the subject of stained glass.

FROM SCOTLAND.

Edinburgh.—A new agricultural hall and auction mart has been erected in Valleyfield-street, Leven-street. The building cost between 5,000l. and 6,000l. The front of the building to Valleyfield-street is 187 ft. long, and is in the Renaissance style. It is divided into nine compartments by rustic pilasters. Over the centre and widest compartment is a pediment, surmounted by an ornamental chimney-stalk, while under is a large three-light arched window, with centre key-stones and moulded oops at the springing of the arches. In the narrow compartments, at each side of the centre, are the entrances for the palisade and those connected with the hall. In the west division is a large arched doorway for the stock. Along the whole length of the building there is a moulded cornice and blocking course returned at the projection of the rustic pilasters. The building contains 120 stalls, and is capable of holding 250 cattle and about 1,800 sheep, the surface it covers being between 15,000 and 16,000 square feet.

Leith.—It is fully expected that the new docks will be ready for opening in time for the autumn trade of the port. According to the engineer's report, the works will be in such a forward state as to admit of the inauguration taking place about the end of August. A request, according to the *Scotsman*, is about to be made by the Dock and Harbour Commissioners to the Queen, to perform the opening ceremony.

Glasgow.—The foundation stone of a new building in Elgin-street for the Gorbals Youths' School has been laid by the Lord Provost. The building, the architect of which is Mr. John Honeyman, jun., is in the Italian style, and will have accommodation for from 800 to 1,000 scholars. There will be eight principal apartments, four of which will each be 40 ft. long by 30 ft. broad, and all of them will have a height of ceiling of 16 ft.

Paisley.—The central fountain in the Fountain

Gardens, already noticed as having been lately inaugurated, is Franco-Italian in character, and rises from a basin of some 60 ft. in diameter to an altitude of about 30 ft. Its upper basins, four in number, are supported upon a centre shaft, having a moulded and ornamental circular base, divided into sections by four trusses or buttresses, which, rising in a series of curves, form a prominent feature. Besides giving character to the outline of the under portion of the fountain, the trusses are arranged to support a number of figures. The first basin, 12 ft. diameter, is quatrefoil in form, each foil projecting over one of the trusses. It is enriched with a pendant ornament, which forms a canopy over the figures, and a cresting on the rim of the basin, which is introduced alternately with shields bearing masks of the sea-horse throwing out streams of water. From this basin rises a circular fluted base, with fluted shaft and decorated capital, bearing the second basin, ornamented with representations of the rush and other aquatic plants in relief. The diameter of the basin is about 7 ft. Inside rest four dolphins dispersing streams of water into the lower basin. The third basin, 4 ft. in diameter, representing leaves of an aquatic plant, is supported upon a circular column, well defined in outline, and enriched with crystals and a fluted capital. From this basin a coronet of water is thrown up from numerous hidden jets. Above rises the fourth basin, 2 ft. 6 in. diameter, fluted and otherwise ornamented, supported on a stem of ferns, rushes, and water-lilies. Herons in various positions are grouped about the base. The whole terminates at a height of 28 ft. with a cluster of aquatic plants, from which jets of water are thrown to an additional height of about 30 ft. The large basin which encloses the whole is cast in imitation of huge blocks of rock thrown together. Four ground fountains are placed in other parts of the gardens, and are arranged to throw water to a considerable height. The decorations of the central fountain and of the iron gateways, lamps, and railings are of an elaborate character. The main fountain at the base is toned with deep sombre tints, appropriate to iron structures, and gradually rises into a series of variegated tints, that bring out the respective ornamental parts of the structure. The gates, railings, and lamps have been all painted a sombre brown; but all of them, as well as the fountain, have been relieved with gilding. The workers of Messrs. George Smith & Co., of the Sun Foundry, Glasgow, who were the builders of the fountains, and constructors of the gates, railings, verandahs, flower-stands, chairs, seats, and general ornamental ironwork of the grounds, have had a holiday, for the purpose of visiting these gardens, in the decoration of which they have had so large a share. The workers and friends, amounting to about 600 persons, went from Glasgow per special train, provided by their employers. They were accompanied by the hand of the Glasgow Blind Asylum, and by Messrs. George and Gibson Smith, two of the partners; Mr. Horgan, the representative of the firm in Dublin; Mr. James Deas, C.E., of the Edinburgh and Glasgow branch of the North British Railway; and a large number of other friends.

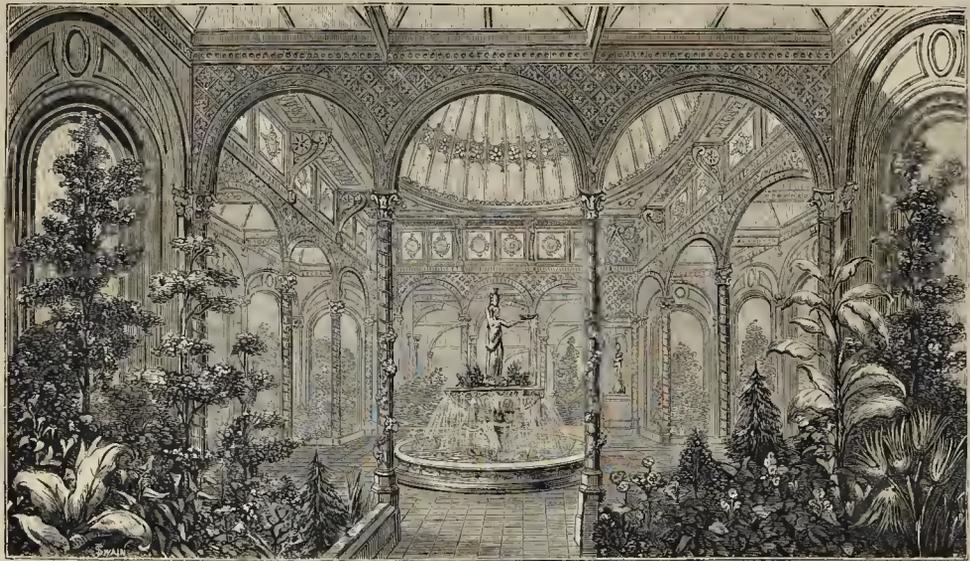
Arvan.—A correspondent of the *Scotsman* calls attention to the fact, that the shaft of a cross which for centuries marked the point whence Robert Bruce and his followers left Arvan has lately been removed, and used in the construction, in the neighbourhood, of a dry stone dyke.

WORKS IN IRON.*

ALTHOUGH entirely a Trade Book issued by Messrs. Handyside for their own special advantage, this pretty little volume will be found of considerable use to others in designing and in making estimates of the cost of works in iron. The book treats of three classes of works:— firstly, constructive iron work, such as roofs, buildings, and bridges; secondly, steam-engines and foundry work; and thirdly, ironwork of a specially ornamental character. The number of works executed by the firm in question is remarkable, and many of them are shown by photographs and wood engravings. We give two of the latter; one representing the Winter

* "Works in Iron." By Andrew Handyside & Co., Illustrated by Photographs. London: F. & E. N. Spon, 43, Charing-cross, 1868.

* On this occasion the election of officers for the ensuing session (1868-69) was proceeded with, and the following gentlemen were chosen:—President: Mr. William White, F.R.S.A. Vice-presidents: Mr. Ridge and Mr. R. H. Watson. Committee: Mr. Carpenter, Mr. C. Henman, jun., Mr. H. Jarvis, jun., Mr. R. W. Lonsdale, Mr. Perry, Mr. Plimbe, Mr. Spiers, Mr. Tarver, Mr. Aldridge, and Mr. G. G. G. G. Hon. Secretaries: Mr. Mathews and Mr. Quilter. Curators and Librarians: Messrs. O. Birch, R. Armstrong, and T. E. Munday.



IRON CONSERVATORY NEAR LONDON.

Garden occupying the central quadrangle of the new Infirmary at Leeds, as already mentioned by us, and the other a conservatory recently erected by Messrs Handy-side, near London, for Mr. Henry Bessemer, from the design of Messrs. Banks & Barry, architects. This is one of the most elaborately ornamental iron buildings yet constructed, and, with the exception of the ribs in the dome, is entirely of cast iron. The conservatory is rectangular, and from the square framework a circular dome rises to a height of 40 ft. The columns are light and elegant, with ornamental capitals, and the arches, brackets, and other main parts of the structure are of light pierced work. A building of this kind affords great scope for colour decoration.

Concerning Conservatories they say,—

“Considerable impulse was given to the manufacture of buildings of this kind by the successful erection of the large Exhibition Palace, in 1851, in Hyde Park, but for some years before that time Andrew Handyside & Co. had constructed conservatories mainly of iron and glass for noblemen and gentlemen in different parts of the country. Cast iron is particularly adapted for such work, and the slight columns and elegant arched spandrels obtained in this material afford great scope for ornamental design. The photographic frontispiece shows the conservatory in the gardens of the Royal Horticultural Society, at South Kensington, which is the largest work of its kind yet constructed by Andrew Handyside & Co. It was made by them in 1860, from the designs of the late Captain Fowke, R.E., and is probably one of the largest and finest conservatories in the world. It is 295 ft. long, 96 ft. wide, and 75 ft. high in the central aisle. Its framework is of cast iron, and the roof of wrought iron, the main semi-circular ribs of the latter being pierced. The building is remarkable for the extreme lightness of its construction, and the very simplicity of its outline offers manifest opportunities to the gardener for decoration by means of climbing and trailing plants. The total weight of iron is 226 tons. The cost of the ironwork of such a building (without erection) would be about 3,600.”

The Leeds Winter Garden is, with the exception of the lattice girders over the columns and in the clearstory, entirely of cast iron. It is 151 ft. long, 63 ft. wide, and 60 ft. high. The construction of this building is peculiar, involving no “thrust” upon the walls, the main roof, which is really carried by the four corner rafters, having its thrust taken by the parallelogram of lattice girders connecting the heads of the twelve columns. The weight of ironwork is about 150 tons. The sash frames for glazing are of wood. The framework of such a building as this, including the wooden skylight bars, delivered ready for erection anywhere in Great Britain, would cost about 3,000.

The usefulness of the book will certainly be made obvious by what we have said.

WORKING MEN'S COLLEGE.—The summer *conversations* will be held on this Friday evening, the 26th. The College choir will contribute to the social pleasures of the evening.



LEEDS INFIRMARY, WINTER GARDEN.



WAREHOUSE, SOUTHWARK NEW STREET.—MR. WIMBLE, ARCHITECT.

WAREHOUSE, SOUTHWARK NEW STREET.

THIS building has been erected for Messrs. Peter Lawson & Son, of Edinburgh, for the convenience of their London business. It covers an area of 3,700 superficial feet, and has a basement, ground, and five upper floors, and has been constructed to carry 3 cwt. per foot superficial on each floor, warehouses for seed being often loaded to that extent.

The top floor, as sample room, is lighted by skylights, at an angle of 75 degrees, and, facing the north, is at all times free from the sun's rays.

The front is carried out in bright stock-brick facings; the cornices and dressings up to the first floor are of Bath stone; and all the window-heads, string, and parapets above are of Ransome's patent stone.

The turret (the top of which is curtailed in the view) is of Bath stone, supported on a granite shaft, with carved corbel and cap, and is covered with copper, laid diagonally, and supported by a wrought-iron finial, 114 ft. from the pavement.

The work has been executed from the designs of Mr. Wimble, architect. The contractor for the building was Mr. Kilby, of Limhouse; Messrs. Cottam & Co., of Winsley-street, Oxford-road, supplying the ironwork.

SALISBURY RESTORATIONS AND UNHISTORIC HISTORY.

SIR.—The discussion on "a question of restoration" was by no means exhausted by Mr. Pritchett and Mr. Armfield on p. 415. The latter is not quite correct in saying "the whole of the walls and groinings" of Salisbury Cathedral interior "were painted in a very exquisite manner;" and still less that the whitewash "was most probably first applied in early Puritan days." These "early Puritans," so long dead, have very convenient broad shoulders. I will subjoin an account written while those decorations were perfect, as my own grandfather saw them also. It is from the only decently good description of that building in existence,—that by Francis Price, "author of the *Complete Carpenter*," in 1753. Those by Sir Christopher Wren, and in the present century, are some of the most worthless or mischievous collections of blunders any monument has suffered from; and the later edition of Price (which stands in the British Museum reading-room) omits this and other of his most valuable matter. He was a very Willis of his day,—a model of the historical critic of a building,—and after inferring truly all its relative dates, he says, p. 53—

"As a further proof of all these assertions, I beg that the choir may be taken notice of; for it is plain at sight that both the sides and ceiling were at first adorned with the painting in crayons, the sides with certain scrollwork, the ceiling with persons famous in Scripture, and labels coming out of their mouths, and over the altar with persons performing different works of agriculture, suitable to the several seasons of the year. What I infer from these is, that the choir and eastern cross of the church was so painted before the arches [the two straining arches with inverted over them, of Edward I. date] were erected, or the beam fixed across the choir. Nay, there is some of the painting upon the east side of the grand arch [tower arch], which proves the choir to have been finished [painted] before the grand arches were carved into roses or flowers; which was doubtless done when that vaulting was added [the square of late and had fifteenth-century vaulting shutting out the tower,—the sole piece of vaulting not original, and the most mischievous addition every way the building has ever had]. The upper pillars of the eastern cross have been cut away, to let down the beams that were formerly fixed there; nor are those parts painted. Besides this, the fractured parts of the walls of the choir, and its crossing, are still visible, and not closed up, as they must needs have been had not the painting been first done. [This proves the painting older than the commencement of the heavy stories of the tower, one at least of which was complete by the second dedication, in 1280.] There is yet another circumstance observable that, whenever the arches were erected in this cross, the workmen have been very careful how they defaced the original painting, which, though its colours are entire, will be mended off by the *slight touch* [alas for De Wittizers!], which makes me call it crayons."

What convenient broad shoulders have those "early Puritans" truly! Hit 'em, they have no friends! Most convenient for us presentagers: when fashion changes at the rate it does now, verily I scarce know how we should get on without them!

Now, then, come to a book of the great century,—Dodsworth's "History and Description," &c., 1814.

But perhaps at no time since the foundation have more effectual improvements been made than by Bishop Barrington, who now fills the

see of Durham, and of whose taste and unminifcence it is needless to speak." The expenses were paid by pulling down the campanile (coeval with the church) and selling its bells and materials. Britton has not a syllable of these grand and most "effectual" improvements! The nine years of Barrington's episcopate are despatched in six lines, and, for aught that his readers can learn, there might never have been a campanile, nor the great Wyatt ever have been "let loose upon Salisbury." Such is "history" in the great civilised age. We must therefore recur to Dodsworth:—

"Among the efforts of a wretched taste, which in attempting to ornament, had deformed the edifice, were various paintings on the vaultings of the choir and eastern transept. These were erroneously considered as coeval with the building, and consequently highly admired by those who regard the mere antiquity of an object as a sufficient title to admiration. But on a close inspection they were found to consist of lines drawn in imitation of brickwork, like those which then remained on the ceiling of the nave and principal transept, and may still be traced in the chapter-house and cloister. Their antiquity therefore was much less remote than was generally supposed. [If Salisbury and the "architect" between them contained neither the taste to know "exquisite" decorations from "wretched," nor the wit to infer like Price, did neither the bishop's, chapter's, nor any library contain his little book?] Drawings of these were made for the Society of Antiquaries. [I know a century not required to make "drawings" of what it destroys, that would not make in such a case even photographs.] Mr. Wyatt judiciously coloured the arches and ribs of the choir like the original stone, and contrasted the ceiling and walls with a lighter tint, which gives every part its due effect [!]. Since his time, the same plan has been carried into execution in the nave and principal transept, and the building may be considered as presenting nearly the same appearance as when left by the original architect."—Pp. 183-4.

But in vain do I copy these things: their lessons will not reach the time that needs them, but glance off effectless from the preparers, as Mr. Ruskin says, of an England "without a ruin and without a monument," in which a race, without discourse before or after, "may dispose itself to eat and to drink and to die." Would to God that our art monuments were portable enough, the land of shopkeepers impoverished enough, and America grown rich enough, to do as the same adviser would have Manchester do with America, huy and export some fragments ere the boof of Per-centage has trampled out all!

You see, then, "history in stone," or in whitewash, is liable to become, like this to Mr. Armfield, unhistoric; and so, not history at all: as we all agree, the very Pentateuch would not be, were it what the "Bishop of Numbers" fancies. The statement about the whole of the walls and groinings must also be thus modified. Figure subjects were confined, it seems, to the vaultings of the choir and east transept, and there is no evidence of wall-painting beyond the same limits (all cast of the tower), nor of its wholly covering more than the east wall with its "exquisite" scrollwork. Many living remember similar scrolls branching from the bosses of the remaining vaults, but their general surface only masoned with red lines on white, and some say with a few medallions. The building was of a rare class as to colour decoration, neither depending wholly on the opaque painting, as Italian and Southern Gothic, nor wholly on the glass, as do Chartres, Bourges, York, and did Rheims and most northern thirteenth-century work, as built. At the Sainte Chapelle, the stone painting, if authoritative (which I doubt), is totally thrown away. Salisbury had no fully-coloured windows, probably none with figures, and very little positive or intentional colour in them, especially the clearstory, for the lower windows are (as in all English works) excessive in relation to the clearstory, but less so here and in Westminster than in any other English church. The coloured glass was valued as gems among the rest, which by its unintended, but now seemingly inimitable, motting of all kinds of sea-greens and dull purples, excluded half or more of the light that now enters; but even then it was a light building, as Westminster Chapter-house was, and must be again if wall paintings are to tell.

Mr. Armfield's protest against the antiquary's claim to have such things as Temple Bar or Burlington colonnades left him as "history" does not go half far enough. I utterly deny that they are history more than the last plates of "Le Follet." "History in Stone," or in wood, clay, metal, ceases in a race when their palace and cottage begin to be in different styles; or, as Mr. Ruskin says, "any stone-cutting or joinery, or pottery, or smith's work, to be so debased in character as to be utterly unconnected with the finer branches of the same art." There are countries, as Japan and India, where all material works are history, down to this day,

their arts being, as Mr. Fergusson says, "though effete, yet not insane;" and as we come westward to Turkey, Russia, Belgium, France, art-history ceases earlier and earlier, not necessarily at the "Renaissance," often later, but in England earlier—as early as the fourteenth century; and there are our colonies and America with not a stone of such history, nor the remotest apparent chance of ever having any. The terms *new* and *young* are so misapplied that they are actually the only lands with no traces of youth. We have been young, and now we are old; but America knows *only* age and decrepitude,—born therein, if you can call it a birth, and never having seen the stage in which stone history is possible.

I deny even the right claimed for more than chief and first-rate works of the native art's decline, to more than careful photographic immortality *on paper*. Wykeham's, and the royal works of the fifteenth century, and Welsey's are history; but not such things as St. John's Gate, Clerkenwell, or the above-named square of groining that spoils the interior of Salisbury Cathedral. They are only so far history as to deserve, before being swept away, well photographing; which even things as late as Northumberland House deserve, but seemingly have little chance of getting.

It is only when we get back to Edward II., the age of Ely St. Mary's Church, for instance, that moulded stones are sacred; and before 1300 universally so; and the breaker down of any carved work with axes and hammers, a national enemy, whose name must be sought out and duly made to stink, entirely apart from "early Puritans."

Poor Salisbury! As one "munificent" bishop, you see, cost her all her nique, "exquisite," and historic painting, so has the monumenting of another cost all her sculpture! Observe, it always takes a great London man of taste to destroy these things. The local artificers have a certain innate feeling, that refuses the job, however good for trade! Mr. Osmond, the Salisbury sculptor, was the sole preserver of the Chapter-house frieze to the end of the late bishop's life. I know that he was constantly urged, but could never be persuaded to lift up tool upon it, and his lordship had an odd scruple against superseding local by strange artificers. But, alas! great men must be monumented. He died just as the Sydenham Palace, and its Panathænaic horses alternating bay and grey, bay and grey, were all the rage. Salisbury shopkeepers resolved Pharaoh's chariots and his horsemen should be equally smart, "in memory of" their excellent hishop. They forgot that at Sydenham it was not the Phidian works themselves, but *casts* they saw coloured. Their toy was to England, not what the casts were to Sydenham, but what the very Phidian frieze had to Greece!—the chief sculpture of our completeness, or, rather, *only* complete monument of the national art. What odds? It was the handiest cheapest ground for what they wanted, a showy monument (of paint) to an excellent bishop; though such ground must be made nineteenth-century workmanship (for there was all Genesis and Exodus; and the Creation, and other scenes with the Deity figured, had been purged by the careful hands of the real Puritans of what they held a breach of the Commandment). But had not another century saved us the designing? What odds whether your handy thirteenth century's own work be left in existence or not? A Londoner, of course, was sent for, and the 170 ft. of shabbied old carving (but convenient design) soon disappeared; yielding said Londoner, I suppose, due per-centage on the outlay of axes and hammers. And so, if Longfellow, or any American, asks there after the sculptures of the Parthenon of his forefathers, he must be told, the Salisbury shopkeepers of 1860, finding it theirs, not England's, and having a munificent bishop to monument (with paint), found the said frieze's place the cheapest for it. Now, I call it monstrous that the whims of the hour, in a place like Salisbury, should thus have power to disinherit the great Anglo-Saxon race throughout the world, for all time.

The real danger, you see, has now become, that however short may be the remaining term of Lord Bishops and the like among us, they will be found, with this religion of Per-centage, to have lasted just too long, by a few years, to leave (between them and their monumenting) any of England's artistic history at all. Salisbury's losses are strangely typical of England's at large. In the new frieze there,—which, by the way, has

not more than half the figures the old one gave me the impression of containing; nor that any engraving, from Duggdale to Britton, gives the idea of—the showman says three bits of figures only are original, and notably the head of Ham mocking his father. Yes, truly, Ham's will be found the only head, when this poor drunken old nineteenth-century John Bull awakes too late from his wile (if he ever does), and perceives what his younger son,—whose name is Perceuter, —bath done to him!

E. L. GARRETT.

WEST INDIES PACKET STATION.

I SAW a paragraph in the *Standard* the other day to the effect that the Government had selected the central packet station in the West Indies, and had adopted "Virgin Gorda" as the most eligible.

This is to be exceedingly regretted, as I feel confident that if thoroughly inquired into it would be found less eligible than many other islands.

It possesses a tolerably good harbour, but the island is rocky, barren, and unproductive. It is in too close proximity to the island of St. Thomas, and is quite as much exposed to the action of hurricanes and earthquakes as that island, which a more southern island would not be so much exposed to.

I think the West India Mail Company will find to their cost, by a falling off in their trade, if it has not already occurred, that a more southern point of rendezvous in the West Indies would be attended with less danger and risks, as travellers will prefer the French line of steamers that are not open to these objections.

B. B.

THE MADRAS IRRIGATION.

SIR,—It is satisfactory to find that this neglected matter is beginning to attract attention at home, as will be seen by the occasional letters which have appeared in the daily papers.

India is blessed with a productive soil, and the benefits which a well-designed system of irrigation will confer on that country cannot be measured by tonnage. The average rainfall in the Presidency is 25 in. annually. Surely it requires no great engineering skill to bring a portion of this water within reach of the cultivators of the land, where the gradients are favourable.

The Madras irrigation has been a complete failure. A large portion of the labour spent on public works in India is pure waste. Surely the enterprisers should not be so fatally blind to their own interests as to entrust great and important works to a lot of speculative adventurers, instead of treating with contractors of position.

The promoters should insist upon all contractors sending qualified engineers and inspectors to India, instead of sending out drabstons and highway surveyors; for, to spend money broad-cast and in a careless way is an easy matter; to spend it with economy and skill is really quite a different affair; and, although we do not rejoice in the worship of Buddha or Krishna, or other exalted deities, we ought to let the natives of the sunny East understand that we are not low barbarians, by leaving useful land-marks of our occupation.

PIERRE ARTHUR.

CHANCEL SCREENS.

SIR,—In your notice of "The Great Architect" the opinion is expressed that its dedication to "master builders" refers to a certain section of the clergy. The "wise master builders" appealed to by the Apostle Paul, were the great body of Christians through all ages, cognizant of their inherent dignity as "kings and priests," and willing to do the work of building themselves up into "living temples."

Ministers were appointed, not to do the work for others, but to exhort all to do it for themselves: the clergy, therefore, have no *ex officio* claim to be "master builders."

You, no doubt inadvertently, use the term "screened platform" as synonymous with railed platform. The distinction between the two phrases is most important,—the one being the

vailing to conceal a presumed mystery; the other, an expedient to prevent accidents.

The late A. W. Pugin wrote his book on "Chancel Screens" with the avowed object of trying to prove that it was the custom from the beginning to put "screens" in front of chancels. "I cannot," he says, "impress too strongly on the minds of my readers that the very *rites* of Catholic architecture are assailed by the opponents of screens." To establish this point he did not hesitate to compromise his reputation as an honest man, as he was told in your columns, by asserting the primitive antiquity of screened chancels, no such thing being known till after the ninth century. To illustrate his assertion, he gives a plate with the title "Elevation of Screen of Old St. Peter's Chancel at Rome," the said screen having been inserted about 1,100 years after the erection of the church; the plan of which shows the old real chancel behind the modern mock one.

"Real Protestants," states Mr. Pugin, "are always built rooms for their worship," an axiom which proves them to have been in accordance with primitive Christians, who never built anything else for nine hundred years; a basilica being simply an open meeting-hall.

We are entering into the great struggle of adverse principles, in which, as I have long predicted, this question of church arrangement will be a leading object of attack and defence. The aim of my little book is to place on record the indisputable fact that the very stones of Rome bear witness against her pretensions.

THE AUTHOR.

COMPETITION PLANS.

THE WALWORTH-COMMON ESTATE.

I REFLECTFULLY beg leave to offer a suggestion to the guardians who have now to decide on the respective merits of the above plans, to avail themselves of the assistance of a professional man of high standing and character to enable them to come to a correct conclusion in their selection for the benefit of the parish.

I know several competitors share the same opinion, and I dare say the entire number would agree to the above: at all events, it will help greatly to remove erroneous impressions. ONE OF THE NOMINEES.

* We have received two other letters to the same effect.

CONTENTS OF CONICAL HEAP OF BALLAST.

SIR,—Allow me to give your correspondent, "A Working Man," the following rules for finding the contents of a conical heap of ballast:—

1. Measure the two ends, and extract the square root of their product; add this to the area, and multiply by one-third of the perpendicular height.

Another rule is to divide the difference of the two ends by the diameters of the two ends by the difference of the two diameters; multiply by 7854 and by a third of the perpendicular height, which will give the solid contents.

JOSEPH E. HAYMES.

PROPOSED NEW CHURCH, ST. PANCRAS.

SIR,—In your impression of June 13th, a correspondent informs you of a church about to be built in Kentish-town, and that the son of the Rev. Mr. Champneys, the vicar, had been appointed by him architect to carry out the works. I beg to inform you I was requested to attend a committee meeting for building this church, February 21st, 1868, the Rev. Canon Dale in the chair. The Rev. Mr. Champneys, vicar of St. Pancras, I believe was there; the Rev. Mr. Andrews, the incumbent, and other gentlemen, being present. I was at that meeting formally appointed architect to the church, parsonage, and schools, proposed to be built out of a fund of 12,000*l.*, to be realised by the sale of the site to the Midland Railway Company of the former Church of St. Luke, King's-cross, which had been erected from my design.

Some time after I attended, by the request of the Rev. Mr. Andrews, at Kentish Town, to inspect and survey a site proposed to be given by one of the colleges for the new church; present, the Rev. Canon Dale, the Rev. Mr. Champneys, the Rev. Mr. Andrews, the surveyor to the College estate, and myself, when I believe it was found necessary to obtain an Act of Parliament to dispose of the funds obtained from the sale of the former district Church of St. Luke, King's-cross, to another district in the same parish; everything regarding myself remained in abeyance until this Act of Parliament was obtained, which received the Royal assent May 26th last. I was now expecting to receive instructions to proceed with the designs for the new church, and the first notification I learnt to the contrary was that contained in your journal of the 13th instant; and, on inquiring of the Rev. Mr. Andrews, I find your statement to be correct, that the vicar has appointed his son to be the architect, after being one of the committee previously to appoint myself, and without having the courtesy to give me any information or reason for removing my name.

JOHN JONSONS, Architect.

In reply to observations under this heading, in our issue of the 13th instant,* we

* See p. 433, ante.

have received from Mr. J. Pritchard, Llandaff, a strong testimonial in favour of the young architect, the vicar's son, who is to design the church, and of the builder from Wales, who is to carry out the design without competition, but we are obliged to decline inserting it except as an advertisement. The facts remain as stated.

THE POOR MAN'S MEAT IN LONDON.

A NEW view of the Foreign Cattle-market scheme is given under this title by the *Daily News*. In an interesting article on the animal food of the London poor, the writer points out how the placing of the proposed market at Dagenham, or elsewhere out of town, would react on the supply to the poor of their portion of the meat-market supply. We give an abstract:—

"The quantity of butcher's meat consumed by the poorer classes of the metropolis is considerably greater than is usually supposed. It must not, however, be hastily assumed that the meat is eaten in the shape of beef, pork, or mutton; on the contrary, large numbers of the poor have been flesh-eaters for years, without once enjoying, unless at rare intervals, the luxury of a bit of beef or mutton. The meat used by them is procured wholly from what is technically termed the 'offal' of slaughtered animals, and which forms a most important feature of the metropolitan dead-meat trade, its sale generally constituting the principal source from whence the profits of the wholesale butcher are derived. The offal consists of the head, tail, kidneys, heart, tongue, liver, and other portions of the animal, the latter being generally going with the skin or hide. The estimated value of the offal per animal is about 50*s.* for a bullock, and from 10*s.* to 13*s.* for a sheep. The offal, when fresh, generally forms in poor neighbourhoods the most saleable portion of the animal.

When it is remembered that in 1867 no less than 285,754 head of oxen, and 1,472,000 sheep, forming a total of 1,757,754 animals, exclusive of calves and swine, were disposed of in the metropolitan market, some adequate idea may be formed of the magnitude which the trade in animal offal has attained, and the important position occupied by it in the domestic economy of the poor. Anything which may tend to increase the price of the commoner descriptions of offal must inevitably press with terrible severity on the humblest classes. Yet the possibility of this has been almost wholly overlooked by the advocates of the new Metropolitan Foreign Cattle Market. The Duke of Richmond, in answer to a question by Mr. Hope Scott, declared that "he knew nothing about offal; and yet he was very anxious for the establishment of the proposed market. He had looked at the question from one point of view only. It has been shown conclusively in the evidence taken before the Metropolitan Foreign Cattle Market Committee that the compulsory slaughter of foreign animals at Dagenham, instead of in the present localities, will most certainly lead in various ways to a complete withdrawal of a large portion of animal offal from the different metropolitan retail markets; the cost of carriage and the deterioration of quality occasioned by the time and mode of transit from Dagenham to the retail shops being more than sufficient to absorb the profit of the dealer.

In fact, everything tends to prove that the animals must be slaughtered as near as possible to the place where the meat is to be retailed. If compulsory slaughter is to be insisted upon, the site proposed for the Islington *abattoirs* is far preferable to Dagenham; but in either case the poor will become the sufferers. If we are to have public *abattoirs*, they must be in different localities, as in Paris, otherwise the price of meat will rise above the reach of the humblest classes, who are already much dissatisfied with the manner in which they have been treated by the abolition of the compound householder system. The establishment of Metropolitan *abattoirs* at Dagenham, if the Foreign Cattle Market would be like pouring oil upon fire, it would prove a dangerous experiment."

PROVINCIAL NEWS.

Lynwoodville.—A monumental tomb has just been erected here, by Mr. Thomas Lewis Webb, of Hagley, to the memory of his deceased wife. The site selected is adjacent to the large vault of the Freeman family, near the pathway on the Tidnor side of the churchyard. The tomb is formed of a base of worked Aberdeen grey granite, 9 ft. 6 in. long by 6 ft. wide, surmounted by a plinth of red Peterhead granite, chamfered on the edge and highly polished. The ledger, or slayed top is of the same material, and the height of the whole is 2 ft. 6 in. The ironwork by which the tomb is protected is in the Egyptian style. Ten standards, of proportionate height, and surmounted by flambeaux torches, carry the bar rail, which is of the cable coil pattern.

Penrith.—The new market-house at Penrith is now almost completed. The new building may be adapted to any purposes, such as lectures, concerts, or public meetings. It is a large brick building of peculiar shape, but that has been caused by the whole of the available space being built upon. The roof is of glass and slate, with fifteen ventilators, and the side windows can also be easily raised to admit of more fresh

air when required. The roof is supported by strong iron pillars, and accommodation has been provided for both buyer and seller. It can be lighted from horizontal lines of gas jets. The new building occupies about 700 square yards of surface, and the roof and sides contain upwards of 1,500 ft. of glass. The architect was Mr. Stewart, of Carlisle, and the contractors were,—for the masonry, Messrs. T. & G. Dixon, Penrith; plumbing, plastering, painting, and glazing, Mr. Relson, Penrith; carpenter's work, Mr. Pollock, Penrith; gas-fittings, Mr. Porter, Penrith; and for the castings, Mr. D. Clarke, Carlisle. It has been estimated that the total cost of the building will be about 1,000l., but we understand that some of the "extras" are heavy.

ARCHITECTURE: UNIVERSITY COLLEGE, LONDON.

At the recent distribution of prizes, the following were awarded:—

In Architecture, Professor Hayter Lewis.—*Fine Art, First Year's Course:* Prize, Arthur Hill, of Cork. Certificates, 2nd, C. R. Griffiths, of London; 3rd, F. H. Reed, of London. *Second Year's Course:* Donaldson Silver Medal, Arthur Hill, of Cork; 2nd prize, C. R. Griffiths, of London; Certificate, 3rd, F. H. Reed, of London. *Construction, First Year's Course:* George Duncan, of London; Certificates, 2nd, C. R. Griffiths, of London; 3rd, J. Wallace Duncan, of London. *Second Year's Course:* Donaldson Silver Medal, George Duncan, of London; 2nd prize, C. R. Griffiths, of London; Certificate, 3rd, J. Wallace Duncan, of London.

In Civil Engineering, Professor Fleeming Jenkin.—Prize, Leslie C. Hill, of London; Certificate, 2nd, W. H. Johnson, of London.

CHURCH-BUILDING NEWS.

Carlisle.—The chief stone of St. Mary's new Parish Church has been laid. The site is that formerly occupied by the Black Swan Inn, near the Cathedral-cloze. Mr. Ewan Christian, of London, is the architect. The design is intended to harmonise as much as possible with the cathedral. The edifice will consist of a nave and transept, with a polygonal apse at the east end, and north and south aisles. The entire length of the building will be about 95 ft., and its breadth about 60½ ft. The apse will have a radius of 15½ ft., and will be 31 ft. across, the whole depth of the chancel being 36 ft. The walls will be built of red stone throughout, from Newbiggin quarries, the character of the external walling being similar to that adopted in St. John's Church, namely, rock-faced rubble; while the masonry around the windows will be dressed. The arcades dividing the nave from the aisles will consist of three pointed arches, of which the pillars will be of black Kilkenny marble, with moulded and carved base and cap, and the arches will be formed alternately of red and white stone, with white stone bands. Above these arches a lofty clearstory will be constructed, with double-light lancet windows on each side, with black marble shafts and arches of red and white stone. There will be three windows on the south side lighting the south aisle, and one triple-light lancet window on the north side, the position in which the church is placed with regard to surrounding property rendering it impossible for the architect to make the north side the same as the south. The use of the east end will contain seven single-light tracery windows, to which are placed marble shafts supporting the internal arches, and above these other marble shafts supporting the carved and moulded ribs of the roof. These windows will be filled with stained glass at the expense of Mr. Losh. The chief feature in the west end of the church will be a large window, 25 ft. high from the sill to the spring of the arch, and having an opening 14 ft. wide. This will be divided into four lights by three mullions, and the top of the window will be filled with tracery and geometrical design. The nave and chancel will be covered with barrel-shaped roofs, which will be plastered, but the main timbers will be moulded and carried round on the under side of the ceiling. The aisles will be covered with open-framed timber roofs. The church will be provided throughout with open seats, which will accommodate about 600 people. The roof will be covered with Westmoreland slates. The

contractor is Mr. George Black, joiner, of Carlisle, the estimate amounting to about 4,552l. The execution of the masonry work has been undertaken by Messrs. C. & J. Armstrong, of Carlisle, builders.

Dorchester.—The chief stone of Holy Trinity Church has been laid by the Lord-Lieutenant of Dorset. The site is in Madeira-vale. Messrs. Cory & Ferguson, of Carlisle, are the architects. The design of the proposed new edifice, which will be built of brick, is that of Lombardy, the "great brick country," at the same time introducing such features as may render it suitable for our own climate. The church will comprise nave, aisles with shallow transepts, and an apseid chancel with small aisles. There will be a Galilean porch extending entirely across the west front, and connected with the tower by a corridor. It is proposed to build the church of red brick, slightly brought out in the most salient points with moulded brick, and terra-cotta introduced in the shafts of the western porch and orders of the main doorway of the tower. The interior is to be lined with buff bricks, if they can be procured of good colour, relieved with red brick string-courses and hood-mouldings, with spaces left to be filled up with string-courses of manjolica tiles; whilst in the circular panels, and in the spandrels of the arches of the main arcade, will be fitted subjects in Venetian mosaic. It was originally intended to have a gold ground for this mosaic work, but the idea has been altered. The roof of the nave is to be barrel-vaulted, in wood, carried by laminated principals tied with wrought-iron ties, and lined with varnished wood. On the outside, the roof will be covered with the ordinary russet-coloured tiles. The church as at present designed will, when complete, afford accommodation to 1,031 adults, and it is intended that 350 sittings shall be free. Without the north aisle and transept accommodation would be provided for 802 adults. It is proposed to build at present the nave, chancel, south transept and aisle, vestry, and cellar for heating apparatus, with temporary porches over the west doors.

Kempston (Bedford).—The church of St. John the Evangelist has been consecrated. The new edifice is situated in the district of Up End. The site, which has a fall of about 6 ft. to the main road, and is very picturesque, was given by the late Mr. Littledale. The ground plan of the building (which is in the style prevailing toward the close of the thirteenth century), comprises nave, south porch, ringing chamber, chancel, vestry, and organ chamber. The materials used throughout for masonry are the local limestone from the quarry of Mr. Mitchell; the ironstone bands from Wellingborough; and the quoins, string-courses, plinths, and dressings generally are of Bath stone. The internal surfaces of the walling are rendered in ordinary plaster. The nave is 70 ft. long, 25 ft. 6 in. in width, 21 ft. and 40 ft. high to the wall plate and apex of roof respectively. This portion of the work has been designed to allow the subsequent additions of north and south aisles, the discharging arches of the arcades for which have been constructed in the masonry of the present walls. The nave is divided into five bays, and is lighted on the north side by five and on the south side by four two-light windows with lancet and circular openings; a smaller window is introduced over the ridge of the roof of the south porch. The west windows form a group of three lancets, with a rose of six foils in the upper stage. The west windows, fitted with painted glass by Mr. Wailes, of Newcastle, form a memorial to the late Mr. Littledale, of Kempston. The side windows have been glazed with cathedral glass in, quarries slightly tinted. The benches in the nave are open and moveable; executed in deal slightly stained and varnished; seats for children are placed at the west end. Accommodation is provided for 270 adults, and about 100 children. The south porch is open roofed in oak, with front truss and coupled rafters. The bell-turret is carried up from the buttresses in the form of a cross on plan. The turret is arranged to carry three bells; one only, at present has been cast and raised by Messrs. Mears & Stainburn, of Whitechapel. The chancel is 33 ft. long, 18 ft. wide, 17 ft. high to the wall plate. The east end is apsidal, with an approach of five steps from the nave, and is lighted by three lancet windows in the octagon faces; the centre light is carried up into a dormer; these openings have been fitted with painted glass by Messrs. Clayton & Bell, of London. The works connected with the erection of the building have

been executed by Messrs. Winn & Foster. The committee decided to dispense with the services of a clerk of the works. The architect was Mr. Robert Palgrave, of London.

Parnham Royal.—The parish church has been re-opened by the Bishop of Oxford. Except a portion of the chancel it has been entirely rebuilt. The cost of restoration was estimated at about 2,200l., and of this sum more than 1,600l. have been raised, leaving a balance of some 600l. still required. The church has been erected by Mr. Pope, of Dover, from the designs of Messrs. Nesfield, of London, architects.

Dinebar (Herefordshire).—The parish church has been restored and re-opened. The restorations have been under the direction of Mr. F. E. Kempson, of Hereford, architect; and have been executed by Mr. J. Stone, of Eynsham, builder. The work of restoration included the entire rebuilding of the nave, chancel, and porch, on the site of and in the same form as the old edifice, with the addition of an organ chamber and vestry on the north side of the chancel. The architectural features of the old church have, as far as practicable, been preserved, and the old materials used in the re-building of the edifice, the masonry being relieved with Bath stone buttresses, copings, and dressings of the windows. The outer walls are of stone from a quarry in the immediate neighbourhood, lined in the interior with stone of a delicate grey colour from the quarry of Sir E. F. S. Stanhope, bart., at Ballingham. The roof, which is of wood, is entirely new, the construction being shown, being open from within with plaster between the rafters. The seats are open benches of pine wood, with sloping backs. Light is afforded in the nave by two couplet windows on the south side, and a couplet and a lancet on the north side; and in the chancel by two windows on the south side, and by a triplet in the east end. The passages between the seats are paved with tiles from the manufactory of Mr. W. Godwin, of Withington, and there is affixed in the church a heating apparatus by Messrs. Rimmington. The porch is executed in pitch pine on a stone base. The tower has not been rebuilt; the masonry has, however, been cleaned of whitewash, the joints raked out and pointed, and new belfry windows have also been inserted. The roof has been re-slatted. The carving in the work of Messrs. Pearney, of Gloucester. The style of architecture of the church is Early English. The cost of the whole work was 700l.

St. Helier's (Jersey).—The town church has been restored under the direction of Mr. John Elliott, architect. The sum voted for the restorations by the parish authorities was 4,530l., and the actual cost was 4,501l. The edifice has been re-pewed in oak, the stonework restored; a new transept built and the nave extended, and various other works done, painted windows inserted, &c. The contractor was Mr. Westway; and the clerk of works Mr. Frank Le Sneur.

Herne Bay.—The new chancel of Christ Church has been consecrated. The architects of the work were Messrs. George & Vanghan, of London, who, in designing the additions to the existing nondescript structure, had first to consider the style most appropriate for the new work. The church, formerly one wide room with flat ceiling and low-pitched roof, was, nevertheless, Gothic in its windows and details, and being of brick, it was decided that the brick Gothic of Northern Italy would best harmonize with the old building. This style was adopted as requiring no great amount of carving or ornament, trusting mainly to its proportions for effect. The east wall of the church has been taken down and rebuilt, 7 ft. being added to the length of the nave. To the north of the chancel is the organ-chamber, with a wide arch to the chancel and a similar one to the nave. Seating for a considerable number is provided by the addition of north and south transepts, which are connected with the church by arches having each a span of 22 ft. These transepts are lighted by rose windows. The walls of the church internally show the brickwork, which is relieved by the introduction of occasional coloured bands, and by stone vasaors in the arches. The capitals of the shafts are of various designs in natural flowers. These, and all the internal stone work, are of Caen stone; while externally Bath stone is employed. The architects' gift to the church is a pulpit of Caen stone. As stained glass was not attainable, the architects have made a departure from the vernacular diamond lights by the introduction of geometrical forms in three shades of cathedral glass. The flat portion of the old plaster ceiling, which has

long been in a dangerous condition, has been knocked away and the main timber of the roof exposed, arched struts being inserted above the tie-beams; the rafters are covered with boarding, and the whole is stained to match the new work. The work has been carried out by Mr. Adams, of Herne Bay, builder. The additions already made, including sundry changes to the original building, have been executed at a cost of about 2,500*l.*, of which not quite 1,800*l.* have at present been raised. It is hoped that this and further funds may be placed at the disposal of the incumbent and the committee, to enable them to complete the work, by the erection of the tower and re-seating of the old portion of the edifice.

Ampleforth.—The church of Ampleforth, in Yorkshire, has been almost entirely rebuilt, and is now re-opened. The restoration, costing about 1,200*l.*, has been effected from plans by Mr. Heeley, of Bradford, architect.

DISSENTING CHURCH-BUILDING NEWS.

Attercliffe (Sheffield).—The foundation-stone of a Methodist New Connexion Chapel, which is about to be erected in Shortridge-street, Attercliffe, has been laid by Mrs. Firth, the wife of Mr. Mark Firth, the Master Cutler. The architects are Messrs. Hill & Swann, of Leeds. The building will be in the Gothic style, and it will be capable of accommodating 450 adults. The external walls will be faced with red brick and stone dressings. The extreme length of the chapel externally is 72 ft., and the width 41 ft. On the basement, a school-room, 46 ft. by 38 ft., two class-rooms, and a kitchen will be arranged. In the lobby, to the left of the vestibule, there will be a tower surmounted by a spire slated with party-coloured slates, and relieved by four dormer windows with spirelets. The roof of the chapel will be open, with arched rib-bindings, and the timbers will be stained and varnished. The whole of the pew framing and internal joiners' work will also be stained and varnished. The total cost of the building, exclusive of the cost of the site, will be about 2,100*l.*

Hilkey.—The chief stone of the Rhyddings-road Congregational Church has been laid. The church is situated on the new terrace to be called "the Grove," and is within two minutes' walk of the railway-station. It is to be in the Decorated style. The front will face the east, and the vestries and school will be in the rear. The principal entrance, with canopied heading and a five-light window above it, will lead into a vestibule faced with stone. To the left will be an octagonal tower, with slated roof and spire, and to the left, at the junction of the Rhyddings-road and the Grove, will be a tower and spire, rising to the height of 120 ft. The windows at the sides, of two lights, are set in gables, which break the roof-line. The interior of the church will be divided into nave and side aisles by iron columns. The pews will be open, 34 in. wide, with low leaning backs, and cushioned. The whole of the woodwork is to be of pitch pine. The glazing will be of cathedral glass, with coloured margins. In the chancel will be the reredos, and above it a wheel window. The dimensions of the interior will be 64 ft. by 42 ft., the extreme length 79 ft., and the accommodation in the area and an end gallery 444 sittings, allowing 20 in. for each person. By the addition of side galleries, 200 more persons can be accommodated at a very small expense, increasing the number of sittings to 644. The school, which is nearly finished, and will be opened for Divine worship in the course of a few weeks, is 50 ft. long by 22 ft. broad, with two class-rooms at the end, beyond which will be a chapel-keeper's house. The cost of the church, school, and land is expected to be about 5,000*l.* Mr. J. P. Pribbett, of Darlington, is the architect; Mr. R. Law the clerk of the works, and the following are the contractors for the works:—Masons, Messrs. T. Y. & W. Freeman, Otley; slaters and plasterers, Mr. J. Tattersall, Bradford; joiners, Messrs. John Ives & Son, Sibley; plumbers and glaziers, Mr. L. Bannister, of Pudsey; painters, Mr. Henry Mitchell, of Huddersfield; iron-workers, Messrs. Walker & Son, Newcastle; carvers, Messrs. Barnstall & Taylor, Leeds; and the warming apparatus was provided by Messrs. G. Haden & Son, of Trowbridge.

Rugby.—The chief stone of a new Wesleyan chapel has been laid here. The style of the chapel is Gothic, of the Early Pointed Period, carried out in red bricks, with black bands, and dressings

of white stone. The principal entrance faces the Market-place, and will be entirely of stone, with enriched moldings, carved caps, and polished marble shafts, the upper part above being finished as a tower, with lancet windows, and the roof carried to a well up. Next to the tower will be a small gable, filled in with a wheel window in plate tracery, the remainder of the side elevation being occupied with three-light windows under one pointed arch, which will show itself inside as well as out. The interior will have somewhat the effect of nave and aisles, the roof being supported partially upon iron columns with foliated capitals, the centre bay or nave being 25½ ft. wide, aisles, 9 ft. 9 in., the end finishing with a semi-circular apse the full width and height, and the roof timbers, springing from shafts on stone corbels, concentrating to the centre, the roof timbers being ornamented, and the entire ceiling of the nave boarded and finished in various shades of stain varnished. The windows throughout are to be glazed with cathedral glass, a narrow margin of white or colourless glass running round, and those in the apse a little more enriched. There will be accommodation for 500 persons on the ground-floor and 200 in the gallery. The total estimated expenditure, inclusive of site, &c., will be about 4,000*l.*

Mallesbrough.—A new chapel has been opened in Milton-street, in connexion with the United Free Methodists. The chapel, which is called Paradise Chapel, has been built from designs furnished by Mr. Hunter, a local architect, and is in the Gothic style. It is built of white brick with stone dressings, and archings and courses of red and coloured brick to relieve. The body of the chapel contains 300 sittings of deal, open and stained. The cost of the whole, inclusive of land, has been 1,200*l.* The vestry and schools are underneath the chapel.

Books Received.

"On the Pollution of Rivers of the Kingdom. Circulated by the Council of the Fisheries Preservation Association, 23, Lower Seymour-street, Portman-square." The purpose of this pamphlet is to point attention to the enormous magnitude of the evil, and the urgent necessity, in the interest of the public health and the fisheries, for its suppression by immediate legislative enactment, as evidenced by extracts from the reports of successive Royal Commissions, Committees of both Houses of Parliament, Inspectors of Salmon Fisheries, Medical Officers of the Privy Council, Registrar General, &c., presented or returned to Parliament between 1855 and 1868. The Fisheries Preservation Association is an influential society, under the presidency of the Duke of Northumberland, and the Vice-Presidency of Lord de Blaquiere.—The *Journal of the Historical and Archaeological Association of Ireland*, originally founded as the Kilkenny Archaeological Society in 1849. Vol. I. Third series, No. 1, January, 1868. It is not to be wondered at that so extensive and successful an Association as the Kilkenny Archaeological should become national in name as in extension. Its Transactions are published by McGlashan & Gill, Upper Sackville-street, Dublin. The number before us is as usual an interesting one, and is well illustrated by very good engravings. The most important papers in it are one on an Ogham Chamber, at Drumloghan, by Mr. Williams, of Dungarvan; and another on a class of Cromleacs, for which the name "Primary" is proposed, by Mr. G. V. Du Noyer, district officer of the Geological Survey of Ireland. As bearing out ideas urged in the *Builder*, and opposed by some Irish archaeologists, we may quote a passage from Mr. Williams' paper on the newly-discovered Ogham cave.

"The total absence of human remains here will seriously affect, if, indeed, it do not completely upset, the theory of the sepulchral character of this class of structures, notwithstanding the accidental circumstance of the presence of such remains in the solitary instance of the Dunloe cave. The promised New Zealand archaeologist, having finished his sketches of the ruins of St. Paul's, may, perchance, happen to visit Kilkenny, and would probably find abundance of human remains within the precincts of the sacred ruins of St. Canice's; but should he thence conclude that it was originally a great mausoleum, would he not err? Christians in every age, actuated by feelings which we can readily understand, have longed to be buried near the shrines at which they worshipped during life; and, as there is nothing new under the sun, it can be hardly doubted that the Pagans of old would desire to have their remains deposited in places connected with religious worship, and to which the odour of sanctity attached."

What is remarkable in reference to Druidical

practices, it appears that a broad circular fence or rampart, coeval with the Ogham chamber, passed directly over the roof of it. This external ring or rampart is concentric with an elliptical enclosure about a third of the extent, and traditionally believed to have been an ancient cemetery, but "long disused, except for the interment of unbaptised children, suicides, and others not considered entitled to burial in consecrated ground." The Druidical allusions in the Taliesin records to "ramparts" and "enclosures" over which the "light-hounding stool of Hu," the Druidical God, was said to leap, are well known. Mr. Williams states his own unhesitating belief that "this great external ring was an open-air Pagan temple."—"St. David's," its Early History and Present State." By an Ecclesiologist. London: Bemrose & Sons, Paternoster-row. The cathedral of St. David, is, of course, the chief object described in this little guide to St. David's: it is illustrated by a few engravings, the only merit of which is that they are copied from rough sketches by a *fac-simile* process, which has thus its demerits as well as its merits, since by the usual processes perhaps some improvement would have been made on the very poor original drawings.—"Examples of Modern Steam, Air, and Gas Engines of the most recent approved Types." By John Bonree, C.E. Part I. Longmans & Co. These examples of the most recent and approved types of engines are designed for the use of experienced engineers. The work is intended to give minute and practical descriptions of engines for pumping, driving machinery, locomotion, and agriculture, and will be accompanied by working drawings, and embody a critical account of all projects of recent improvements in furnaces and boilers, as well as engines. The whole will appear in twenty-four monthly parts, and form one volume quarto illustrated by about fifty plates and 400 woodcuts.

Miscellaneous.

VALUE OF PROPERTY IN MANCHESTER.—At a sale last week by Messrs. Chinnock, Galsworthy, & Chinnock, of the numerous properties sold by direction of the Court of Chancery, in the causes of Hervey v. Chapman and Hervey v. Slack, land in Fountain-street, with the Swan Inn, sold at the rate of about 24*l.* per yard, or upwards of 120,000*l.* per acre.

CUTTING GLASS BY HOT AIR.—According to *Les Mondes*, the use of hot air, or gas, for cutting glass, is an invention, already utilized by the Crystal Company of Calcutta. The hot gas issues from a pointed or flattened tube, and is driven directly upon the goblet or other object to be cut, which is placed in close proximity to the tube, and made to revolve upon its axis. A narrow circle of heated glass is thus formed upon the object in question, which being damped immediately afterwards, causes the glass to divide with extreme neatness at the part thus heated. The operation is more rapid and effectual, we are told, than any means hitherto employed for this purpose.

THE LADIES' SANITARY ASSOCIATION.—The annual public meeting of this admirable association took place on the 12th inst., at the Hanover-square Rooms, the Earl of Shaftesbury presiding. The report (which was read by Dr. B. W. Richardson) stated that the funds had increased during the past year beyond those of any previous year. Fifty-three essays had been sent in competition for the prize of 100*l.*, offered by the society for the best essay on vaccination, the majority of the writers being medical practitioners, and the successful competitor being Mr. Edward Ballard, medical officer of health of the Islington district. The financial statement showed that the receipts amounted to 1,372*l.*, and the expenditure to 1,358*l.*, leaving a balance of 14*l.* The Earl of Carnarvon proposed the adoption of the report, expressing his cordial approval of the objects and operations of the society, especially in regard to the establishment of branch associations abroad, and the circulation of tracts diffusing important information upon the laws relating to the maintenance of human health by preventive means. The Rev. J. B. Owen seconded the proposition, which was agreed to. The meeting was also addressed by the Hon. L. Stanley, the Rev. Mr. Rowsell, Mr. Godwin, Mr. Edwin Chadwick, Dr. Richardson, Dr. Aldis, and by the chairman; and various resolutions were adopted in furtherance of the objects of the association.

SURVEYOR FOR OXFORD.—Mr. Clarke, the
stant borough surveyor of Portsmouth, has
lected surveyor for Oxford. There were
enty-one candidates. Great credit has been
n to Mr. Clerke for his conduct during the
ress of the main-drainage works in Ports-
th.

PEALS FOR ST. CHAD'S CHURCH, MIDDLE-
R.—A peal of bells has been presented to
Chad's, Middlemoor, by a daughter of the
Mr. Horner Reynard, of Holgreen, West
keshire, as a memorial of the late Mr. Simon
ner, merchant, of Hull, the last of a family
known in the Dale. They are a maiden peal,
were cast by Messrs. Blows & Sons, of Bir-
gham, May 19th, 1868. Weight of the peal,
ns 10 cwt. The opening of the peal took place
some festivities on the 11th inst.

NEW TENDERS FOR THAMES EMBANKMENT.—At
last meeting of the Metropolitan Board of
orks, the Board received tenders for the con-
ction of that portion of the embankment
(th) between the eastern end of the Inner
ple and Blackfriars-bridge. They were as
ows:—Messrs. Hill & Keddle, 179,000.;
mas E. Ridley, 173,500.; Messrs. Eckers &
les, 159,500.; Messrs. Jennings & Co.,
0,000.; Messrs. T. Pearson, 144,000.;
rs. Thos. Doowre & Son, 142,000.; Kell-
ng Bros., & Lucas, 127,000.; W. Webster,
5,000. The tender of Mr. Webster was
elected.

EXPLOSION IN A THEATRE.—A serious ex-
ion of gas has occurred at the Theatre
al, Preston. The etage foot-lights are sup-
d with oxyhydrogen, and this dangerous
ture of gases is kept in bags provided
ially for the purpose on one side of the stage.
Previously to the commencement of the per-
ormance, a man named Catterall and some
ers were engaged in preparing for the ignition
the foot-lights by arranging the gas-bags, &c.,
on one of them suddenly exploded. Catterall
blown some distance, his clothes were torn,
several places, and he was considerably
ed and cut about the chin and face.

THE PLANTATION ON FIRE.—The wooded hill
rd, on the other side of Kessock Ferry from
erness, recently caught fire. About 400
ers were planted with Scotch firs. The fire
nated amongst the brushwood, and in an
r's time it had traversed a distance of nearly
a mile, and mounted to the summit of the
The flames passed through amongst the
e and whigs with such rapidity as to a cer-
extent to save the timber of the grown
s; but the bark and branches are all
kened and scorched. The fire extended over
ut 100 acres. It was not expected that it
ld be thoroughly mastered until a heavy
ver of rain fell.

LABOURERS' COTTAGES.—Mr. Lencashire, at
dinner of the Hants and Berks Agricultural
ety's show, urged that there was needed a
sh better class of cottages on farms, espe-
ly for the superior labourers whom a farmer
uses steam machinery and improved imple-
ments requires. Such men must be, to a certain
ent, mechanical engineers, and they will not
content with the ramshackled, comfortless
of mere shelter which farm labourers
e had, in many instances, to put up with.
a farmer could not be asked to erect per-
ment buildings, but he is entitled to ask that
investment in machinery, implements, and
ure shall be backed up by his landlord, and
per houses be provided on his farm for the
n, in accordance with the altered circum-
ces of the times.

THE ROYAL ALBERT ASYLUM AT LANCASTER.—
e chief stone of a new asylum for idiots of
ix northern counties of England has been
d with Masonic ceremonial by the Earl of
land, as Grand Master. Upwards of 40,000
of the 60,000 necessary for the erection of the
difice have been already contributed. The site
plot of land containing 67 acres, lying 150 ft.
ve sea-level, and about a mile south of
naster, and has been purchased at a cost
10,000. As the whole of the necessary
difices have not as yet been raised, it has been
most desirable, and the contracts have recently
n let, to erect the building so as to accom-
date 500 inmates, at a cost of 42,900. It
e erected so as to admit of easy and inex-
pensive enlargement. The building has been
igned in the Gothic style of architecture
elected to modern requirements.

BRITISH ARCHEOLOGICAL ASSOCIATION.—The
annual congress will be held this year at Ciren-
cester, commencing on the 3rd of August.

VENTILATION THROUGH STREET WINDOWS.—An
obvious plan of improving the ventilation of
dining-rooms, drawing-rooms, and bed-rooms in
this hot weather, without drawing up the
blinds, is suggested, or rather re-suggested, in
the *Morning Post*.—"Fix the roller of your blind
on the upper sash of your window, and then when
the sash is pulled down an open space is left
above for the free current of air, and yet the
lower part of the window is protected from the
sortery of outsiders."

SCULPTURE.—We have seen with much plea-
sure a group in marble, recently executed at
South Kensington, by Professor Jerichau. It is
titled, "The Bathers Surprised," and represents
two startled girls on the ground clasping each
other for mutual protection. The pose is good,
and the countenances are admirable. The lower
limbs of the elder girl would have borne a little
greater development. Some years ago, as we
have heard, the Princess Alexandra of Denmark
saw the design in Copenhagen, and, liking it,
said when I am rich I will have it produced for
me in marble. The promise was not forgotten,
and the group we have seen is the property of
H.H.H. the Princess of Wales.

MODEL LODGING-HOUSES, ST. THOMAS'S,
OXFORD.—New buildings for the labouring classes
are in the course of erection in St. Thomas's
parish, Oxford. In this district were the most
dilapidated courts and the poorest of the popu-
lation. The first block is now complete, and con-
sists of thirty sets of dwellings, each a complete
house in itself. They are approached by four
stairs, and all of them have a sitting-room,
one, two, or three bed-rooms, a scullery, a water-
closet, a coal place, and a larder. They have a
distinct water service unconnected with the closet
supply, and a shaft runs from each scullery, into
which dust and other refuse may be swept. The
new buildings have been visited by the Prince of
Wales, who, it is well known, has paid great
attention to the question of the dwellings of the
labouring classes, and his father, the late Prince
Consort had done, and has erected a large number
of admirable cottages on the Sandringham estate.
The Prince of Denmark and M. de Bulow were
with the Prince.

THE GREAT TRELLIS BRIDGE AT RUNCORN.—
This bridge, on the new railway which is to
shorten the north-western route between London
and Liverpool, has been successfully tested.
The contract for the construction of the line was
given to Messrs. Brassey & Ogilvie, and the most
difficult part of the undertaking—that of carry-
ing the bridge over the Mersey—was given by
them to Messrs. Cochrane, Grove, & Co., who
appointed Mr. John P. Ashton to superintend the
erection of the work. Mr. W. Baker, C.E.,
chief engineer of the London and North-Western
Railway Company, designed the bridge; and
Mr. S. B. Wells, as resident engineer, exercised
a general supervision over the whole work. It
is a trellis-girder bridge, and is close upon
1,000 ft. long, supported upon piers, at an alti-
tude of 75 ft. above high water-mark, so as to
allow vessels of considerable tonnage to pass
underneath. It is divided into three lengths of
327 ft. each, the extremities of the girders rest-
ing on lofty stone piers, two of which rise from
the bed of the river, and the other two being
situated near to, though not actually upon, the
shore. There is a clear space from pier to pier
of 305 ft., over which the mass stretches. The
piers are faced with Yorkshire stone, the body
consisting of red brick, and each one is crowned
with a small battlemented tower. On each side
of the girder-bridge are several arches which
carry the railway over the remaining portion of
the river. There are three of these arches on
the Cheshire side and five on the Lancashire
side, each having a span of 60 ft. These are
succeeded on each side the river by a long
viaduct, and that again by an embankment, with
an inclination of about 1 in 120, until the level
of the line at Ditton and Aston respectively is
reached. Altogether, independent of the girder
bridge, there are ninety-seven arches, sixty-five
being on the Lancashire side and thirty-two on
the Cheshire side. Those which form the viaduct
have a span of 40 ft. The river arches are built
of yellow brick, and the remainder of darker
coloured materials. The width of the bridge is
38 ft., measured to the outside of the girders;
it is 25 ft. between the girders, and there is a
footpath 6 ft. wide on each side.

MALICIOUS DAMAGE TO BOLTON NEW PARISH
CHURCH.—On Tuesday a labourer, named John
Smith, was apprehended by the Bolton borough
police, under the following circumstances:—
During Monday night or early on Tuesday morn-
ing it was discovered that the new parish church,
which is being erected by Mr. Peter Ormrod, at
a cost of about 40,000*l.*, had been seriously
damaged, several portions of the buttresses and
mullions at the north and south transept win-
dows, a large quantity of shafting belonging to
the north piers of the chancel, and the abacus of
two capitals for the piers, each weighing about
15 cwt., had been smashed with a hammer.
These portions will require to be replaced, and
the capitals are rendered useless. The only
reason that can be assigned for the commission
of the outrage is maliciousness.

DISCOVERY OF ABBEY VAULTS.—An interest-
ing discovery has just been made in Belgium.
A portion of the flooring of the stables at the
military school of Nemur gave way beneath
the feet of the horses, precipitating them into a
chasm about 10 ft. deep. On the rubbish being
cleared away, some of the pupils descended with
torches, and found subterranean passages branch-
ing off in various directions, and which proved
to be the vaults of the former abbey of St.
Jacques of Coudenberg. An exploration in the
direction of the King's palace brought to light
the place of burial of the clergy, and in a more
remote corner was found a mausoleum, bearing
the date 1481, and a Latin inscription, showing
that the monument had been raised to the
memory of the Archduke Francis, infant son of
the Emperor Maximilian and Marie de Bour-
gogne. The leaden coffin containing the body
was at the foot of the mausoleum, which was of
white marble.

THE SOCIETY FOR THE ENCOURAGEMENT OF THE FINE
ARTS.—The fourth *concertation* under the
auspices of this society was held at the gallery
of the Architectural Exhibition, in Conduit-
street, Regent-street, Mr. F. Y. Hurlstone, one
of the vice-presidents, officiating as chairman;
the company being seated, rather than engaged
in the more accustomed process of promenading,
and a programme of music being selected for
performance on the occasion. Mr. Hurlstone, in
addressing a few observations to the company at
the opening of the proceedings, stated that the
rise and progress of the fine arts in modern days
had shown the necessity for reviving that union
of the various departments of art which existed
in earlier times. The object of the present
society therefore was to comprehend, in a con-
nected form, the whole of the fine arts, under
circumstances which should be useful, alike to
professors and amateurs. The scheme of the
society, as far as it has already been developed,
includes lectures on all branches of the fine arts,
discussions upon questions of art, and more
especially contemporary art, *concertations*, exhibi-
tions of works of art, and performances of
vocal and instrumental music; and the pro-
moters have found that the combination they
desired to establish is happily receiving general
approval and encouragement.

THE HANDEL FESTIVAL.—A comparison be-
tween the numbers of persons who visited the
Crystal Palace at the last Handel Festival, in
1865, and those who have attended the present
meeting, may help to some estimate as to which
was the most successful of the two. Subjoined
is the official statement:—

	1865.	1868.
Rehearsal	15,420	13,597
First day	13,677	19,217
Second day	14,215	21,559
Third day	15,422	23,991
Total	59,434	82,465

In 1857, the experimental trial, the aggregate
numbers were only 38,114; in 1859—the first
real Handel Festival, in commemoration of the
100th anniversary of the composer's death—they
were 81,319; and in 1862, the year of the In-
ternational Exhibition, when it was first resolved
to make the Handel Festival in the Palace
triennial, 67,567—the absorbing interest created
by the International Exhibition satisfactorily
accounting for the considerable difference be-
tween 1859 and 1862. The second triennial
meeting—that of 1865—looked at simply from
the point of view of numbers, represented a
decadence, although, regarded in an artistic
sense, it greatly surpassed any of the three
previous festivals. A more wonderful series of
performances was never listened to, either in
England or elsewhere.

DIAMONDS.—A paper to the Paris Academy of Sciences on the artificial production of black, colourless, and coloured diamonds has been sent in by M. Saix. If a current of chlorine, he says, be made to pass through cast-iron, when in a state of fusion, perchloride of iron is formed, which disappears by evaporation, leaving the carbon of the metal at liberty, in a crystallised state. It is notable that Sir Humphrey Davy believed that the carbon of diamonds contains a trace or tincture of chlorine, or some other halogen.

LIVERPOOL ARCHITECTURAL SOCIETY.—The annual excursion of this society will take place on this Saturday, the 27th inst. At Wrexham conveyances will be provided which will take the party round some of the finest points of the neighbouring country, and through Wynnstay Park, where the house will be open for inspection, returning to Wrexham in time to visit the parish church (recently restored). The society offers to its student members a prize of 2 guineas for the best set of drawings, from actual measurement, of the pulpit and reredos in the Unitarian church in Hope-street. Mr. Bonit offers a set of photographs, from sculpture subjects in the Exchange News-rooms, as a second prize; and Mr. H. H. Vale offers a prize of 2 guineas for the best short essay on "The Application of Gothic Principles of Design to Modern Street Architecture."

NEW EMBASSY HOUSES.—In the Commons, Mr. Monk asked the Foreign Secretary whether the plans for the proposed new Embassy House at Therapia had been set aside; and if so, whether it was the intention of the Government to have new plans prepared upon the basis of the estimate already submitted to Parliament. Mr. S. Booth replied that two plans had been sent home by Colonel Gordon, one of which, as being the cheaper, was adopted. Mr. Otway asked the Secretary to the Treasury who was responsible for the large excess over the estimate given for the repairs of the Embassy at Constantinople. Mr. S. Booth said that no officer of the Royal Engineers could be held responsible for the works at the Embassy. He supposed the hon. gentleman alluded to the withdrawal of the clerk of the works from Constantinople. No doubt the expenditure at that time was under the control of the officer of works, through their agent at Constantinople, but he was not prepared to say there was now any excess over the estimates.

THE GREAT EAST WINDOW OF THE GUILDHALL, LONDON.—The chairman, and several members of the special committee appointed by the Common Council to superintend the works connected with the restoration of the Guildhall, recently held a meeting for the purpose of viewing the stained-glass window which has just been erected at the eastern end of the Guildhall, and which was presented to the Corporation by the operatives of the cotton-manufacturing districts, as a memorial of the exertions of the Mansion House Relief Committee during the distress in those districts in the years 1862-65. The amount, which was raised for the purpose in penny subscriptions, exceeded 1,000l. The window is described as of fifteenth-century character, being in accordance with that of the stonework. It is 31 ft. from sill to apex, and 36 ft. 3 in. in width. The window is divided into three unequal portions, triply chiesive. The central, and more important division, is of five lights in width, in two tiers. The lower series of five lights is devoted to a representation of King Alfred re-building the City of London, the figure of the king being in the middle light. The upper tier, in like manner, represents William the Conqueror granting the charter of the City of London, the figure of the king being central, as in the lower tier. The document in the hands of the king is an exact copy of the actual charter now existing, in the possession of the Corporation. In the tracery openings of the central division of the window are represented the arms of the City companies. In the side windows in each of the two lights, with traceries, are represented respectively the figures for London of Sir Richard Whittington and Sir Thomas Gresham; and for Lancashire those of John of Gant, Earl of Leicester, and Sir Thomas Stanley. Above, in the tracery, is introduced the personal heraldry of each figure. Lord Derby has expressed his regret that the state of his health prevents him from inaugurating the window, and the Chancellor of the Duchy of Lancaster, Mr. J. Wilson-Patterson, is to do it. The day is not yet fixed.

A CO-OPERATIVE MARKET AT KENNINGTON.—An Act has been obtained for a new general market for the south of London, at the junction of the Brixton and Clephan roads, at St. Mark's Church, Kennington, to be conducted on co-operative principles, so far as the subscribers are concerned. There will be seventy-five shops, to be let to all sorts of tradesmen, in regulated proportions, on condition of supplying their goods to the subscribers at certain prices and discounts, and under supervision as to adulteration, &c. The association will supply stabling and a parcels delivery system on a fixed tariff. The market will be in the form of a covered arcade, and new thoroughfare between the Clapham and the Brixton roads.

LECTURES ON THE VALUE OF SCIENCE TO INDUSTRY.—A lecture on mechanical drawing, showing the methods of projecting plans and elevations, and the application of geometrical drawing to the work of masons, carpenters, engineers, and metal plate-workers (as provisionally notified in these pages), was given by Mr. E. A. Davidson, on Tuesday evening last, at the London Mechanics' Institute. There was a good deal of ability in the lecturer's demonstration of the subject, by the aid of models, as where he showed how much work might be saved in cutting a hole in a plate-iron pipe, by knowledge of the form to be delineated on the plate before rolling, and so on; but on the matter of plans, elevations, and sections he was scarcely so clear as might have been desired. The lectures have not been attended by large audiences, and have left the committee, we are sorry to hear, out of pocket.

VALUE OF LAND, CARLISLE.—At a recent sale of the Suttle House and Newby estates, together with various other properties in Carlisle; Lot 1 belonged to Mr. G. Thompson, of Suttle House, and was a field called Raffles-lane field, containing 1a. and 39p., which went for 140l. Lot 2 consisted of two fields called North Head and South Head Closes, containing together 7a. 2r. 3p., which sold for 500l. Lot 3 consisted of East Close, East Roadside field, and two other fields, containing together 11a. 1r. 39p., which sold for 655l. Lot 4 was Suttle House, and 12a. 1r. 8p. of land, which sold for 1,210l. Lot 5 contained West, Well, and Barn Closes, together 13a. 1r. 31p., which sold for 700l. Lots 6 and 7 were combined, and contained West and Near Farm Closes, and the remaining portion of Newby estate, in all 95a. 2r. 37p., which sold for 3,960l. Lot 8 was a little garden, containing 17p. of land, and sold for 13s., or at the rate of 500l. an acre. Lot 9 was the Park Head, or Wharfedell estate, containing 132a. 1r. 25p., which sold for 1,260l.

SAFETY LAMPS.—Since the Davy lamp, which gives but a faint light, is not perfectly secure against the dangers of explosion by fire-damp, the English Government offered 4,000l. for the invention of a lamp burning without contact with the external air. Two young students of the Paris Polytechnic, MM. H. Lianté and J. Denoyel, have invented a lamp which carries within it the requisite supply of gas. In exhibiting this lamp, a man, in the costume of a diver, descended with it into the sluice opposite the Mint, to the depth of 8 ft.; the lamp burned beneath the water, and with it, at the distance of two yards from him, the diver was able to inscribe, with a diamond, on a piece of glass, the date and hour of the experiment. The lamp burned for three-quarters of an hour in the water, and when it was hauled to the surface it was still burning, and the flame as bright as ever. It has been made by M. Delenil, constructor to the Polytechnic. Several members of the Institute, pupils of the Polytechnic, as well as several journalists, were present at the experiment.

TENDERS.

For building new public-house, in Hirschell-street, Forest-hill, for Messrs. Day & Noakes, Mr. Robt. Walker, architect.

Williams	£1,147 0 0
Tarrant	1,138 0 0
Masers	1,079 0 0
Rilly	1,074 0 0
Tully	1,058 0 0
Stoner	1,050 0 0
Estimate (accepted)	1,030 0 0

For works, St. Marylebone Almshouses. Mr. C. Eyles, architect:—

Mitchener	£300 0 0
Clark & Mansook	297 0 0
Shaw	231 0 0
Harris	229 15 0

For the erection of house and premises, Golders Green Finchley-road, Messrs. Mayhew & Calder, architects

Dunn	£5,341 0 0
Lawrence & Haugh	4,659 0 0
Turner & Sons	4,603 0 0
Rider & Son	4,603 0 0
Coleman	4,619 0 0
Longmire & Barge	4,603 0 0
Jackson & Shaw	4,548 0 0
Ennor	4,548 0 0
Roper & Chapman	4,472 0 0
Piper & Wheeler	4,373 0 0
Carter	4,367 0 0
King & Sons	4,254 0 0
Mather & Reed	3,922 0 0

For work above the street level, Manchester Royal Exchange, Messrs. Mills & Margatroyd, architects:—

Holme & Nicoll	£29,021 0 0
Parrell & Son	86,783 0 0
City	83,979 0 0
Thompson	83,917 0 0
Paterson Brothers	81,340 0 0
Nell & Sons	79,860 0 0
Southern	77,390 0 0
Parker & Co. (accepted)	76,820 0 0

For the erection of a Wesleyan chapel, Kiburn, Mr. John Tarring, architect. Quantities estimated:—

Browne & Robinson	£7,355 0 0
Myers & Sons	7,116 0 0
Turner & Sons	6,875 0 0
Dove Brothers	6,721 0 0
Hill & Sons	6,630 0 0
Nutt & Co.	6,630 0 0
Hilleg	6,533 0 0
Brough & Son	6,504 0 0
Kilby	6,273 0 0
Mason	6,235 0 0
Sanders	6,890 0 0
Bishop	5,975 0 0

For the Volunteer drill shed and sergeants' house, 12, K.E., Tauxbridge Wells. Mr. John Montier, architect:—

Smith & Hoadley	£1,290 17 6
Coker, Junr.	1,186 0 0
Strange & Sons	1,154 10 0
Hammond	1,050 0 0
Grover	1,075 17 0
Wainfrith	997 10 0
Walker	863 2 6
Perigo	829 16 6
Mercor & Camfield (accepted)	914 11 6

For horse, offices, and stables, to be erected at Edward's Heath, for Mr. Thomas Bannister. Quantities supplied by Mr. Henry W. Broadbridge:—

House and		Stables.
Rowlan & Aldridge	£1,180 0 0	... 4415 0 0
Hall	1,170 0 0	... 415 0 0
Filer & Longley	1,120 0 0	... 405 0 0
Stanbridge	850 0 0	... 385 0 0
Godsmark	1,080 0 0	... 370 0 0
Fuante	2,005 0 0	... 280 0 0

For rebuilding No. 1, Wood-street, Cheapside, with Portland stone front. Mr. Herbert Ford, architect. Quantities supplied by Messrs. Howden & Heath:—

Wells & Sons	£3,743 0 0
Lawrence & Sons	3,732 0 0
Myers & Sons	3,712 0 0
Browne & Robinson	3,657 0 0
Henshaw	3,576 0 0
Corder	3,509 0 0
Pipe & Wheeler	3,305 0 0
Fritchard	3,313 0 0
Brass (accepted)	3,274 0 0

For a block of buildings for the working classes, French-ally, Goswells-street. Mr. J. M. McCulloch, architect:—

Stockwell	£264 17 6
Dove Brothers	885 0 0
Wills (accepted)	883 0 0

For the erection of new factory, Kenilworth Town, Messrs. George Vaseghan, architects:—

Ashby & Sons	£1,321 0 0
Newman & Mann	1,194 0 0
Kelley Brothers	1,187 0 0
R. Mann	1,175 0 0
King & Sons	1,140 0 0
Manley & Rogers	1,057 0 0

For alterations, additions, offices, &c. to Town-hall, Woolwich:—

Vickers	£197 0 0
Longman	175 0 0
Williams	158 19 0
Bloom	150 0 0
Woodford	138 0 0

For removing mud from ornamental waters at Lambeth, Abbey, Sidney, for Mr. R. Bonfield:—

Drummond (accepted)	£300 0 0
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For premises, Plough-court, Lombard-street. Mr. J. Elmcasser Saunders, architect. Quantities supplied by Messrs. Osborn & Russell:—

Extra for cellars in front.	
Little	£8,538 0 0
Lawrence & Sons	6,263 0 0
Gannon & Sons	6,137 0 0
Widd & Sons	5,950 0 0
Myers & Sons	5,973 0 0

For the Longdon and Eldersfield Drainage:—

Webb & Wintle	£7,137 0 0
Leach & Co.	6,974 0 0
Lee & Meredith	6,869 0 0
Wood & Edwards	6,747 0 0
Leach	5,400 0 0
Dixon	5,337 15 6
Jackson & Co.	5,071 19 0
Strickon	5,055 0 0
April & Co.	4,893 0 0
Davies	4,298 0 0
Mills & Watson	3,824 0 0

For making road at High-street, Sydenham, for Mr. ...

Table with 2 columns: Name and Quantity. Includes Messrs. Leaning & Nicoll, Messrs. Mealls, etc.

For alterations and additions at No. 12, Highbury-square, for Wm. Garrett, esq. Mr. Wm. Smith, architect.

Table with 3 columns: Name, Cost of Church, Add for spire. Includes Messrs. Messers, Goodman & Vinal.

TO CORRESPONDENTS. Mr. T. Mason, B. J. N.-M. M. C. M. E. G. B. J. R. B. R. ...

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The Builder.

VOL. XXVI.—No. 1326.

Leeds.—Fountains Abbey.



ESS to our surprise than our regret, we hear that, up to this time, the financial results of the National Exhibition of Works of Art in Leeds are not satisfactory. The number of visitors is comparatively small: the crowds have not yet begun to flow into the town from other quarters; and the people of Leeds themselves are somewhat apathetic on the subject. The committee, as we thought at the time, put too high a price on the season tickets; and, by thus keeping people out of the building on the opening day, created a large amount of dissatisfaction, which has spread and grown. Men who had each given two or three hundred pounds towards the erection of the Infirmary, when they found that they could not attend the ceremony with wife and daughter without paying fifteen guineas equally with those who had given nothing, or go themselves without a five-guinea ticket each, were soured, and declined to go at all,—and, moreover, have grumbled ever since. Let us hope, however, that this feeling is passing away, and that all will avail themselves of the means of instructive enjoyment now within their reach. The collection is one of great interest and value, and to all, in the North especially, affords an opportunity to see, without difficulty, fine works of art that may not soon occur again. Amongst the works of the old masters exhibited,—Italian, Spanish, German, and Flemish,—are many of the greatest beauty and value,—pictures each worth a journey to see; and the collection of ancient drawings is also one of great interest. The catalogue rightly observes that nothing gives a more conclusive evidence of the artistic ability and knowledge of the painter than those sketches and drawings which have been done off-hand from the subject or model which he wished to note or to study. They are invariably forcible and truthful, and have ever been in high esteem with all admirers of art. A distinction should be made between those sketches which are merely notes of particular objects that struck the artist's fancy, as seen in many of the present examples by L. da Vinci, and those more or less finished studies made for the arrangement or completion of a large work, such as are most of Raffaele's; whilst another series consist of the study of the work itself in chalk, completely carried out on a small scale to serve as a model for the large and finished painting. The attention paid by the old masters to this system of study was, no doubt, one of the main reasons of their success in works on a large scale, and the studies themselves have

a value and importance which place them amongst the most treasured remains of the different masters that the amateur possesses. In the collection of works by deceased British painters, Reynolds and Gainsborough reign supreme. Some works by Etty, Turner, Milne, ready, Roberts, and Philip appear here; but others by the same men will be found in the Gallery of Living British Painters. This contains a large number of beautiful works, and well represents the present position of the art. The drawings in Water Colours by British artists are also an admirable collection:—

"This is a school of art, in a great measure distinguished by different characteristics, as well in style as in practice, from any other, and is one in which we have taken the lead over other nations. Although practised to a certain degree by the early painters of Europe in the fifteenth or sixteenth century, for sketches and studies, and carried out with no slight amount of finish by the painters of the Dutch school in the seventeenth century, yet it is, as an art, essentially one of English origin and growth, and in which we have produced the greatest masters, of whom excellent examples will be seen in the present collection, commencing from the simpler style of Sandby, Girtin, Barrett, Varley, &c., through the system founded by Turner, to the large and highly-finished works of living artists, in which every appliance for effect is freely used, and with a success and power which silence the opposition of those who advocate the older system, and object to the present extensive employment of body-colour."

In the Museum of Ornamental Art some of the early works are exciting wonder and admiration. The illuminated MSS., the carvings, enamels, metal-work, and porcelain include rare objects. We shall hope to hear soon of a larger number of visitors, and that there is no longer any doubt as to the financial success of the undertaking. Let the working-men look to it as well as the gentry. Workmen, by their representatives, have lately expressed their opinion that the want of public museums of works of ornamental art is a bar to their progress, and leaves them at a disadvantage in competition with the men of other nations who have such collections to resort to. Let the working-men of the North now show that they are ready, even at some little personal sacrifice, to take the utmost advantage of museums when they are provided for them.

Leeds is full of life; improved thoroughfares are being formed, and new buildings are rising in all directions. A few days ago the Church Institute, designed in the style of the fourteenth century by Messrs. Adams & Kelly, was opened. It is of brick with stone dressings and coloured bands, and has cost about 4,000*l.* In the basement the greater part of the space is occupied by wine-cellars, and the remainder is devoted to the purposes of a sitting-room and kitchen for the use of the librarian, and a large kitchen fitted up with boilers and other appliances likely to be called into requisition when tea-meetings and *societes* are held. On the ground-floor there are the library and reading-room, together with rooms for the clergy and secretary. The first-floor consists of a lecture-hall, 69 ft. by 48 ft., council-room, and two class-rooms. On the floor above, the librarian's bed-rooms and some store-rooms have been placed. Mr. Edward Boothman has done the brickwork, and Messrs. Poulder have executed the stonework. Stained glass has been supplied by Messrs. Lavers, Barraud, & Westlake, and gasfittings have been put up by Messrs. Skidmore & Co.

The great bank recently finished from the designs of Mr. Scott, Mr. Perkin being the resident architect, so to speak, and mainly responsible for the interior arrangements, is an ornament to the town. Red brick, with stone dressings, are the materials used: Italian Gothic is the style employed. Mr. Perkin, we may add, has done much in the shape of churches round about Leeds. In the borough itself, by the way, there are now no fewer than forty-four churches. With reference to the exterior of the bank a question has been raised which is worth a thought. In the brick string-courses an incised ornament has been cut by hand *in situ*. Now, some say this is surely a mistake. Brick is a

monied material, and might as well have been moulded with the required ornament in it, of course with great saving of expense. Others, however, are found who defend the course taken on the ground that greater sharpness and vigour have been thereby obtained. Any how, the effect produced is very agreeable. The building is a credit to all concerned.

The new Northern Hotel now in course of completion under the direction of Mr. Hadfield,—Italian Gothic,—is a good, substantial, not to say handsome, structure. A building opposite to it, to be let out in chambers, with round and pointed arches, brick and stone like nearly all the new buildings, is *bizarre* in the extreme. The Cloth Hall, finished this year, is a poor thing; presenting a long straight sky-line, with clock-turret in the centre. The improvement in the architecture of Leeds within the last six years is, nevertheless, remarkable. Every shop or warehouse that is now built makes an attempt at style. The great enemy to all this is smoke, which in about four years renders brick and stone the same colour, and takes from the work all chance of giving pleasure. Surely there is power to prevent this injury if the corporation would put it in force. That any furnace not consuming its own smoke should be permitted in Leeds, the centre of the machine trade, is more than discreditable: it is stupid. Many of the manufacturers require no compulsion to do the wise thing. In the remarkable establishment of Messrs. Greenwood & Batley, whence all the Governments in the world are supplied with the machines and tools for making weapons of offence, there is a furnace at work that consumes nearly the whole of its smoke, and so, too, effects a considerable saving in coals. We were not surprised to learn that Messrs. Greenwood & Batley had received plenty of medals marked *Honoris causa*.

Of course few of our readers who visit Leeds will fail to see Bolton Abbey and bridge, Kirkstall Abbey (Norman in style, and picturesque in appearance); Brimham Rooks (including the Druid's Coffin, the Baboon's head, and the Pulpit Rook); Harrogate, the Healthy; Knaresborough, with its castle, bridge, rocks, wood, and river; Ripon Cathedral, now nearly restored; and Fountains Abbey at Studley.

"From streams and springs, which Nature here contrives, The name of FOUNTAINS this sweet place derives."

A sweet place, indeed; the ruins, since the excavations made by the late Earl de Grey, are more extensive than those of any other abbey we remember. We have made two or three small sketches, to convey some idea of its character,*—one, showing the nave and south aisle of the church; another, a view of part of the abbey from Robin Hood's Well; and the third, the lady-chapel, which extends north and south beyond the choir, at the east end,—a second transept, as it were. The line of the choir is carried on through the lady-chapel by two arches on each side, supported in each case on a lofty clustered column, seen in the view. The small columns which surrounded the octagon pillar remaining have disappeared. The effect of this part of the building must have been very beautiful. The large window seen at the end, or, rather, side, of the lady-chapel, was a Perpendicular interpolation. The nave is Transition Norman. At the west end of that also a Perpendicular window was introduced, the date of which appears above it outside in archaic numerals. The guide-book sold on the spot says,—"The large window in the west end of the nave was put in during the abbacy of Darneton, and may be looked upon as the last work of any importance, with the exception of the tower, added to the place. Above this window, on the outside, is a rude representation of a bird, holding a cross, and resting on a tun, conjectured to be a pun upon the name of

* See p. 490.

Thurston, i.e., a thrush upon a tu. A scroll behind the bird hears the word and date.—*DEBN, 1494.* Surely the more obvious pun is on the name of the abbot by whom the alteration was made,—*Dern-ann*. *Dorn*, by the way, is an obsolete word (from the Saxon), meaning sad, mournful:—

"The birds of ill presage this lackless chance foretold,
By demfulf noise."

But it is unnecessary to look further for a meaning. The remainder of this front is of twelfth-century work.

Fountains is truly a wonderfully fine ruin, and the grounds of Studley (through which it is approached) at the end of it, the river Skell widened out to a lake, the laurel bank, and magnificent trees, contribute to form a whole rarely surpassed. A Norwegian spruce, 134 ft. in height, and a splendid beech, 60 ft. to the first leaf, are noteworthy items in the grounds. The remains of the Abbey include the Norman Chapter-house, the cloisters, the refectory with readers' gallery, the Abbot's house, the ancient bridge, and the mill and forge. The artist, the lover of nature, and the archaeologist will alike find matter to delight in a visit to Fountains Abbey.

EXAMPLES OF RECENT VILLA RESIDENCES AND COTTAGES.*

Messrs. BLACKIE have now completed the issue of a work commenced by them some time ago, consisting of examples of villas and cottages recently executed in various parts of the kingdom by different architects. On the appearance of the first few parts we made favourable mention of the undertaking, and have now but to indicate the manner in which it has been brought to a close. Nineteen firms have contributed examples of villa residences and cottages erected under their care. Three of these belong to Edinburgh, six to London, four to Glasgow, four to Manchester, and two to Nottingham. There are thirty houses, in all, illustrated.

Among the villas represented are two that have been designed and built by architects for their own occupation. In these we have opportunity of seeing the plotting out of the greatest amount of accommodation in a given space; the adoption of various cunning contrivances to secure comfort, combined with an artistic eye to effect and a determination to avoid the miseries of bad construction. All this, it may be urged, should always be found in the design of an architect, whether he is building for himself or an employer; but it must be remembered that, in nine cases out of ten, a client requires an architect to embody his ideas, not to supplant them with a novel design to which his mind is a stranger. Those who resolve to build, generally ponder over the project some time beforehand, and in that period revolve in their minds somewhat of the aspect their house is to present; still more of the accommodation it is to contain, and arrange with even more precision the plotting out of the ground-plan. When the architect is consulted, these previously-formed ideas are imparted to him as part of his instructions, and, generally speaking, it is the amount of skill and taste with which he is able to place these on paper that is the criterion in the client's mind of his ability to undertake the superintendence of the execution of the project. A tangible presentation on paper of the crude ideas of the client, polished and artistically with trained skill, is, we may repeat, more acceptable than a fresh set of ideas on the same subject, starting from a different point of view, nine times out of ten. But when an architect builds for himself, he is unfettered in the matter of instructions. He has still, to be sure, fetters; such as cost, prospect, and site; but these he would have to contend with as well as the predilections presented to him for embodiment if employed to build for another. The first of these villas has been designed by Mr. Banks, of the firm of Banks & Barry, for his own occupation, and built at Dulwich Wood Park, to the west of the north end of the Crystal Palace. The treatment is quiet, composed, reticent, and finished. The eye receives from it an impression of rest, invitation, and elegant cosiness. A

* "Villa and Cottage Architecture. Select Examples of Country and Suburban Residences recently erected by various Architects." London: Blackie & Sons, Paternoster-row; Glasgow; and Edinburgh.

Tudor porch hospitably shelters those who wish to enter. The entrance-door opens into a small square hall, which in its turn gives access to an inner hall or corridor, running at right angles from it, from which the staircases and different rooms are entered. One staircase departs upstairs, a second conducts downwards, for owing to the deep dip in the site, there is a basement floor, which, although out of sight from the entrance, is level with a kitchen court or yard in the rear. On the basement floor are the kitchen, 13 ft. by 13 ft.; scullery, 10 ft. by 7 ft. 3 in.; larder, coal-cellar, beer-cellar, wine-cellar, china and dry store closet; a w.c., dust receptacle, a furnace-room to heat the conservatory above; a small work-room, 10 ft. 6 in. by 6 ft.; everything, in fine, required to rejoice the heart of a model housekeeper; and a billiard-room, 20 ft. by 16 ft. The two last mentioned are cut off from the kitchen department, by a door in the passage leading to that side of the house in which the offices are grouped together; and all are 11 ft. 4 in. high. On the ground floor are three good rooms, and a greenhouse, with steps leading out of it down to the garden. The dining-room and drawing-room are of the same dimensions, 20 ft. by 14 ft., only one lies across the ground plan, and the other along it, and both look out upon the fine prospect of the winding Thames, seen from the back of the house. The third room, which is the study, 14 ft. by 10 ft. 6 in., is in the front of the house.

On the floor above these are four bedrooms, none less than 14 ft. long, one 15 ft. 6 in., and a bath-room; and in the attic are four more rooms, lighted by dormers that must command a lovely view, and a cistern and closet. All this accommodation is packed upon a ground space of 38 ft. by 33 ft. The front elevation may be described as having two gables, separated from each other by a receding centre, which contains the single mullioned windows that light the staircase on two stories, and is surmounted by a small dormer. The right-hand gable end contains the porch and door, and on the floor above one of the bedroom windows; the left-hand gable end has the study window on the ground floor and a bedroom window above. The apices of the gables have narrow slits. There are overhanging eaves and ornamental barge-boards. The west elevation contains the windows of the principal apartments. Here is another slightly advanced gable end, occupying nearly one half of the elevation, which contains a three-lighted window on the basement, another on the ground floor with transomed mullions, and a double-lighted window on the upper floor, besides a slit in the apex. A two-storied bay extends from the basement to light the billiard-room and dining-room on the floor above it; and over this is a double light to a bedroom, and a dormer on the roof. Dividing these two parts, gable end and bay, rise three single-light windows, one on each floor. The greenhouse is placed on the south side of the house; and below it is a door leading into the furnace-room. On the north side there is a flight of steps down to a door on the basement story. The four external walls are built of Lowestoft bricks, the inner walls of common bricks, some of the partitions of 4-in. brick on the ground-floor, and the rest of timber gartering, as are all above stairs. The windows, dressings, string-courses, and door-jambes are of Box ground stone, Bath. The roof is covered with chocolate-red coloured Broseley tiles, placed in alternate bands of three eaveslaid and six plain, and the ridge has an ornamental tile cresting. Baltic timber and deals have been used for most of the woodwork, except the stairs, which are of American pitch-pine, with waincoat balusters and handrails. The cost of this house was 2,099*l.*, including gasfitting and oak framing to garden and gates, but excluding the ornamental painting, which was not executed till two years after the house was finished, and then cost 300*l.* The merit of this design consists in its repose, the provision for an orderly performance of domestic duties, its sanitary arrangements, and the amount of residential accommodation, viz: three reception-rooms, besides the billiard-room, eight bedrooms and a bath-room, conservatory, and set of kitchen offices, in small conservatory, and set of kitchen offices, in small conservatory.

The second house, erected by an architect for his own residence, is on a smaller scale, being built upon an area of 28 ft. by 25 ft., and costing but 705*l.* Its owner is Mr. George Trefnit, and its situation is in the neighbourhood of Camden-road, Holloway. Here we have no basement story, and only two day-rooms and four bedrooms, besides the offices. There is a porch, however, and a conservatory, which is heated

by a gas-stove. The house stands on an angle formed by the junction of a road and a lane, and its most distinctive feature,—a double window on the angle of the first floor,—was designed to take advantage of the double prospect this circumstance afforded. The extension of London has, since the completion of this house, nearly neutralised this advantage. Additional size is contrived for the kitchen by a projection with a lean-to roof, the whole width of which is occupied by windows, to insure an ample supply of light,—a commodity that is often scarce in London kitchens. A glass-covered way leads from the house to the back garden, and, unadvisedly, we must admit, to a combined bath-room and w.c., and also gives access to the kitchen. Opposite to the kitchen door in this covered way is a back door leading into the lane. It is built of brick. The fronts are faced with washed stocks, with bands and window-arches of red bricks, and those employed in the rest of the house are common stocks. The roof is slated; and all the gutters are external iron eaves gutters with external downpipes,—an arrangement that has prevented any wet from coming in at any point. The woodwork is of Baltic fir and yellow deal, varnished without being previously stained. The hearths and skirtings, like the floor of the hall, are of ornamental tiles, and the dining-room and drawing-room fire-places are "coved" with the same cleanly contrivance. Both architects give a second villa, in the neighbourhood of their own designed by them, in which the leading characteristics of their respective modes of treatment recur.

We next turn to one of the Scottish residences. This is a house called Holmwood, designed by Messrs. A. & G. Thomson, Glasgow, and built on the top of the steep bank of a bend of the river Carr, about three miles south of that city. It illustrates, in a remarkable way, the difference between London and Glasgow prices. Here we have a handsome residence, built in an adaptation of the Greek style, with stone walls 2 ft. thick, and, where required, stone partitions of the same thickness, covering a site 70 ft. in frontage by 95 ft. in depth, containing three spacious day rooms, seven bedrooms, and two dressing-rooms large enough to be furnished with beds, besides a capital set of kitchen appointments, with laundry and washhouse, and a very large quantity of ornamentation, for 2,608*l.* 4*s.* 11*d.* Instead of the usual cubical mass, or centre with two wings, these architects have arranged their building to consist of several masses and several heights. There is no basement. The dining-room is only one story in height; the kitchen is also one-storied; but the greater part of the building is two stories high, and this is surmounted by a circular lantern which lights the staircase. In the front elevation there is the recessed entrance-doorway nearly in the centre, at the top of a flight of steps, with a square-headed window of the same height on either side of it, the one lighting the vestibule, the other a retiring-room; the dining-room with ornamental stone piers clear of the window to the right of this central group, all one story high; and to the left of the doorway is a two-storied group of building, consisting of a parlour on the ground-floor 18 ft. 6 in. by 17 ft., with a semicircular window, 10 ft. 8 in. in diameter, with a column standing clear of it all round, and a drawing-room above, 25 ft. by 17 ft., to which the flat roof of the projection serves as a balcony. Surmounting this, though recessed from the front elevation, is the circular lantern, which, as we have mentioned, lights the staircase, and in the rear is a wing, giving on to the dining-room and looking over its roof, containing six bedrooms. In the extreme rear, but adjoining the main group, though furnished with a distinct roof, like all the rest of a low-pitch, covered with slates, with very broad overhanging eaves carried on ornamental cast-iron brackets, is the kitchen lighted with a range of five windows, placed somewhat high, below which, in the interior, stands the dresser. Away from the building, but indicated in the perspective, is a group of coach-house, stable, coachman's-house, greenhouse, cow-house, &c., which cost an additional 1,009*l.* 19*s.* 6*d.* A great point in this design is the completeness of the details. The retiring-room, for instance, is furnished with hot and cold water, a looking-glass, sofa, clothes-pegs, and a water-closet opening out of it, lighted from the vestibule. The dining-room is provided with a recess for the sideboard and a serving-way from the butler's pantry, where there are communications both

with the kitchen and scullery, with the former by means of a hot closet, and with the latter by means of lifting-sashes. The store-closet is fitted with dresser, drawers, and shelves. The kitchen is partly surrounded with low lean-tos containing places for coals, roots, and a larder. It is a drawback to the general nicety of completeness to find five bed-chambers, or three bed-chambers, and two dressing-rooms accordingly as they might be required, on the ground-floor. The materials employed are irregularly coursed rubble freestone from Giffnock quarry, a mile distant from the site; a course of Caithness flagging to prevent damp rising; Quebec red pine and St. John's yellow pine; brick for some of the partitions; a cast-iron bressumer carries the wall over the opening between the parlour and its semicircular window; and encaustic tiles for vestibule and hall. We quote the description of the ornamentation of the drawing-room—

“An enriched skirting, or dado, 28 in. in height, in wood, is carried round three sides of the room; between the window-sights, also at the sides of the doors and fire-place, and at intervals round the room, are placed square colonnettes, surmounted by a frieze, all of yellow pine, varnished, enriched with arabesques in mahogany. Six of the spaces between the colonnettes are further enriched by painted and gilded ornamentation; and the panels thus formed are filled with paintings, by H. Cameron; A.R.S.A., illustrating Tennyson's ‘Idylls of the King.’ The centres of the sides are occupied, in one case, by the fire-place, which has a white marble mantel-piece, having gilt incised ornament, and a mirror over it; and in the other case by the piano, over which is a mirror; whilst at the end opposite the window is another large mirror, with a decorated marble slab in front supported by chimera.”

We pass on to notice one of Mr. Ewan Christian's rectories, that of Goldgharg, Essex. This house was built upwards of sixteen years ago at a cost of 2,000l., the contractor averring that he had under-estimated it by 200l. This is given as a plain substantial house, intended to last for generations, in which excellence of material and workmanship have been considered before ornamentation, in deference to the stringent law of ecclesiastical dilapidations. It is situated in a flat marshy district, in consequence of which circumstance the main body is raised about 4½ ft. above the highest part of the site, and terraces are formed on three sides of it. It is built, in the Domestic Tudor style, of red bricks, with the window openings and mullions and the arches and jambs of the west front of Caen stone, the heads and sills only in the other front being of stone. The copings are likewise of Caen stone; the plinth of Yorkshire stone. The roof is covered with plain red tiles, relieved with courses of ornamental tiles and ridge tiles. There is a basement sunk below part of the house, containing an ample supply of cellars for beer, wine, potatoes, a larder, a dairy, and a furnace-room to the greenhouse, and an attic to part of it, containing two bedrooms, lighted by dormers, and a place for lumber. On the ground floor an open vestibule, in which the entrance door is placed, a hall with dining-room and drawing-room opening out of it, a large conservatory, 21 ft. square, so placed with reference to these two rooms that they may all be thrown into a suite; the principal staircase, study, w.c., butler's pantry, back-staircase, housekeeper's room, store-room, kitchen, cook's pantry, scullery, fitted to serve also as a brew-house and bakery, coal, wood, and ash places, and servants' w.c.s. Above stairs are seven bedchambers and two dressing-rooms, besides those mentioned in the attic, and a housemaid's closet. Mr. Christian also contributes a parsonage-house at Friday Bridge. There is a curate's house also shown, designed by Mr. Walker, and built at Gotham, Nottinghamshire. This is built entirely of common bricks, which in this locality are better than they are in some places, except bands and crosses of blue Staffordshire bricks placed ornamentally, and it covers an area of 32 ft. square. The plan is very compact and original. The entrance-door opens into a small passage, beyond which is an octagonal hall, in the centre of the house. The doors of drawing and dining rooms open right and left out of the passage; those of the study and kitchen out of the octagonal hall, in which is a third door opening to a space under the stairs, which communicates with the larder. There is a decorated conservatory beyond the study, which opens out of it. At the octagonal hall takes an angle off the drawing-room, and a window placed in the angle facing the junction of street and lane, cuts off another, a bookcase is placed cornerways to make the room symmetrical. The dining-room is square, because the angle cut off by the octagonal hall is not shown; for that end of the room is partitioned off to form closets, one being a

glass-closet in the dining-room, and the other, opening on the other side into the kitchen, a brush-closet. There are four bed-rooms on the upper floor, a lavatory, w.c., linen-closet, and housemaid's closet. The chimney-stacks here are a feature, for they are arranged to have no “pockets” every part of the interior being occupied by fires, or fire-places, or both. This admits of some correlling on the exterior, which, with a stone shaft, 6 in. in diameter, with a base and neck-moulding and foliated capital, placed to carry the angle of the building out away by the window mentioned in the drawing-room, is about the only external ornamentation, except that afforded by the ingenious management of the brickwork. The contract for this house was 329l. 10s.; but, with the addition of a tessellated pavement for the hall, forming a w.c., cesspit, and drain, an ornamental fence wall, 80 lineal feet, and entrance-gate, the cost of the conservatory, a rain-water cistern, a wash-house, and a few trifles not allowed for in the contract, the price ultimately became 503l. 7s. 11d. To prevent the rise of damp, a layer of boiled tar and finely-washed Trent sand one-eighth of an inch thick was laid on the course of bricks forming the top of the external plinth.

The Manchester designs are Rosebank Villa, by Messrs. Speckmann & Charlesworth; a double villa, by Mr. E. Walters; and the Sycamores, by Messrs. Pannell & Ayliffe. The first of these is a brick-built Italian villa, with a Gothic roof, covering 61 ft. by 35 ft., not including any of the out-buildings and projections, containing three reception-rooms, seven bed-rooms, a bath-room, a smoking-room, and a set of kitchen offices, and finished with so much completeness as to include a lightning conductor for 2,833l. 12s. 4d. Mr. Walters's is a group of four villas, two and two of them being built back and back, so as to look at a distance, as one house of considerable size. The two blocks are connected by a length of walling only. They were built in 1852 for 8,000l. or 2,000l. a-piece. For this sum there is an accommodation, consisting of three day-rooms, eight beds, allowing two for the nursery, two dressing-rooms and a bath-room, besides the usual kitchen offices, grouped upon an area of about 53 ft. square. The style of the exterior of these houses is also Italian, with high-pitched roofs. The Sycamores is a substantial-looking, and at the same time tasteful red-brick house, of modernised domestic treatment, curious for containing within it seven distinct levels of floors to fit in and contrive three day-rooms, six bedrooms, and dressing-room, and set of kitchen offices, on an area of 60 ft. by 50 ft., exclusive of the ground occupied by the conservatory.

None of the clever Scottish architects have represented the national style. Their cottages are miniature Italian villas in too “rural” a style to compensate for the loss of the picturesque features that combinations of those given in some of the rare specimens of ancient Scottish buildings would have afforded. That they can retain some national features we perceive in the drawings of “Strath Cottage, Dumharton,” by Mr. Rochford, where there is a servant's box-bed shown built up in the kitchen like a closet. We could see this piece of retention dismissed with satisfaction. The style of this cottage, however, is less antagonistic to the character of the surrounding scenery and associations than some. It is built of freestone, with a little Jacobean detail, and covered with Highland slates. There are three day-rooms, four bed-rooms, two dressing-rooms, bath, kitchen, scullery, &c. The cost was 854l. 18s. 4d. A second cottage, by the same architect, erected at Govan, Renfrewshire, in the Tudor style, and costing a similar sum, is a remarkably happy composition. A cottage by Mr. Baird, erected at Roseneath, Dumhartonshire, as a residence for the parish schoolmaster, at a cost of 554l. 8s. 8d., would combine harmoniously and unpretentiously with any landscape, which is more than can be said of a rural Italian villa, built by him in the southern outskirts of Glasgow.

A somewhat finny cottage ornaée, half-timbered, with porch and conservatory constructed of fir, built in Essex, by Mr. Kendal, costing 1,830l.; a quiet modern detached house at Grantham, built by Messrs. Hine & Evans, costing 1,560l.; and a gabled and mullioned Yorkshire farm-house, pleasant, grey, and sedate-looking, as though Time and it had already some acquaintance, built in 1856, by Mr. Lamb, at Blinberhouses, near Bolton, incomparably superior to the square white boxes with square openings for windows, and another to match for a door in the centre of them, now frequently affected, are further varieties of

buildings shown in this practical volume. The last mentioned, unlike every other example, has neither closet, cupboard, nor cellar. Neither is there a dairy shown. The kitchen, though, is admirably light and capacious, as all should be, but more especially so where it is still the custom of the country for the farmer's family and his domestics to take their meals together in it.

This is a volume that those about to build villa-residences or cottages may usefully study. The combined wit of nineteen architects can scarcely fail to furnish information that it will be a gain to them to acquire, and perhaps prevent them from being added to the list of those who if they set about building again would do so differently. Builders engaged in erecting such residences for sale will also find in it many valuable suggestions. There is an introductory preface, drawing attention to some of the building contrivances and structural arrangements that are most novel, such as different methods of using hollow bricks without interference with the bond, and modifications of sliding sashes, amongst which is one in which the lower sash descends in the same way that window-shutters are sometimes constructed to do. The great difference between London and country prices in some parts, the rise even in some towns, and the difference in London prices compared to those when many of the houses illustrated were built, is also pointed out. The present difference between London and Yorkshire or Scottish prices is estimated at 25 per cent. The owner of Worcester Lodge estimates the rise on London prices since his house was built to be nearly 30 per cent.; other architects have, however, quoted it at 15 per cent. In Southampton and its neighbourhood the rise is estimated as being fully 10 per cent. Architects' charges, too, are touched upon, and treated fairly—

“These are a uniform per centage (5 per cent.) on the cost of the building, where the cost exceeds such an amount as 1,000l., where travelling expenses have not to be added, where several designs have not been made, where materials of a former building have not been used, and where the architect does not act as the surveyor or measurer, taking the quantities of materials and work from the drawings and specifications for the builder's use in estimating. The measuring-surveyor's charge usually comes in as part of the cost of the building; and in London, as indeed in many of the chief towns, it is considered most desirable that the ‘surveyor’ and the architect should be different individuals. There remain, therefore, to be added to the amounts stated as building cost not less than 6 per cent. upon each, as well as the travelling and other extras, being architect's expenses, if any. Also, should the services of a clerk of works be deemed necessary to secure a closeness of superintendence beyond what an architect will be bound to afford, and which may be true economy, even where the cost of a house falls within the limits kept in view in this publication, the weekly stipend will have to be paid by the owner of the building, although the clerk of works will act as the deputy or subordinate of the architect. In the case of a cost below 1,000l., the reader may consider the professional charges as having been matter of special agreement; for most architects would consider themselves ill paid at the rate mentioned for houses of the different classes below the 1,000l. cost.”

Gobbett could not have given a clearer exposition of a vexed question.

“THE TRIUMPH OF CHRISTIANITY.”

ANGRY controversy bristles up at the sound of the name of Gustave Doré. The works of the most prolific artist of our time afford ample scope for criticism and for contest. In almost every human production exists a greater or less proportion of what is objectionable, however it may be blended with what is admirable. An artist, therefore, whose enumerated works some years ago amounted to thousands, must have furnished materials for a whole library of attack, as, on the other hand, he may have offered a basis for a cyclopaedia of praise. M. Doré has shown within the last month that he possesses two qualities which Englishmen are wont to treat with respect,—unexampled industry and unfinching pluck.

Certain writers who have sneered, and with some justice, at the “tricks” of this “clever book-illustrator,” must have rubbed their eyes at the boldness with which he has appealed to the judgment of the British public. When our streets are crowded with the busy life of the London season, and when all our exhibitions are open, M. Doré invades the West-End and opens an exhibition of his own. Thirty-four paintings, in very different styles of art, cover the walls of the German Gallery in Bond-street, all produced, we are told, within a few years. There can be no valid reason for refusing to this collection the same fair and impartial examination that we should

devote to a gallery of equal magnitude containing the works not of one, but of numerous artists.

There are four or five landscapes which, viewed from the proper distance, are actual transcripts of nature. "Morning and Evening in the Alps," and the "Effect of Sunset on the Summit of Montaine," give representations of gloom, and mist, and glancing mountain peaks that are familiar to the Alpine traveller, and that a knowledge of our own lake district, or of the Scotch or Irish mountain scenery, will prepare the visitor to admire. The "High Lake in the Alps (Valais)" is another of these coloured photographs of the sublime solitude of nature.

In the illustration of "Vivien," the head of Merlin is the same as in the original sketches,—a painful sense of weakness unfitting him to be the representative of the mighty but genial wizard of song and romance. The face of Vivien, on the other hand, is a great advance on any former delineation of the repulsive character which it has pleased Mr. Tenyson to draw, the steady cat-like glance which she fixes on the magician being highly characteristic. But the length of her arms, and the size of her hands, are not to be endured.

Over the "Scenes from the Inferno" of Dante we should be content to draw the sponge of oblivion. The "Ascent of the Matterhorn" is rather fitted for an artist's portfolio than for an exhibition-room. The "Christ bound to the Column" is only a less painful failure than are almost invariably the modern, and most of the ancient, attempts to depict the divine sufferer. Isaiah and Jonah might have been left in Paris without diminishing the attractions of the gallery.

The door of a Spanish Cathedral, garnished by the usual fringe of disgusting beggars, and lighted up by the grace of the Spanish devotees, is a very accurate and correct bit of work. The effect of the painted windows in Seville Cathedral lights up an interior which contains a row of Spanish women, one of whom, in a velvet dress, is singularly graceful. Still more charming is a figure in the "Fortune-teller," where the sly leer of the old woman's eye, and the pose and aspect of the hulking vagabonds around are tinted by a brush dipped deep in local colour.

Apart from these pictures, and from the larger, and, as we should call it, half-finished, painting which gives name to the exhibition, are five or six specimens of a new style of work. They have not, or have only in the faces, the finish of fresco, but they have all the breadth which is peculiar to a style which it appears to be impossible to transplant in healthy and vigorous vitality to our climate. A question arises, which time alone can answer, as to the durability of this style. If it be durable as far as the endurance of the pigment is concerned, it must certainly attract and retain an unusual amount of the dirt that revels in such an atmosphere as that of London. Against both dangers we should wish to see how the production, not of water-glazing, but of actual glass, can be made available without interfering with the effect of the painting. The propriety of this inquiry will be obvious from the remark that the walls, and some other portions of the background in these paintings, parts of the drapery (as well as the tree in the "Vivien"), seem to have been thrown on the canvas in the manner in which plasterers apply rough cast to a wall. The buildings are actually rougher to the touch than in real dressed stonework. But there is no denying the powerful effect that is produced. The walls in the "Gitana" and the Psalter-player are actual pictures of illusion. There is a family of peasants which most people seem to prefer, because the greater finish is more in accordance with their experience of oil painting, but the faces of the old and young women knitting, life size, in one of these rough pictures are admirable, and the others only fail to please because the faces of the sitters are low, repulsive, or common place. The fault is in the selection, not in the execution. The "Gitana," though cursed with an ugly baby, has a face worthy of Murillo himself, and a tempting little dangling foot, as to which Mr. Doré seems to have committed the rare fault (as far as he is concerned) of having had it washed before he drew it.

The largest picture in the exhibition, some 10 ft. to 11 ft., by 6 ft. to 7 ft., we should call little more than a sketch, though a sketch of great power. Its chief defect is want of finish; its chief merit is life and motion. It takes a long period to get it well on the retina.

The "Triumph of Christianity" at the first glance recalls to the mind the "Last Judgment"

of Michelangelo, or at least the method of treating that awful subject which has become conventional among Italian artists. On a more minute examination the resemblance proves to be illusory, and the student of the picture becomes aware that he is in presence of an entirely original design. It is unnecessary here to enter into any discussion of the merits of allegoric painting in general. It is only intended to describe or to explain the present work of M. Doré.

The scene of the picture, instead of being laid, as usual in similar cases, in the region of the clouds immediately above the earth, is fixed in the higher or more distant regions of space, the earth being visible, as a planet, at such a profound depth below, as to have apparently shrunk to the dimensions of the moon when viewed from the terrestrial surface. Thus the motive, or text, of the painting may be appropriately sought in the words—"I saw Satan as lightning fall from heaven." The upper part of the picture is occupied by "a globe of circular light," as Milton expresses the angelic vision, consisting of a halo or glory of angels, surrounding Christ, bearing a symbolic cross. Two of the heavenly ministers are distinguished in the foreground, who may be taken to represent Counsel and Execution, or the angels of Light and of Power. The whole celestial hierarchy are unarmed, excepting with the sword of truth and the buckle of faith, and their white and flowing garments denote purity. The emblems of Hope are designably absent from a scene which tells of hope fulfilled. Central and predominating by size in the lower part of the picture is a figure which may be regarded as the genius of Paganism, the dragon of the Apocalypse, or the Author of Evil himself. His gilded horns recall that worship of animal forms which prevailed in early superstitions. The employment of the artifices of idolatry, under every changing form, to augment the wealth and importance of the priesthood, is indicated by the golden collar which hangs out in such clear relief against the abyss. The ever-varying phases of idolatry and of sacrilegious colours in the dragon wings and scales of the great enemy of spiritual religion, and in the consciousness of defeat expressed by his countenance and attitude may be seen a memorial of the words "Woe to the inhabitants of the earth and of the sea, for the devil is come down to you, having great wrath, because he knoweth that he hath power but for a short time."

Around and below the central dragon-winged Genius, the whole pantheon of African, Asiatic, and European mythology falls in helpless terror and confusion, and with that rapid motion that is characteristic of the figures of M. Doré. To the left of the spectator the Norse gods are feeding in the distance: Thor, and Odin, and Friga, from whom our Saxon ancestors named the days of the week, are flying in terror. Below them are the representatives of the ancient British worship,—the Druids with their golden sickles and their wreaths of sacred oak-leaves. To the right, Diana and Venus, Apollo in his quadriga, wine-wreathed Bacchus, and the whole population of the classical Olympus, may be distinguished by their well-known attributes. The great Roman Jove himself is upborne by the very person of the dragon, grasping his ambrosial locks in dismay, and, as it were, discharging his boltless thunder unawares. Behind him is a figure of Juno, his sister and his wife, and their father, Saturn, stretches forth his straight-shafted scythe in vain. The head of Mercury, marked by the Caduceus, calls attention below. The gods of ancient Egypt, Osiris and Isis, and the sacred bull Apis, with either the sphynx or the cat-god Pashtor Bubastis, are falling to the left. On the corresponding part of the picture are shown Nimrod and the Assyrian gods. The winged hills of Babylon and Nineveh, lift their wings and stretch out their paws in quaint and noisy dismay. The crown of Jupiter has fallen from his head; and far below the earth, shrouded in light, awaits the irrad of the host cast down from Heaven.

We are no blind admirers of M. Doré. We have taken the liberty, before now, to point out some of his most palpable faults; as instances of which, in the present exhibition, we may refer to the ignorance of the laws of flotation displayed in the position of the cradle of the infant Moses, impossibly shelved on a shoal in the Nile under the imaginative canopy of the angelic wings; and in that of the hier or barge which conveys the corpse of Elaine. The cradle cer-

tainly, and the barge probably, would have overturned.

But courtesy is due to the industrious and remarkable artist who has thus cast himself on the verdict of our public opinion,—a courtesy which, whilst it does not exclude an honest criticism, must gladly bow to the great merits of a man who, old in the number of his productions, is young in years, and young in the power and faculty of improvement.

ON LINCOLN CATHEDRAL.*

THE Architectural History of Lincoln Cathedral has been already very ably and completely described by two most competent persons, namely, Professor Willis and the Rev. Ayliffe Poole. I am not aware that Professor Willis's remarks, delivered at the meeting of the Royal Archaeological Institute, at Lincoln, in 1848, have ever been published, or made available in any form to readers. Mr. Poole's were printed, together with a valuable appendix, comprising all the historical data bearing on the cathedral and connected with the see, in the volume of this Society's Transactions for 1857.

Mr. Poole's review of the building was based chiefly upon information derived from the light which this collection of historical facts threw upon the subject. It is in every respect a very interesting treatise. When, then, the committee of this Society did me the honour to invite me to lecture, I had to consider from what new point of view the subject could be again presented in an acceptable form.

It appears to me that I shall best serve the objects of this Society, which no doubt are continually to enlarge the circle of those who interest themselves in the noble series of monuments that contain the history of our national architecture, by endeavouring to draw from the building before us a few practical hints on the subject of church architecture generally, and by pointing out the excellent illustrations which different parts of the structure offer, of the several periods of this interesting history; and in doing this I intend craving the indulgence of the more learned, to address myself more particularly to those whose knowledge of the subject is less advanced, and who consequently stand in greater need of help and guidance in their studies.

Now, in order to render what I have to say useful, or indeed intelligible, to this portion of my audience, it is necessary that I should explain the few technical terms which I intend to use; and here I may remark, by way of parenthesis, that the fewer technical terms a lecturer uses to a mixed audience the better; and the more obvious and self-explanatory these terms are the better.

It is just twenty years ago, at the meeting, in fact, of the Royal Archaeological Institute at Lincoln, in July, 1848, that I read in this room a paper on certain parts of Lincoln Cathedral, which formed the basis of a work that I subsequently published, in which I proposed what was then a new division and nomenclature of the styles of English architecture. As this terminology is the one which I intend to use here in the classification of the different works of Lincoln Cathedral, it is necessary that I should briefly explain it.

There is one division of the architecture of Europe on which all are agreed, that, namely, which separates the buildings of the Middle Ages into two classes, the first comprising all those buildings that were erected during the prevalence of the circular arch; and the second, those that were erected during the prevalence of the pointed arch. These two classes have been by common consent called Romanesque and Gothic.

Of English Romanesque buildings we have, again, two kinds, those which were erected before and after the Conquest, and which may therefore be conveniently called Saxon and Norman.

Of the buildings constructed during the Gothic period the most natural division is that which is indicated by the several changes of form, through which that prominent feature of every Medieval building, the window, passed during that time.

For the first half-century after the complete adoption in all parts of buildings of the pointed arch the lancet window was alone

* By Mr. Edmund Sharpe, read at the meeting of the Lincolnshire Diocesan Architectural Society, June 17th.

used; during the next half-century, or thereabouts, the geometrical window, or that in the tracery of which that simplest of all geometrical figures—the circle—prevailed, was alone used. During the next half-century, the window-heads were characterised by that peculiarly English feature, flowing tracery, in which the ogee, or curve of contra-flexure, was conspicuous; and during the last or fourth period of Gothic art, straight lines, both horizontal and vertical, formed the leading lines of the tracery of windows.

I proposed, then, in the work to which I have alluded, to call those four periods of Gothic art, respectively, Lancet, Geometrical, Curvilinear, and Rectilinear,—terms which may be accepted as fulfilling the condition already laid down, and as being sufficiently self-explanatory.

But there remains to be noticed a period during which a large number of buildings were erected, of great importance and great originality, to the characteristic features of which attention has not, even yet, perhaps, been sufficiently directed; I mean those that were erected during that prolonged struggle carried on between these two rival principles, the circular and the pointed form of arch; in fact, during the interval that occurred between the first appearance of the pointed arch and the final disappearance of the circular arch. To this interval I give the name of the Transitional period, a term that has become now almost universally adopted, as applied to these buildings.

We have thus seven periods of the history of church architecture in Great Britain, to the duration of which I ventured to assign, twenty years ago, the following limits, which subsequent experience and study have not, in the meantime, led me in any respect to alter.

	A.D.	A.D.
Saxon Period	—	1066
Norman Period	1066	— 1145
Transitional Period.	1145	— 1190
Lancet Period.....	1190	— 1245
Geometrical Period.	1245	— 1315
Curvilinear Period.	1315	— 1360
Rectilinear Period ...	1360	— 1500

I have now only three other technical terms to define in order to enable me to at once enter, without further explanation, upon the consideration of Lincoln Cathedral.

Almost all the great cathedral and conventional churches of this country are divisible in their entire length into three parts, forming the three branches of the Latin cross,—namely, choir, transepts, and nave.

They are also generally divisible laterally into three portions,—namely, choir or nave, and north and south aisles.

Vertically, also, this tripartite division is again found; the entire elevation of the main interior walls being usually divided into three portions or stories, separated and defined by horizontal string-courses.

These three stories I have named—I, the ground story; II, the blind story, from its being usually dark, and opening into the roof of the side-aisle; and III, the clearstory,—terms which also sufficiently explain themselves.

Now, it will strike every one who looks down the nave of a Mediaeval building, that it consists of a number of exactly similar compartments, placed side by side and tied together by the horizontal lines or string-courses which separate their three stories. The same remark applies as well to the outside of these buildings.

For the purpose, then, of comparing the architecture of one structure with that of another, with a view to trace the progress of the art of building through the Middle Ages, it will be sufficient if we take one or two of these compartments and place such a representation of what may be called the *main idea* of a building, side by side with two similar compartments of another, or of several other buildings.

Time will not permit me to lay before you in detail the characteristic features which distinguish these six periods of Christian architecture from one another. They are, however, sufficiently obvious to all who have paid any attention to the subject.

And now let us proceed to consider how Lincoln Cathedral serves to illustrate the history of church architecture; to which of its several periods its different parts belong; and how far we may be able, by its works, to trace the progress of Christian art in this country during the Middle Ages.

Professor Willis was the first to apply colour to the ground-plans of churches, for the purpose

of indicating the different periods of their construction. He applied his colours indiscriminately, and simply with a view to distinguish one part of a building from another. It appeared to me, some time ago, that this use of colour might be carried a point further; and, in fact, made much more useful, by attaching a fixed signification to the employment of different colours, and by causing a specific colour always to represent a specific period of architecture; and it occurred to me that no better basis could be taken for such an application of colour than the prismatic spectrum itself, which, in a twofold sense, is peculiarly adapted to represent the gradual progress of art in the buildings of the Middle Ages; first, because, as in church architecture, that progress was so regular and so gradual as to be almost imperceptible, and to render it difficult for us to draw any exact line of demarcation between the buildings of one style and those of another, or to enable us to say, for example, where Norman art ends, and where English art begins; so in the prismatic spectrum it is difficult to say where one colour ends and where another begins. Yet, inasmuch as we are obliged, for descriptive purposes, to call certain portions of this blended whole blue, green, yellow, and red, so are we, for the same reason, under the necessity of selecting and characterising in the same manner certain portions of the history of this continuous art, and of designating those parts by some each specific terms as those above proposed.

And, in the second place, this adaptation of the prismatic spectrum to our wants in this respect appears to me to be a peculiarly happy one, inasmuch as our national architecture, rising out of the deep gloom of debased Pagan art in the dark age of barbarous invasion, is thus fitly represented as brightening gradually into the glory and refinement of Christian art in the Geometrical period of the thirteenth century, and as deepening again in its descent through the three following centuries, into the dark age of Pagan revival in the seventeenth.

I have therefore already for some time, for my own purposes, made use of the following selection of colours to indicate, on the ground plans of churches, the particular dates of the construction of their different parts; and I think I can safely recommend it as a convenient one for general use.

	A.D.	A.D.	
Norman	1066	— 1145	.. Black.
Transitional	1145	— 1190	.. Blue.
Lancet	1190	— 1245	.. Green.
Geometrical	1245	— 1315	.. Yellow.
Curvilinear	1315	— 1360	.. Orange.
Rectilinear	1360	— 1500	.. Crimson.

The ground-plan of Lincoln Cathedral behind me, and the elevation of its grand west front, above it, are coloured after this fashion; and you will see at once that every one of the six periods of English architecture is more or less represented in both.

Norman Period.

For all speculations as to the character and extent of the first Norman cathedral erected at Lincoln by Remigius, the first Norman bishop, I must refer you to Mr. Poole's treatise. What is certain is, that, with the exception of what remains of it at the west end, it has altogether disappeared. This fragment, however, is of the highest interest. It has been respected and preserved by all subsequent builders, and still forms an integral and very important portion of the west front. The outline of its simple and unadorned masonry is easily to be traced on the west elevation, and its massive proportions are as clearly visible on the plan.

That we see in what is left the entire breadth of the west front of the original church of Remigius, commenced probably about 1070, there is no doubt whatever. How this design was terminated above and on the north and south sides, is a matter of speculation. I think, however, that the solution of this problem is not so difficult a one as might at first sight be supposed. We have not time to enter upon it here to-day; but, if I am correct in the supposition which I have formed, and which involves the existence originally of a single western tower in place of the two western towers which actually exist, the opinion which Professor Willis and Mr. Poole appear to entertain, that these towers were built either in restoration or in continuance of Bishop Remigius's design, is incorrect.

That these two towers, and other works to be noticed at the west end, were built after the

second fire, which is recorded as having consumed the entire church in 1141, there is little or no doubt. They exhibit, up to the top of their third story, in all their ornamental details, the characteristic features of the very date. They were flanked on the north and south sides with richly ornamented projecting gables, which still remain; and on their west side also with gables of probably similar design, which have been removed. But the weather-mouldings of these gables, still to be seen under the roof of the later work of the Lancet period, reveals to us the singular fact that the apex of both of these gables, which corresponded with the centre of the two large circular side arches of the west front of Remigius, were not in the centres of the two towers, which latter were not, in fact, placed symmetrically with the earlier work of the west front.

How these and other discrepancies of this second Norman design, which could not have been in harmony with that of the first, behind which it stood, were reconciled, we have no present means of knowing; but we may naturally conclude that they furnished the reasons which induced the gifted architect who marked these irregularities, and combined the works of these different periods into one harmonious whole, to erect, towards the close of the Lancet Period, the noble west front or screen, which still remains to us as it left his hands.

Besides these two western towers, built at the very close of the Norman period, two other works of this date remain in the west front. The first is the circular arcade immediately above the plain walling of Remigius's front on each side of the central arch; the second is the great western doorway of the nave, which exhibits, in the five richly ornamented orders of its circular archway, the latest features of the period to which it belongs.

Transitional Period.

Closely following the last-mentioned work, but of clearly defined Transitional character, are the two other western doorways; those, namely, of the north and south aisles of the nave, that on the north side being of slightly earlier character than that of the south side; the limits of time within which all the three doorways were designed and built probably not exceeding ten years.

These two later doorways are amongst the most interesting and valuable remains of the entire structure. Although to be reckoned amongst the earliest works of the Transitional period, they contain not one of the characteristic features which distinguish the works of the Normans, either in this country or in their own; nor does their ornamentation resemble that of works of any other country of Europe of the same date. They prove to us, in fact, along with numerous other similar works in all parts of the kingdom, the existence in England, at this time, of a school of native artists who were not only completely emancipated from those influences which had governed the designs of buildings for the previous eighty years of Norman rule in this country, but who were able to design and to carry out their works with an originality of thought, a fertility of invention, and a perfection of execution, which most justly entitle them to our especial notice, as well as to separate classification. Although they were in reality the earliest works of English design, properly so called, in the country, we are unable to call them "Early English," from the fact that this term has been applied to, and generally received as indicating, the works of the subsequent or Lancet period; neither, although belonging to that period in which the Pointed arch was first used in this country, can we call them "First-Pointed," first, because that designation was also intended to apply to the works of the Lancet period; and, secondly, because in this really First-Pointed period the whole of the arches of decoration are usually circular, as indeed are those of the doorways in question. Until, then, we are supplied with a better term I shall continue to apply to them and to similar works that denominative expression which so aptly characterises the transitional nature of those intermediate works which were constructed during the prevalence of both forms of arch (used, as the latter were, simultaneously, but discriminately, in the same building), and which occupied, in point of time, the latter half of the twelfth century.

Lancet Period.

We have no work in the kingdom of genuine Lancet character to which we can attribute an

earlier date than the eastern transept and the choir of Lincoln Cathedral. We know, from undoubted documentary testimony, that they were commenced about the year 1190 by Bishop Hugh de Grenoble, and were on the point of completion at his death in the year 1200. The dignified simplicity of the whole of this work, and the vigorous boldness which marks the design of all its details, its simply clustered piers, the single vaulting shaft descending in their front in an unbroken line from the clear-story to the floor, their spreading capitals and projecting foliage, the bold sweep of their overhanging bands and circular bases, the deeply-moulded pier arches and vaulting ribs, and the tall single Lancet windows; above all, the largeness of treatment and the vigorous originality of conception with which the entire design has been conceived and executed, demand our highest admiration, and place this grand work clearly at the head, as well in point of time as of excellence, of the works of the Lancet period.

It is not to be wondered at that so noble an example should be rapidly followed by works designed in the same spirit. Within the next ten years several important buildings of similar character were begun; and even before the commencement of the thirteenth century this new fashion of building, the second characteristic type of English art in church architecture, had become firmly established in this country.*

A PARISH STATUTE.

A STATUE of the late Richard Cobden, chiselled out of Sicilian marble by Messrs. Wills, has been set up in High-street, St. Pancras, a good site, where several roads converge, and on Saturday last it was formally opened. The committee met first in the vestry-hall, where, some 30l. being needed to meet the total cost,—about 320l., if we understood rightly,—this was gathered in small sums, and gave a twopenny-halfpenny character to the opening proceedings that, truth to say, was not removed by what followed. The crowd that had gathered round the site was certainly the shabbiest crowd we have looked on for some time, and on the platform there was scarcely a face known out of the parish. The borough members, Mr. Harvey Lewis and Mr. Thomas Chambers, were there, of course, and did well what they had to do. But the statesman element and the artistic element were otherwise conspicuous by their absence. The statue is very picturesque, not to say disagreeable. Cobden, as we remember him, was a grave, earnest, and somewhat straight-haired man; the curly whiskers and thoughtless head here presented do not recall him to us. The pedestal, too, is coarse and common.

If the energetic corner who was present had impelled a jury of artists from some of the neighbouring studios to sit upon the marble body, the verdict could scarcely have been any other than "Found Murdered." We regret greatly to have to speak thus. The notion was a good one,—highly creditable to the gentlemen who conceived it and have worked to carry it out; but they have not taken proper advice, and the result is not satisfactory. The metropolis has yet to call on art to do proper homage to the memory of Richard Cobden.

ROYAL BOX, CRYSTAL PALACE.

THE aspect of the new Royal Box in the Crystal Palace on Saturday last deserves a line of record and a line of praise. Externally it is, as we have before said, by far the best thing of the kind that has been done in the palace for some time; elegance, dignity, and propriety distinguish it. Within it is a model of comfort, and, as it was fitted up on Saturday, of tasteful decoration also. The ante-room into which the box, or rather the boxes, open is a fine apartment, in arrangement something like the old Music Court. On the occasion in question, when the Prince of Wales and some of his Royal Highness's more intimate friends including the Duke and Duchess of Sutherland, the Duke and Duchess of Manchester, Earl Granville, the Marquis of Hartington, and others, entertained the Crown Prince of Denmark, and his Royal Highness Prince Edward of Saxa Weimar at

dinner in the intervals of the *fête* that was going on within the Palace, flowers lined the walls and steps, while on one side appeared an illuminated landscape, and on the other, within an arbour, was seen a sculptured nymph beneath a cascade of water under coloured lights. Well carpeted and well lighted, the effect of the whole was exceedingly satisfactory. The whole credit of the design and arrangement is due, we believe, to Mr. Wilkinson, one of Mr. Bowley's principal aides in the building.

The remarkable popularity of the Prince of Wales was strikingly shown on this occasion. On the party returning to the front of the boxes after dinner, when "God Bless the Prince of Wales" had been sung with great spirit by Mr. Cummings and the choir, the vast audience and the occupants of the orchestra rose and cheered again and again, the ladies waving their handkerchiefs tumultuously. The effect, as seen from the box, under a blaze of light, was fine in the extreme.

The fireworks on this occasion were particularly good. If we had not known that Dr. Price, inspired by seeing what is done in Rome in this way, had been bringing his chemical knowledge to bear upon the subject, we should have supposed them the work of a descendant of that eminent pyrotechnist not long dead who, delighted by the inscription on the tomb of the composer Purcell,—

"He is gone where alone his melodies can be exceeded," arranged that over his own grave should be written,—

"He is gone where alone his fireworks can be exceeded." Joking apart, however, the *fête* was a great success.

A NATIONAL SYSTEM OF IRRIGATION.

A PETITION to Parliament on this subject is being signed in many parts of the country by landowners, farmers, bankers, merchants, and others, showing that the present drought throughout the country is creating anxiety, and that its effect upon the grass, clover, and permanent pasture and green crops is likely to be very serious, and productive of great national loss; that the Government "agricultural returns" for 1867 show that the extent of land under grass, clover, and permanent pasture and green crops exceeds 32 millions of acres, while that under corn crops does not reach twelve millions; that the petitioners believe a national system of irrigation to be practicable over a great extent; if not the whole, of this large area, and that if established it would very greatly increase the production of the country, steady prices, and relieve the minds of the public from the alarming apprehension which the recurrence of such droughts as the present occasion, while it might be made to subserve the further purpose of preventing great damage from floods; that in countries where national systems of irrigation have been adopted the results have been very beneficial, and other countries are following the example. The petitioners therefore pray that inquiry be made as to the practicability of establishing a system of national irrigation.

THE TRADES MOVEMENT.

Wolverhampton.—Masters and men have decided upon the 13th of July as the date of the builders' demonstration to celebrate the adoption in this trade in Wolverhampton of arbitration in the place of strikes and lock-outs. There will be a procession from St. James's-square to the Exchange, where, at one o'clock, there will be a dinner. After that there will be a *fête* and tea in the grounds of Mr. Kettle, the founder of the builders' courts of arbitration; the day's festivities being wound up by a ball in the Exchange.

Liverpool.—The four unionist bricklayers who were charged before the Liverpool Stipendiary, some weeks ago, with "picketing," but who were remanded, have surrendered to their recognisances. Mr. Parkinson, who appeared on behalf of the masters, stated that there were now about 250 non-society men at work, and he was happy to say that they had not been molested or intimidated. The union had done all they could to prevent picketing, and he would ask that the prisoners might be discharged. Mr. Pemberton, on behalf of the men

and the union, gave a pledge that they would take the advice that he had given them, viz., that there should be no more picketing. The prisoners were consequently discharged.—A numerously attended meeting of workmen has been held to take into consideration the trade disputes. Explanations were given by men connected with the Bricklayers' Union of the circumstances under which the dispute in the building trade had arisen, and a representative of the foot and shoe trade stated the cause of the strike in that branch of business, and addresses upon the relations of capital and labour were delivered. A resolution expressive of deep regret at the struggles now existing, and pledging the meeting to afford those engaged in them moral and pecuniary support, was unanimously agreed to.—The bricklayers on strike here, it is said, formed a co-operative association.

Taunton.—The master builders of Taunton have issued a notice in which they refuse to advance the wages of the bricklayers, as requested, and for which they are now on strike. The men ask for 8d. per day extra, which would make 4s. per week. Masters refuse upon the grounds that at the prices at which their present contracts are taken they could not afford the increase, and also that the manner in which the work is now executed by men who call themselves "society men" is so unsatisfactory that it calls aloud for amendment. They also threaten that unless a very great improvement take place both in quality and quantity of work performed by the bricklayers, they will look out for men more skilled and efficient.

Creff.—The operative joiners, after being out for a week, have returned to their work at their former wages. The advance asked was 2s. 6d. a week, which the employers unanimously refused to give.

TREES AND SHRUBS AND SEATS FOR CROWDED STREETS.

THE vegetable creation consists chiefly of carbonic acid gas which it has absorbed from the atmosphere. The organs of trees, shrubs, and plants, imbibe air during the day, while the light of the sun is most active and vivifying, and at night their functions in this respect are largely suspended. They take in and retain the carbonic acid gas as their food, and return the oxygen gas pure to the air.

There is always more carbonic acid gas in the air in dry than in wet weather, and more of it present during hard frosty weather, because the soil, which is at those times less absorbent, imbibes it less freely. There is also more carbonic acid gas in the atmosphere of urban or town districts than of suburban or country districts; and more of it in the higher than in the lower strata of the air near the ground in the latter districts. This is owing to the large cultivation there of trees, shrubs, and plants, which absorb this gas from the air near the surface.

This fact shows that the atmosphere of crowded streets in cities and towns could be relieved of a great portion of the deleterious gases it contains if rows of trees and shrubs were to be placed along the lines of the footway kerbs, along the cab stands, and round public urinals. They would be no more obstructive to traffic than the lamp and other posts are; and a short seat for two, here and there, by a lamp, or a post, or a tree, would be a boon to many a weary traveller. The trees and the shrubs would not only absorb much of the carbonic acid gas in the air, but they would also seize and appropriate much of the noxious gases thrown into it by the breathing of animals, the combustion of fuel, the exhalations from the sewers, and the pest-stratum formed by the escape of gas from the pipes under the streets. While the trees and shrubs were absorbing these noxious gases they would be at the same time exhaling pure life-giving oxygen gas, and thus they would tend to equilibrate the air, or to preserve its salubrity.

A few minutes' rest under the shade of a tree when one is tired is as refreshing as a drink of water when one is thirsty. The *Builder* did much to promote drinking-fountains, will it urge the placing of trees and shrubs and seats in crowded streets? The improvements now going on along High Holborn to the City, and at other places, afford excellent opportunities for doing what I propose should be done.

JOHN PHILLIPS.

* To be continued.

* We have often done so.—Ed.

A CONTRAST: OR HOW MECHANICAL STUDY IS FOSTERED IN FRANCE AND IN ENGLAND.

"THEY message these things better in France," is a backneyed phrase which most thorough-going Englishmen are fonder of quoting when some opportunity of contradicting it presents itself than at other times. Yet there are occasions when no thoughtful traveller can avoid regretting that institutions which he has seen in active working on the Continent have not their parallels in this country, or have those parallels hampered by that clumsy or pedantic inefficiency which is painfully obvious in much of our official work at all times, but is made now and then doubly clear by contrast.

A comparison of one of the public establishments of Paris with what most closely corresponds to it in this country is about to occupy our attention for a moment, and we hope to show that such comparison is neither uninteresting nor ill-timed, and that in the case now under consideration an institution following the Paris model would not be extremely difficult, nor its execution so problematical or unlikely as, for instance, the idea of our remodelling London after the fashion of M. Haussmann must always prove should it ever be proposed for our acceptance.

A visitor to Paris, whether his taste leads him to seek out what little still remains of the monuments of the Mediæval city or whether he prefers to study the scientific work of the present generation and to investigate the practical side of French civilization, will be sure to betake himself to the Conservatoire des Arts et Métiers. Here he will find standing a portion of the buildings of the Royal Priory of St. Martin-in-the-Fields (Saint Martin des Champs), a foundation dating back to the year 1060. Occupying the venerable and very beautiful buildings still left, together with certain more modern galleries adjoining, which themselves stand upon ground formerly covered by portions of the Priory, he will find books, models, and specimens of the scientific inventions, the arts, and the manufactures of the most modern age of France, together with all the machinery of classes, lectures, students, and the various appliances of modern scientific study.

The buildings of the Conservatoire occupy a frontage of something like 600 ft.; but the most important parts of the structure enjoy the advantage of being remote from the noise of any public thoroughfare. The modern part of the establishment presents on the principal floor a range of galleries, not far, if at all, short of 800 ft. in length, with almost the same amount of space on the floor below, appropriated to a museum and to spacious ranges of offices, with lecture theatres, residences for officers, and other administrative buildings appended. Connected with these galleries is the very beautiful thirteenth-century refectory, a building about 36 ft. wide by 168 ft. long, and very lofty, divided in its length into eight bays. This has been restored, and in this noble hall the library is installed. Not far off stands the church of the priory. Of this building the thirteenth-century nave has been very extensively repaired,—in fact, rebuilt in part,—and is occupied, in strange contrast to its original appropriation, by specimens of hydraulic machinery. The apse, which till recently had been little meddled with in the way of restoration or appropriation to modern purposes, is an uncommonly beautiful specimen of transitional Romanesque work.

There is something more than ordinarily striking in this blending of the best workmanship of the past with the best work of the present; but if we have allowed ourselves to dwell upon it at present, it is because this circumstance is not only striking,—it is eminently suggestive. Science is the glory of modern Europe, just as much as architecture and the cognate arts were of Mediæval; and if we would do the best that we can in that race for supremacy in the arts of peace upon which we are now embarked, we shall strain every nerve to excel in the practical cultivation of science. We need now, more than ever before, to train our artificers and our engineers to the same pitch of individual and collective skill which, as the best buildings of the Middle Ages fully show, was so uniformly kept up among the masons, and carvers, and architects of the best period of the Middle Ages. It is to aid in effecting this object that the Paris Conservatoire is established.

Of the collections forming the museum, lodged

in the galleries we have described, the following is a brief summary:—Hydraulic, optical, and acoustical scientific instruments, specimens of the arts of reproduction, i.e., typography, lithography, photography, &c.; ceramic work, chemical products, models of the art of construction, models of apparatus for heating and lighting, weights and measures, lathes, tools, textile fabrics, agricultural implements and products, models illustrative of geometrical mechanics and of descriptive geometry, models of machinery and constructions relative to railways, models of machinery, motive power, engines of various sorts, machines for various purposes of manufacture; ancient and modern globes, maps, and relief maps; apparatus for experiments in physical science, electricity, galvanism, sound, &c.; specimens of horology; and a variety of machines, especially hydraulic machines, in motion. Of these varied groups of objects, the very extensive collections of models of machinery, most of them to the same scale, and excellently well placed and lighted, and easily approached, are eminently instructive and suggestive; while many of the collections of actual instruments or machines contain individual specimens of skill or patience famous in the history of science, and having an historical interest quite apart from their value as links in a chain of scientific steps.

If the galleries are richly filled, the noble library of scientific books equally claims our admiration. Appended to this library is a collection of drawings to scale of all the most valuable and most recent machines manufactured, available for purposes of study to inventors, mechanics, and others.

Fifteen professorships are attached to the Conservatoire, and the classes and lectures include a certain number of public gratuitous courses of evening lectures on subjects upon which it is considered desirable that some degree of scientific training should be readily accessible to those who cannot afford to pay for the instruction they need.

Such, in some of its features, is the Conservatoire des Arts et Métiers—a noble group of buildings, to house a rich museum and useful public library; and a staff of professors, including many of the best-known names in science in their several branches. This machinery is devoted to the promotion of the scientific education of the rising race of French engineers, machinists, and artificers, or, in short, to what we are beginning to know by the title—not, perhaps, strictly correct, but now well understood—of technical education.

Where shall we turn to find an establishment of an analogous character in England? There exists such an establishment, and it is with the hope of possibly aiding to win for it that very moderate degree of encouragement, or at least of forbearance, on the part of the Government, which it needs to render it prosperous, that we have drawn this parallel. We allude to the museum and library of her Majesty's Commissioners of Patents.

The Patent Museum and Library contain between them the germs—nay, not merely the germs, but most of the materials—of an institution as useful, as complete, and as famous as the Paris Conservatoire, but present every possible contrast in their situation, the mode of their display, and the degree of support afforded by the Government to their more fortunate rival across the Channel. The library and the museum are, for example, separated by a distance of from two to three miles,—the former being housed in the recently-added upper story of a building in Chancery-lane, devoted to the other purposes of the Commissioners of Patents, and in a good position for its purpose; the latter being tolerated rather than taken care of in a forgotten and still lingering fragment of the old "boilers" building at South Kensington.

The museum has been formed mainly through the exertions of the present able clerk to the Commissioners of Patents (Professor Woodcroft) and to no inconsiderable extent, we understand, the nucleus of it was provided by his private collection of models and other objects valuable to students of mechanics. It now includes the most interesting objects known in the archaeology of mechanics, if such a word exists. The "Rocket," Stephenson's successful effort, which established the locomotive in its position as the iron horse, furnished new, and, till then, impossible resources for commerce. Earliest still is the first complete engine of Bolton & Watt, showing the dawn of that revolution in which the introduction of the locomotive was the most important step. The earliest steam-engine, too,

ever used on a steam-boat, is to be found in this museum; also the old wooden printing-press of Franklin's day, presented by Messrs. Wyman. These, and many other such venerable monuments of our mechanical triumphs, are there themselves; and by their sides are numbers of the most exquisite and elaborated models, showing how the same leading principles have been applied, elaborated, and carried to their further results in all the infinite mechanical wonders which British ingenuity has produced for the railway and the steamship, the spindle and the loom, the factory, and even the farm.

This collection is housed so badly, that it can be seen only with the greatest inconvenience; and yet, notwithstanding its remote situation, at South Kensington, and the great disadvantages under which it can alone be studied, it has been visited during the space of about eleven years that it has been open, by more than a million and a quarter of persons.

The Patent Library, situated as we have stated in the heart of London, is an eminently practical institution in its scope and intention. It contains printed copies of all the specifications of patented inventions, together with the elaborate indices, abstracts, and other guides which the commissioners have caused to be prepared for the service of students, inventors, and others.

A Reference Library upon all subjects connected with science and the industrial and fine arts was proposed to be collected round this nucleus, and perfectly free and unrestricted access to be given to all who desired to consult it. As far as it has been possible, this plan has been carried out. The library contains now about 50,000 volumes, selected with judgment; and it includes almost all the scientific periodicals. The access is, and always has been, perfectly free to every person applying and entering his name in a book, and the readers number about 16,000 annually.

The new room, though recently constructed, is full, or very nearly so, and any large increase of books would render it necessary to do what had to be done for long previous to this room being built,—keep the books least often wanted in packages in adjoining stores, whence they were fetched when wanted.

These institutions ought never to have been placed apart; they ought to be brought together, to be well housed, and to be fostered by liberal grants; nor is it necessary for this purpose to expend the ordinary revenue of the country. The annual surplus from the fees and stamps paid on patents amounts to from 40,000*l.* to 50,000*l.* a year. It was the intention of the Legislature when last the patent law was the subject of legal enactment, that so much of this surplus as was needed should be available for purposes such as those of the patent museum; and should this intention ever be loyally carried out, an extremely short time would suffice to convert these two divided and cramped institutions into branches of a noble establishment equally fitted with the Paris Conservatoire to minister to the education of those upon whom England depends for her future greatness.

The country is gradually awaking to the necessity that our artisans should be instructed in at least the elements of such sciences as bear upon the arts they practise, and that those who are to guide and direct them should be men of the highest scientific culture attainable. Yet no better provision than what we have described has yet been made for supplying reference books and models to our students of mechanics. We have repeatedly pointed out in this journal the need of appliances to forward the great and pressing work of technical education. We recognise the great services to the cause of decorative art rendered by the Science and Art Department, and the solid advantages given to a limited extent by the Government School of Mines. We were among the first to point out the value of Mr. Whitworth's noble and opportune establishment of scholarships; but all these things are not enough: we want more and more complete means and appliances, and we consider that nothing could tend more to this end than the uniting of the museum and library of the Commissioners of Patents, and the so completing them to the full scope of their original intention, that they should serve as a great storehouse of knowledge for all students of science, inventors, and artificers; and, in fact, that they should render the same services to science which the British Museum does to literature.

A society, the list of vice-presidents and supporters of which includes a large number of well-known names in the scientific and

literary world, has been lately formed for promoting the public education in a way sufficiently indicated by its title of "Public Museum and Free Libraries Association." The object of this society is to promote the establishment of museums and libraries wherever possible, and it has turned its attention to the institutions which we have just been considering, and proposes to urge on Government the importance of establishing these valuable creations of the Commissioners of Patents on a basis worthy of their great national importance. There can be no question that this object is one that falls legitimately within the scope of the Public Museum and Free Libraries Association, and that their action, if properly supported by public opinion, cannot fail to have great weight with the Government. The readers of this journal are few of them without a direct interest in this question. None of them, no Englishman, indeed, is without a strong interest in the progress of means of scientific education, and we trust that a fitting response will not be wanting to any appeal that may be made to the public voice on the general question of fostering our institutions for scientific culture, and especially on the specific point now being agitated for the niting and completing the museum and the library of the Commissioners of Patents.

LAND AND MARINE SURVEYING.

THE out-door labours of an engineer give scope for the application of the exact sciences, and require a large amount of technical knowledge and experience. It is to be regretted that the ordinary course of office education offers little chance of the young architect becoming acquainted with the duties of the engineer, but to duly qualify himself for future professional success, the conscientious student will gladly learn all he can of engineering practice. The works of the surveyor and engineer precede those of the architect,—the ground is prepared, roads are made, the river pent within a safe channel, the sea controlled, before the edifice is raised; and yet the engineer and architect are so dependent the one upon the other, that it is a question whether the two should not more often be found combined in the same person. At all events, the architectural pupil should embrace every opportunity of acquiring the theory of engineering practice, and exercise himself in such out-door exemplifications thereof as circumstances permit. The elementary proceedings necessary for surveys of lands, taking of levels, and many other simple practical operations may be practised with advantage, and after thus obtaining an insight into the use of the various instruments employed, the student will be encouraged to perfect himself in working out more elaborate and difficult problems.

Leisure time may generally be found for this: "where there's a will there's a way," and there must be, we hope, few artied pupils but who at some time or other during their term can find an opportunity of outdoor practice and of indoor study of the simpler processes of engineering fieldwork.

Perhaps no craft possesses so many well-digested elucidatory works united to the student, to say nothing of the scientific and technical treatises written for the experienced professor, as are provided for the engineer. The necessities of our enormous towns make a constant call upon the services of the profession, and although railway mismanagement seems for a time to have arrested employment of engineers in one particular branch, there is yet so much to be done by these "pioneers of civilization," as to serve as an encouragement to many clever young fellows to take up the theodolite and the transit, and to qualify themselves to compete for the prizes held out.

Three hooks by the same author now upon our table, show that publishers, at all events, believe in the steadiness of the demand for practical engineering literature. These are "The Practice of Engineering Field Work," vol. i., 8vo, price 24s. London: Atchley & Co.; the second volume of the same, by same publishers, 1868, price 20s.; and "Land and Marine Surveying," Lockwood & Co. 1868," each by W. Davis Haskoll, civil engineer, and author of many previous works on subjects connected with his profession.

The two volumes published by Atchley & Co. so nearly cover the same ground as the "Land and Marine Surveying" of Lockwood & Co.

that it seems hard to understand why separate works were written. Each commences with definitions of different kinds of land surveys; descriptions of the 100 ft. and the Gunter chain, the foreign variations thereof; directions how to proceed to use them, &c., and so through the various stages of out-door and of office work, using almost identical illustrations, and enforcing the same well-digested rules for practical guidance in almost the same words.

So throughout the entire volumes, excepting that the last-named book ("Land and Marine Surveying") is more systematically written, and, if it be "a twice-told tale," is yet so well told, and hath so much of pith and marrow in it, that we must suppose the different publishers were understood to reach different circles of readers, or else how could the two almost twin books simultaneously appear?

Each work abounds with useful hints. The following is worth attention:—

"Many years ago, the writer was assistant to a gentleman who was engaged on a very extensive survey, on which one base line measured upwards of seven miles. A straight-edge (?) was purposely made for laying down this base, which was on mounted paper, and strained on a large board. When we came to fill in the survey, a great number of lines were run from, to, or through this base, and on plotting the work we were very much annoyed and surprised, for great pains had been taken, to find that many of these lines plotted too short or too long; many of them were chained over again, without finding any defects to account for the cause of our annoyances. At last the guilty one was suspected; a long piece of the strong silk was procured, slightly waxed, and strained from end to end of the base, which was then discovered to be in many places as much as ten and fifteen links out of the straight line, and accounted for apparent errors in the field work."—*The Practice of Engineering Field Work*, vol. i., p. 19.

Ergo, test your straight-edge before using it; the simplest way being to place one against another and hold against the light, when the defects can be seen and corrected.

On page 24 of the same volume is a description of a home-made heliotrope. We would suggest as an improvement upon the author's swinging bit of mirror an American modification, which consists of a moveable cap, on which are two hemispheres of cut glass (like a decenter-stopper) silvered between. The reflected rays from this are visible at great distances, and the cap is strong and easily carried in the pocket.

The value of large ground-plans, in which the lines of survey are set out to a large scale, is very properly insisted on, and the author truly says that, although costly, the expense will in the long-run be an economy. The description of the various instruments used by engineers, which completes the first volume, is clear and satisfactory, and the illustrations are sufficient for the purpose. In the letter-press a little confusion is occasionally created by not making the references to the illustrations at the end of the book distinct from those that occur in the pages. The price of this volume, 24s., is startling; and that of the second volume, a thin octavo of 184 pages, 20s., is still more inexplicable.

The second volume is devoted to the subjects of water-supply, sewers, and irrigation, with, at the last, apparently to make the bulk of the volume somewhat more imposing, a supplementary chapter on "Traverse Surveying." The remarks on water-supply and the kindred topics of sewage and irrigation are well collected and valuable. The author has no hobby to ride; and when he expresses an opinion, does so with force and with well-applied reasoning. His references to statistics and ascertained facts are always fairly made; and his testimony against the present ignorant waste of sewage matter is given in the strongest terms.

The remarks on organic matters causing impurities in rivers we would gladly put, for their length, transfer to our pages; the reader is therefore referred to the work itself, pages 21 to 30. Following these are some useful facts relative to the comparative value of hard and soft waters. Contrary to popular opinion, our author correctly gives the balance of recommendation to the former.

The well-known works at Croydon and Edinburgh are of course described, and the subjects of constant and intermittent water-supply are discussed at full length. At page 128 he says: "We will now venture to make a few observations as to the present state of the outfalls at Barking Creek, because we believe that the whole of the question of the disposal of the London sewage will again demand the attention of the engineering profession;" and then gives the pith of all the evidence that has been collected upon this most important subject,—one full of difficulties. This portion of the work concludes

with well-put arguments for the more frequent employment of irrigation as a means of increasing the wealth of our island.

Land and Marine Surveying is a most useful and well-arranged book for the aid of a student. It contains all the practical directions of the two volumes previously reviewed, omitting the remarks on sewage, water-supply, &c. The table of contents gives exactly the character of the volume, and we can strongly recommend it as a carefully-written and valuable text-book.

WORCESTER ARCHITECTURAL SOCIETY.

THE first excursion for the present season of this society was to Redditch and the neighbourhood. The weather was excellent. The party started by train at half-past nine in the morning, arriving at Redditch in about an hour, and the places visited, a monster omnibus from Birmingham and several other carriages being engaged for the purpose, were Redditch, Headless-cross, Ipsley, Besley, and Alvechurch.

At Redditch the party were very kindly received by Mr. R. S. Bartlett, who showed them over his extensive manufactory for needles, fish-hooks, &c., describing and illustrating all the various processes used in the trade. Then the company were taken to Mr. Bartlett's house and gardens, where they inspected many relics of the ancient Bordesley Abbey, including tiles, fragments of foundations, windows, doorways, &c., preserved by Mr. Bartlett during a recent excavation, and of which he has published an interesting account. After visiting the site of the abbey, where Mr. Bartlett described the ground-plan and the other features of the spot, the excursionists returned to his mansion, where a substantial luncheon had been spread, and all were thoroughly refreshed. Then they took to the carriages and sped away to the various churches of the places already mentioned, which were briefly described by Mr. J. S. Walker. After one of the most agreeable rides possible, the party arrived at the last halting-place for the day,—namely, Archdeacon Sandford's retreat at Alvechurch. They visited the Church of St. Lawrence, and, on leaving it, they were hospitably entertained by Archdeacon Sandford and Lady Eskine, and after remaining for a time at the rectory, and wandering about the grounds which surround it, the party proceeded leisurely to the railway-station, and returned to Worcester.

SIR DAVID WILKIE.

WRITTEN BY THE LATE JOHN BURNET.

WITH much enthusiasm for, and but little knowledge of, art, Wilkie went to Edinburgh in his sixteenth year to pursue his studies in the Trustees' Academy. This establishment (for good sometimes comes from evil) arose out of forfeitures for rebellion in the years 1715 and 1745; and though the sum, like that allotted for the Kirk of Scotland out of the plunder of the ancient Church, was scarcely sufficient to keep breath in a body which it should have animated with life, it awakened the slumbering spirit of the country. The aim of the institution was to improve the elegance of our manufactures; and the directors invited students from all professions in which taste had a share to come and study in their school of design. A succession of professors, who loved and excelled in painting, gradually extended the original plan. Runciman, scarcely inferior to Fuseli, came with the influence of his enthusiasm; David Allan succeeded, who brought from Rome some knowledge of Italian art; and how still loved to evoke characteristic scenes for Scottish song and domestic story. In short, the forerunners of Wilkie raised the fame of the school in the elegant as well as the useful. On the death of the master, who followed Allan, the Trustees, deceived by sketches which Wood, one of the candidates, did not himself draw, made him master, but presently resented the fraud by displacing him and electing John Graham, a man of probity as well as talent, in his stead. The new master, who had studied at Rome and in London, took an enlarged view of the duties of his station; and, though he continued to lend manufacturers the aid of art, and render more graceful the leaves and buds and blossoms and the tracery from the looms of Glasgow and Dunfermline, he gradually introduced art of a

higher reach, and directed the students to draw both from the flat and the round, from statues as well as from pictures. To this for a time the selfish and short-sighted objected, for they failed to see that he who could successfully draw the unity and proportions, the poetical geometry, of the human figure, could draw anything.

Graham used, it is said, to relate, after Wilkie rose to eminence, how he was surprised one morning by a call from a sedate lad with a low voice and a country air, who presented a letter from the Earl of Leven requesting that the bearer, the son of a neighbouring clergyman, might be admitted to the benefits of the institution. He produced the drawing of a shepherd's dog, and sketches of men's heads, which the professor saw at a glance were not copied from pictures, and was surprised to find that David—for this was Wilkie himself—had drawn them from living nature in that wide academy, the world, and chiefly from the heads of the members of his father's congregation. In the art of drawing he was, indeed, far behind others of the students in whose ranks the professor immediately placed him; but he surpassed them all in comprehending the character of whatever he drew; indeed, as one of his comrades said, Wilkie would draw nothing till he understood it, and when he seized the meaning he proceeded to draw it on studiously and slowly, saying that the meanest figure in the smallest group had a meaning and a character, which it was evident all great painters observed. Artists who have since risen into eminence were in the same class with him. Allan the second—for Scotland has had two distinguished artists of that name—made room in the class for Wilkie, and went abroad. John Burnet (destined to aid in diffusing the fame of his fellow-students to the uttermost ends of the earth), together with Thomson, since dead (the brother of George Thomson, secretary to the Institution, and the editor of "The Melodies of Scotland," and correspondent of Burns),—these three were regarded soon as the ablest of Graham's pupils: Burnet for quietness of tints; Thomson for what was called historical loftiness; and Wilkie for original observation. One of the first drawings which Sir David made was a Niche, in red and white chalks, still preserved; the second a man's foot, of which one of the elders of Cultra remarked, when his attention was called to it, "A fit? It's mar like a flute than a foot;" the third, and this was done out of school, a shepherd's dog, which, during the first vacation, he carried to the castle of the Earl of Leven, nor did he hesitate to own, when, long afterwards, he happened to meet the Hon. Leslie Melville, how his heart beat when he approached the gate. He occupied very humble apartments in Rose-street, in keeping with the condition of a minister who had eight children and a stipend of 115*l.* a year; and in keeping, too, with the perfect modesty and good sense always as conspicuous as the genius of Wilkie.

The time of study in the Trustees' School was in the morning from ten to twelve, when the mind is unjaded with the business of the day, and the eye fresh: to this some of the masters, whose apprentices were students, objected, as it tended to unsettle the young mind for the soberer duties, and at last—but that was long after—the study-time was fixed for the evening, thus bringing to a work of genius a body fatigued and spirit hunted by a work of the hand. This suited the selfish feelings of business; but Wilkie, heedless of all but the studies of art, laboured on. Of a frame too delicate for the boisterous amusements and laborious wit of the younger citizens of Edinburgh, he watched the idle groups in the streets and the market-places, shoemakers at their task, masons at their toil, ploughmen between the stils of the plough, and all the postures which crafts or professions put men or women into, and found a difference in all. He made nature his Ostade, and his Teniers, and Carse, a Scottish painter, with a fine tone of colour, was his Rembrandt, for neither Fife nor the Lothians had one of those artists, though the critics found both in him, when his first pictures burst on their sight. The nearest point of his approach was, Carse had seen a Teniers, and he had seen a Carse. Next to the contemplation of nature he loved the works of David Allan, and as Raffaele was traced to Perugino, so was David the second supposed to be descended from David the first, and Wilkie borrowed some of Allan's attitudes, but the one was all propriety, and the other never stumbled upon it even by accident. Wilkie's early study of heads for portraiture—his skill in representing individual character

—his art in catching Nature in her grotesque mood when she was all negligence, was the origin of his great success in the subjects of domestic or familiar life.

Graham loved historical painting, and had painted several successful pictures. His "Murder of David Rizzio," "Chevy Chase," and the "Burial of General Frazer," particularly the last, were meant to Wilkie's mind, and he kept a print of it in his study. The professor represented the value of the higher studies to the Trustees, and was allowed to choose subjects in which the ablest students might exercise their talents in oil colour, and stimulate ambition by premiums. The first runners in this race were Thomson, Burnet, and Wilkie, and they were directed to find their subjects for themselves in the tragedy of "Macbeth." The picture of Burnet was the sinking of the cauldron; that of Thomson, the scene where Banquo is murdered on the skirts of the forest; and that of Wilkie, the interior of Macduff's castle, where Lady Macduff defends her little ones from the murderers. The landscape showing the torches of Banquo flashing through the glades of the forest, was the chief attraction in the work of Thomson; the mingled supernatural light and darkness in which the cauldron sank into the earth, the most expressive in that of Burnet; the fine expression on the face of young Macduff is still remembered in that of Wilkie. Thomson obtained the prize, though, with some, not the praise; and some were not slow in imputing his success to his brother, the secretary, who influenced, they alleged, the distribution. Wilkie, if disappointed, did not show it, but bore it with a modest tranquillity; and so far did his gentle manners and after fame touch the fancy of the secretary that in letters still extant to the minister of Cultra he forgets the name of Graham altogether, and speaks of David as his noblest student, and how he laid, under him, the sure foundation of his fame.

BELLHOUSE'S SAFETY APPARATUS FOR HOISTS.

The greatly increased use of hoists and colliery cages renders more and more important the invention of means of preventing accidents with them. Bellhouse's apparatus appears calculated greatly to increase their safety. The following is the arrangement of it. Upon a strong wrought-iron pin secured to a wrought-iron fixing (which in its turn is bolted to the cross pieces of the chair or cage) is hung a weighted lever, one extremity of which is connected to the suspending chain or rope by means of a clip, which is attached firmly to both; whilst the other extremity is, after passing over the wrought-iron pin, jointed into a wedge or inclined plane, and terminates in a sharp pointed pin. The wedge is made to fit the conductors, so that in the case of corner guides these wedges are V shape on the face, in side conductors they are flat, in both cases they are serrated. When the suspension ropes or chains break, the weighted levers fall some 3 in. lower, which lifts the wedge by forcing the sharp end of the lever into the conductor. The cage is meanwhile moving downwards, but the wedge having been stopped it follows that a thicker part of the wedge must be between the pin and the conductor, and the heavier the cage the more will the pin be forced on to the thick part of the wedge; so that the greater the weight to be stopped the greater is the pressure on each wedge by which it is again transmitted to the conductors. This is a feature peculiarly its own. It is the weight of the cage itself which, with the momentum, supplies the power to stop it; the weights and springs merely move, or rather set in motion, the wedges, which are instantly fastened by coming into contact with the conductors: this first action does not stop the cage, but merely places the wedges in such a position that the cage must stop itself.

By these means the greatest simplicity is preserved, and consequently the liability to get out of order is materially lessened. By employing wedges against the conductors, the tendency to break is reduced to a mere nothing, and the injury to the conductors, which in most arrangements is very great, is here only nominal, owing to the large bearing surface of wedges as compared with forks, spikes, or excentrics. No rack is required; and as there are so few joints, and in those few the metals working together being made purposely different, prevent liability to rust or to become fast from disuse.

The weight of this apparatus is very trifling, and the cost is said to be moderate. An arrangement is attached in mills, warehouses, hotels, and hospitals, which enables the catches to be instantly brought into action by any one in the cage; in the event of the strap which drives the gearing breaking or slipping, or over-weighting of the cage, or even of the break not acting with sufficient promptitude; so that whenever the descent is too rapid for safety, a chain overhead, hanging in easy reach, may be pulled, and the stoppage effected instantly.

LECTURE ON EPITAPHS.

A LECTURE on epitaphs was recently delivered by the Rev. E. C. Lewis, of Rochdale, in Macclesfield. The lecture was both interesting and amusing; its more sombre features being relieved by an enlargement on the lighter and more humorous or even absurd phases of the subject. A cruel epitaph on a doctor runs:—

"Here lies the corpse of Dr. Chard,
Who filled the half of this churchyard."

At Oakham, 1736, on a wood-cutter:—

"The Lord saw good, I was lopping off wood,
And down fell from the tree;
I met with a check, and broke my neck,
And so death lopp'd off me."

The following is an epitaph on a man who was too poor to be buried with his relations in the Church of Kingsbridge:—

"Here lie I, at the chancel door;
Here lie I, because I'm poor;
The further in, the more to pay:
Here lie as warm as they."

In an Irish village churchyard:—

"Here lies the body of Mary Quin,
Who was so very pure within,
She broke her outward shell of skin,
And hatched herself a cherubim."

There is a humorous epitaph in a churchyard in Wales, on the grave of an organ-blower, thus:—

"Under this stone lies Meredith Morgan,
Who blew the bellows of our church-organ;
Tobacco he hated,—to smoke most unwilling,
Yet never so pleased as when pipes he was filling.
No reflection on him for rude speech could be cast,
Though he gave our old organist many a blast.
No puffier was he,
Tho' a capital blower,
He could fill double G,
And now lies a note lower."

Our readers may recollect of a Yankee epitaph on a husband by his disconsolate widow, who stated in it that she still carried on the tripe-and-trotter shop round the corner: the following, on the other hand, looks as if it were intended to damage the sale of Cheltenham waters:—

"Here lie and my three daughters,
All from drinking the Cheltenham waters;
While, if we had kept to the Epsom salts,
We should not now be in these here vales."

Many epitaphs are, no doubt, not merely "only fit for Punch," but never appeared in any churchyard; and we may very fittingly sum up the present selection with one from *Punch* itself:—

"On a Locomotive: Written by the sole survivor of a deplorable accident (no blame to be attached to any servants of the company):—

Collisions four
Or five she bore,
The signals were in vain;
Grown old and rusted,
Her boiler busted,
And smashed the excursion train.
Her end was pieces."

ACCIDENTS.

Manchester.—A fatal accident has occurred at the Flixton cotton mill. The mill, which is eighteen windows in length and three stories in height, has only been built about three years. Last Christmas a massive iron cistern, supported by iron beams, was built on the top of the central portion of the mill. The rooms below this cistern were used as head and hobbin rooms, the ground-floor being used as a stable. The cistern had only been half filled with water during the week, and was for the first time quite filled when it broke, by its own weight, the supporting iron beams, and crashed through into the stable, completely destroying the floors of the head and hobbin rooms. Some 300 persons were employed in the mill at the time, and the

noise of the crash sent them running out of the building. Two men were in the stable. They were both got out alive, but one was so injured that he died in an hour and a half. The other man received a severe blow on the back by the falling iron, but it is considered that the injury will not prove dangerous. At the inquest it was given in evidence that the tank was made and erected by Mr. Robert Hall, of Bury. It was supported by five cast-iron beams, and rested on the walls on three sides. The ends of the beams rested on two walls. The building over which the tanks was fixed was not exactly square, and the beams were of different lengths. Four of the beams had broken, and one was still resting on the walls, which had not given way. The tank was calculated to hold 8,050 gallons of water. The weight of the tank and beams was over nine tons. Mr. Hall was called, and said he could not account for the accident. His son and one of his men had superintended the work, but his son was not there that day owing to his nervous temperament having been so much affected in consequence of the accident. He thought the tank was 4 ft. deep, perhaps 13 ft. wide, and 18 ft. long. He believed the beams were sufficiently strong. They had made and fixed tanks for twenty years, and had never known one to give way before. Ultimately a verdict of "accidental death" was returned.

Hook-Norton.—A man had just finished some repairs at the bottom of a deep well at Park Farm, and had ascended some 20 ft. on his return to the surface, when the walling began to give way beneath him. A moment or two more, and the whole of the stonework and surrounding earth had fallen in, burying him under at least 30 ft. of earth and stones. At the mouth of the well appeared a great chasm, of perhaps 12 ft. diameter, and the carb, &c., that had fallen in, reached to within about 12 ft. or 15 ft. of the surface. Digging out the well was commenced at once, and throughout the whole day untiring efforts were made to recover, as was imagined, the body of the unfortunate man. To the surprise and delight of the workmen, his voice was at last heard, earnestly entreating them to be quick, for that he thought he could not last much longer! He was brought up at last alive to the surface, and is now progressing as favourably as possible. No bones are broken, and the internal injuries, it is hoped, are not much. He was protected by a very large stone, which rested on a stout bar which had been thrown across the well to strengthen the masonry. He seems to have been supplied with air from a wooden tube, belonging to a pump which was fed from the well, this tube fortunately broke just opposite where he lay.

Crief.—At a hydropathic establishment in the course of erection on the rising ground on the north side of Crief, ten masons were in the act of carrying a large stone along a gangway, when the planks broke, and all the men, with the exception of one who clung to a beam, were thrown to the ground. All were more or less injured, but three of them were seriously bruised.

SANITARY PROGRESS IN THE LAKE DISTRICT.

THE tourists' season will soon commence, and many persons will be pleased to learn that great improvements have been made in the English lake district. Until very recently a warm bath could not be obtained at any town in the mountain part of Cumberland; neither did there exist either main-sewerage, house-drainage, or a public water-supply in any one of the lake towns or villages. Keswick has set the example, and we trust all the other places will follow. Keswick has been sewered and drained, and receives an abundant supply of soft and pure water from Skiddaw side: there is railway accommodation, a fine new Station Hotel, with the Royal Oak, the Queen's, as also the Lodore and Borrowdale Hotels, having warm and shower bath accommodation with other sanitary arrangements and conveniences of the most approved kind. The *Builder* has more than once pointed out the glaring sanitary defects in the lake towns, and remonstrated with the inhabitants on their apparent apathy. It is but fair, therefore, we should notice the improvements which have been effected, and we venture to promise an abundant repayment for the costs incurred. Penrith and Cockermouth have each been sewered, drained, and provided with public supplies of soft, pure, and wholesome water.

FOUNTAINS ABBEY, YORKSHIRE.



The Nave and South Aisle.



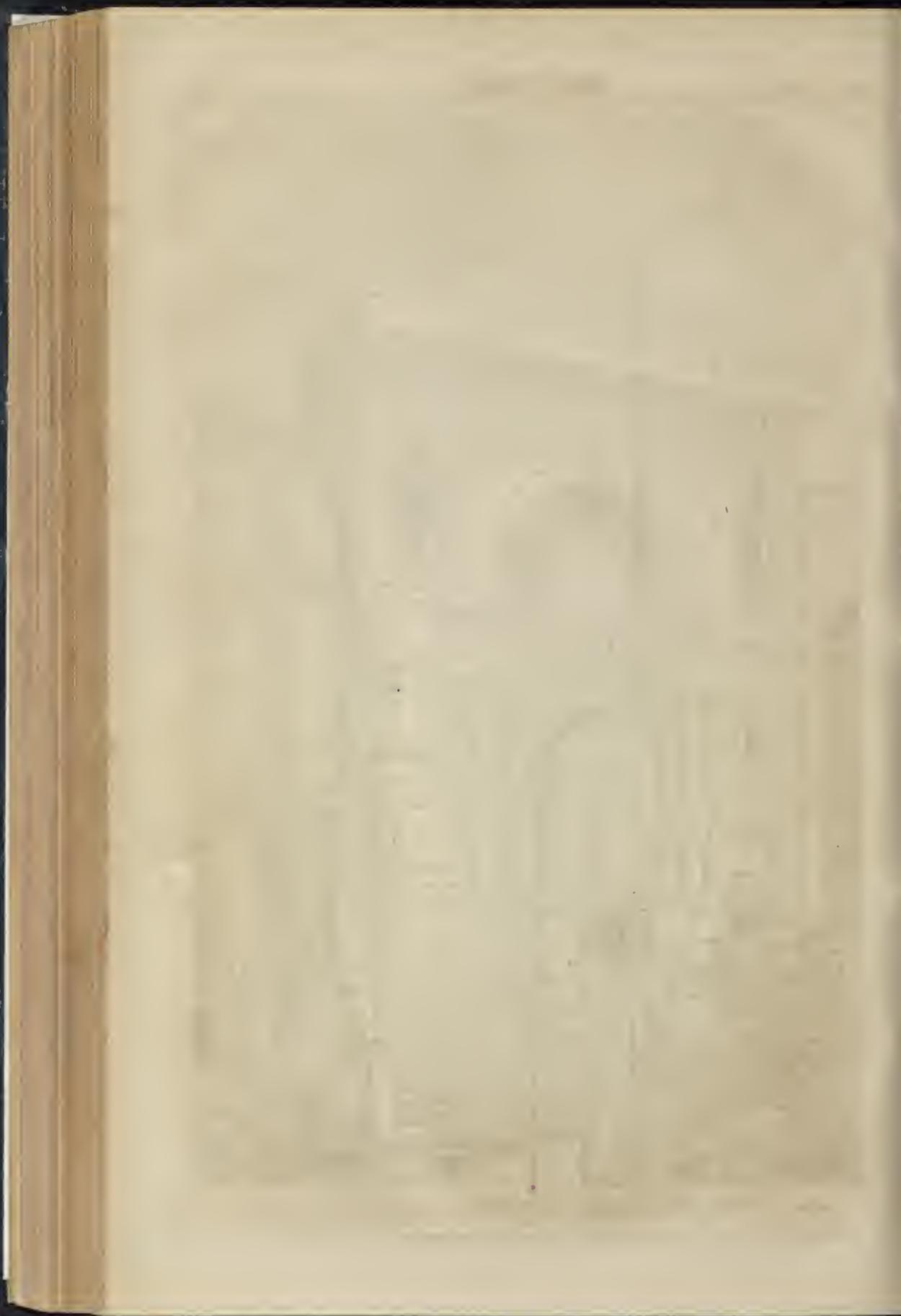
View of the Abbey Church from Iolin Hood's Well.



The Lady Chapel.



ENTRANCE TO THE VICTOR-EMMANUEL GALLERY, MILAN, ITALY.—SIGNOR MENGONI, ARCHITECT.



THE VICTOR-EMMANUEL GALLERY,
MILAN.

Not long ago, this fine new gallery, constructed in Milan, by an English company, was illustrated & described in our pages.* We now give a view of the entrance to one end of the gallery, embracing a view of the monument to Leonardo da Vinci. It will be observed that the external end of the gallery is not at right angles with its axis, and that an arrangement was necessary to produce symmetry and regularity within. The ornamentation is rich and elegant.

THE WIDENING OF PARK LANE.

In answer to Mr. Goddard, in the House of Commons, Lord J. Manners detailed the steps taken by the Board of Works with a view to improve the approaches to Park-lane. At the present moment there was no scheme, and until further proceedings had been taken it would be quite impossible for the Board of Works or any other body to widen Park-lane. A recommendation had been made that the east side of Park-lane should be pulled down; but the whole matter would no doubt be carefully considered before next session.

At the last meeting of the Metropolitan Board of Works, the chairman drew the attention of the Board to what had taken place in the House of Commons in reference to this question. The Board, he said, had made application to the Government, asking that a surveyor should be sent down to make arrangements for the opening up of Park-lane, but they refused to entertain the question. The next thing the Board did was to consider the opening of Hamilton-place, when they met with the most determined opposition on the part of the Commissioner of Woods and Forests. They then had no course left to them but to open Park-lane itself, and in the consideration of the public interest, which they were bound to attend to. If they had attempted to open Park-lane on the opposite side, they would only have had a 50-ft. roadway instead of one 70 ft. or 80 ft. A strong opposition was offered to this proposition of the Board for the widening of Park-lane, and the consequence was that the hill was thrown out, and now the committee of the House of Commons recommended that the Board should go back to Hamilton-place. What were they, as a public Board, to do when driven about from one thing to another in this way? After some further discussion the subject was referred to the works and general purposes committee.

The Piccadilly end of Park-lane cannot be equalled in the "West-ends" of all Europe for inconvenience, all things considered: it is narrower now, as the *Morning Post* remarks, than when it was only known as "the lane leading to the gillows." Could not the plan some time since suggested in the *Builder* be reconsidered, with the view of its adoption, as the easiest way out of the difficulty?

FROM IRELAND.

Dublin.—A plan for increasing the width of Carlisle Bridge has been designed by Mr. Georgehan, architect. It could be carried into execution, it is said, without disturbing the present bridge, and would not cost half the amount which would be required to erect a new bridge. Mr. Georgehan proposes to allow the present bridge to remain, removing the parapets, and extending the width to that of Sackville-street, 53 ft., and reducing the roadway to a perfect level, the centre arch only having to be altered, the stone voussoirs being replaced by cast metal beams, arranged so that the water and gas pipes may pass between the beams in the depth of the new crown, the extensions each side being supported on hollow cylinders sunk down to a solid bed, and filled with concrete, the roadway being maintained on cast metal arched beams and iron plates, filled in with road metalting. The façades facing the river on each side would be of ornamental metalwork, concentric with the arches of the present bridge, the whole forming to all appearance a new and ornamental structure. The old bridge may remain undisturbed until the lateral extension is completed.

Belfast.—The foundation-stone of a projected

Masonic hall has been laid with Masonic ceremonial. The site is central, occupying a considerable portion of one side of Arthur-square and Ann-street. It is approached from Cornmarket, Arthur-street, Castle-lane, and Ann-street, and there is an open space in front which will show the dimensions and general character of the building. The architects are Messrs. Lanyon, Lynn, & Lanyon; and the builder is Mr. McKeown. The cost is estimated at 8,000. The building will consist of a ground, first, second, and third floors, with a total street frontage of 170 ft.—100 ft. in Arthur-square, and 70 ft. in Ann-street. On the ground floor there will be six spacious shops and a suite of apartments for the caretaker. On the first floor will be a large and small dining-hall, a billiard-room, and a committee-room. The arrangements on the second-floor will be somewhat similar to those on the first, and it is intended that this floor shall be devoted to the purposes of a Masonic club. The third floor will be used solely for the purposes of Masonry, and will consist of one large hall, 42 ft. 6 in. by 26 ft., and 18 ft. high, for the meetings of the Blue and other symbolical lodges; a smaller hall, 30 ft. by 20 ft., same height, which may be used for the Royal Arch Chapters. There will also be another hall, 30 ft. long by 18 ft. 6 in. wide, and same height, for the purposes of an encampment of the High Prince Masons, and also for their chapters. Each of these rooms will be provided with an entrance-porch and ante-room. On the same floor is a small room for the paraphernalia connected with the various degrees. The design is in the Early French style. The lower portion of the exterior, from the ground-line to the level of the windows, will be executed in Cookstown sandstone, and the remainder of the building in white brick. The quoins, orbel moulding, string courses, and all the other dressings, will be of sandstone.

THE CANTERBURY SEWERAGE.

The main drainage and sewerage works have been handed over by Mr. Pilbrow, the engineer to the local Board. The report presented by him shows that the house connexions only are now required, and these must depend upon an efficient water-supply to make Canterbury a thoroughly-drained city. The total cost has been 13,157l., which is considerably within the estimate.

The total quantity of sewers laid, of all classes, is about thirteen miles, together with about fifty-four large inspection-shafts, seventy-six flushing-shafts, 100 ventilating-shafts, and crossing the river at five different places. The outfall works, or sewage deodorizing tanks and filters are said to be now satisfactory; but the nearly submerged state of the land below the city, and the boggy character of the soil, rendered this portion of the works more costly and difficult than was anticipated.

The principle upon which the system of sewers is laid down is the "Separating System" (and which Mr. Pilbrow claims to have originated in 1850). All surface and storm waters are excluded, so that the sewers are for the exclusive purpose of carrying away from the houses and city the sewage proper, the vehicle for conveying and forcing this through them being the artificial daily and hourly supply of water to each and every house.

The most of the sewers laid in the city are of stoneware pipe of Messrs. Doulton & Co.'s manufacture, ranging in size from 8 in. to 18 in. in diameter, and of the kind known as "coned and related pipes," originally devised by the engineer, and always specified by him. The sewage from these is eventually collected into a main brick sewer of oval shape, measuring 3 ft. by 2 ft., built of 4½ work in Portland cement, and rendered with the same.

From this sewer the sewage is emptied after traversing the Broad-Oak-lane, about a mile and a quarter from the city, into the sewage-house, which is a plain rectangular building of brick, the greater part of it being below the surface. It is 160 ft. long by 60 ft. wide internally, and divided longitudinally into three compartments, the centre one comprising the filter and charcoal rooms, the former 120 ft. by 19 ft., the latter 39 ft. 3 in. by 19 ft., and situated on the ground level. The compartments on each side consist of the subsiding tanks, which collectively run the whole length of the building, the brick partitions with iron strainers on the top acting as

weirs. The sewage on entering the building is received in a pit, and made to pass into the first tank through an aperture at the bottom of the partition, thus keeping all solid matter down at once as much as possible. As each tank is filled the liquid passes over the several weirs, and eventually into the filter-house, which contains two sets of filters 3 ft. apart, two in each set, at different levels, 2 ft. apart, 120 ft. long, 2 ft. wide, and 2 ft. high. The sides of the filters are cast as gratings, the openings ¾ wide and bars ¼.

The sewage-water after passing laterally through two filters filled with charcoal (one set being in operation while the tanks on the other side are being cleared of deposit) finally flows as clear, it is said, as inodorous water down the 24-in. outlet pipe to the river below Fordwich, a further distance of ¼ mile passing twice in its course through iron pipes laid under the bed of the river Stour.

The execution of the works has been attended with some discoveries and findings of considerable antiquarian interest. We may mention the Roman tessellated pavement referred to in a letter in our number for May 23rd, but which was broken up in removing. The engineer, however, had luckily had it photographed and an accurate key for colouring it taken (by his assistant, Mr. W. H. Fox), and has since presented the Society of Antiquaries (London) and the Kent Archaeological Society with coloured photographs of each.

Other portions of Roman pavement were found in different parts of the city, as also remains of the ancient city walls constructed by the Romans. The engineer is preparing a plan of the city to show the position of this and other interesting features.

The whole of the works have been designed and carried out under the personal supervision of Mr. J. Pilbrow. Messrs. Good & Inlens acted as clerks of the works. Messrs. Dowell & Tyler, of London, were the contractors for the construction of the brick sewer; and Messrs. Dickinson & Oliver, of London, for the sewage-house and pipe-laying. The pipes were found by the Local Board.

LIGHT AND AIR: IMPORTANT
JUDGEMENT.

The case of *Horsley v. Leak*, decided by Vice-Chancellor Malins on the 22nd ultimo, appears to be of more than usual interest as a practical test of the law on this frequently perplexing subject. From a full report in the *Yorkshire Gazette* we extract the following portions:—

"This bill was filed to restrain the alleged obstruction of the plaintiff's light and air, in Coxy-street, in the city of York. It appeared that the plaintiff and the defendants derived their title from the same vendor, the plaintiff being a gun-maker, and the defendants, Messrs. Leak & Thorp, drapers. The land on which the respective houses stood had originally formed portions of the site on which the well-known George Hotel had stood, and the defendants had contemplated building on a yard or space fronting the plaintiff's house, which, it was sworn, if carried out according to the plans, would materially obstruct the light and air, especially those of the engraving and finishing rooms. The case came on originally as a motion for an injunction to restrain the alleged obstructions, when, by arrangement, it was agreed that the case should come on upon motion for decree, and a reference was directed to Professor Kerr, to examine and report on the obstruction of the intended building. The professor had made his report, suggesting two lines of building, which may be called the upper and the lower. By the former sufficient light would be secured to the plaintiff to be serviceable for domestic and other purposes; and by the latter, practically, the whole light which he had before he would still enjoy."

In explanation of these "two lines of building," we are enabled to quote from the referee's report, "The average elevation of the old skyline would be very little more than 20 degrees above the horizon. It also appears that the elevation of the intended new buildings of the defendants would rise up to about the 45th degree. In precise measurement I estimate the original arc of exposed sky to have been on an average 36 degrees vertically, and the obstruction by the intended new buildings to be about 24 degrees thereof, leaving only 12 degrees still to remain exposed. Upon these data I have to answer the question, 'Whether the proposed new buildings of the defendants will materially diminish, obstruct, or prejudicially affect the passage or access of such light as passed or had access to' the window formerly. If these words were to be taken to mean that the whole of the former light-yielding sky-surface ought to be preserved,

* See pp. 297-299, ante.

* Terms of Order as agreed by counsel.

it cannot be disputed that a large and material portion thereof would not be preserved; but if it is rather to be understood that the defendants' new buildings may possibly be permitted to a certain extent to enroach upon that former extent of sky-surface, but only so far as not to diminish materially the serviceableness of the window for purposes of ordinary occupation and work within the room, then I am of opinion that the said new buildings may be permitted to rise to a considerable degree above the old sky-line without the plaintiff suffering any sort of practical injury in carrying on his business or otherwise. As regards the precise height to which the new buildings ought to be confined, I need scarcely point out, that if the principle of preserving the whole of the old sky-surface were laid down, the limit of about 22 degrees above the horizon" (illustrative drawings being referred to) "would obviously be a fair average, which would render it necessary to cut down the new buildings to the line *z z*; but if the other principle of preserving only the serviceableness of the window for occupation and work be laid down, then my opinion, after very careful consideration, is that, so long as the new sky-line to be formed by the summit of the new buildings does not reach above the summit of the new wall called E in the evidence, as seen from the window, the efficiency of the window for purposes of ordinary occupation and work within the room (which is a small one) will not be found to be materially interfered with, and the line *z z* (drawn from the head of the window through the top of the wall E) would be the limit to which it would on this account be necessary, in my opinion, to cut down the new building."

The Vice-Chancellor, in delivering judgment, said.—These questions, with regard to light, are about the most embarrassing questions that come before the Court. In the present case it appears that it does not depend on the question of the antiquity of the light, but is a question between two adjoining proprietors claiming under one common vendor, and the plaintiff rests his right upon a grant contained in his deed. The whole of the property in question—that which is held by the plaintiff, and that which is held by the defendants—is an old hotel, called the George Inn, in York. That having, in the year 1856, in consequence, I suppose, of the establishment of railways, become an unprofitable concern as an hotel, it is offered to public competition as a site by auction in four lots. None of the lots were sold at the sale, but that day after the sale the plaintiff became the purchaser of the most northern lot, namely lot 4, and subsequently adapted it for the purposes of his business as a brewer. As to the remaining lots, how they were occupied does not appear, but they appear to have remained unsold until the year 1856, when they were again put up in three lots, being, I suppose, the same lots as are specified in the particulars of sale of 1855, and were bought by the defendants. The defendants, who are carrying on the business of linen drapers, and, I suppose, on a large scale, desired to enlarge their premises, I presume to pull down the old buildings altogether and erect new buildings, and have as much space as they could get, and they proceeded to build on that vacant space of ground, as stated in the plaintiff's conveyance. To erect buildings of some kind it is perfectly clear they were entitled; but it is also, I think, quite clear, that they were not entitled to erect such buildings on that vacant space of ground as would derogate from the grant to the plaintiff, that grant being of "all lights," which means the existing light. Now, as regards the grant to the plaintiff, I take it, the effect of a grant of all lights, meaning the existing lights, was to put the plaintiff (whether these were ancient lights or not) now material as between himself and his vendor, and, consequently, as between himself and all persons who, by subsequent title, derived a title from the vendor in the situation of grantee of the lights, having the same rights against the vendor as if they had been ancient lights. I am, therefore, of opinion that the defendants were entitled to erect some buildings. I am also of opinion that they were not entitled to erect such buildings as would derogate from the grant to the plaintiff. There seemed to be great uncertainty as to what the defendants could do; and then, from this correspondence, which has been read, it appears that, in the month of August, the defendants made a communication to the plaintiff to the effect that they would be willing to abide by the decision of any independent architect to be appointed between them, half the expenses of which they were ready to bear. The plaintiff gives an answer, which contained amounts to this,—that he contended then, as he contended most unequivocally to contend up to the day of the filing of the bill, that they had no right to build on the vacant space. He contended the right altogether. The plaintiff is proved to be entirely wrong in that part of his contention. On the other hand, the defendants have made an offer, which I think the plaintiff would have done well to have accepted to in August, at the time this dispute was going on, they gave up that reasonable course, and employed an architect to prepare plans for them to erect a building on this vacant piece of ground to the height, in round numbers, as I recollect as nearly as may be of 45 ft., and they insisted on going on with that building. That led to the institution of the suit. The plan existing plan would have given the defendants twenty bed-rooms at the back of their shops; but they are now willing, in consequence of Professor Kerr's report, to submit to the line recommended by him, which would cut down their building from twenty bed-rooms to fourteen. The result of all this, therefore, is that the plaintiff has been entirely wrong so far as he has contended that they were not entitled to build at all, and the defendants have been equally wrong so far as they have contended they were entitled to carry their buildings to any height whatever. The matter coming before the Court in April, feeling myself much embarrassed by the evidence on both sides, I referred it to a gentleman, whose name was acceptable to both parties, namely, Professor Kerr, of King's College, to ex-

amine the premises, and not by way, of course, of deciding anything, but simply to report to the Court what in his opinion ought to be done. He has made a report which I think is very satisfactory, because he has made a recommendation which both parties have accepted, which in the result comes to this, that the buildings, instead of being carried to the height of 45 ft. should be carried to the height of 35 ft. only; that is, the defendants are satisfied to diminish their building 10 ft., and the plaintiff has said that he is content to acquiesce in that (the line 22). Under these circumstances it has been contended on the one hand by the plaintiff that the defendants ought to pay the costs, and, on the other hand, it has been vigorously contended that the plaintiff ought to pay the costs. But it being considered that both parties are wrong, and that both parties contended for more than they were entitled to, I think the justice of the case would be met by saying that each party should bear his own costs. Therefore the substance of the decree will be—The defendants, undertaking not to erect any building beyond the height of the line 22 in the plan in the report of Professor Kerr; and the plaintiff being satisfied that a building of no greater height should be erected, there will be an order in the terms of the prayer of the bill, against the defendants. Each party pays his own cost, and the costs of Professor Kerr to be paid by the plaintiff and the defendants in equal shares.

WHERE ARE WE GOING TO?

SIR,—In perusing the article so headed in the *Builder*, it gave rise to thoughts mingled with sadness and reproach. I have thought them down as they presented themselves, and send them to you. If you find anything worth notice do with them as may seem best. I have a vivid recollection of living in a house where there were many children, all very healthy and full of animal spirits. Neither the father nor mother had the least conception of proper parental authority; consequently the children ran wild, and the poor woman was continually complaining of their waywardness and ingratitude. It never once suggested itself to her that the greater part of the fault probably lay with herself. In making a comparison of society and its complaints against trades' unions with the woman and her children you will bear in mind exercised authority, and the consequent disobedience of the children. Whenever any startling effect presents itself in relation with the physical laws it is known there must be a cause; if new men bend their minds to find it out. Cause and effect in the moral laws work with the same unerring certainty, but through not presenting themselves so suddenly and startlingly, their connexion is not always so apparent. I will endeavour to form a chain to connect the cause of the formation of trade unions and the effects we see. The cases I shall name came under my own observation, being at work with the trowel at the places. Of course they will be but the type of a system generally practised where it could be done. Some eighteen years ago I worked for a task-master who used to do most of Messrs. Lock & Nesham's large contracts. At that time we were building Wandsworth Prison: we used to tumble in from 1,500 to 2,000 bricks in ten hours per man: still the cry was, "More! More!" Every mean advantage was taken of the men, who were compelled to do the work in such a manner that a man with the least conception of what was right must rebel against it. The men had a fair price for their work; but, besides providing for themselves, it cost much to buy those whose duty it was to see the work was done properly.

The next scene is the North Kent Railway; the same sub-contractor; principal contractor, Mr. Little. On a summer's morning at daybreak, as the occasion required, might be seen a gang of labourers wheeling bricks into the spandrels of the arches (they used to build them solid, or were supposed to do so at that time) and tipping them in the same as they would rubbish into a hole. When they got to a certain height brick-layers came and levelled them down, and paved a course or two on the top in the proper way before the ordinary time of coming to work. The inspectors had got so fat by gratuities, eating and drinking, &c., that they could see nothing of that sort. As many as 20,000 or 30,000 bricks placed put away in a morning in that manner. If it were wanted to be done in the day-time those that should have looked after it were taken off to the public-house, when of course they did not see it. I myself was told by the man's own brother, that he got 1,000*l.* out of the work on that line—labour only.

No doubt the same evil influences have been at work in other branches of industry (though not in that form), leading men, as it did in the circle in which I moved, to see the necessity of organization to resist the system.

I think I have shown causes sufficient in them-

selves to call up a spirit of antagonism, and induce men to combine to give it effect. In these operations what has led, then, to produce such fruits as we see? During the great lock-out in the building trades a deputation waited on the Home Secretary, Sir Cornewall Lewis (Sir Morton Peto was spokesman—shrewd man!), to ask for the interference of Government. After enumerating the many concessions in the shape of leaving off at four o'clock on Saturday, and the rise of wages, &c., he said they felt bound to resist any further demands. The Home Secretary asked under what circumstances those advances were made? Sir Morton replied, when the men struck for them. That is where the worst evils in connexion with trade unions spring from. If a concession is just, and can be granted when asked for, give it; but if wrong, it becomes ten times more so if granted under the pressure of a strike.

Do not infer from what I have said in reference to piece-work that I condemn it,—I see no objection to that with honest supervision;—or that I have any sympathy with trade unions in their operations; but believing there are causes that bring them into existence, and the evil effects that follow, I have endeavoured to point out a few; and, if right, let all in society who should set an example of right and duty done take it to themselves and work it out in their lives, and then the cry of the strong against the weak would cease, and we should not have to ask, with anxious minds,

WHERE ARE WE GOING TO?

MORE THINGS WORTH KNOWING.

1. Why are not the names of streets painted on the lamps instead of being stuck up high on the wall, where, when night comes on and they are most needed, they cannot be seen? Or a stencil plate hung inside would do.

2. Why do not owners of house property have their chimney-stacks occasionally looked to? Life is not safe in some parts of London during a gale.

3. Why, when there is a trap-door in the roof to facilitate escape from fire, do lodgers allow the householder to keep the necessary ladder down in the back yard for the purpose of elevating his clothes-line? This is more often the case than many would think.

4. Why are Thames steam-boats allowed to carry as many passengers as can crowd on board, to the peril of those persons' lives? Take, as a sample, any boat returning from Battersea-park on a fine summer Sunday evening.

5. Why, as the cry is still "more bridges," does not some one start the idea of bridge bazaars? The rents would pay for their erection, and they must become thoroughfares for traffic, toll free. Why not have a bridge fish-market?

6. Why are our new bridges being built without seats on them?

7. Why, as attempts are sometimes made to upset a train by placing impediments on the line, is not something fitted to engines that would chip even a sixpence off the metals if it were there? Present precautions are insufficient.

8. Why are paupers clothed in so absurd a style? Does Mr. Bumble mean it as a deterrent?

9. Why are not the Volunteers enrolled as permanent "special constables"?

10. Why do not all artisans begin their day's work at six a.m., and have two hours a day,—a day a week!—to recreate themselves, more than they get now? A factories' doctor once said to the writer of these queries, "It is between six and eight o'clock in the evening that you mechanics get old."

11. Why is not every lift to a mine-shaft fitted with a self-acting apparatus which, directly the tackle breaks, shall throw out projections to catch the sides of the shafts, and thereby prevent it smashing itself at the bottom and killing its contents?

12. Why are not those men who drill monkeys on tables in the streets until their poor little lives are not worth having, punished by the Society for the Prevention of Cruelty to Animals?

13. Why are not the long-ago-suggested subways, or overhead footpaths at busy crossings, commenced before more lives are lost?

14. Why not have life-lines and buoys bandily placed along the Thames Embankment (say, under the trees we hope to see there), for while

boys will climb, and women will lean over the river wall with children in their arms, something of the kind is necessary? The suggested fastenings of chain would only be serviceable to those close in at the side.

15. Why not remove the gate by Tavistock-square and a few buildings by Clare-market and Drury-lane that want removing, and so have a direct road from Hampstead Heath to the Embankment?

16. Why is the Cobden Memorial, in High-street, Camden-town, put up the wrong way? Sir Robert Peel might as well turn his back on Chapside.

17. Why does not somebody keep a sharper eye on speculative builders in new localities? Judging by some carcasses, it is a wonder that many houses do not collapse under their own weight.

18. Why does not the Government at once take steps towards working the railways itself? After the lamentable show of inefficiency in the arrangements for the late Windsor Review, no more argument is required to show why the item of conveyance should be under the direct control of the War-office.

19. Why are boats let out on the Thames to little boys too weak to manage them and too thoughtless to sit still?

20. Why are "muzzled" dogs' mouths sealed up with a tight hindling-strap, so as almost to prevent them breathing? Would not a wire-work nose-cap be cooler and less irksome to them?

21. Why do hutchers always drive so fast? Do they and Hansom cabmen think it proper to turn corners on one wheel? J. G.

BOTANIC GARDENS: CONSERVATORY ADDITIONS.

APPLICATION has been made to the Fellows of the Botanic Society by the Council to raise 3,500*l.* in order to enlarge the conservatory and provide a covered way to it from the road to the north side. A conservatory ought to be a part and parcel of the decorative embellishments of a pleasure-ground, and we see how the Government, usually so parsimonious in such matters, have erected very elegant conservatories at Kew. The present conservatory at the Botanic Gardens is already most unsightly, and unworthy its position as the culminating point at the end of the broad long-walk. But the outlay is to go to increase this mass of ugliness in the same taste. I am no advocate for useless show; but disposition of mass and variety of outline need not necessarily involve increase of cost. I think it would be more judicious in the Council, if they have not the spirit to employ an architect of taste, to invite designs and tenders from other tradesmen in that class of ironwork, stating the amount the Council are prepared to expend and the additional accommodation required, and I am convinced they will have a much more sightly and possibly more extensive erection than that shown by the model in the council-room of the Botanic Gardens. Messrs. Handyside's trade-book on "Works in Iron," reviewed in your last number, shows what can be done for comparatively little money.

THOS. L. DONALDSON.

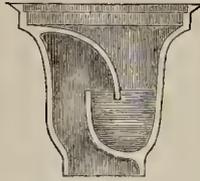
ADULTERATION OF LABOUR.

SIR,—Has not the time arrived when this question should be taken into consideration. Is it not notorious that the expenditure of thousands of pounds is in abeyance, on account of the disgraceful manner in which works of decoration and repair are now executed. Do the workmen give a fair day's work for a fair day's wages? It is notorious that when a job is to be executed, it is done in a most indolent manner, to the great inconvenience of the householder, who of course has in the end to pay the master builder or employer. Talk of the adulteration of food, it is nothing to what the holders of house property have to submit to. My contention is, that ample work is to be found, if the workmen would do justice to their employers, and enable them to execute the work they could obtain, if it were not put off indefinitely, in consequence of the difficulty in getting rid of the workmen when once they commence a job.

W. H. B.

ANTILL'S PATENT STENCH TRAP.

OUR attention has been called to a stench-trap invented and patented by a working man, J. Antill (Merton-road, Wandsworth), which has this advantage, that the grating may be taken off to clean it out without thereby admitting bad air



from the drain. The section shows its construction. The principle is old enough; the novelty is in application. A builder writes that he has had one of these in use for some time, and finds it answer well.

LOLLARDS' TOWER.

SIR,—The Lollards' Tower is mentioned in Masekyn's Diary, a.º. 1555. "The xx. day of September was cared from Nugst [Nowgate] unto the Lollar stowre serten men;" and a.º. 1556, "the xx. day of October was delivered out of the Lowlar Torre alle the heretykes that came out of Essex," &c. Stowe's Survey also notices that the southern bell-tower at the west end of St. Paul's Cathedral was so called. The northern tower, near the Bishop of London's house, was attached "to the use of the same palace; the other, towards the south, is called the Lollards' Tower, and hath been used as the bishop's prison for such as were detected for opinions in religion contrary to the faith of the Church." In the "Churches of London," by George Godwin, F.S.A., and John Britton, a note states that "in 1514 Richard Hunn was hung in a tower at the S.W. corner of the church for heresy" (p. 17).

MACKENZIE E. C. WALCOTT, B.D.

WAGES IN THE UNITED STATES.

SIR,—It may interest some of your readers if you like to publish the following paragraph, which I copy from a letter dated 30th May, 1868, just received from a friend who returned from London to Chicago, Illinois, last November, and is now actively engaged with a partner in erecting several houses as their joint property, on a plot of suburban land, lately purchased for 5,000 dollars. The wages for skilled workmen may be easily reckoned by allowing 5 dollars to the pound sterling.

W. H. ESPENETT.

He writes as follows:—"You will say, why do we take off our coats and do our own work? Bricklayers are getting 5 dollars a day; masons 4 dollars; carpenters, painters, &c., 3 dollars. No man will touch a hod or a spade as labourer for less than 2 dollars a day. My partner and I yesterday hauled with our team 10,000 feet of boards to a planing-mill; it would have cost us 10 dollars to have employed two other men to do it. When a man makes 5 dollars a day, he can afford to hurry his gentility, particularly if his gentility would only starve him."

* * * Paper currency must, we suppose, be allowed for.

MAIDSTONE MUSEUM.

SIR,—With reference to the interesting notice of the Maidstone Museum, in your last number, permit me to send a few supplementary remarks as to the past and present condition of the museum. The late excellent curator, who had been the personal friend of Dr. Charles, the founder of the museum, was advanced in life before he accepted the office, and, during his latter years his memory failed him a good deal. The present curator, therefore, on succeeding, had not only to reduce to some order the original collection, but to incorporate and catalogue the extensive and valuable bequests of his predecessor. This he has at length completed, and

he has likewise prepared, for the use of the visitors and readers, a catalogue of the library. He is also engaged on a catalogue of the antiquities, &c. These he hopes to get printed; but, as the Corporation have only a limited sum at their disposal for the improvement of the museum, time must be allowed for all you wish to be done.

It is due to the Corporation to state that they seem fully alive to the importance of their trust; and that they give as much encouragement as is in their power to the recommendations of their curator for making the museum what I hope in a few years it will become—a model museum.

The old Manor-house had been sold in portions, and that of which the Corporation became possessed was the centre and back premises and garden. They have very recently (partly through the liberality of the gentleman referred to by you) purchased another portion of the house, and at this time the holders are engaged in making the alterations necessary for the enlargement of the museum. One of these will consist of a new library, adequate to the proper arrangement of all the books, many of which are at present useless for want of room. Another apartment will give space for a collection of curiosities, which has been presented by a gentleman connected with the town by family ties. These alterations will involve an outlay of many hundred pounds; and I think that Maidstone may fairly be congratulated on having a Corporation of intelligence and public spirit, by all strangers who visit its museum, and who ascertain how much has been effected in a few years with limited means.

A LONDON VISITOR.

LEIGHTON ("BUZZARD") AND VICINITY.

SIR,—This subject was included in your notice of "Woburn Abbey and Vicinity."* You even recommended the spot—far more generally known now by "railway" connexion than (as many other things) would have been dreamt of half a century ago,—as a desirable "standing ground" for excursions within a moderate circle.

Its adjunct of "*Beau Desert*" has long been known, apart from any local "merit," as being without proof. The origin is believed to have been from a family named "Bozart," or "Bussart," connected with the place. But I am unable now to give the date. Probably about 1350.

Doubts, since Lyson's time, have been thrown as to this having been the "*Lygean-Burgh*" of the *Saxon Chronicle*, A.D. 571, one of "four towns" taken from the "Brit-Welsh" (for this seems a natural interpretation of "*Brit-Wealas*" by *Cuthwulf*, after a victory at Bedcanford (Bedford). In the writer's very humble opinion probability is on the side of this, as it was the first place of probable importance on the undoubted line of route.

But "that as it may," there is no doubt that from the considerable details in "Doomsday Book," 500 years afterwards, it was then a place of no trifling repute. The tolls of its market (still the largest for a considerable distance), being then "7*l.*" per annum, a very considerable sum for that date. It is now the second parish in extent, 8,000 acres, to Luton (16,000), in its county, and has a much more unusual feature in this part of the kingdom, four ancient Chapels of Ease; one of them, Stanbridge, a small three-aisled "church," possessing also a peal of five good bells, and having, though a hamlet, given name to a "Half Hundred," three or four parishes, in "Doomsday Book."

The population, about 3,500, with the hamlets, in 1801, is supposed to be now about, or upwards of, 7,000. The neighbouring parish, or (Bucks) "railway suburb" of Linslade, from 100 then, has between 1,500 and 2,000. The first modern move in the prosperity of Leighton was the "Grand Junction Canal," sixty years ago; a great boon in the supply and price of coals.

The "Cross," a "market" one (the only other in that county being at Stevenage), was perhaps built about 1400; and has certainly small claims to beauty. The church is a tolerably spacious and neat, though plain, cruciform building, showing to much advantage to railway travellers. Its best feature is the oleanatory (Mr. Rickman says "plastered") with double-windowed bays. A superior and perfect row of stalls is on either side of the chancel. The spire is 192 ft. high,

* See p. 365, *ante*.

and the loftiest within a large circuit, perhaps of forty miles; Olney, 185 ft., approaching nearest.

Here also, as at Dunstable and Ampthill (before alluded to)* are good almshouses. Eight founded, besides other acts, including an augmentation of the poor vicarage, by Matthew Wilks, a simple "Squire," some 250 years ago, the favoured inmates of which receive now eight shillings a week each, besides some fuel and clothing.

An additional church, of moderate pretensions, has been erected for the town; also one long before at Linslade. The "Corn Exchange," in Roman style, is equal to a larger place.

Distress from the unhappily little use now made (it is hoped slightly increasing) of "Straw plait" bonnets, on which the public were appealed to in the *Builder* last year, extends to Leighton and farther.

Wing (Backs) has, also, a lofty and imposing tower window. Here was a grand tenor of six weighing 33 cwt., re-cast lately to 30 cwt. only. (Leighton has the best, though not quite heaviest, pool of eight in Beds* tenor 26 cwt.)

Stewkeley Church (engraved, I think, both in Grose and Lysons), which I once saw, very long ago, appears, except that it has one transept, most resembling Ilfley, Oxford. Some five miles north of Leighton is Bow, Brickhill Church Hill, very nearly 700 ft. high, and seen below Northampton (an "Ordnance survey" station, I was told, about 1800). Bletchley Church (from a very out-of-the-way village, now a still more important railway station), and Fenny Stratford Chapel, both connected with Browne Willis, deserve the notice of the antiquary.

J. D. PARRY.

CONTENTS OF CONICAL HEAP OF BALLAST.

Your correspondent, Mr. Haynes, has given correct rules in this case; but I think an alteration in the formula as below might make it less troublesome in practice,—

$$(d^2 + d^2 + d^2) \times 7854 \times \frac{h}{3} = s$$

or, in words, add together the square of each diameter, and the product of the diameters, and multiply the sum by 7854 and by a third of the perpendicular height. Jos. A. DAVIES.

BUILDERS AND DISTRICT SURVEYORS.

Sir,—I forward the annexed, thinking you may print it in your paper. If builders who do not pay till they are summoned become known to the district surveyors, it may save trouble. N. E. J.

At the Wandsworth police court, June 25th, 1868, before Mr. H. S. Selfe, Mr. George Godbolt, King's-road, Chelsea, was summoned for non-payment of the sum of £5. 6s. due by him to the district surveyor for the district of Central Lambeth and part of Battersea for his fees in respect of a certain building of which he said George Godbolt was the builder. Ordered to pay the sum of £5. 6s., with 12s. 6d. for costs, forthwith.

THE WALWORTH-COMMON ESTATE.

Sir,—Will you kindly allow me to endorse the opinion of "One of the Number," in your last week's *Builder*, that the Guardians should appoint a professional man, of high standing and character, to report upon the plans? It appears to me quite unreasonable to expect that, without such assistance, they will be able to arrive at a just and satisfactory conclusion. I would also beg to submit other suggestions, which I think should be taken into consideration, either by the Guardians or by the gentleman who may be appointed as aforesaid.

1. That all plans not strictly adhering to the "Instructions" should be put out of the competition. If they should be more suitable plans than the others, let the competition be decided regardless of them, and the Guardians afterwards adopt such one of them as may prove the best.

2. That those plans which disregard the laws for the better local management of the metropolis in having only one entrance to some of the streets be also set aside.

3. That in considering the relative merits of the designs the plan for laying out the land should be the first consideration, and the elevations of the buildings the next, as these may be varied *ad infinitum*.

4. That in calculating the income to be derived from the estate (which is doubtless a subject of importance) care should be taken not to give the sole preference to the amount of frontage regardless of the space left open by fore-courts, gardens, or yards for ventilation.

5. That short streets enclosing square blocks of build-

* See p. 428, ante.

ings, with plots of but little depth, must be very objectionable on the score of health.

6. That courts, alleys, and small plots must be very detrimental to the health and respectability of the neighbourhood, and calculated to increase the poor-rates and reduce the frontage value.

7. That right-angled streets and plots are usually most advantageous and economical.

ANOTHER COMPETITOR.

PORTABLE GAS-STOVES.

Sir,—The advantages of gas-stoves, especially in warm weather, are too obvious to require any comment. Where there is gas laid in a house, they can easily be made use of; but there are many houses, both in town and country, into which gas has not been introduced, and there they are unavailable, unless an apparatus is attached to them for generating gas. This can be easily done, as is shown by the great variety of portable gas-slamps for lighting purposes now manufactured; but I have not been able to find any gas-stoves with such apparatus, and I will feel much obliged if you, or any of your correspondents, would inform me where an article of the kind can be had. Spirit-lamps answer the purpose pretty well; but they are too expensive for general use; and, besides, they do not afford the same degree of heat regulated according to the degree of heat required. I have spoken about this to gas-engineers, but none of them appeared to see the importance of it, though I feel satisfied that if a thing of the kind, not too expensive, were to be brought out, it would command a very large sale. A LINGERER.

LINCOLN AND NOTTINGHAM DISTRICT SCHOOLS.

Sir,—As there is at present a competition advertised emanating from Lincolnshire, it may interest your readers to know how a similar thing has been managed there. The Lincoln and Nottingham Union Schools were advertised, and several plans submitted, ranging in estimate from 12,000l. to 22,000l. The committee met, and, I believe, rejected all the "high-priced" plans; that is, not the more elaborate ones, but those whose authors had given what they believed to be the real cost. No test, as I hear, was taken, but the superficial feet of each design I append below, as sent in a printed list to me:—

	Super. feet.	Estimate.
Cooke.....	9,178	£23,000 0 0
Giles & Biven.....	6,014	13,000 0 0
Peyton & Co.....	8,466	19,000 0 0
Hendray & Kingsburgh.....	3,684	18,000 0 0
Lee.....	11,962	14,000 0 0
Peck.....	8,704	12,000 0 0

Gut of this list the committee selected the design of Mr. Peck, covering 8,764 ft. super., and to cost—everything being of the best description—12,000l.

I may mention that heights and spaces for beds, &c., are in all the designs alike, so that a comparison is easy, and a notion may be formed that about 1½. per cubic foot is the calculation of the supposed cost.

Some of your readers may perhaps know something of the value of buildings of this kind, and will give their opinion on the subject. I would, with your permission, ask them to do so, believing that the time has come when architects may fairly ask from fellow competitors for fair and proper estimate of the designs they submit. I trust you will aid this object. A COMPETITOR.

"SINK TRAPS."

Your correspondent "M. A. B." in your issue of the 13th ult., complains of the inefficiency of the bell-trap: that I have for some time found to be a great objection in house-drainage, in which I have had much experience, and have been led to adopt another principle (and do so now) with the bell-trap where practicable, viz., in connecting the waste-pipe from the sink with the branch drain, to fix an ordinary S siphon outside the building, and allow the waste-pipe to dip into the siphon, which being much larger (say 3 in. to 4 in. diameter) than the ordinary bell-trap, we invariably find that they seldom or never choke up, and the siphon being placed outside the building is easy of access should it ever be necessary to examine it.

The above method has the great advantage of economy over the other, as we can have the siphon fixed complete for 1s. 9d. each. J. B.

THE PROPOSED NEW LAW COURTS.

Mr. GOLDSMID, in the House of Commons, called attention to the recent appointment of architects for the new Law Courts, and especially to the claims of Mr. Barry to the appointment, and moved that a select committee be appointed to inquire into the subject.

Mr. Gladstone said that to appoint a committee would be to recommence from the beginning an operation which had been extremely laborious and complicated, and there would be less chance of arriving at a more satisfactory conclusion than that which had been already come to. The only prudent course would be to leave the matter in the hands of the Government, for them to act upon their own responsibility.

Mr. Lowe thought it would be an unwise course to incur a large expenditure by a renewed inquiry into the subject, though at the same time he believed the Government had missed their way, and had not arrived at the conclusion which they ought to have done. They had set aside the fact that Mr. Barry's plan was the best, in regard to its internal accommodation, and they had given the work to an architect whose plan the judges had reported possessed the least merit with respect to that point.

Sir K. Palmer, as one of the judges, said that while there could not be any doubt that it was a main and leading point, they should attend to the internal uses for which the building was intended, yet they certainly did not think they were to pay attention to this point alone. They considered that where the internal arrangements clashed with architectural effect, they were in that case

to give a preference to the former; but it would have been a great injustice to judge the plans merely upon the simple point of their internal arrangements. Though Mr. Barry's was the best in this respect, yet unless it had been also the best in other respects, could they recommend it for absolute adoption? As to the point before them, it was a fallacy to suppose that the Government were to be bound by the opinion of the judges, who had failed to make any selection of a plan as judges.

Mr. Hope did not think any good would be attained by appointing the committee asked for.

Mr. Hoag thought that the two architects who had been bracketed together might have had the building entrusted to them jointly. He did not think the building could be placed on the site that had been prepared for it, and he suggested that the Chancery Courts should be placed on the site, and that the Law Courts should be placed on the Thames Embankment, Mr. Street being entrusted with the erection of one, and Mr. Barry with the other.

Mr. Powell hoped that whatever they did they would not have the court in two divisions.

Mr. Writterbotham believed that the difficulty had arisen by adding Messrs. Shaw and Powell to the five judges already appointed. Messrs. Shaw and Powell were added at the request of the London architects from a trades union feeling against Mr. Waterhouse, who came from another part of the country, and whom they wished to exclude. He supported the reference to a select committee.

Mr. Childers hoped the suggestion of having two courts would not be listened to.

After a few words from Mr. C. Bantick,

Mr. Pease said Mr. Street had only proved himself a snigger in this respect, and he would have followed Mr. Street would have been called for a new competition. They considered, however, that it would be unwise to pursue that course, inasmuch as they had already come to a decision which in the main should be fair, and at the same time give security to the country and the profession that a proper building would be erected. He reminded the House that a petition had been presented from the judges and officials of the Divorce and Probate Court, stating that although they were to occupy one-fifth of the new building, yet the arrangements for them were of a most inefficient character in Mr. Barry's plan. Therefore, if the Government had appointed Mr. Barry to be architect of the interior and Mr. Street to be architect of the exterior, this result would have followed; Mr. Street would have been able to carry out his own design, while Mr. Barry would have had the mortification of finding that his plan for the interior would have to be mysteriously altered before it would give satisfaction to one important branch of the new courts. To re-open this subject after the decision of the Government would only make the complications worse.

The motion of Mr. Goldsmid was negatived by a majority of 90 to 45.

A PREMATURE DEATH.

THE *Sydney Morning Herald*, of May 1st, records at some length the melancholy death, at the age of 29, of Mr. Thomas Duckett, late a pupil of Mr. Thornycroft, and a young sculptor of great promise, who had been in his studies and made the journey to Rome, was preparing for the contest in the grand arena, when he was recommended to visit the Australian Colonies for the purpose of averting consumption. But the voyage was taken in vain. During his absence his young wife died, and two little ones are left orphans.

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THE "OWNERSHIP" OF ST. PAUL'S, CAMDEN-SQUARE.

In the Court of Common Pleas (sittings in Banco, before Mr. Justice Willes and Mr. Justice Byrne), the *Vestry St. Pancras (Appellants) v. Thomas (Respondent)*. The facts of this case were these:—The respondent, the Rev. A. R. G. Thomas, was incumbent of the church of St. Pancras, and the Vestry of the same church summoned him before Mr. Justice at Chancery Lane, to show cause why he should not pay 683l. 6s. 10d., the estimated cost of making a new road and footway round the land on which his church stood. The question of the respondent's liability depended upon whether he was "owner" of the church and land within the meaning of the Act of Parliament. The churches in the parish of St. Pancras are under the management of a board of trustees, and these gentlemen received the pre-rents of the respondent's church, and paid him his stipend out of the amount so received. On the one hand, it was said that the legal estate was in the respondent; but, on the other hand, it was contended that the possession of the legal estate did not necessarily imply an ownership within the meaning of the statute. The Metropolitan Local Management Act defined the "owner" as the person who received the rack-rent. The appellants said that the respondent was entitled to vote for a member of Parliament in respect of his interest in the church; but to this he replied that he claimed to vote not as the owner of the land, but in respect of his interest in the benefice. Mr. Justice Wille said that the parties, besides the respondent, had submitted the question, decided in favour of the respondent, and dismissed the summons. The question raised for their lordships was, whether he was right in his decision. The court held that the respondent was not liable, and they dismissed the appeal.

Sanitary Regulations for Work-shops and Work-places.

The Sanitary Committee of the Legislature have issued a notice, under the advice of Mr. Ballard, their medical officer of health, a portion of which we may usefully reprint:—

"SANITARY ACT, 1866, AND WORKSHOPS' REGULATION ACT, 1867.

The following are among the more important regulations of the above Acts, which are applicable to all places not under the operation of the Factory Acts. It is the duty of the Vestry to see that they are observed in this parish.

1. Work-rooms and work-places must be kept in a sanitary condition.

2. They must be well and effectually ventilated, so as not to endanger the health of the persons employed therein.

3. The Medical Officer of Health will regard any work-room not sufficiently ventilated in which an unpleasant animal odour is perceptible, or in which the temperature is found materially to exceed that of the external air during the warmer months or 60° in the colder months of the year.

4. No overcrowding of workrooms is permitted; that is to say, the number of persons working in any room must be so great as to endanger their health.

5. The Medical Officer of Health will regard any work-room to be overcrowded, in which for the number of persons employed therein a sufficient ventilation as above described cannot be constantly maintained without exposure of the work-people to dangerous draughts; also any room in which a floor-space of at least 30 superficial feet cannot be allotted to each person, or in which the cubic space of the room is such that at least 300 cubic feet of air are not allowed for each person.

6. The superficial floor space of a room is found by multiplying its length by its breadth; and the cubical space of a room by multiplying the result of this by its height.

For example:—A room 25 ft. long and 15 ft. wide = 375 ft. of the surface, and (if properly ventilated) can be occupied by ten work-people, provided that it is not less than 8 ft. in height = cubical capacity of 3,000 ft. If less than this in height, the floor space must be proportionally larger, or the number of occupants reduced.

7. An infringement of any of the above three regulations will render the master or mistress liable to prosecution under the 19th section of the Sanitary Act, 1866, and the Penalties Removal Act.

THE CONSTRUCTION AND FITTING-UP OF METROPOLITAN WORKHOUSES.

The Poor-Law Board have just issued a circular letter informing the Guardians of the Poor in London, that they have prepared instructions or the guidance of architects in the construction of workhouses and workhouse infirmaries. These instructions are intended "as a general guide to the architect employed by the Guardians, and are not designed unduly to fetter his discretion in the preparation of plans for the consideration of the Guardians, or to apply to every detail connected with the construction of the workhouses;" but the Poor-Law Board say that "they will generally be guided by these instructions when considering plans which may be submitted to them for their approval." With regard to the fittings, the circular says:—

"It appears to the Board to be desirable that there should be a nearer approach to uniformity in the mode in which workhouses are furnished, and they are of opinion that whilst for the ordinary wards only a few conveniences, and those of a simple character, are required, the sick wards should be more carefully furnished, and all the necessary medical appliances supplied. It is the duty of the medical officer, under the regulations of the Board, to suggest the number of articles that may be required from time to time, and they do not doubt the Guardians will usually consider such suggestions, or that they will be made by the medical officer with all reasonable discretion and with due regard to economy."

CHURCH-BUILDING NEWS.

Arnold.—The church of Arnold, a village in Nottinghamshire, has been closed for some time past for general restoration and improvement, and is now re-opened. The restoration has been at present not partial, as there yet remain the chancel and porch and other parts in an incomplete state. The work has been carried out under the management of Mr. Henry Currey, of London, the architect for the new St. Thomas's Hospital, and of Mr. S. Dutton Walker, of Nottingham, architect. Owing to a dispute with the contractor, and other difficulties, the work has been more than two years in progress. Amongst other difficulties with which the architects had to contend was the insecure state of the arcades, which were at least 10 in. out of the perpendicular, and which upon examination were found to be absolutely without any solid foundation, growing to original faulty construction, and to the numerous burials which had taken place. Saw-grooves were out in the stonework of the inclining piers, and the whole arcade was heeled

over until it had attained a perpendicular line; and this was done without crack or flaw, every pier being underpinned with a solid foundation. The whole of the stonework and tracery of the exterior of the building has been repaired, the gallery at the west end have been cleared away, new benches have been placed in the nave and aisles, new floors laid, the windows re-glazed, new roofs constructed, &c.

Gretton.—The church here has been rebuilt and re-opened. It is situated close to the high road between Winchcomb and Tewkesbury. Its tower and spire, which rise to the height of about 100 ft., are visible from most parts of the surrounding country, and may be discerned even so far off as Malvern. The plan of the church consists of nave, chancel, south transept, tower (the lower part forming a porch), and a vestry on the north side of the chancel, from which it is separated by an arch. The design is Decorated, the walling being constructed of Guiting stone, with Bath stone dressings. The spire is wholly of the latter material, and the roofs are covered with Staffordshire tiles. The tower adjoins the transept, and is square at the base; at the helix stages it diminishes to an octagon, which form it preserves to the top. The windows are in part single lights, and in part coupled. Three of these windows are filled with stained glass, by Messrs. Hardman, and it is contemplated to fill the remainder also in like manner. In the gable of the transept is a rose window, consisting of a series of circles with trefoil cusps, arranged round a central circle, also cusped, the whole being comprised in an outer circumscribing circle. Of similar character, though differently treated, is the west window, which is a large composition of four lights, under a pointed head, and having lofty jamb moldings. In this window, as well as in those of the apse, chancel arch, and principal doorway, are introduced shafts of various, coloured stone. The roofs throughout are open, and differ in design in the several parts of the building. In the chancel the principals spring from stone corbels, carved as angels bearing shields, and picked out in gold and colours. The seats in the nave and transept are of deal, those in the chancel are of oak, as are also the pulpit and desk. The floors are paved throughout with tiles, plain and encaustic, in various patterns designed by the architect, and the chancel is lighted by a brass corona. A medal has been struck as a memento, and presented by Mrs. Dent to those who have been most engaged in carrying out the work. It bears on one side a view, in relief, of the church, and on the other an inscription. Mr. J. Drayton Wyatt, of London, was the architect, and Messrs. Collins & Collis, of Tewkesbury, were the builders.

Clifton (Bristol).—The new church, dedicated to All Saints, has been consecrated. It will, when completed, be one of the largest in the city, taking the place, so far as extent and solidity of construction go, between churches of an ordinary size and a cathedral. When finished it will accommodate 1,200. At present, however, the structure consists of only a portion of the original design. The whole design, when carried out, will cost somewhere about 20,000l. The plans were made by Mr. G. E. Street, who has designed the structure in the transition period (Gothic). For some time the work was left in abeyance. The chancel, with its side aisles, the vestries adjoining, and the pillars of Mansfield stone supporting the nave, were erected, and the foundation of the whole building built up to a certain height. Recently a temporary nave, for the accommodation of about 500 persons, and constructed so as not to interfere with the erection of the original design over it, has been formed of stonework, inside the pillars of the original design. The pillars supporting the arches and the chancel are formed of alternate hands of Pennant, red sandstone, and freestone. The whole of the chancel is paved with Minton's tiles.

Sedgeberrow.—For some months past the parish church of Sedgeberrow has been closed during the progress of extensive works of restoration and decoration, which have been carried out at the sole expense of Mrs. Barber, widow of the late rector of the parish, as a memorial of whom the work was initiated. The church consists of nave and chancel only, the nave terminating at its western end in an octagon tower, surmounted by a spire of about equal height, and reaching an entire altitude of 104 ft. The exterior works of the present restoration comprised the rebuilding of about two-thirds of this spire, which has been fitted with Newell's

lightning conductor, carried through the vane, and a galvanised iron cross, the entire reconstruction of the roof, and the rebuilding from the window-heads upwards of the exterior walls. Entrance to the interior is obtained through a porch, in keeping with the rest of the edifice. The roof is an open ribbed one of English oak. The seats are uniform and open, with pierced backs and carved ends. The floor is of English oak, the nave and chancel being paved with Minton's red and black encaustic tiles, interlaced with stone bands. The nave and chancel are divided by a carved oak rod-screen, filled in with tracery. Most of the windows throughout the church have been, and the rest are, understood, in due course to be, filled in with painted glass, painted by Mrs. Barber herself. The works have been carried out at a cost of upwards of 2,000l. The architect employed was Mr. W. Butterfield.

Blitchley.—The parish church of St. Mary has been restored and re-opened. The whole of the exterior has been restored in Ancaster and Bath stone. The interior has also been restored, the incrustation of brickwork and other materials used in the "churchwardening" process having been removed. The most conspicuous alteration is in the chancel, all the windows in which, together with the doorway, have been altered so as to harmonize with the original character of the building. In the east side is a five-light traceried window, with trefoils and quatrefoils in the head. There is a screen, consisting of a canopied centre panel, surmounted by a foliated cross, and two narrow side panels of Painswick stone, with carved caps and bases, and Mansfield red shafts. In front is a detached cross of Mansfield stone, carved, backed by a painting of radiated nimbus in the centre panel, the side panels being diapered, with an angel in the centre beneath the cusping. The chancel is fitted with return stalls of carved oak. The ceiling of the chancel, "painted," says Lipscomb, "with extravagant expense, but little taste," representing the twelve Apostles, has been preserved, partly in deference to the memory of Browne Willis, and partly on financial grounds. The body of the church has been fitted with oak seats, and a paving of wood blocks under the seats, the other portions of the floor being covered with Minton's tiles and the old paving. The old tower had fallen into a state of dilapidation which was almost dangerous. The "four handsome pinnacles of the angles," commemorated by Lipscomb, have been removed, as out of character with the rest of the building. The clearstory windows and parapets have been entirely removed. The whole of the work has been executed under the superintendence of the architect, (Mr. W. White), by the contractor, Mr. Kimberly, of Banbury; the carving was done by Mr. S. Allen. The entire cost has been 2,300l. The chancel has been restored by the rector, at a cost of 550l. An organ, designed by the Rev. W. G. Corker, of Fenny Stratford, and built by Mr. T. Atherton, Leighton Buzzard, has been placed in the north aisle.

Limbury.—The new district church of Limbury-cum-Biscot, by Luton, has been consecrated by the Bishop of Ely. The church, which has been built at the sole cost of Mr. John S. Crawley, consists of a nave 58 ft. by 26 ft., a chancel 35 ft. by 20 ft., a north chancel aisle 16 ft. by 10 ft., divided from the chancel by a double arch, supported on a polished marble pillar, an organ-chamber, a sacristy, a north porch, a double bell-cote, and a warming crypt. The style is Decorated. The walls, which are 3 ft. and 4 ft. thick, are faced inside and out with light-coloured bricks, relieved with others of a deeper tone, and cased with chalk. All the dressed work is out of freestone. The roofs are open-framed of pitch pine, covered with heavy green slates, and are boarded and felted. The benches are also of pitch pine. The aisles are laid with encaustic tiles, and the chancel-hall below the windows is faced with similar tiles supplied by Mr. Godwin, of Hereford. The pulpit and font are carved, the former diapered. An oak screen separates the chancel from the nave, and the chancel is fitted with stone sedilia, piscina, and credence. The church was erected by Mr. Gough, of Bishop's Castle, builder, from the designs and under the superintendence of Mr. T. Nicholson, of Hereford, the diocesan architect.

Curbar, Derbyshire.—All Saints' Church, Curbar, has been consecrated. The church is a Gothic structure, which has been erected by the exertions of the Rev. J. Stookdale, the incum-

bent of Baslow. The edifice is completed and opened at a cost of from 1,800l. to 2,000l. There still remain to be built a passage and schools towards which there is a sum of 200l. or 300l. in hand. The Duke of Rutland gave the site. The architect is Mr. A. Salvin, jun., of London; and the builder Mr. Ashwell, of London.

Bebbington.—The Bishop of Chester has consecrated the Church of England portion of the new cemetery at Bebbington. The cemetery is situated about the centre of the parish, some 500 yards from Old Chester-road, on the south side of Rock-lane, which leads to Higher Bebbington. There is a main entrance from Rock-lane, and a drive, 24 ft. wide, leading to the chapel, which is erected on the crest of the ground forming the main entrance. On either side, about 100 yards inside the ground, and the same distance apart, facing each other, are the Nonconformist and Roman Catholic chapels, the Nonconformist being on the left hand side when you enter.

Neath.—We are requested to state that the gas-fittings of St. David's Church were provided by Messrs. Hale & Sons, of Bristol—not Hall, as misprinted.

DISSENTING CHURCH-BUILDING NEWS.

Lindley.—The new Wesleyan chapel, which is now nearly completed, was recently opened. It has been designed in the Geometric style, by Mr. George Woodhouse, of Bolton. The principal façade faces East-street. It is set back some 30 ft. from the canalway. The approach is flagged with sawn flags. This front has two side and one central entrance-door openings, each having a flight of three steps to the threshold. The ground-floor story has a frontage of 60 ft. To the left, with its west and south front, is the tower, 13 ft. square on plan. Above the foundations of this tower, which have been sunk below the workings of an old quarry, is a base course, 2 ft. 6 in. deep, the upper part of which is splayed and moulded. The whole is crowned with a light ornamental cornice on the four sides. The principal decorative feature in the front is the large four-light window. It is 22 ft. high and 11 ft. wide. The whole of the windows are glazed with selected rolled glass, in diamond panes, with coloured borders, executed by Messrs. Edmundson, of Manchester. The outer walls throughout are built of pitch-faced wall-stones from the Elland-edge quarries. The roof is a steep Gothic pitch, rising 30 ft. high from the square. The roofs are all hoarded and covered with felt, on the top of which are laid the slates, in blue and green bands. The ridge has an ornamental ridge-cresting, set in cement. The following contractors have executed the several works:—Masons' work, Messrs. Thos. & Geo. Rhodes; joiner and carpenters, Robert Whiteley; plasterers, I. Jowitt; plumber's, H. Garton; painter's, John Brook; slaters', Goodwin & Sons; gasfittings, J. W. Dovers, of Manchester. Accommodation is provided for 650, and the cost of the whole works, not including architect's commission, is expected to be about 3,600l.

York.—The new Baptist church has been opened for divine worship. The edifice is situated in Priory-street, Micklegate, and will accommodate about 700 persons. The building stands with its side to Priory-street. The style is the Early Decorated. The plan consists of a nave and aisles, with transepts. The extreme length of the nave is 78 ft., the width, 24 ft. 6 in.; height to the eaves above the clearstory, 32 ft. 6 in., and to the collar beam of roof (where it is ceiled) 44 ft. 6 in. The extreme width is 44 ft. between the aisle walls, and 49 ft. 6 in. across the transepts. The arcade below the clearstory is of brick, with plaster mouldings, and supported upon cast-iron columns, with foliated capitals. A gallery has been erected over the aisles and across the ends over the vestibules. The front of the galleries is in pitch pine, with Quebec pine panels in the lower part, and ornamental ironwork in the upper part, the framing being relieved with ornamental chamfering. The iron columns supporting the arcade divide the gallery front into bays, as they are seen the entire height. The seats are all open benches, with ornamental ends. Behind the church, with its end to the street, is a lecture-room, 40 ft. by 21 ft., ministers' vestry, lobby and staircase to schoolroom, which is 45 ft. by 25 ft. The timber work of the roof of both church and school is exposed to view. The exterior is faced with stone, the dressings in

Whitby stone, and the walling of Bradford sets in thin beds. The side being to the street is the principal front. There is a tower at the entrance corner towards Micklegate, containing one of the staircases to galleries. The tower itself is to the top of the parapet 54 ft., and to the top of the pinnacles 61 ft. It is covered with a high-pitched roof of ornamental slating, having iron cresting on the roof. The architect was Mr. W. Peachey, of Darlington. The contractors for the several works were for the brick and stone work, Messrs. C. Bowman & Co.; plastering, Mr. Croft; slating, Mr. T. F. Wood; carpenter and joiner's, Mr. W. Bellerby; plumbing, gasfittings, and glazing, Mr. J. Dickinson; painting, Mr. Poulter; smith and ironfounder's, Mr. Bonsfield; and warming, Messrs. J. Longbottom & Co. The cost, including everything but school fittings, was 3,538l., and the total cost, including the land, about 5,000l. This does not include the cost of the organ (nearly 200l.), erected by Mr. Postill, organ builder, of York.

ROMAN CATHOLIC CHURCH BUILDING NEWS.

Longton.—The corner-stone of a new church has been laid here in the presence of Dr. Ullathorne, Roman Catholic Bishop of Birmingham. The site of the new building is Heathcote-road, a short distance from the existing edifice. The new church will be in the Early French Decorated style of Gothic architecture, and will accommodate 1,000 persons. It will be erected of Staffordshire red brick, with Bath stone and Hollington stone dressings. It will be a parallelogram in form, the nave being 138 ft. long by 36 ft. wide, with two aisles 110 ft. long by 14 ft. wide. The external height of the building is to be 78 ft. The nave will terminate in a pentagonal apse, and will be divided from the aisles by nine equilateral arches resting upon columns 17 ft. high, formed of Mansfield and Paisley stone. The sanctuary is to be raised 4 ft. above the body of the church, at the end of which will be placed a reredos, made of Caen stone, with marble columns in various colours, and cappings of the same material, the gift of a private benefactor. The sides of the sanctuary will be lined with polished oak stalls, and the pavement will be laid with Milton's encaustic tiles. The roof over the sanctuary is to be formed with a concentric groin. The rest of the sanctuary will be covered with a timber roof decorated. The nave is to be divided into eight compartments by framed and moulded principals, with painted and gilt iron roses at the several junctions. The same will be divided and sub-divided with framed and moulded ribs, the intervening spaces being filled with plaster, which will also eventually be decorated. The organ-loft will be placed at the west end, and supported by a stone arch extending the entire width of the nave. Above the organ will be placed a western rosette window 18 ft. in diameter. The roofs will be covered with green and purple slates in various devices. Attached to the church are to be extensive sacristies, and also a presbytery for three priests. The plans further contemplate a south-west tower and spire. Independently of the site, the cost of the work already contracted for is about 5,000l.; this being exclusive of fittings, carving, and the contemplated tower and spire. The architect is Mr. E. W. Pugin, of Ramsgate; and the builder is Mr. Geo. Heveningham, of Wolverhampton.

STAINED GLASS.

St. Michael's, Worcester.—The chancel window of St. Michael's Church, Worcester, has been filled with stained glass by Messrs. Duncanson & Davies, of Shrewsbury. The design was chosen and executed under the direction of Mr. H. Bennett, who presented the window to the church. The subject, which occupies the three openings of the window, is the Crucifixion. In the upper part of the centre opening is our Saviour on the Cross, looking towards the penitent thief, who is in the side opening on His right hand, the impenitent thief being in the side opening on His left. At the foot of the cross are Mary Magdalene and His mother.

St. John's, Cowley.—A stained-glass memorial window of three lights has just been placed in this church. The subjects are the Marriage at Cana, the Man at the Pool of Bethesda, Raising

the Widow's Son, Christ blessing Little Children, and, in the centre, our Lord raising Lazarus. The detail of the window is grisaille, the subjects in the centre being surmounted by a canopy. It was designed and executed by Mr. Baguley, Newcastle-on-Tyne. The east window of same church is in hand, by the same artist, the Rev. R. M. Benson, of Cowley, and is shortly to be erected.

Abbey Church, Cambridge.—One of the windows of this church has been filled with stained glass in memory of the late Mrs. Preston, widow of Mr. T. Preston, of the Abbey. The central opening is filled with the Crucifixion, and the Saviour is surrounded with an aureole of glory, on a blue and ruby ground-work; latter representing heaven and the former earth. In the trefoil above is an angel holding the emblem of the Trinity; at the base is the emblem of our Saviour, with ornamental work. The left-hand opening contains the Nativity; the right, the Baptism. The windows are under Early canopies. At the base of the outer subjects is the Alpha and the Omega, surrounded with ornamental ground-work. The trefoil above there are angels holding scrolls. The artist engaged was Mr. Constable, Warwick.

Kimbolton Church.—A stained-glass window from Messrs. Avery & Sons, London, representing the Resurrection of our Lord, and the appearance of the Angel to the Marys at the Tomb, has been placed in one of the windows on the south side of the church. The window is erected to the memory of the Rev. T. Ainsworth, the late vicar.

Bulkington Church, near Nuneaton.—There has been recently fixed in this church, by Messrs. Holland & Son, of Warwick, a stained-glass memorial window containing the subjects Healing the Sick and Raising Lazarus to Life, surmounted by canopies in a floriated treatment containing figures of Faith and Hope, an angel in tracery holding a scroll, with the words, "Faith is the substance of things hoped for." An inscription is placed at the foot of the window.

SCHOOL-BUILDING NEWS.

Carlton (Nottingham).—The chief stone of new national schools for Carlton has been laid. When completed they will accommodate 400 children. The schools will be situated almost in the centre of the village. There will be three rooms, 50 ft. by 20 ft. each, the class-rooms behind. Messrs. Goddard & Son, Lincoln, the architects, propose to erect the buildings in the Tudor style. The builders are Messrs. Key & Cave, Carlton.

Stratford, Essex.—New schools are now in course of erection in the district of St. Paul's Stratford. They are being built of stocks with brick dressings. The contract has been taken by Mr. James Rivett, of Stratford, builder, for 2,400l. Mr. Henry Ough is the architect and the building is being erected under his superintendence. The foundation-stone was laid on the 6th instant, by Mrs. T. Ewel Buxton, whose family have been great benefactors to the district. St. Paul's district contains more than 10,000 inhabitants, principally mechanics and labourers, without any schools; and it is feared from the great difficulty experienced in making up the present deficiency of 500l. it will be necessary to postpone the erection of the boys' and girls' school.

Prittlewell (Chelmsford).—The new national schools recently erected are now open. The building, which is Ecclesiastical in style, is situated at the south end of the church, and is in keeping with its architecture and general character. The architects were Messrs. Wenham & Blake, of Westminster, and their designs have been carried out by Mr. Carter, of Rochford, builder, at a cost of 1,500l. The school-room, which can be divided by a temporary partition into boys' and girls' rooms, is 54 ft. long by 24 ft. wide, and will accommodate 180 children. The benches have been constructed under the superintendence of Mr. Edmunds, of London. In their ordinary position each forms a bench with a lean-to behind, but the back can be opened so as to form a level desk for reading, and by touching a spring this becomes a writing-desk sloping at an angle of 45 degrees, while by joining two benches together with the desks in the level position a table is formed, 10 ft. long by 4 ft. wide, with seats on each side. Opening from the schoolroom is a class-room, 18 ft. square, which is also intended for readings, con-

certs, and other parochial purposes, and is provided with a moveable platform suitable for such occasions. Adjoining the schools is a residence for the master and mistress, the style being uniform with that of the school buildings.

Chester.—The Bishop Grabam Memorial Ragged School, in Princess-street, is now completed and opened. The building has been designed by Mr. W. M. Boden, of Chester, architect; and Mr. Edwin Harrison was the builder. The elevation presents a porch with two doors, divided by a shaft of slate, with carved stone capital. Above the doorway is a statue (executed by a Chester artist, Mr. Griffiths) of the late diocesan, Dr. Grabam, as a tribute to whose memory this school has been erected.

Miscellanea.

MEMORIAL TABLETS.—At the annual meeting of the Society of Arts, it was stated that leave has been obtained to affix tablets on the former residences of Benjamin Franklin, Sir Joshua Reynolds, Lord Nelson, and James Barry, but that the progress in fixing these and others had been delayed by experiments in the manufacturing, which Messrs. Minton, Hollins, & Co. have been making.

ELECTRIC ORGAN.—An electric organ, which will shortly be opened by Mr. Glenn Wesley, is being built by Bryceson Brothers & Co. for Christ Church, Camberwell. This organ is to be placed in a chamber on the south side of the chancel above the vestry, but the organist will sit on the opposite side amongst the choir, some 40 ft. distant from the organ. The electric system is forthwith to be applied to the organ in St. Michael's, Cornhill, Messrs. Bryceson's contract having been accepted for the entire reconstruction of this large organ. The manuals will be placed at a distance of 30 ft. from the instrument. Various pressures of wind and other improvements will also be introduced.

CROPS FROM LONDON SEWAGE.—At the usual meeting of the Metropolitan Board of Works, the chairman said he had received a letter from Mr. Hope, of the Essex Reclamation Society, in reference to the effects of sewage manure applied to the land. In this letter Mr. Hope said—

"Here with I have the honour to send duplicate specimens of the samples of our crops, which we are exhibiting at the show of the Essex Agricultural Society this day. Some of the samples are quite unprecedented. The sample of wheat is grown on a piece of land which bore the same crop last season. The oats, which are perhaps the most extraordinary ever seen, have been produced by the unexhausted manure left on the land by the application of 4,000 tons of sewage per acre last year to a piece of land from which we got last season 71 tons of grass per acre. This is a conclusive refutation of those enemies who pretend that sewage farming exhausts the land. I trust that these samples will be interesting to the Board."

Some specimens of wheat, barley, oats, potatoes, and strawberries accompanied this letter, and were of extraordinary size and quality.

THE MARQUIS TOWNSEND'S SCHEME FOR IMPROVING THE GOVERNMENT OF THE METROPOLIS.—A Bill has been presented to the House of Lords by the Marquis Townsend, "to provide regulations for the government of the metropolis in certain matters." This Bill has been made sufficiently comprehensive to bring within its scope a variety of minor but more or less important matters which have not hitherto been deemed of sufficient importance to be dealt with by specific legislation. He proposes to make it a penal offence to drop fruit-peel on a footway; or to ride across a thoroughfare at a greater speed than six miles an hour. Other persons to be subjected to a penalty, not exceeding 40s., are those exposed upon the foregoing offenders are persons exhibiting or distributing pamphlets relating to diseases; women who place themselves outside houses for the purpose of cleaning the windows; and persons who place flowerpots, &c., outside their houses without securing them. Cleansing-sweepers not employed by the guardians of the district in which they ply their calling are to be put down, and a decided nuisance those beggars are. Another object of the Bill is to compel all stall-keepers to take out licenses, under which clauses impose penalties for retaining dead animals in rooms occupied by living persons for more than twenty-four hours, and for conveying hackney carriages persons suffering from infectious diseases. Some of the clauses are not very clear in purpose, and others may not meet with universal approval, but the intention generally is good and useful.

A NEW DYE FROM GAS REFUSE.—A new golden-yellow dyo, called dinitro-naphthyl, has been obtained from the naphthaline of gasworks, by treating a solution of muriate of naphthylamin and nitrate of potash with nitric acid.

LONDON'S DIRT.—Sir: The intolerable noise caused by the wheels of vehicles on the London streets is distressingly painful to many; sleep is often broken by the rasping of midnight cabs and lumbering carts. With the view of silencing this turmoil and ceaseless din, I beg to propose as an experiment to twirl the wheel in a pan of hot thick glue, so as to coat the iron tire, then roll along the ground struck with sand or fine gravel: it hardens quickly, and adheres tenaciously, if not wet or dirty. Any uniform thickness can be insured by a fixed scraper; the composition can be purchased at 2s. 6d. per can. It is gutta-percha and india-rubber dissolved by naphtha. The horse's hoofs and shoes might receive a covering with advantage.—R. T.

M. MUSARD'S STABLES.—The Paris papers give the following description of the new buildings to M. Musard, of musical fame:—The visitor enters beneath a vast *porte cochère* into a vestibule entirely unroofed by glass, whence, without the trouble of moving from his divan, the master of the establishment can survey his equine property. On the right are eleven loose boxes, at present unoccupied, as monsieur or madame are at their chateau in Normandy. On the left are the coach-houses containing the town carriages,—that is, Victorias, landaus, cocottes, hanches, &c.,—all eight springs. The harness-rooms next occupy your attention: to reach them you pass the stalls belonging to M. Musard's saddle-horses, which are built round a court, the central ornaments of which are three marble fountains. The names of twelve of these fortunate animals are recorded. I spare you the recital, but beg to assert that carpets extend the whole length of the stalls, within which the animals are allowed to repose on ordinary straw.

THE IMPROVEMENT OF GLASGOW.—At a meeting of the Glasgow town council, in their capacity as City Improvement Trustees, held in Glasgow last week, some details were given with regard to the operations of the trustees for the improvement of the city. The committee reported that the loans obtained by the trustees amounted to 393,000l., while the assessments received were in all 64,728l. The committee estimated that they would be able to pay the trustees still 200,000l. below the sum which the trustees authorized them to borrow. The total purchases of property amounted to 291,307l., and the whole expenditure to 274,211l. A considerable number of houses had been taken down in the old parts of the city, with a view to open up densely populated and unhealthy localities, and the work of demolition was still proceeding. On the other hand, the committee had made arrangements for the erection of four blocks of dwelling-houses for the working-classes, and were prepared to proceed at once with a block capable of accommodating about 200 persons. It was hoped that when these houses were erected private builders would come forward and provide for the displaced population, in which case the committee did not propose to proceed further in this direction.

A SANITARY DEPARTMENT FOR INDIA.—At a recent meeting of the health section of the Social Science Association a paper on the necessity of establishing a department for public health in connexion with the Government of India was read by Mr. W. C. Bonnerjee, in which he pointed out the extremely unsatisfactory state of India from a sanitary point of view. Both in cities and in the provinces people die by thousands from preventible disease. In the provinces, he said, there is no drainage, nor even the open-air drains as in towns. No death-rate is kept, but it is known to all the world that the percentage of deaths in India is far above the common. There being no officer to advise the Governor-General in sanitary affairs, the recommendations of subordinate medical officers are not properly considered, and medical officers fear being considered "pushing men." He thought that India would improve in matters of sanitation if there were created a department to look after the public health, and he submitted a plan for the consideration of the Association, which was, that there should be a central board of health in the different provinces, with local boards all over the country, the presidents of the central boards to be members of the council of the governors.

THE SURVEY OF CITY PROPERTY.—An officer is about to be appointed by the corporation of London to make periodical and systematic surveys of the City property. The salary attached to the new office will be 400l. per annum.

DEMOLITIONS IN THE STRAND.—Several of the houses on the north side of the Strand, lying between Wellington-street and Catherine-street, are closed, prior to demolition, for the purposes of the new circus which is to be erected there. The building known as the Strand Music Hall is to be in a great measure rebuilt.

INFANT MORTALITY AT LIVERPOOL.—At a recent meeting of the local health committee, the chairman remarked that there was one serious feature connected with the medical officer's report, to which he wished to call attention. The number of deaths of children under five years of age was 50 per cent. of the total mortality, and it varied little from that every week. It was very extraordinary that the average should be so steady, but he had observed for a long time that the rate kept at 50 per cent.

STANGROUND CROSS.—There has been erected in the grounds of Stanground Vicarage an early cross, which had been doing duty as a footway over a narrow water-course in the village. Before the Conquest there was a church at Stanground, and the existence of the latter ornament raises the question among ecclesiologists whether the cross recently discovered may not have been erected before the time of William I. It is in fair preservation, and the thanks of the antiquary are due to the Rev. R. Cory for preserving this relic.

THE INAUGURATION OF THE LUTHER MONUMENT.—The inauguration of the Luther monument attracted to the small town of Worms sufficient visitors to fill a large capital. As many as 90,000 people were present, who, of course, could not be lodged in the town, and had to seek shelter as well as they could in the villages of the neighborhood. Besides the Kings of Prussia and Wurtemberg, and several of the minor German Protestant princes, about 2,000 clergymen had arrived from all parts of Germany and Switzerland, and even from France, England, and America. The festivities were rather of a serious than a gay character.

SOCIETY FOR IMPROVING THE CONDITION OF THE LABOURING CLASSES.—The annual meeting has been held at Willis's Rooms, St. James's, under the presidency of the Earl of Shaftesbury. The report presented a favourable account of the success attending the various model lodging-houses belonging to the society, as well as several renovated dwelling-houses in different parts of the metropolis. The report was adopted, and addresses were given by the Right Hon. W. F. Cowper, the Hon. A. Kinnaird, Mr. Dimsdale, the Rev. Canon Nisbet, &c. The gold medal awarded to the society at the Paris Exhibition was presented to the president.

ILLUMINATING GAS has many impurities, of which perhaps the most objectionable is sulphur. Some tests have recently been made by Mr. Valentin, of the Royal College of Chemistry, to ascertain the amount of this noxious substance evolved in the combustion of given quantities of the gas supplied by various companies; and it has followed that the purest samples give as much as from 20 to 30 grains of sulphur for every 100 cubic feet consumed. An ordinary fish-tail jet may be said to burn 5 cubic feet an hour. From this and an inspection of his gas hills, a consumer may compute the quantity of brimstone that he diffuses through the atmosphere of his house in the course of a year.

SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—At the last meeting of this Society on Thursday—Mr. Samuel Carter Hall in the chair—Mr. Wyke Baylis delivered the last lecture of the season, "On Certain Effects of Religion on Art." He showed that for good or evil religion and art have always been associated together, and in the refined idealism of Classic, the devotional character of Medieval, the broad human sympathies of modern art, he traced the influences of the dominant religions under which these schools existed. Mr. Baylis contended that Greek art, in its eleticism, limited itself to few but grand types of human beauty; that Medieval art added new types in heroism or saintly virtue; and that it remained for the modern schools to show that the theme of art should be as limitless as is the splendour of the creation.

PORTRAIT OF BROUGHAM.—A remarkable portrait of Lord Brougham, life-size, is given in the *British Workman* for July, price one penny. It is wonderfully like him as he appeared lately, and a capital specimen of wood engraving for the million.

THE TOWER OF ST. MARY SOMERSET CHURCH, UPPER THAMES STREET.—Mr. Bostwick, in the Commons, asked the Government whether they would obtain, by purchase or otherwise, the materials of the tower of St. Mary Somerset Church, Upper Thames-street, advertised for sale by tender, with a view to the re-erection of the tower in some fitting locality. In reply, however, Lord J. Manners said he thought the Government would not be justified in asking Parliament for the money for the re-erection of the tower referred to.

THE BRADFORD SUPPLY OF WATER.—A season of unusual drought has seriously diminished the store of water in the Stubbin Reservoir, from which two-thirds of the supply for the high-level district are drawn. The waterworks committee at length decided to limit the supply from the high-level service to one day per week, commencing with the following day, when notices to this effect were extensively posted, and naturally created no little consternation throughout the district affected, which includes, besides the high-level parts of the borough, Thornton, North Bierley, Wibsey, Comersal, Birstal, Tong, Yersal, Padsey, and Eccleshill.

BIRMINGHAM ARCHITECTURAL SOCIETY.—The annual meeting of this society was held on Thursday, the 25th of June; the president, Mr. John J. Bateman, in the chair. The report of the council showed that during the past session six papers had been read upon various subjects of interest, and that the present number of professional members is thirty-seven. Votes of thanks were awarded to the returning officers for their services, and the following gentlemen were elected officers for the ensuing year:—President, Mr. A. B. Phipson; vice-president, Mr. Y. Thomson; treasurer, Mr. J. J. Bateman; hon. secretary, Mr. B. Corser.

THE PEEL STATUE IN NEW PALACE-YARD.—Lord Elcho, in the Commons, moved that in the opinion of the House the Peel statue ought to be removed from Palace-yard. No one, he remarked, could say with truth that this statue was an ornament to the metropolis. It ought to be broken up and melted, and a better statue of Sir Robert Peel obtained, as this one was a disgrace to the memory of that great man. Mr. Bunsford Hope said the friends of Baron Marchetti ought to have it put out of the way. There should be a first-class minister, with full control over all matters of art in the metropolis. Mr. Cardwell said the original statue was objected to by Sir C. Barry, as being too large for the site, and Baron Marchetti had made this one at his own cost, and obtained Sir C. Barry's consent to its erection on the present site. Other members expressed their opinion, and Lord John Manners said that, after the public faith had been pledged to the original subscribers to erect this statue, a very strong case ought to be made out before the House sanctioned a violation of the pledge. Lord Elcho's motion was agreed to by a majority of 182 to 71.

MASTERS AND WORKMEN.—The House of Lords, at one of its recent judicial sittings, gave judgment in the case of Weir v. Merry, which was a Scotch appeal raising the question of the liability of masters to their workmen for injuries sustained by the latter in the performance of their duties. The Lord Chancellor, in giving judgment (in which Lord Cranworth, Lord Westbury, Lord Chelmsford, and Lord Colonsay concurred) said that the liability or nonliability of a master to his workmen could not, in his opinion, depend on the question whether the author of the accident was or was not the fellow-workman, in any technical sense, of the sufferer. The duty of an employer, who did not take part himself in the work, consisted only in providing competent persons to do it, supplied with proper materials; that done, his liability ceased, and the fact that an injury had been caused, as in this case, by the act of a person who had been formerly, but was no longer, in the service of the master, but who had been selected as fully competent, would not have the effect of making the master liable, though this person and the injured man could not be technically described as fellow-workmen in a common employment.

THE ART-UNION OF LONDON PREMIUM.—The premium of 200l., offered by the Council of the Art-Union of London, for the best set of designs illustrative of some English literary work or period of history, has been awarded to Mr. Henry C. Selous, for a series of drawings illustrating the romance "Hereward."

SEA WALLS.—Where a man buys land below the level of high water, and which could be daily covered by the overflow of sea-water, were it not prevented by the obstacle of a sea-wall, the purchaser has notice, and is thereby made aware that by law, unless for some custom, or unless some special contract exists exempting him, he is liable to contribute to its repair. The Master of the Rolls thus held in the case of Morland v. Cook—a suit instituted by the proprietors of certain land within the parish and level of Broomhill, in Romney parish, in the counties of Sussex and Kent, to compel the defendants to contribute towards the repair of a sea-wall formed on the southern extremity of the parish, to exclude the inroads of the sea.

NEW WAREHOUSES AT BOSTON, MASSACHUSETTS.—The Donahoe buildings, on Franklin and Hawley streets, Boston, are in the French Renaissance style, for which the Boston streets are noted. The two façades of the block on the two streets above named have together a frontage of 175 ft., with a height of 65 ft. above side-walks. This height is subdivided into four stories, all of which are faced with white granite from the quarries of Concord, New Hampshire, with the mouldings and other enrichments selected from the latest Paris structures by Visconti and other architects who have received the patronage of the Emperor Napoleon. The stonework of the façades is crowned by a double two-story roof. The building has been designed and superintended by Messrs. Gridley J. F. Bryant & Louis P. Rogers, architects. The mechanical execution of the various works has been carried out by Messrs. John W. Leighton; Cranite Railway Company (O. E. Sheldon, agent); George W. & F. Smith; Carlisle & Cummings; Francis Richards; C. Parker & Son; Duffey & Hartnell; and Otis Tufts.

TENDERS.

For rebuilding the Star Inn, Reading, for Messrs. Langton, Burrows, & Co. Messrs. W. & J. T. Brown, architects:—
Wheeler, Brothers (accepted) ... £500 0 0

For the erection of a house in the Downs, Park-road, Hackney Downs, N.E. Messrs. Shaw & Torlington, architects:—
H. E. & A. E. Abery (accepted) £670 0 0

For the conversion of three railway arches at the Surrey end of the Cannon-street Bridge, into a wharf. Messrs. Shaw & Torlington architects:—
H. E. & A. E. Abery £670 13 0
Rawlins 632 0 0
A. & J. Smith 539 0 0
Lewis 475 0 0
Goslin 460 0 0
Holmes (accepted) 420 0 0

For the erection of new farm-buildings at Spring Farm, Bulphan, near Tilbury, Essex, for Mr. J. Mitchell. Messrs. Shaw & Torlington, architects:—
Lewis £245 0 0
Turner 535 15 2
Blake 389 0 0
Horscroft 389 0 0
Larkin (accepted) 290 10 0

Accepted for the erection of a brewery for Messrs. Bentley & Shaw, Huddersfield. Messrs. Davison & Samuel, architects:—

Excavators, Bricklayers, Masons, &c. Work.
Mallinson, Bremnar, & Gledhill £2,620 0 0
Carpenters, Joiners, and Ironmongers' Work.
Rushworth £362 0 0
Ironfounders and Smiths' Work.
Harrison & Bedford £1,800 0 0
Plumbers and Glaziers' Work.
Taylor & Co. £147 0 0
Slaters' Work.
Goodwin & Son £127 9 0
Painters' Work.
Brighouse £48 10 0
Plasterers' Work.
Longbottom £7 5 0

For four shops and houses in Acre-lane, Brixton, for Messrs. Standing & Marten. Mr. Hiscocks, architect. Quantities by Mr. Shrubsole:—
Wardle & Baker £2,500 0 0
Wilkins 2,484 0 0
Blackburn 2,409 0 0
Soper 2,385 0 0
Harrison & Edwards 2,330 0 0
Richards 2,315 0 0
Hosgood & Covert 2,150 0 0
Warr 1,980 0 0
Pierce 1,798 0 0
Minty (accepted) 1,648 0 0

For new school and addition to the Baptist chapel, New Swindon, Wilts. Mr. Thos. S. Laandown, architect:—
Drew £1,405 0 0
Walt 1,317 0 0
Beaven & Son 1,262 9 0
Barrett 1,219 9 6
Sheppard 1,200 0 0

For new roads and drains, Morden, Surrey, for Mr. E. Garth. Mr. Charles Rowe, surveyor:—
No. 1 contract. No. 2 contract.
Doggett £2,251 19 8 £1,933 5 10
Topell 2,241 19 8 1,923 10 4
Holmes 2,277 0 0 1,739 10 0
Bloomfield 2,250 0 0 1,888 10 0
Neal 2,210 10 0 1,790 0 0
Clarke 2,231 10 0 1,897 0 0
Goodair 2,212 0 0 1,892 10 0
Blackman 2,237 10 0 1,772 10 0
Parker 2,150 0 0 1,510 0 0
Osentor & Co.† 2,082 0 0 1,882 0 0
Pezzey 2,119 0 0 1,790 10 0
Rough 2,150 0 0 1,510 0 0
Coker, Junr. 1,823 0 0 1,344 0 0

* Accepted for No. 2 contract (conditionally).
† Accepted for No. 1 contract.

For memorial synagogue, Chatham. Mr. H. H. Collins, architect:—
Naylor (accepted) £4,000 0 0

For model farm-buildings, Cutsey. Mr. J. Watson, architect:—
Shobrook & Son £5,287 0 0
Harvey 5,178 0 0
Goslin 5,160 0 0
Pollard & Son 4,900 0 0
Gibson 4,800 18 0
Calt & Pethick 4,900 0 0

For building warehouse for Messrs. Turner, Nott, & Strong, West Bate Dock, Cardiff. Mr. J. Hartland, architect. Quantities supplied:—
Estate & Co. £2,394 0 0
Webb, Brothers 2,390 0 0
Cooper & Day 2,325 0 0
Lock 2,284 0 0
Sheppard 2,290 0 0
Seager (accepted) 2,200 0 0

For labourers' cottages, at Binfield, Berks, for Mr. P. H. Crutchley. Mr. Jos. Morris, architect:—
Plan A per pair. Plan B per pair.
Bryant £320 15 0 £348 16 0
Sheppard 317 0 0 377 0 0
Higgs 318 0 0 377 0 0
Alway 305 0 0 355 0 0
Lawrence* 284 10 0 340 10 0

* Accepted: two pairs to be built on plan A.

For house on the Redlands Estate, Reading, for Mr. Holder. Mr. Joseph Morris, architect:—
Oldfield £442 0 0
Higgs 423 0 0
Goslin 423 0 0
Dunn 419 14 0
Smith 417 11 0
Simonds 369 0 0
May (accepted) 359 0 0

For stabling at Messrs. Brown's brewery, Reading. Mr. Joseph Morris, architect:—
White £214 15 0
May (accepted) 212 18 0

For the erection of the Sheerness public rooms. Messrs. Jeffery & Skiller, architects:—
Contract No. 1. Contract No. 2.
For hall and offices. Tower.
Hall £2,299 0 0 £230 0 0
Jeffery 4,474 0 0 431 0 0
Naylor 4,327 0 0 267 5 0
Muller 4,218 0 0 254 15 0
Dover & Co. 4,556 0 0 307 0 0

For rebuilding premises in Milton-street, Cripplegate for Mr. J. H. Maskee. Mr. Parris, architect. Quantities by Mr. Shrubsole:—
Heysman & Cookrell (accepted) ... £1,127 0 0

For the construction of sewers on the Ashburnham Estate, for T. B. Simpson, esq. Mr. H. Currey, architect:—
George £5,250 19 0
Nicholson 4,980 0 0
Robinson 4,600 0 0
Threlkeld 4,625 0 0
Dickenson & Oliver 4,300 0 0
Wigmore 3,550 0 0
Moxon 3,260 0 0
Whitlock (accepted) 3,097 0 0

Longdon and Eldersfield drainage. Mr. T. Curle, Hereford, engineer.—The tender of Mr. William Field, Shrewbury, for 6,138l. 2s. 2d., has been accepted. Mr. Thomas Brassey, Westminster, surety.

TO CORRESPONDENTS.

R. R.—R. P.—C. A. P.—J. O.—S. & L.—Messrs. D.—J. P.—R. C. H. T. S. L.—J. S. S.—R. T.—A. Ledger.—R. D.—D. & S.—J. & S.—B. C. H. P. H.—J. M.—E. M. B.—J. M. S.—W. C. T.—Constant Reader F. R.—W. D.—M. W.—J. G. W.—T. M.—A. A. (particulars could not be gone through and certain examinations passed).—A. Z. Judgment by Mr. Kax in the case of Saville House, Leicester-square reported at the time in the *Builder*.
We are compelled to decline pointing out books and giving addresses.
All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily publication.
NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

Advertisements cannot be received for the current week's issue later than THREE o'clock p.m. on THURSDAY.

The Builder.

VOL. XXVI.—No. 1327.



Suburban Growth of London and Suburban Railway Accommodation.

SUBJECT has lately been brought prominently under public notice which is of great importance in relation to the growth and increase of the metropolis. We have ourselves not infrequently called attention to the steady and rapid pace at which this increase proceeds, a rate which, if unchecked, will demand shelter within the limits of the London of A.D. 1900 for from six to seven millions of inhabitants.

With increase of size we now see coincident transformation of character. The old nucleus of this immense group of parishes, cities, and boroughs, the City of London itself, is becoming more and more the office of the world. Stately buildings replace the ugly and cramped houses of the Georgian era, and these buildings are almost entirely parcelled out in offices. The City lives out of town. And not only the wealthier but the poorer inmates of these lofty rooms by day, escape to a comparatively less dense neighbourhood to snatch their few hours of sleep, and to bring up their numerous families.

In this architectural and social transformation of the central part of London the railways have had no small share. It is evident to those who have given due attention to the subject that no traffic pays like a metropolitan traffic. The powerful engines and well-managed trains of the underground railway conduct a constant stream of human life to and fro (without any apparent diminution of the crowds that fill the streets), that resemble only the march of an enormous army. While the interior traffic of the metropolis assumes such commanding dimensions, the suburban traffic is hardly less important. For the constant circulation of the former is substituted the steady tidal flow of the other part of the same great system. To reach the business centre from eight to eleven, to leave it from four to eight or even later, is the daily habit of a large mass of persons, who have become accustomed to arrange the whole routine of their business life on the assumption that a decent and reasonably paid service will be continued by the different railways.

To catch and to convey this steady and increasing stream has been, for many years, the great object of railway rivalry. A third line was created to snatch a portion of the wealth for which the Brighton and the South-Eastern Companies were fighting at each other's throats. Nothing was too much to attract the public. lofty and costly stations, so far in advance of the requirements of the traffic that they must be regarded rather as advertisements in brick, and glass, and iron, than as the provision made by public carriers for the accommodation of their customers, form the most prominent objects to be seen from London end from Westminster

Bridges. Duplicate bridges of gigantic proportions span the Thames. Acre after acre of London has been denuded of its ancient roofing. And so headlong has been the race that the rival claimants, for instance, have found themselves not only out of breath, but out of pocket. Ruin came to stare them in the face.

Then succeeded that which took place in the good old days of the road. When the coach proprietors had come to the end of their tether in their efforts to ruin one another, it was their wont to combine. Up, then, went the fares which, in the attempt to underbid one another, had sunk almost, or (in one instance) altogether, to zero. The late rivals, now partners, charged their own prices; and it was only the possibility that some "outsider" might be tempted to come in for a share of the harvest (exactly as did the London, Obatham, and Dover Company), that kept the charges of the newly-combined opponents within limits. They had raced, at each other's cost, to catch the public. They now strove to make the public pay for their losses.

Within certain limits this kind of thing is quite consistent with our national peculiarities. These limits, to a certain extent, imposed themselves. The capital necessary to set up a stage-coach was not out of the reach of many a man with a turn for sporting. Any particularly "close" road would be likely to attract some of this floating capital. Private enterprise had offered certain facilities to the public. When those facilities were restricted, private enterprise might always be invoked to repeat its original effort.

But when, instead of hundreds of pounds laid out on horse-flesh or in coaches it became a question of millions invested in railways, the good old rule of leaving wrong to right itself ceased to be applicable. It was no longer a question of private enterprise; for, though the money invested in the new carrying business was that of individual proprietors, the conduct of the concern was by a corporation, and the powers of each corporation were given by *ad hoc* legislation. In the earliest legislation on the subject some idea of justice was apparent. There was a desire to protect the public, an uninformed desire, it is true, but still one evinced under the new exploded impression that Parliament was responsible for its proceedings. There was also, in the second place, an idea that the new property which thus, with no small amount of speculative courage and of professional skill, had been created under the incubation of the Legislature, should be protected from wanton assault. Thus men grew up, and went on, to plan the steady course of their daily lives on the strength of one or two assumptions the unpardonable folly of which is now apparent. First, they thought that Parliament would protect the public, and that in granting to certain individuals large powers, in the exercise of which all the earlier means of conducting the traffic of the country would be destroyed, provision would be made to insure a wise and fair use of those powers. Secondly, men took for granted that when difficulties had been incurred, property had been purchased and created, and the carrying trade had been placed on a new footing, such property would be protected from wanton attack. Thirdly, they thought that, certain laws having been passed on certain conditions, those conditions would be adhered to by the corporations, and would be enforced or respected by Parliament. In each of these three assumptions we reckoned miserably without our host. The least amount of public convenience was attained at the cost of an expenditure of which it is little to say that the half was unnecessary. No care or industry was allowed to count as a defence against wanton attack. The problem how to spend most money with the least advantage to the public at present, and in such a manner as to render future improvement all but impossible, was worked out by our railway

legislators with full and unexampled success. Even this was not all. First, having thrown clean nway ten shillings out of every pound they spent, in order to injure their neighbours, then having ceased to fight from sheer exhaustion, those great corporate malefactors, so soon as they met in truce, agreed on one point alone. They decided to kill the goose that laid their golden eggs, and they came to Parliament to hold the neck of the bird while they did so. The House of Commons gaily and instantly assented. Had it not the mission to take a grand leap in the dark—and could it be bothered by trumpery questions of public faith or utility? The men who objected to have their fares doubled on them were probably non-electors. Even if they were electors, were not the chairmen of the railway companies M.P.s? Who could care for the inconvenience of printers' devils and those low sort of people when it was a question of passing a Bill supported by honourable members. So the House of Commons readily gave power to the companies to reverse all former bargains, and to make the public pay through the nose for the wasteful squandering of an intercomend fend. It was a characteristic way of making things pleasant.

The House of Lords had a little more scruple: not inaccessible to the force of the argument that money was wanting, and was only to be squeezed out of the public, it yet scrupled to hand over the whole South-Eastern traffic of the metropolis, with its suburbs, and with the world at large, to the unchecked power of persons who had shown such utter want of consideration for the public interests, or of wise cultivation of their own. The small end of the wedge their lordships admitted, but they scrupled to show the perfect indifference to the need of the people, proper to the people's House.

The subject is one on which it may indeed be pardonable to use the language of irony, for it is the only refuge from that of shame and of anger. It shows a miserable inefficiency in our boasted institutions, that the vital interests of thousands should be thus exposed to the sport of any greedy assailant. Omitting any further reference to the earlier stages of an inconsistent and discreditable legislation, let us look at the vested interests that have sprung up around even the present ill-conducted union of the South-Eastern systems of railway. Even while the only reason for a Brighton train starting at any fixed hour was that a Dover train started at the same time, New Cross grew into a succursal of the city. Croydon became as Clapham or as Camberwell. The dense population of middle London spread itself out to breathe along the Kent and Sarrey lines. Discouraged, as far as possible, by railway mismanagement, the true friends and exporters of railway traffic swelled the dividends in spite of the directors. What might have been done had a wise attention to the wants of the public, and thus to the true interests of the shareholders, been paid by the several Boards, let the returns of the Metropolitan Railway indicate. But even as it is, thriving and growing colonies have sprung up all along these ill-managed lines, which the directors cannot nproot without the aid of Parliament. It is not their fault. They have done all they could to drive the smaller occupiers of house-room back into the crowded city. They threaten, if refused their new powers, to do still more to spite their own shareholders.

Once and again has it been pointed out that the evil stato of the South-Eastern Railways is to be amended, not by the application of the principle of protection, but of that of free trade. Let the managers set themselves to develop their traffic according to the rules of common sense and of railway experience. Let them economise in the distribution of trains. Let them conduct the traffic so as at once to suit the

convenience of the public and to avoid that duplication of every item of expense which is the peculiar feature of the district. In spite of the large sums laid out on the stations, the arrangement of the tangle of lines between New-cross, London Bridge, Cannon-street, and Charing-cross is such as to leave no element of danger and disturbance out of play. All depends on the accurate use of a complex system of signals. Every train runs over the line of other trains. Every passenger (almost every passenger) from Charing-cross to London-bridge is sent to Cannon-street by the way. In other words, except in the few trains that run direct, every passenger carried from Charing-cross to London-bridge, or *vice versa*, is so carried at a double expense. If it pays to take a third-class passenger in this awkward fashion for twopence, it would pay as well to take him in half the time for a penny.

We might speak of the neglect of mechanical law which is evinced in the unnecessary weight, and rigid structure, of the engines and carriages. Into this subject, however, it is impossible to enter in a few words. It is a question of great pecuniary importance to the shareholders. But the jumble of up and down lines on the same level is a question of life and death to the public. To avoid a constant choking, which is not always avoided, great expense and considerable danger are daily incurred in the working of this group of railways,—unnecessary expense, and unnecessary danger. It is probable that some frightful accident will some day give weight to the remonstrances which we do not now for the first time utter.

To all householders, residents, or proprietors of London, the subject is one of direct and lively interest. The method of suburban extension is intimately connected with the mode in which Parliament enforces the faith of contracts, or hands over the poorer classes who earn their bread in London to the short-sighted greediness of the railway companies. Nothing can be more unsatisfactory than the manner in which the advocates of the latter bodies have conducted themselves when driven to appear in print. Questions of justice to the poorer (but yet the more valuable) customers, who have fixed their humble suburban dwellings in reliance on Parliamentary faith, and on fair and ungrasping arrangements for their accommodation, have been entirely ignored. "I have made a most extravagant outlay. I am out of pocket. Therefore the public must pay." Such is the argument of the embodied railway interest. "Other people have gained something by our expenditure. Land has risen in value near our stations, and people have been induced enough to sell land at this increased value, or to buy it in hopes of a still further rise; therefore we shall double our fares." was another argument. Public faith, adherence to contracts to the strength of which Acts of Parliament had been obtained, convenience of customers, wise development of traffic by giving facilities of travel at low cost,—acknowledgment of error in past contests,—all these things were entirely ignored. The applications to Parliament, and still more the letters of the applicants, have taught the public that nothing whatever is to be expected from the directors, except what they are compelled to do, and that the contentions and ungenerous spirit which has long regulated the relations of board with board may be expected for the future to preside over those which subsist between carrier and customer.

Secondly, if neither kindness nor true prudence can be expected of the boards, it is clear that still less can any aid be looked for from Parliament. But for one or two public-spirited members of the House of Lords the measure which the chairman of one of the companies described in the columns of the *Times* as an application to Parliament to allow of the *reduction* of fares, would by this time have been law. Owners and occupiers must watch future applications to Parliament for themselves.

Thirdly, and even more important than the convenience of the colonies along the Kentish lines, or than the future traffic returns of the companies, is the architectural question,—the mode in which the future development of London will be influenced by the greater or smaller amount of good faith and good sense shown by the managers of the South Eastern lines.

The present tendency of building is to expand along the course of their railways, not in dense lines of streets, but in villa or even cottage residences, each furnished with a breathing-ground in the way of garden or paddock. Of all the

forms of that great evil, agglomeration of habitations, this is the least obnoxious. Again, the physical features of the ground, the lofty hills which catch the breezes from the Channel, the chalky and sandy soil, the fact that the prevalent winds carry off the products of vitality and of combustion to the open country, instead of pouring them on to the already asphyxiated town, are all arguments in favour of that method of suburban growth which can only be checked by the blindness or by the greediness of the railway companies.

There is no room to doubt that had the Amalgamation Bill been passed (for it is childish to speak of its being passed and not acted upon by its promoters) the first result would have been to force back into London itself a dense population which has just escaped from its confinement. The next result would have been to check the wholesome and rational style of building which is now dotting over the district between Camberwell and Croydon. The third would as surely have been the covering, with regular lines of unbroken street, of that wide flat sweep of meadow land between Bayswater and Kilburn, and even Hampstead, which is now the only inlet by which fresh western and north-western breezes can enter to ventilate the metropolis. With the level district about Kensal-green turned into a manufactory of smoke and of carbonic acid, and covered by that alternation of lofty houses, and of dense small streets, crowded with shops and with mews, which characterizes the Bayswater quarter, the more habitable part of London will be reduced to a state of permanent gloom and stagnation such as that which now prevails in the most unhealthy neighbourhoods. The North-Western, the Midland, the Great Western lines will thrive at the expense of those south of the Thames. London will extend to Slough, to Stanmore, and to Elstree, and we shall be advancing rapidly towards the fulfilment of the old prediction which spoke of Highgate-hill as the future centre of the metropolis.

RESERVOIRS AND WATER SUPPLY.

A CORRESPONDENCE has appeared in the leading London papers on the subject of the realization of the surplus water of rivers and brooks of this country, for the use of the population situated on their respective drainage areas, and a claim has been put forward for certain persons as the originators or discoverers of that provident and useful system of storing up the redundant waters as near the rainfall as possible, so that an ample supply of good and pure water may be obtained at all seasons for the supply of the inhabitants; and it is suggested that a large debt of gratitude is due to those far-seeing and discerning men for having made the discovery, and sketched out a scheme that may be put into a practicable shape, and so lead to a good and matured plan to effect this very necessary and desirable object.

To show how futile and upon what slender grounds these claims are propounded, we may observe, that to collect and impound water in rainy seasons as proposed, is of very ancient origin. In Eastern and all tropical countries water has been collected and stored in reservoirs from a very remote period; and perhaps in this place it may be interesting to draw attention to a few examples of these ancient works used for storing water for the supply of large populations.

The Romans, in the same of their glory and the zenith of their greatness, bestowed considerable attention on the water-supply of towns that came within their dominion; and it is said that at one period they had no less than twenty aqueducts for the supply of the city of Rome, and so abundant was the supply, that Strabo remarked that "whole rivers flowed through the streets of Rome."

Many of their aqueducts took their supply of water from springs and streams situated many miles from Rome; the number of reservoirs situated at various points, to store up and keep the water pure and cool, exceeded 1,800; and the supply of water at one period amounted to fifty million cubic feet, while the population of Rome at that time was about one million; the quantity was therefore equal to 50 cubic feet per head of the population.

This water being procured from elevated springs and streams was conveyed through their particularly strong and enduring aqueducts of masonry, many of which are now in existence,

having endured the wear and tear of centuries, to covered reservoirs; so the water was at all times deliciously pure and cool, and even this system of protecting the water from exposure is handed down to us from tradition.

But although the Romans constructed no large impounding reservoirs at their ancient city strictly of the kind alluded to, they left many important examples in those countries that became subject to their dominion; and we may instance Constantinople, by way of example, as affording a clear and lucid type of their practical knowledge of the mode of obtaining water from gathering grounds and impounding it in large reservoirs, and thus delivering it by means of their favourite aqueducts, and other means, to supply the inhabitants.

The site upon which the city of Constantinople is erected is very remarkable, and surpasses in many respects that of any other city in the world. It is erected on a triangular peninsula composed of seven hills, and two of its sides are washed by the seas of Marmora and the Golden Horn, and besides having a considerable elevation in parts, it is surrounded with views and prospects of the most beautiful and enchanting character, and scenes of the most picturesque grandeur.

Constantinople was originally supplied by means of water collected from the roofs of houses, and stored up in reservoirs beneath them; but the quantity of water so collected was found insufficient for the wants of the Turks, whose peculiar religion requires frequent ablutions; besides, it became impure from various causes, which rendered the water unfit for use.

Fortunately another source presented itself to the enterprising Romans, from which a profusion of water could be obtained for the supply of the city, and this source was situated on a range of mountains to the north of the city, and bordering on the Black Sea. As the frequent rainfall on this mountain range produced a large supply of water, and numerous streams flowed down the valleys and ravines, the idea occurred to construct monads at certain elevations across these valleys to intercept the different descending streams so as to impound and preserve the water for the supply of the city.

Six large almost triangular-shaped reservoirs are there formed, some of great depth and capacity, and the monads erected to dam up the water are of great breadth and height, and being faced with white marble finely sculptured in the Oriental style, they exhibit a bold and magnificent appearance; and these sources of supply are religiously guarded and preserved, and heavy penalties inflicted for injuring or improperly abstracting the water.

The aqueducts that supply the city are four in number, and constructed on the well-known Roman system: one of the structures is 440 ft. long, and 107 ft. high, with a double tier of arches, one over the other, supported at intervals with strong buttresses; at others the valleys are crossed by means of "souterrazi," or water towers. The water descends a lead pipe affixed to the tower on one side and ascends on the other, and at the top of the tower is a small basin to permit the escape of the air from the conduit, so as to relieve the pressure on the pipes.

A capacious reservoir contiguous to Constantinople, receives the water from the impounding reservoirs and distributes it gradually over the city, through the various conduits, for the supply of the Seraglio of the Sultan, as well as the numerous fountains that usefully adorn the different parts of the city.

To show the extent and magnitude of ancient reservoirs, we may mention the Imperial reservoir at Constantinople, said to have been built by Justinian, the ruins of which now remain in a very perfect state.

The reservoir is 336 ft. long, 132 ft. broad, and 40 ft. 9 in. high; the sides, arches, and roof are all of brick, covered with terrass; and the roof is supported by 336 marble columns, the capitals of which were of the Corinthian order of architecture; the intercolumniation is 12 ft., and each column is 40 ft. 9 in. high, and they stand in regular ranges, twelve in one direction and twenty-eight in another.

Over the arches of every pillar is placed a large stone, which forms the bed course which supports the arches that spring from the tops of the columns, and which form the vault or roof.

This is a very remarkable and interesting reservoir or cistern; its mode of construction is on a large and magnificent scale, such as usually characterizes the works of the wealthy and luxurious Romans, and stands out in strong

contrast to the constructions of the present age, which are commonplace and rude in comparison. We do not desire to imitate them in holiness of design and splendour of execution, but rest ourselves satisfied with roughly hewing our works out of the commonest material.

In Spain and Portugal are many remains of Roman works of equal interest carried out in a similarly hold and comprehensive scale, evidently showing that that enlightened and enterprising people were far advanced in the knowledge of the laws that govern health and sanitary science, and a study of their remarkable works affords us good examples and precedents, and doubtless will do to remote generations, when many of our modern erections shall have crumbled away to their original dust.

In all tropical countries, particularly the East, it has for generations been the custom to store up water for the use of the population, and for irrigating the land for the purposes of agriculture; and one stupendous reservoir in that wonderful country (India), we may mention, is of extraordinary extent; it is situated at Hussein Segur, Secunderabad, Deccan, and was made, it is supposed, about the middle of the sixteenth century.

It covers an area of about 2½ superficial square miles, or 1,760 acres in extent. Its principal embankment is upwards of 1 mile long, 30 ft. to 40 ft. broad at top, at the deepest part, and gradually narrows towards each end of the embankment, and it is 72 ft. high. The fore slope is 1 to 1, rear slope, 2 to 1, and the face of the inner slope is pitched with large blocks of granite.

The level of high water is maintained at 12 ft. below the top level of the bank. There are many other works of a similar character in that very extensive and interesting country, which cannot be referred to in the limits of this paper. In the course of the recent expedition to Abyssinia, Aden was visited, and some interesting tanks examined there, which are objects of archaeological attraction. On the face of the steep rocks, wherever there are any channels for the rainwater to find its way to the plain below, erections which appear like fortifications, but are in reality tanks for water.

At the head of the plain is a circle of hills which surround Aden, and a ravine descends therefrom; and here are very extensive and massive tanks, built of very solid masonry, very deep, and are lined with a white cement. They are said to be large enough to contain water for Aden for two years, but we understand they contain about thirty million gallons.

These tanks are of extreme antiquity, and were only discovered three or four years ago. They were completely covered up with the debris brought down by the heavy rains of ages past, and their existence was unknown or unsuspected.

They have been cleared out with great labour, and were found to be in as perfect condition as when they left the builders' hands, which is supposed to be about the sixth or seventh century.

It is quite a mystery by whom these tanks were built; but it is supposed to have been by the Egyptians, who at one time possessed a very extensive territory, and in that case these tanks were not improbably contemporaneous with their celebrated Pyramids. The discovery of these tanks is most important, both on account of the shipping calling there, and the garrison, as rain only falls at Aden once in every four or five years, and then it comes down in such torrents as to fill the tanks in a very short period. Another interesting and ancient tank was found some time ago in the Island of Ceylon, it is called the Pathavie Tank, but it is now in ruins. It was discovered in the great central forest of the Wannu, about seventy miles north of Trincomalee, and twenty-five miles from the sea.

It is considered the largest as well as the most perfect of the extraordinary works of this island, and which possesses about thirty of these immense tanks, and from 600 to 700 others of smaller capacity, scattered about the island, many of which are repairable.

The Pathavie Tank occupies the basin of a broad and shallow valley, about twelve to fifteen miles long, with a breadth varying from six to ten miles.

The embankment by which the waters were accumulated within this area is nearly seven miles long, 300 ft. broad at the base, tapering to 20 ft. at the top, and upwards of 60 ft. high, formed throughout its whole length by layers of squared stones.

One of the existing sluices consists of hewn

stone, 6 ft. to 12 ft. long. These run into ponderous wells immediately above the weir, which regulates the escape of the water. Each layer of the work is kept in its place by frequent insertion, endwise, of long ties of hewn stone, whose extremities project beyond the face of the work with an enlarged head, so as to prevent the courses from being forced out of their places.

The projecting heads of these ties are carved with elephants' heads and other devices, somewhat resembling the extremities of Gothic corbels.

The front embankment of this reservoir has been estimated to contain 7,744,000 cubic yards of stone, and the cost to have been, for that portion of the work, about 870,000 sterling.

At some unknown period a breach was effected in the embankment about 200 ft. long and 100 ft. broad, which injured the efficiency of the works, and which was never repaired; and this remarkable reservoir is thereby rendered perfectly useless.

Having quoted a few examples of remarkable ancient reservoirs, we will now call attention to a few of the extraordinary works of this kind in this country. It was the establishment of the canal system that first drew the attention of engineers more particularly to the execution of reservoirs on a large scale as receptacles for storing water, and these were usually formed by choosing a suitable site in deep and narrow valleys or ravines, generally above the level of the summit of the canal it was intended to serve; so that a regular supply of water could be obtained at all times and seasons for the passage of boats, and also to supply the locks constructed for the purpose of transferring the boats from one level to another.

Many of these reservoirs are of considerable extent and executed most substantially and with considerable engineering ability and skill, and several of them are placed in situations where the geological formation is not well adapted for them, on rock, or porous strata, or other objectionable sites, but, still, the best that could be selected in point of level to afford the supply of water required.

If we cursorily examine the sections of country over which our canal system has been carried, our readers will be able to appreciate a few of the difficulties our old canal engineers had to contend with in the execution of such works; and as these have been ably surmounted with substantial and enduring works by their indomitable energy and perseverance, it redounds more to their honour and fame, and no failures are recorded, or even hinted at, to tarnish them, which cannot be said to be the case in the present day, as several of our important works are stated to be not quite free from serious defects. In running our eye over the sections of the respective canals at that time forming main arteries for the traffic of the country, taking the one from Liverpool, by way of Birmingham, to the river Thames at Limehouse, a distance of 262 miles, we cross four summit levels,—first at Harescott, 420 ft. above low-water at Liverpool; another at Knowle, 380 ft. above low-water; another at Brampton, 365 ft. above low-water; and another at Tring, 395 ft. above low-water at Liverpool, and the Thames, of course. To supply these summit levels there are series of reservoirs and locks on the line, to pass the boats up and down the inclines.

On this line of canal there are some very interesting examples of reservoirs, and amongst them I may mention those of the Grand Junction Canal Company. These are situated at the following places, and of the capacity and depth enumerated below:—

Daventry	7,905 locks of water...	35 ft. deep.
Drayton	1,337	28 "
Marsworth	994	18 "
Stanhope End	2,296	24 "
Tring	1,016	29 "
Wilton (old)	1,413	15 "
Wilton (new)	1,413	18 "
Weston	1,856	22 "

Each lock is computed to contain 9,000 cubic feet of water, so that the largest of these reservoirs (Daventry) would be capable of holding 64,845,000 cubic feet of water, and the whole series of reservoirs 167,770,000 cubic feet, for the supply of this particular canal.

But the highest of these reservoirs (Marsworth) is 31 ft. below the summit level at Tring, and the water has to be pumped up to supply that level, and also as there are various levels, to pump the water from one reservoir to another, as a very small supply only is received from the springs and other sources in the vicinity, the summit level requires to be kept regularly sup-

plied to meet the demand required by the lock for each boat, as it carries a lock of water (viz. 9,000 cubic feet) in descending to the lower levels.

The date of the execution of these works varies from 1793 to 1795.

Another important line of navigation is from the River Severn at Bristol, by way of Devizes, to the River Thames at London Bridge, a distance of 178 miles; and on this line we cross only one summit, at Crafton, which is 474 ft. above the level of the English Channel. This line is principally supplied from rivers, and the date of the first Act is 1794.

The aqueducts, bridges, tunnels, and works of this canal are of superior construction and excellent workmanship, the fruits of a master mind, the late John Rennie, C.E.

Another important line of navigation proceeds between the ports of Liverpool, Goole, and Hull, making a distance of about 159 miles: in this distance one summit level is crossed near Stanfield, which is 600 ft. above the level of low water at Liverpool and Hull.

The water for the supply of this line of canal is taken from the rivers and brooks in the vicinity of it, and forced up by means of pumping machinery to the summit levels, from whence it is locked down to the Duke of Bridgewater's Canal one way and the Aire and Calder navigation the other. The date of the first Act for this work is 1794.

On many of the canals there are other interesting reservoir works: on the Barnsley Canal the Hindley Reservoir is 127 acres in extent, and has a depth of 40 ft. of water, and this is supplied by means of pumping from the long level when full, and is returned to the canal in droughty seasons. The date of the Act for this canal is 1793.

The Birmingham system of canals is also of considerable magnitude, connecting the town of Birmingham with the South Staffordshire coal-fields and the rivers Trent and Mersey. The works that have been executed on this line of canal by the late Messrs. Telford & Walker are of the heaviest description.

The supply of water is obtained for lockages from many of the old coal works, raised by steam-power, and there are service reservoirs at Smethwick and near Oldbury; and these being found inefficient to supply their extended works, another reservoir was made at Rotten Park, near Birmingham, by the late Mr. Telford: it was constructed of 80 acres in extent and 45 ft. deep, and to supply this reservoir a feeder was carried from the Oldbury Reservoir to connect them together, contouring the country over ridge and dingle in such a manner as to intercept all the flood-waters of the county, and to conduct it to the great reservoir at Rotten Park. The date of these works was about 1824.

On the Birmingham and Liverpool Junction Canal there are also extensive reservoirs, one of fifty acres at Belvide, and another at Knighton of fifty acres, to supply the lockage of that canal, but their main supply is derived from the Birmingham Canal summit, with which it is connected near Tettenhall.

The Cromford Canal is supplied chiefly from feeders at the Cromford end, and also by reservoirs near the Butterly Iron Works of fifty acres in extent, containing when full 2,800 locks of water, or 25,000,000 cubic feet; besides, there are two other reservoirs of twenty acres and fifteen acres in extent respectively, one of which is situated at the eastern end of the great tunnel, and another where the Pinxton branch commences; besides, the summit level of the canal, which is fourteen miles in length, acts also as a reservoir in consequence of being made of 1 ft. extra depth of water than is required for the traffic, and this would supply 2,117,600 cubic feet of water. The date of this canal is about the year 1790.

The Ellesmere and Chester Canals are also an extensive system of canals connecting the Mersey with the Dee, and the Montgomeryshire Canal in Wales with sundry branches. It takes its supply of water from a natural reservoir, the Bala Lake, by means of a feeder carried up from the celebrated Pontycysyllte Aqueduct to Llandysilio. This supply of water not only affords lockage down to the Dee and Mersey, but also in the other direction towards the Birmingham and Liverpool Junction Canal.

In consequence of the quantity of water supplied from Bala Lake being in excess of the amount required for lockage, a very fine and interesting reservoir was formed at Imbleston, in Cheshire, for the purpose of collecting the surplus water of the upper pond locks, and

supplying the lower in times of scarcity; the area of this reservoir is twenty-four acres, and the greatest depth 40 ft., and its cost was said to be 31,200*l.* The date of this work was 1830.

The English and Bristol Channel canal carried out in 1825, has also some very interesting reservoirs; the canal itself is 90 ft. wide, and 15 ft. deep. It is supplied from several reservoirs in the Axe valley, near Seaborough, covering a surface of 217 a. 3 r.; and another in the same valley at Winsham, a third at the upper end of the valley of the Yarty, near Hilhaven bridge, of 105 a. in extent; and another at the Ridge of 16½ a. The two last mentioned reservoirs are connected together by a cut of 6½ miles long, and from the Ridge reservoir to the canal the feeder is 3½ miles long.

The Forth and Clyde canal is also another important undertaking; it is 35 miles long, and its summit level is about 155 ft. above low water on the Clyde, and it affords a passage for vessels drawing 10 ft. of water from the Irish sea to the German Ocean. Its summit level is supplied with water from reservoirs, one of which is at Kilmanuir of 70 a. in extent, and 22 ft. deep, and another at Kilsyth of 50 a. in extent, and 24 ft. depth of water. The date of this first Act for this work is 1768.

The Nottingham canal, made in 1802, although a short line of 15 miles, and is connected with the Cromford canal and the river Trent, has a large reservoir at Amworth, with a self-regulating sluice whereby 3,000 cubic feet of water per hour, or 72,000 cubic feet per day, is allowed to the Erewash canal and certain mills on the line, reserving sufficient for their own wants.

In addition to those reservoirs above-mentioned, we may state there are several others: one on the Carlisle canal, one on the Croydon, two on the Dearne and Dove, one on the Dudley (Cradley Pool), one on the Huddersfield, containing 20,000 locks of water, or 180 million of cubic feet, one at Darnall, and two others on the Sheffield canal, of 32½ acres in extent; one on the Stourbridge canal, at Pensnet Chase, of 12 acres area; two large reservoirs at Earlewood, on the line of the Stratford-on-Avon canal; one on the Trent and Mersey canal, at Knyperley. The Grantham canal has two reservoirs, one of 20 acres extent at Denton, and the other of 60 acres at Kipton. On the Leeds and Liverpool canals, near Fowlbridge tunnel, there is a reservoir of 104 acres in extent, containing 32,400,000 cubic feet; the Todda Brook, containing 47,412,270 cubic feet, and the Combs reservoir, containing 64,259,000 cubic feet. The Macclesfield canal has two reservoirs, the Sutton, containing 12,817,000 cubic feet, and the Bosley reservoir, containing 64,266,399 cubic feet; these latter were recommended to supply Manchester with water, before the present water-works were laid out and made, and would certainly supply very pure water.

Besides the examples above given, there are many others situated in different parts of the country of equal extent and interest, but we believe we have enumerated many of the principal reservoirs, and the construction of several of them dates back to the latter end of the last century, so that the idea of conserving and using the water for the supply of canals, irrigation works, mills, &c., dates back to a very remote period; and many of these works are of great extent and large capacity, much greater than are generally adopted for the supply of our towns; and it is idle to suppose that the idea is a modern one, or that any one person can reasonably claim the merit of their invention.

In the same way as the water is collected and the rainfall economised for the uses above mentioned, it may be collected on the respective water-sheds of our rivers, and used either for the proper water supply of the inhabitants, to irrigate the land for agricultural purposes in dry seasons, or to aid the navigation of rivers where navigable, or to assist in cleansing and purifying them by flushing, until legislative measures can be generally adopted to prevent their being fouled by the sewage of towns, villages, manufactories, or other improper means.

And in this place we may observe, that we have drawn attention more particularly to those vast stores of water supply situated in different parts of the country, as a few examples out of the many that exist for the supply of our system of canals as a means of transit for goods, &c., that are daily growing obsolete and into disuse, occasioned by the rapid and more certain system of railway locomotion; and as the former becomes abandoned or broken up, it assumes a

question of serious import whether we ought not to avail ourselves, where practicable, of this vast system of storage of water collected in the country, and not used, or only partially, as a preliminary measure, and in aid of the one proposed for rendering available the complete rainfall produced upon the drainage areas of our respective rivers and their tributaries for the proper supply of our growing population in times of drought and scarcity.

As it is likely that legislation will be protracted in consequence of the time required in the examination of the state of the rivers, holding inquiries, and reporting on the state of the same, and then to found a measure thereupon, would it not be advisable to pass a short Act, so as to put a peremptory stoppage on the present system of fouling our rivers, and to force upon the authorities of towns the absolute necessity of applying an immediate remedy to this monster grievance?

The passing of the Thames Conservancy Act is one of the best measures that has emanated from Parliament for many years past; and we understand by instructions given to the official staff, that it is intended to be carried out to the letter and spirit of the Act; and this is as it should be. After well-considered and matured measures have passed the Legislature, they ought to be carried out in all their integrity, and not left, like many of our health and sanitary Acts, to be carried out only so far as agreeable and pleasant to the ruling magistrates.

If the rainfall on the water-sheds of our rivers is to be collected and utilized, as proposed in a former part of our journal, some strong and efficient measures must be adopted to dispose of the sewage refuse of our towns, otherwise our water-supply will continue to be contaminated as hitherto with the sewage. The great object should be to collect the water as pure and as near the rainfall as possible, and to pass the sewage beneath the soil, so that it cannot appear again upon the surface, except as supernatant water, purified by its filtration through the upper strata, depositing the whole of its varied fertilising matter in the soil as food for vegetation.

In tropical countries where scarcity of water frequently exists, every drop is carefully collected and stored up for periods of scarcity; and it is quite an unaccountable anomaly that in a country like ours, blessed with copious rainfall at frequent intervals, and droughts are few and far between, that the cry should be anywhere, "Water, water, and not a drop to drink," that millions of gallons should be allowed to flow back to the great ocean unstored or unutilized while any living creature should stand in need, at any season or period, of this indispensable and vital element of life.

We think we have shown satisfactorily that the very natural sciences to our water supply, reservoirs, are of rather ancient origin, and that it has been a work of time and of close study of many clear heads to arrive at the present stage of knowledge possessed by professional men on this subject; but as the data on the proper construction of reservoirs, as we observed in our article on "Water Supply," is not very well understood, and different formula are used by eminent practitioners in the construction of such works, we have an idea that in a future article we may draw attention to these differences and discrepancies, examine into the methods adopted in ancient works and those of our old engineers, so that we may deduce therefrom a data and theory founded on practice and experience that may serve as a guide in the future.

CEDAR AND ITS RELATIONS.*

In pointing out some of the practical purposes to which cedar is applicable, we must, of course, give the first place to carpentry. Such uses in ancient times were confined to the Oriental nations; and in our own times, with the exception of Japan and some of the islands of the Indian Archipelago, to the continent of America. The boundless forests of the Amazon and the Mississippi supply, as we have seen, much larger quantities of the timber than could be sent to us from Lebanon. Nevertheless, the highest illustrations of its original and most magnificent applications to the purposes of building.

Sir Christopher Wren had a curious hypothesis with regard to the construction of the Temple of Dagon by the Philistines. This was probably a quadrangular pile of buildings, having a court in their centre; but he conceived to himself a vast roof of cedar beams resting at one end upon the walls, and centering at the other upon one short architrave that united two cedar pillars in the middle. Such a method of construction would doubtless render the celebrated feat and dying effort of Samsoos intelligible; but this view, as we have said, was merely an hypothesis. It is to the minute and graphic account which is furnished by the sacred historian respecting the building of Solomon's Temple that we must look for the earliest authentic account of the carpentry of this valuable timber.*

We need not recapitulate the details of that ancient and honourable contract which Solomon made with the King of Tyre. Let us call attention to one or two of its features which are still worth the attention of our modern political economists. In the first place, the wise monarch makes no attempt to conceal the want of "technical education" on the part of his own subjects. "For thou knowest that there is not among us any that have skill to hew timber like unto the Sidonians." At the same time, although the pastoral tribes of Israel could not hew timber, they had plenty of corn and oil, which they were willing to exchange for this architectural skill. In order to see that this exchange was equitable, agreeable, and profitable to both parties, let us simply note the result. "And there was peace between Hiram and Solomon; and they two made a league together." Is there anything, we should like to ask the question, so antiquated in this simple but sacred principle of those ancient Syrian monarchies that the governments of modern Europe and America could not find it their interest to act upon it? In the second place, although Solomon did not set his subjects up as skilled artisans equal to those of Tyre and Sidon, he made no difficulty about supplying a host of inferior labourers, "three score and ten thousand that hew hurdens, and four score thousand hewers in the mountains." This is a lesson in the division and subordination of labour that might be usefully taken to heart by our Irish fellow-subjects, when contrasting with their own passionate and heated imagination the comparative merits of the condition of England and that of Ireland. Once more, we are told that Hiram delivered the timber and stone-work in a finished state; "so that there was neither hammer, nor axe, nor tool of iron heard in the house while it was building." The circumstances, in fact, were these. The river Adonis was in the vicinity of the forest of Lebanon, and discharged itself into the Mediterranean Sea near Bilhos. Accordingly Hiram could transport the timbers all squared, and not only cut to scantling, but cut up as to occupy the places each timber was to occupy in the building. From Bilhos those rafts might easily be sent down the coast, and landed at Joppa, the nearest port to Jerusalem. On this most singular circumstance we will only remark that Solomon, with all his wisdom, would not have been able to do such a thing—at all events, in England,—in the nineteenth century. Our wise carpenters, bricklayers, and stonemasons have far too much good sense to permit their timbers to be worked in the forest, their stones at the quarry, or their bricks in the field, even although it can be demonstrated that the builder would obtain a better article, save much time and the cost of transporting superfluous materials. Whether they are wiser in their generation than Solomon is a question which we will not stay to determine.†

To proceed. The roof of Solomon's Temple was constructed with beams and boards of cedar, as well as the lining or panelling of the walls, and even the foundations. We must always remember, however, that the Eastern customs of construction respecting the roof are very different from our own. We construct our ceilings with plaster, and our floors with wood. They, on the other hand, construct their floors of plaster or painted tiles, and their ceilings of wood. As to foundations of timber, these, of course, are only possible in a dry, porous, sandy soil, such as that of Palestine. We need not dwell on the cedar ornaments of the Temple; indeed, the whole timber used, even to the most minute finishing or decoration of that celebrated

* 1 Kings, v. vi.; comp. 2 Chronicles, x.
† We cannot call to memory—it is curious—a passage of any modern political economist wherein these important Scriptural illustrations occur.

* See p. 356, ante.

Temple, was composed of cedar. The altar was of cedar overlaid with gold, the oracle was of cedar,* and the cedar of the house within was carved with gourds and open flowers: † all was of cedar; there was no stone seen. ‡

Cedar timber, thus so lavishly used by David and Solomon in their buildings, was also, we read, used in the second temple rebuilt under Zerubbabel. The timber employed was cedar from Lebanon. † Cedar is also said by Josephus to have been used by Herod in constructing the roof of his temple. And the roof of the Rotunda of the Cbrurob of the Holy Sepulchre at Jerusalem is said to have been of cedar, and that of the Church of the Virgin at Bethlehem to have been of cedar or cypress. ‡ Nor was the use of this famous tree always confined to the purposes of house building; it was sometimes employed, we are told, even in shipbuilding. The Prophet Ezekiel tells us (xxvii. 6) in that valuable historical account of the ancient Phœnician commerce—then at the period of its greatest prosperity (B.C. 600)—that the Tyrian shipbuilders constructed their shipboards of the fir trees of Senir, and their masts of the cedars of Lebanon.

It should always be remembered, however, in speaking of the cedars of Lebanon used in building by the ancient Jews—particularly when beams, pillars, or ceiling-boards are mentioned—that it is extremely probable the wood of more than one tree was employed. The generic name, indeed, of the tree was used. But under that name (*Pinus Cedrus*) were also (as Dr. Boyle has shown) § comprehended the *Cedrus deodora*, the yew (*Taxus Baccata*), and the Scotch pine (*Pinus Sylvestris*). The latter tree might have furnished the material of the ships' masts mentioned by Ezekiel, which recent commentators consider was the case.

In our day the chief consumption of cedar for building purposes lies in the States of South America. There is a species of cypress called white cedar in the Brazilian territories, which is valuable timber; and in Bermuda and other islands of the West Indies a brown quality of wood is much employed. The tree gives the name to a range of hills called the Cedar Mountains, in Cape Colony, which supply the township of Clan Willans and its neighbourhood with planks for building. It is very little known in Africa, although the cedar of Algiers is compact, very durable, and said to be susceptible of a high polish. But the Japanese employ a species of cedar, which, however, Thüningberg describes as a kind of cypress,—a beautiful wood that lasts long without decay. || Cedar is now seldom employed in England or the Continent for building purposes, although there is a species indigenous to Spain and the south of France, which possesses many of the essential requisites. Indeed, there seems to be as great a difference between the various qualities of cedar as there is between the Scotch fir and the Norwegian pine; and it is obvious that the ordinary failures of strengths of materials must be grossly defective when they speak of cedar as representing a constant quantity, as most of them do. The fact is, in many of its physical qualities, particularly in its powers of resisting strain or compression, it is much inferior to the most ordinary description of yellow pine. It is seldom fire-grained or sufficiently compact to take a fine polish, and the green timber is extremely prone to crack and rend in the process of drying. Its colour, indeed, is varied, and often beautiful, and its capacity for being easily worked is very great. But it possesses one simple feature which distinguishes it and gives it a value above all other trees of the pine tribe, and that is the important quality of durability.

Pliny tells us that the durability of cedar was proved by the duration of the cedar roof of the Temple of Diana at Ephesus, which had lasted 400 years; and at Utica, the beams of a temple of Apollo, constructed however of Numidian cedar, lasted 400 years. ¶ It was on this account—*propter æternitatem*—that Vitruvius recommended it to be employed in the construction of temples and other public buildings, and particularly in the formation of statues to the immortal

gods.* It is not so much prized for those sacred or ecclesiastical purposes in the present day; but that is not owing, as we shall see, to its properties of durability.

This unrivalled quality is undoubtedly owing to the essential oil of its resin. The wood, cones, bark, and even the leaves of the best species of cedar are saturated with resin, of a peculiar and powerfully aromatic odour, a slightly bitter taste, and a rich yellowish brown colour. It renders the timber proof against the attacks both of the worm and the moth. This cedar resin, which is sometimes called *cedrin*, flows spontaneously from the trunk upon incision. It somewhat resembles mastic, and was often used by the ancients, along with other aromatic gums and resins, in the embalming of the dead. It was burnt as a perfume at the funeral pyre; it was also used in certain diseases as a medicine.

It is proper to mention, however, that Pliny, to whom we are indebted for these facts, comprehends under this name the lesser cedar (*oxycedrus*), or Phœnician juniper, which is still common on Lebanon, and the resin of which is also aromatic. Cedar oil, a kind of turpentine, was likewise prepared from the wood, and was applied to the rolls of papyrus in order to preserve them. Hence the celebrated sentence attributed to Persius, that in order to deserve fame one should leave words which were worthy of being preserved in cedar! The resin or oil of cedar are almost unknown in the present day. We wish it were otherwise; for in that case we might present a striking contrast to some (most, indeed) of the modern chemical processes of the destructive distillation of resin. The essential oil of cedar, we may add, belongs to a family of hydrocarbons which are all celebrated for their antiseptic properties. The oil of juniper, the oil of cloves, the oil of nutmeg, and some others, belong to the same family,—of which, however, the most perfect chemical type is the essential oil of bitter almonds.

The next important purpose to which the timber of cedar is applied must come under the wide category of interior decoration. But to whatever extent it may have been applied in this direction in eastern countries, it cannot be said to have taken root in Europe. For wainscot or panelling it cannot be compared for a single moment with oak, or even in certain respects with red pine. The fact is, being a very porous wood, it is liable to absorb moisture, and so become extremely sensible to changes of temperature; in other words, to split and crack. Although it is very easily cut, it does not preserve its form when cut; and besides, we are half of Mr. Ruskin's opinion, that carving in cedar is too easy to be valuable. Some of the American river steamers, we are informed, have their large and handsome saloons fitted up with cedar, carved and heavily gilded; but even here it cannot compete with mahogany. Certain Mediæval Greek churches, as we learn from the ecclesiastical historians, had their roof screens, and sometimes their altars, constructed of this material; but it was seldom or never employed for the sedilia or other internal fittings. The best example we remember to have heard of with regard to the application of cedar to interior decoration, was a very handsome library, fitted up in the Cinquecento style by the late King of Bavaria; but whether the material was derived from Lebanon or from South America we do not at this moment recollect. No doubt but for this purpose cedar is a highly useful and proper material. Book-shelves constructed of cedar would have the very same conservative influence on books that Russian leather binding exercises, and their common effect springs from the same cause—in each case the antiseptic properties of the oil. Besides, as we have seen, there is the antiquity of the practice to recommend it. If the ancients kept their writings in cabinets of cedar, why should we moderns not follow their example with regard to our books?

We must not overlook entirely, in our cursory survey of the subject, the tablets of cedar mentioned by Vitruvius. These consisted of wax tablets, that were written upon with a stylus, and which were furnished with timber backs and raised mouldings on the front edge, either composed of citron or of cedar. The wood tablet used by the prophet Isaiah (iii. 22) signifies perfume boxes. In Hebrew it is literally "Houses of the soul or breath." Many Eastern women still wear an ornament composed of cedar, resembling a house or temple, containing a

small image, obviously at once a symbol of purity and of devotion.

If we wished to institute a comparison derogatory to our modern sentiment, we must refer to the very popular application of cedar to the manufacture of cigar-boxes. The boxes in which Havannah cigars are usually imported consist, however, of a very common tree, a native of the West Indies, known in the trade as Barbadoes cedar. It reaches often to the height of 80 ft., and its trunk is remarkable for its circumference. The cones, bark, and leaves have a bad smell, resembling that of asassaftida; but the wood has a rather agreeable fragrance. Enormous quantities of the timber are annually consumed in the form of cigar-boxes and light packing-cases, and it is sometimes used in France and Germany in making the cheaper sorts of blacklead-pencils. This tree (*Cedrea odorata*) is so common and plentiful in the West Indies that it is used for the most ordinary domestic purposes, such as shingles; and it has been even applied by the natives to the construction of their canoes.

The next and probably the most important modern application of cedar we shall notice is that of furniture. And here the same principles, of which we have already spoken, will govern the extent of its consumption. It will not make a good chair; but it will make an excellent work-box or dressing-case. It could never, we think, supersede mahogany as a table or a side-board; but it will make a splendid wardrobe and the best of all book-cases. It must always be remembered that the value of cedar resides in its virtue of resistance to the parasites which infest other timber, its general antiseptic properties, its pleasant odour, and its light agreeable tone of colour. We understand that Messrs. Morrison, of Edinburgh, under the direction of Lord Lindsay, have ingeniously contrived a description of wardrobes in which the best features of mahogany, rosewood, or walnut are combined with an interior skeleton of Florida cedar, thus uniting the properties of both woods in the same article of furniture, and we can easily imagine that the conception is a sound one. The lining of wardrobes and drawers with cedar, however, is of old date in Scotland. As a material for furnitur, *per se*, Florida cedar is by no means the best. That which is imported from the Northern States, although possessing less perfume, is harder, more susceptible of polish, and capable of standing greater tear and wear. This species of timber is also the best adapted for the cases of pianofortes, although we cannot admit that cedar is the best, or even one of the best, forms of timber for this trying purpose. Some of the finest specimens of cedar that can be applied to furniture or such like purposes may be seen in the museum at Kew Gardens; and we may add that we saw in the Paris Exhibition several highly creditable examples of light cedar bedroom furniture, for which purposes we think it will be found highly suitable. ¶ Its chief consumption at this moment, however, consists in the lining and interior fittings of drawers, wardrobes, sideboards, and tables; in which respect it is, owing to its low price and abundance, gradually superseding oak and even black birch. As we have said, it will never stand comparison by itself with mahogany or black oak for dining-room furniture, or with rosewood or walnut in that of the drawing-room. But in the library and the bedroom there are grounds for believing that cedar furniture will gradually obtain a principal place.

The last and certainly not the least important application of cedar is that of its use in the manufacture of black-lead pencils.

On this head we shall be brief. Some years ago, we described at great length the whole process of the pencil manufacture in Cumberland; and to that volume we must refer the reader who cares to pursue the subject minutely. We shall just state here that its adaptation to pencils is threefold. First, its freedom of manufacture; secondly, its pleasant perfume; and lastly, its property of easy cutting along with the lead. Keswick pencils are mostly the produce of Florida cedar; and the kind which is best suited for the purpose is the free, quick-growth wood; there is a harder sort of slower growth, which, however, is more fitted for the purposes of furniture. Those who are in the habit of cutting good pencils will know better than we can describe the feelings of impatience and disgust which one cannot avoid on coming across a piece of hard cedar in the pencil-stick! The red

* See Mrs. Jameson's "Illustrations of Sacred Art," p. 128.

† Exra, iii. 7; 1 Esdras, iv. 48, 55.

‡ Vide Williams's "Holy City," ii. 202, and other authorities cited by Dr. Smith, "Dictionary of the Bible," art. "Cedar."

§ See his excellent and exhaustive article on the subject in Kitto's "Bible Dictionary," edited by Dr. Lindsey Alexander, Vol. i.

¶ See Tredgold's "Principles," under "Cedar" for other Applications.

‡ Hist. Nat., b. v.

* Vitruv., lib. ii., 9. In the time of Vitruvius the timber (*cedrus*) was principally obtained from Crete, Africa, and some parts of Syria.

¶ Since this article was in type, Sir Wm. Maxwell Stirling tells us that his library at Kew is lined and stored with planks of cedar.

cedar, so well known in the pencil trade some five-and-twenty years ago, was chiefly derived from the Virginia cedar, which is in fact a juniper (*Juniperus Virginiana*). Like the cedar, these junipers are distinguished for their resinous qualities, and have been also applied to furniture and other purposes; but its chief consumption was in pencils.

We began this article with a description of the cedars of Lebanon, and we conclude by once more expressing the hope that these splendid historical trees will not be allowed to become extinct. Here, after all, resides the poetry of the subject. There are other woods, such as Spanish mahogany and walnut, which are more beautiful in their colour. There are some, too, such as rosewood and sandalwood, which are possessed of a stronger fragrance and a more agreeable perfume. But no other tree carries back our associations to the time when Solomon, in all his glory, ruled the dominions of Israel; and no other was thought fit to be applied to the sacred purposes of the Temple altar and the covering of the cherubim.

LETTERS BY SIR THOMAS LAWRENCE.

THE following hitherto unpublished letters addressed by Sir Thomas Lawrence to Mr. Perry Williams will interest many of our readers, not merely by their references to men and incidents, but by the advice and criticism they include:—

"Russell-square, August 31, 1867.

DEAR SIR,—You have not been absent from my thoughts, although my too numerous engagements and professional labours have prevented my sooner writing to you. I received with the greatest pleasure the little sketches* that you sent to me by my friend, Mr. Camuccini, which are touched with your usual taste, delicacy, and truth. They will be always retained by me, as evidence equally of your talents and of your thoughtful remembrance of me. I shall most sincerely rejoice to hear of your continued health and the successful prosecution of your studies.

You inform me that you have been making sketches of the peasant—*their costumes, &c., &c.* You are right in keeping up this attention to the human figure, since it will not only be of great advantage in the introduction of it in your landscapes, but, from the increased difficulty of its study, it will exceedingly enlarge your power of copying inanimate nature. The best historical painters have always been painters of good landscape; and perhaps there are examples in Titian of a greater style in that department of art than can be found in Nicolo or Gaspar. I would add Claude, but that he is so exclusively devoted to the beautiful (or to that species of grandeur that is united to it) as not properly to have place in the comparison. The chief direction of your studies, however, will be landscape; and I have no fear of your interpreting my advice into abandonment of it for any other.

I am now about to ask you to employ your genius on it for me, and on such a scale as your Windcliff drawing. If the evenings are still of the same beautiful serenity that I remember, will you give one of their happiest effects to a general view from the front terrace of San Pietro, in Montorio? I used often to drive up there for the delighted admiration which the grand expansion of that scenery so constantly excited. It reminded me of Milton's fine description of Rome in the 'Paradise Regained.' A faithful delineation of that scene, touched with your usual finishing and pure taste, would be much valued by me, and, I need not say, possessed by me for your own price. Do not, however, let me fetter you by this commission, nor, above all, break in on the rational happiness of your stay at Rome. Be free as air in your choice of subject, so that you employ your talent, and do not lose this spring-time of your life, which, from your present residence, will hereafter appear its happiest epoch.

I am rejoiced to learn that you have for your companion young Mr. Theod.; he left England with great promise, and a regard has followed him from the esteem and respect in which his father was held by us. Give my kind remembrance to him.

You will probably have been introduced to Mr. Eastlake, whose admirable picture† was so justly

admired in our late Exhibition. Pray offer him the inquiries of my high esteem and regard, and cultivate as much as you can (without intrusive freedom) his advice and friendship. To my friend, Mr. Pietro Camuccini, I beg you will not fail to offer my best thanks for his kind friendly letter. I do not want you to tell him that I consider him as one of the most amiable and estimable men that I have ever known, but I privately tell it to you for your guidance and advantage, as I know you can safely trust to his judgment, and have perfect confidence in his worth, whatever be the subject of your application to him.

Pray, if you have time to write again, inform me if Mr. Metz is still living and in health.

Believe me always, dear Sir,

Your very faithful servant,

THOS. LAWRENCE."

"Russell-square, March 9, 1829.

MY DEAR SIR,—I have received and read your welcome letter with great pleasure, and shall carefully attend to your wishes respecting the exhibition of the picture you are sending for Mr. Bailey, and the having it properly framed; the drawings I shall give to Mr. Robson, should anything prevent your sisters calling for them.

I trust I need not tell you how sincerely I rejoice in your success, and in the good taste and liberality of my countrymen; but, hitherto, you have 'won your own spurs by your own valour,' however the kindness of friendship may have cheered you in the contest. Think no explanation to me necessary for change in your choice of subject, provided it be advance in character; for the painting of your figures last year convinced of your increasing ability in the study of the human figure, and, unless you attempt the higher dramatic or epic style of composition, you already walk in perfect safety, and need fear no pit-fall in your path. I am anxious to see the picture you are now sending, of which I heard last night a very favourable opinion from Mr. Turner.

You give me sincere pleasure in still considering Mr. Bailey as your first friend, in your own selection of the purchasers of your pictures. Neither can it be undelightful to you to send down the best efforts of a genius that is now generally acknowledged, to that private and humbler scene where it was first nurtured and advanced. There were many competitors for your little picture of the 'Youthful Italian Lovers;' but having your own authority for considering it to be Mr. Bailey's, I carefully retained it for him. Beautiful as your drawing of the same subject was, I preferred the picture.

I am well acquainted with the talents and intelligence of Mr. Havell, from my own knowledge of his works and the report of his friends. Your tour to Naples must have been rendered both pleasanter and more improving by such companionship. If, indeed, you now go to complete those sketches which were but slightly traced with him, and add to them the colour and effects of Nature, your tour with a man of such known taste and knowledge of composition, whether beautiful or grand, will have been all gain, and the benefit be lasting.

You inform me that you have not forgotten my own commission, which I took the liberty to offer you, of a drawing of Rome from San Pietro in Montorio. You will oblige me much by executing it for me. Your powers are now in their youthful vigour, and there is a truth, delicacy, and refinement in your drawings that, except in our greatest artist, I have seen in no other. From my own recollection, a sun-set or evening is the finest moment for that glorious scene.

You have so many commissions of importance that I hardly venture to press others on you. There is a gentleman, however, who is desirous of having two small pictures by you, about the size of the "Boy and Girl," at your own price and subject. He is not in the circles of fashion, but known to almost all our artists by his liberal patronage and gentlemanly conduct,—his name is Vernou. Let me know that you undertake them for him.

I shall not fail to give your remembrance, with your thanks, to Mr. Calcott, who will be much gratified by the report of your success. You are fortunate in having still the society of Mr. Eastlake, an advantage that cannot be too highly appreciated. I am much pleased with your account of Mr. Uwins. He very greatly obliged me by sending me some interesting sketches from Urbino, that birthplace of the prince of

painters; they are drawn with a Raffaellesque simplicity and taste. I shall have to write to you again in a day or two, on the receipt of your picture.

In the meantime believe me to remain, with my best regards to Mr. Pietro Camuccini (which I particularly beg you to communicate),

My dear Sir,

Your very faithful friend,

THOS. LAWRENCE."

"Russell-square, March 27, 1829.

MY DEAR SIR,—I have the pleasure to tell you that your picture and the drawings are safely arrived; I have ordered a frame for the former, and the latter are now either with Mr. Robson, or gone from him to your sister.

Your drawings will doubtless be much admired, but I prefer your picture, which I think very beautiful; you have rendered an incident in nature,—a peasant woman suckling her child (which, though it ought always to be hallowed, is yet sometimes unpleasant in itself, and often grossly represented),—with a delicacy and affection that make it deeply interesting and pathetic; and you have likewise given that essential in such subjects—beauty. The composition and colour of the picture are exceedingly good, and altogether make it a decided advance on your popular little picture of last year.

I have little to add of other criticism, except to notice a trifle of defect. You have taken great pains with your principal figure, and the eyes are as well drawn as the other features of her sweet countenance; but in the two boys, the one on the ass, and the other accosting him, the eyes are two dark blots, and ill-formed. Let this carelessness be soon impossible to you. Besides the incorrectness, it is a check to the interest of the work, or the incident, however trifling, when there is meant to be communication between the figures.

In that sweet little work, too, of last year, the boy was not looking quite in the girl's face. Be at the pains often to draw that feature. I can quote you high authority for it; I have a sheet of eyes drawn by Michelangelo for some young Perry Williams, whose genius had excited the friendly effort.

The fault equally exists in one of your drawings,—in the child just beginning to walk; and there, by-the-by, you have a little failed, for the child is not pretty, nor have the features the delicate form of infantile character.

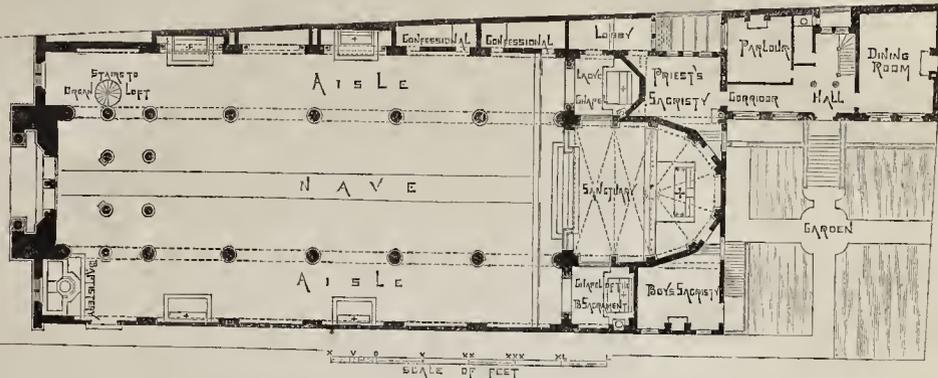
Try now to get something of more precious character of surface in your skies and distance. Don't be content with insipid, fair, Roman painting (this between ourselves); Claude's, 'tis true, are all softness, but we have been too long accustomed to see them touched with the expression of the pencil to be content with their tame and spiritless representations. 'Tis the same with your distances; they are very accurate, of true and sweet hues, but you do not scumble enough, nor give that finer zest of pencilling that is so exquisite in the first works of Claude and Turner. One thing I see is very much against you, viz., the coarseness of your canvas, which no quantity of colour could well amend.

Your sister has just sent me your letter with the description of the picture, which I shall direct to be inserted in the catalogue. I have not yet written to Mr. Bailey. This picture, I am to understand, is his; but pray tell me what would be your price for either of the same sort of subject and size? I mean your general price to any visitor of your study. I am now going to ask a trifling attention from you which may not be without its use. Never write a letter home without adding to its date the place of your residence at Rome. Letters are mislaid, your friends may be old, and their memory of the numbers and names of streets be rapidly decaying; whereas, if one only of the former is preserved, the direction is found which some intended patron may be soliciting at that moment, or which may be wanting to the direction of some letter. The Duke of Wellington never writes a note but with scrupulous attention to this little form. Besides, the habit of doing one thing leads to application of it in another, and the peculiar danger to which talent and genius are exposed, is irregular desultory thought and neglect of method—of that love of order which is essential to respectability and happiness. I fear you will think my letter and lecture too long, but their extension springs from sincere regard, and an esteem that will always leave me, my dear sir,

Your faithful servant,

THOS. LAWRENCE."

* Two small drawings done in a letter, views of Claude's house and Raffaello's villa at Rome.
† Greek subject of Spartan youth.



ST. MARY'S NEW (R.C.) CHURCH, KENSINGTON.—Plan of Church and of Residence adjoining.

[See p. 511.

ST. MARY'S NEW (R.C.) CHURCH, KENSINGTON, MIDDLESEX.

We illustrate this week the new Catholic Church of St. Mary, which is being erected on a site adjoining Newland-terrace, in the High-street, Kensington, from the designs of Messrs. Goldie & Child, architects.

The style of the new church is that of the earlier part of the thirteenth century, with the introduction of Geometrical tracery in the apse and principal façade. This will face the high road, and will comprise a great central doorway under a moulded and carved arch spanning the deep recess formed by the projection of the buttresses, and carried by polished granite shafts with moulded bases and foliated capitals, the whole being surmounted by a light arcade forming a parapet, and bearing effigies of the Virgin Mary carrying the Saviour, with attendant angels on either side, and above this will rise the window lighting the nave, and composed of six lights, with a rose of six many lights, cusped, in the head. The gable will contain a triple-lancet window, above which, at the apex, will rise a cross of suitable design.

The aisles are lighted from the principal façade, by two-light windows, having a rose in the head of each, while the spires of the buttresses are crowned with carved statues of angels.

The central portal will display a broad arch of foliage carved on marble shafts, enriched with encaustic tiles and inlays with a moulded base and foliated cornice. The entrance is divided into two, by a central shaft carrying the lintel, the ends of which rest on foliated corbels springing from the jambs. The tympanum will contain a large seated effigy of our Lord in majesty, attended by adoring angels, the intervening spaces being filled in with foliage, which will be, throughout the church, of the severe conventional type, consistent with the style.

Entering the church, the dimensions will be striking. The entire length will measure 143 ft., of which 33 ft. will be devoted to the choir and sanctuary. The width of the nave will be 30 ft., and the total width of nave and aisles 58 ft. The internal height of the nave will be 65 ft. The nave will be separated from the aisles by a lofty arcade of six bays, carried on cylindrical shafts of polished granite, already fixed, with moulded bases and bands and foliated capitals. Above this runs an arcade, carried by shafts of terra-cotta, with moulded caps and bases, stopping between the pillars which carry the deeply-recessed clerestory arcade, which is lighted by single lancet windows. The aisles will be lighted by cinque-folled rose-windows, and have recesses for confessionals and side altars.

The sanctuary will be raised 4 ft. above the nave, and will be reached by six steps leading to the choir, and two more into the sacristy. This portion of the church will be divided from the nave by a moulded arch, springing from foliated and moulded corbels, and will consist of nine bays, whereof seven will form the apse, all

lighted by two-light windows, having a seven-lobed circle in the head of each.

The roof of the nave will be a continuous barrel vault of timber, with a moulded king-post and tie-beam to each principal. The sanctuary and two lateral chapels will be groined, and the organ will be placed in a gallery at the western end of the church, carried on six granite shafts, banded, and with moulded caps and foliated caps. At the entrance to the sanctuary will rise, on the exterior, a lofty niche, covered with lead, and bearing on its apex a rich vase and cross, at a height of 120 ft. from the ground. At the rear of the church will be a residence for the clergy, suitable in style and arrangements to the rest of the edifice, and communicating with the sacristies behind the high altar. The foundations, which are very extensive, have been executed by Mr. Simpson, builder, of Tottenham-court-road. The foundation-stone, bearing a suitable inscription and containing the usual deposit, was laid with ceremony on the 14th of May last.

ON LINCOLN CATHEDRAL.*

For those who desire to study the progress of style through the Lancet period, Lincoln Cathedral presents the amplest opportunities. We can trace the hand of the designer of Bishop Hugh's works, in continuation of that of the choir, along the east walls of the great transepts, as well in those of the east aisles as in the upper parts of the building; we can trace even the gradual slackening of the work, and its absolute cessation in the north and south walls of these transepts. Here a pause of many years must have occurred, probably whilst the crossing and central tower were rising, which, however, fell from insufficiency of some kind, *per insolentiam artificia*, in the year 1239. Meanwhile Bishop Hugh, having been canonized, became the patron saint of Lincoln; the odour of sanctity attached to his memory attracted crowds of the faithful to the cathedral, and the contributions, which flowed in largely, permitted the rapid prosecution of the works, which, judging from internal evidence alone, must have been resumed about 1215, and carried out without intermission in the course of the next twenty years. These later works of the Lancet period comprise, — 1. The central transept (west side). 2. Nave and aisles, with north and south chapels. 3. West front, with north and south pinnacled turrets. 4. Chapter-house. 5. West porch of south transept. 6. The crossing and lower part of the central tower (rebuilt); and, 7. The two western doorways of the choir aisles. They were constructed probably in the order above given, and show, with the exception of the two last-named, but slight differences of style in their details.

With regard to the Chapter-house there exists a singular discrepancy between the internal

evidence afforded by the character of its work and the external evidence of documentary history. We are told by Giraldus Cambrensis, on the authority of Wharton, that Bishop Hugh built the "Capitulum," a term which can only correctly be interpreted "chapter-house." Professor Willis, feeling convinced that the work was of later date, endeavored to explain away the difficulty by arguing that the word "capitulum" meant, in this case, "caput ecclesie," the head, or east end of the church.

It is always unfortunate when, as is sometimes the case, antagonism arises between the internal evidence furnished by the building itself, and the external evidence of contemporaneous history. In the earlier days of archaeological study the tendency was to discredit the former and to accept the latter; in these days the results of strict analytical investigation and comparison of the minor details of the buildings of the Middle Ages dispose us to place much more reliance upon this species of internal evidence than on even the most unequivocal assertions of ecclesiastical historians. The inductive reasoning based on the former appears to be safer than the possibly hearsay testimony of the latter.

Without, then, contending for, or, indeed, accepting, Professor Willis's interpretation of the word "capitulum," as used by Giraldus Cambrensis, I have no hesitation in asserting that the stonemasons who executed the work of the Chapter-house of Lincoln Cathedral did not live in Bishop Hugh's time, but twenty or thirty years later.*

The two latest of this second group of Lancet works, namely, the west porch of the south transept, or Galileo porch, as it is usually called, and the two doorways situated at the west end of the choir aisles, exhibit much greater elegance of treatment and delicacy of execution than the others. Of these two works, the former may be advantageously compared with a similar work, similarly named, at the west end of Ely Cathedral, which belongs to the earlier, as this porch does to the latest part of the Lancet period; whilst the exquisite carved work and capitals of the former correspond closely with those of the elegant work of contemporaneous date at the east end of the choir of the same cathedral, which was commenced by Bishop Northwold in 1235.

Before quitting the work of the Lancet period, it may be well to notice an opinion which has prevailed, and which is due, I believe, to Professor Willis, who discovered that the name of Bishop Hugh's architect was Geoffrey de Noiers,

* In a paper which was read at Lincoln by the Rev. J. Dymock, on "The Documentary History of Lincoln Cathedral," the day following that on which Mr. Sharpe's lecture was delivered, the difficulty above referred to was completely solved by the fact announced by Mr. Dymock, that, on reference to the original text of Giraldus Cambrensis, he had discovered that the passage in question had been erroneously transcribed and printed by Wharton, the real word in the MS. being plainly and legibly written, not "capitulum," but "capitulum," which cannot otherwise be interpreted than as signifying the head or east end of the church.

* By Mr. Edmund Sharpe. See p. 484, ante.

to the effect that the design of the east transept and choir of Lincoln Cathedral is of French origin. The only feature, however, in this work which at all resembles French work of this date is the pier capital of the choir, which, with its double row of stiff foliage, and four attendant shaft capitals, all attached to the same block, is not unlike those of Chartres and Soissons. But we have in the pier capitals of the presbytery of Chichester Cathedral, designed and constructed only a few years earlier, at the close of the Transitional period, the very idea, in genuine English workmanship, of which these Lincoln capitals are the Lancet version, and to which, with their detached shafts, they bear a much stronger resemblance than to the capitals of any French cathedral with which I am acquainted. In all other respects, in the general outline of the design, and in all its minor details of mouldings and carved work, there is no resemblance whatever between the work of Geoffrey de Noiers and that of French buildings of corresponding date.

Geometrical Period.

The introduction of Tracery in the middle of the thirteenth century caused a rapid and complete change in the appearance of buildings: it arose from the practice of perforating in various ways the spandrels of arches, and the solid stone-work lying between the heads of contiguous lancet windows. Of this practice, and its progress through the Lancet period, we have excellent examples in Lincoln Cathedral. In the plain circles, trefoils, and quatrefoils, with which the solid stonework above the sub-arches of the blind story of the choir and early transept of Bishop Hugh is perforated, we see an early and a somewhat clumsy effort to relieve this blank space. In the nave three foiled openings more completely occupy it; and in the noble wheel-window of the north transept, so entirely is the large plate of stonework, which fills the circle, pierced, that but small portions of solid stone remain between the circular voids.

To call this a tracery window, however, would be a mistake: the principle of tracery, which consists in the conversion of the whole of these intervening portions of stonework into moulded bars, is wanting. This is the invention, then, which, applied in circular forms to the windows of the succeeding period, forms its chief characteristic.

1. Of the noble series of monumental works which were constructed in England during the Geometrical period, one of the earliest, and certainly one of the finest, is the presbytery of Lincoln Cathedral. Designed, as we know it to have been, about the year 1256, at the exact moment when Gothic architecture in its chief forms, its sculpture, its carved and moulded work, had reached its highest development, it exhibits in every part a refinement and elegance, as well as a delicacy of finish in its minutest details, to which it would be difficult to find a parallel in the whole range of Gothic art. To attempt to describe to you its varied beauties in the short space of time at our disposal, would be a vain effort.

I cannot, however, pass over without notice its chief and most characteristic feature, its glorious east window of eight lights, confessedly the finest of its kind in the kingdom, which, occupying as it does the entire east end on the inside, and worked out as it was with a wealth of deeply-moulded detail of surpassing excellence, may be looked upon as the crowning work of the singularly beautiful building of which it forms the termination, and the chief ornament.

This building, commenced, as it is reasonable to suppose, immediately after the granting of the Royal permission to remove the city wall, in order to allow its construction in 1256, was so far finished in 1282, that Bishop Hugh's shrine was transferred into it in that year.

Among the remaining works of the Geometrical period may be noticed—

2. The stone screens of the choir on the east, north, and south sides. They were probably all commenced soon after the completion of the presbytery. One of them, on the north side, has on its aisle front an arcade of circular foliated tracery so exactly similar to that of the aisle arcade of the nave of York Minster, and is finished with straight canopies carrying mouldings, crockets, and finials so identically the same, that it is scarcely possible to suppose that they were not designed by the same hand.

3. An Easter sepulchre on the north side of the choir, with figures and carved work of great

excellence, belongs also to this later Geometrical work.

4. It was not until the middle of the Geometrical period that the stone-carvers of the Middle Ages began first to imitate in their works the foliage of nature. The period is thus divisible, almost equally, into two portions, Early and Late; during the earlier of which the carved work was of conventional design, and during the later in imitation of natural forms. In the presbytery the capitals, not only of the piers, but of all the host of minor shafts, carry foliage of the most elegant conventional type, consisting of curled leaves of the most varied outline, but all designed in the same spirit. In the passage leading from the north-eastern transept to the cloisters, and in the cloisters themselves, we have an opportunity of contrasting the new fashion of carving, introduced about the years 1280—1290, with the old; the capitals of all the shafts, of the tracery of these two later Geometrical works, having natural foliage only, chiefly in imitation of the oak and the vine-leaf. So much as remains of this cloister is in other respects an interesting example of the works of the second half of the Geometrical period.

5. Whether the central tower, of which the two lower stories remain, was ever carried higher, we have no record, and no present means of knowing; what is certain is, that its noble upper story, belonging to the latter part of the Geometrical period, must have been commenced about the year 1306. It is justly reckoned one of the finest central towers in the kingdom, and groups as grandly with the two smaller western towers, as the central spire of Lichfield Cathedral does with the two subordinate western spires of that building.

Curvilinear Period.

1. Whether or not all may be disposed to agree that the progress of art from the point at which we have now arrived was in a downward direction, and that the decay into which church architecture fell, at the close of the Rectilinear period, dates, in its earliest beginnings, from the time when natural foliage was introduced into the ornamentation of buildings, and flowing tracery into their windows, it cannot be denied that, in one respect, the builders of the two latest periods surpassed their predecessors. The graceful finish of the upper walls and gables of by far the greater part of our cathedral and parish churches, of whatever date, is due to the panelled and pierced parapets, and crocketed pinnacles of the Curvilinear and Rectilinear periods. Of this we have notable examples at Lincoln; the earliest of which occurs in the panelled parapet of the west front, which crowns so appropriately the earlier work below. To the same date belongs the flowing pierced parapet of the south clearstory of the nave, with its Curvilinear pinnacles marking the limits of each compartment. Following this parapet westwards we arrive at the west wall of the south transept, along which this open parapet of flowing tracery is still continued.

2. The chief work of this period, however, was the remodelling of the south front of the south transept. This work consists of a large circular window, corresponding with the rose window of the north transept, and filled with flowing tracery of Flamboyant character, of a large five-light window above, and of a pierced parapet of flowing tracery on the gable.

3. It is not improbable that this work is due to the Burghersh family, one of whose members was Bishop of Lincoln from 1320 to 1340, during the time, in fact, that it must have been executed. This supposition is confirmed by the circumstance that a chantry belonging to this family was founded at the east end of the north aisle of the presbytery, one side of which was formed of the tombs of Lord Burghersh, the founder, who died in 1356, and of his brother, the bishop, who died in 1340. They are both interesting monuments.

4. The last works of this period were the two canopied tombs at the east end of the presbytery, under the last pier-arch on the south side. They are, although late, of very elegant workmanship, and were probably erected during the lifetime of Lord Cantilupe, by whom the adjoining chantry is said to have been founded, but who did not die until 1372.

One of the most elaborate and admirable screens of any kind that exist, designed in this style, is to be seen in this cathedral under the east arch of the crossing, and serves at present as the organ screen. It is stated by Wild to

have been constructed in the year 1775; but it is scarcely credible that so excellent a work is due to a period when Gothic architecture was so little understood and appreciated. It is probable that it is a very careful and accurate restoration of an existing work of undoubtedly great merit, and that the greater part of what we see belongs really to the earlier part of the Curvilinear period. It deserves attentive study.

Rectilinear Period.

1. Strongly resembling the Cantilupe tomb, is the arcading of the interior of the ground story of the two western towers, with its elaborate vaulting; and to the same early date probably belongs the interior of the west doorway.

2. The upper part of the west towers was, no doubt, the next work executed. They are plain, but well proportioned.

3. The insertion of the west window of the nave and north and south aisles followed; and the construction of the canopied walk, above the west doorway, with its row of kingly statues, is of the same date.

4. The west porch of the south transept received in this period its richly panelled parapet; and the airy lightness of the skyline of the central tower is due to its pierced Rectilinear parapet, constructed probably about the same time.

5. The three last works remaining to be described belong all to the latter part of this period. They are the chantry chapels of Bishop Fleming, who died A.D. 1432; of Bishop Russell, who died A.D. 1480; and of Bishop Longland, who died A.D. 1521. The two last named are excellent examples of this kind of sepulchral oratories, which were often erected by the prelates themselves during their lifetime.

In the transepts are several screens of excellent Rectilinear design; and the stall-work of the choir, executed in the early part of the period, is amongst the best in the kingdom.

PARIS.

In the interior of the new Opera-house the works of decoration advance slowly but steadily, and it will be many months before they assume a comprehensible form. The iron ribs of the dome are in place: it will have a very flat and *enfoncé* appearance, especially as the base from which it rises, though apparently of some consequence as seen in the elevation, cannot be perceived except from afar. The ornamentation of this base cannot, tasteful as it may be, appear at a great distance; and, as all cats are grey in the dark, so all details of ornamentation, good or bad, are equal in artistic merit when viewed from afar. The term *dome* is a misnomer here, as, in all cases, this feature should *dominate* over the rest of the building, whereas in this building it is completely masked, from the north side, by the roof. It is a pity, also, that the side on which the new opera stands cannot permit of its being all seen from the line of the Rue de la Paix and the Place Vendôme. The clearance for the new Place de l'Opéra and the new street from the Palais Royal to lead to it has been undertaken on a scale which is truly appalling. Looking at this vast plain of *débris*, from the Opera-house, one would imagine that Baron "House-manie" intended to demolish every thing between the "noble" building and the river. The new street, it is said, is to be the most magnificent in Europe, and of course in the world, and a profitable speculation for the Ville de Paris, &c. The façade of the Opera is not yet completely uncovered; the same hoarding that we saw last year is still in its place, with this improvement, that it has been decorated with a coat of slate-coloured paint, and the unsightly placards and street hills have been removed totally.

At the corner of the Rue de la Chanssée d'Antin the new Théâtre du Vendôme is in a forward state, and the plank hoarding, which sheathes it from top to bottom, is disappearing piece by piece, and the cupola of the auditorium is terminated, as are also the floors of the first four galleries.

From a return sent by the municipal authorities of Paris to the Commission of the Budget, it appears that since 1853 the population of the town has doubled; but they forget to say that the area of Paris at that epoch was only 3,222 hectares (hectare equal to about 2½ acres), whereas since the annexation of the new eight arrondissements the area is 7,902 hectares. The number

of houses demolished during the last fifteen years is put down at 20,000, and the new houses built 45,000. The 25,000, representing the surplus of the construction over the demolition, give a surplus of 110,000 apartments, and it is estimated by the authorities that there exist in Paris 80,000 lodgings, the rents of which are less than 500*l.* per annum.

Seven bridges are now in construction over the Seine below Paris; two below the park of Neuilly, three below Clichy, across the two Isles des Ravageurs, and two below Saint Ouen. These will permit the Parisians to locate themselves on the verdant hills of the *rive gauche*, from Courbevoie to Cenevillers.

The Ambassador of Russia has forwarded to the Prefect of the Seine a marble bust of the Emperor of Russia, presented by him as a *souvenir* of the *exposé* he passed at the Hôtel de Ville, June 8th, 1867. It has been placed in the gallery of sovereigns, containing the busts of those who since 1853 have honoured the Hôtel de Ville with their presences. There are twelve already there: those of the Queen of England, Prince Albert, Victor Emmanuel, the late Dom Pedro of Portugal, Dom Luis I. of Portugal, the Queen of Portugal, the late King Maximilian of Bavaria, the Sultan, the Emperor of Austria, the King of Prussia, the King of the Belgians, and the Queen of the Belgians.

Notwithstanding the protest made to the Prefect of the Seine, signed by 2,500 inhabitants of the *arrondissements* of the town of Sens against diverting *their river*, the Yanne, for the purpose of supplying Paris with more water, the reservoirs of Montrouge were commenced on the 29th ult. This colossal structure, placed between Montsouris Park and the riding-school, is bounded on the south by the Avenue Reille, on the east by the Avenue de Montsouris, on the west by the Rue de la Tombe Issoire, and on the north, at some distance, by the Boulevard du Transit. It will be of two stories high, built entirely out of the ground, and will contain 305 millions of litres (123 for the higher quarters of the left bank, and 182 for the low quarters of the left and part of the right bank). It has been decided that the Palace of the Barde (Bey of Tunis), as yet standing on the Champ de Mars, shall be re-erected at the Montsouris Park. All the materials purchased by the administration are to be made use of, and the present rubble hasement replaced by one of ashlar.

We mentioned some time ago that the Bièvre river was to be diverted into the collecting sewer of the left bank, and to cross the Seine by a gigantic iron siphon-tube, near the Pont de l'Alma. This is being carried out, and the immense pieces of tube may be seen on the banks of the river. The barge carrying the dredging apparatus and the immense diving-hell is moored close to the left bank, and the workmen go down by relays and work at their ease, as the depth is not very great. Only one of the arches of the bridge is at present available for navigation.

THE SANITARY STATE OF BARRACKS.

FOLLOWING up what we did some years ago, the *Lancet* has sent sanitary commissioners to examine several of the metropolitan barracks and that at Windsor. The barracks of the Household Cavalry at Knightsbridge they condemn as unfit for either officers, men, or horses. The whole place is reodent of horses and horse-mannure, the buildings being huddled together, and the litter thrown out directly under the windows of the barrack-rooms. The mess-rooms of the privates have been taken from them for regimental offices, and they are now compelled to take their meals in their bed-rooms. The married men and their children are lodged in the most shameful manner. They have no supply of water, no water-closet, no domestic conveniences whatever. They are worse off than they would be in a workhouse or a prison. The managers of the Zoological Gardens would be execrated if they kept their animals in such an unhappy state. There appears to be an almost total neglect of sanitary laws: bad ventilation, offensive urinals, disgusting privies, untrapped drains, and badly ventilated barrack-rooms. In the hospital the bath for the 6 ft. troopers is 4 ft. 2 in. long! Extraordinary pains appear to have been taken to secure ventilation and pure air by complicated tubes over the gas-burners, louver openings near the ceilings, Sheringham valves and Galton stoves, to the utter neglect of

the simpler, but far more efficient, expedient of making a sufficient number of windows opening at the top. The Commissioners recommend that this barrack should be at once rebuilt.

Great fault is found with the situation, arrangement, construction, and ventilation of the barrack-rooms to the Regent's Park Barracks, which have neither lavatories, urinals, nor latrines close at hand. The troopers eat, drink, and sleep in the same rooms. The married quarters are still more emphatically condemned. The single apartment allotted to a man, wife, and three or four children, has no domestic conveniences of any kind, and absolutely no ventilation. It appears that the hospital has been repeatedly condemned, but as often patched up at considerable cost. Half the building is again in the hands of the engineers for repairs, which will be equally misplaced. The water-supply is intermittent, and the commissioners deem it incredible that the War Department should be guilty of such a piece of economy at the risk of the health and lives of the men in such a costly establishment. The sanitary condition of the men is good, which seems owing mainly to the extraordinary sanitary precautions carried out, not at the expense of the Government, but of themselves. Three men are employed to flush the drains, urinals, latrines, &c., daily, and to sprinkle them with disinfecting powder. The labour, expense, and supervision bestowed are worthy of the highest commendation, but do not justify the postponement of more permanent reforms. The commissioners recommend the removal of the barracks to a more appropriate site, and the sale of the valuable land and buildings to defray some portion of the cost.

Of the Windsor Cavalry Barracks, reported to be the *chef d'œuvre* of the military engineers, complaint is made that the barrack, although constructed for half a regiment, is now forced to contain a whole one. Horses worth several hundred guineas each have so little room that it is dangerous to pass behind them. The barrack-rooms are more spacious. Here, also, as in the other barracks, the meals are eaten in the sleeping-rooms. At the end of each room, and approached by a short corridor, are the lavatory and urinal, fitted up with the latest patents. But the misfortune is that they are continually out of order. There was not a single urinal which did not stink abominably, and the floor of nearly every lavatory might reasonably be called a lake, from leakage from the pipes. In one instance the thoughtful ingenuity of the corporal has placed a pair of heavy boots for those who desire to wade across without wetting their feet. The water-closeta appear to yield an excellent annuity to their ingenious inventors. Those, for example, in the officers' quarters have never been in working order for a fortnight together since they were put up. There is an insufficient supply of water: not a drop in any of the taps; and this is said to be of almost daily occurrence. Cases of scarlatina have been constant in the portion of the barrack set apart for families since April last, and one of the married sergeants is now in hospital. Any day it may extend to the troopers' quarters. The state of the water supply is simply disgraceful. Many of the tanks are nearly always empty. There is not enough for ordinary cleanliness, much less for flushing drains and watering roads. The hospital is spoken of in terms of almost unqualified approbation. The wards are lofty, light, and well ventilated; the floors and furniture exquisitely clean; the walls panelled higher, and decorated with prints. A protest is entered against the employment of complicated sanitary machinery without proper skilled supervision. In conclusion, the *Lancet* commissioners express their belief that simple arrangements and daylight are the best remedies for dirt and filth, and that a proper sanitary state can only be maintained, where large numbers of men are congregated together, by making care and trouble obviously necessary.

In the House of Commons, since this last report was published, Sir John Pakington made a very unsatisfactory reply to a question which Colonel Leslie put to him with reference to the odious condition of the Windsor cavalry barracks. Sir John spoke of the failure of certain modern inventions for the promotion of cleanliness. Nobody doubts that these inventions sometimes fail and often get out of order, but that surely is no reason why matters should be made worse by gross neglect. So much complaint had been made on this subject, that last winter Sir John appointed a medical officer and an engineer to go through the various barracks of the country and

report on their condition. These gentlemen have not made their report; but why have they not? and why, too, should it be necessary to appoint a commission of inquiry in order to insure in any barrack common respect for the laws of decency? Then, again, Sir John states, that during the last ten years the country had spent a quarter of a million in providing suitable quarters for married soldiers. Nobody doubts that the money has been spent; but it is not the less certain that the work of reform has not been satisfactorily accomplished.

STEAM CULTIVATION.

A LECTURE was delivered by Professor Coleman, of Estrick, York, upon the application of machinery to agriculture, at Brayton Hall, the mansion of Sir Wilfrid Lawson, on rent-day, to his tenant farmers and the gentlemen connected with the Wigton Farmers' Club. About 150 sat down to dinner in a large farm building fitted up for the purpose, and the company afterwards adjourned to another room to hear the lecture. Having sketched the history of steam cultivation, Mr. Coleman said the question they had to consider was how small farms of one to three hundred acres could have the benefit of steam cultivation. There could be no doubt that the double engine system was the best. If they had the land drained, capital, and the co-operation of the landlord willing to remove obstacles in this direction, the farmer would be justified in purchasing a double cylinder engine, and he would never regret it. The reason why steam cultivation had progressed so little was, that landlords would not support tenants in their enterprises. They were told to use steam as an auxiliary to horses, and he believed it was a beneficial and practical thing, and well worthy of consideration. He believed the time was coming when small farmers would come in for the benefits of steam cultivation. He did not suppose they had much faith in steam cultivation companies. They had nothing of the kind started. In the northern part of Shropshire, however, there was a company with more than eighty farmers on the books, who regularly looked for the steam plough, and were extremely disappointed if they did not get it. What had been done in Shropshire might be done in Cumberland. Let landlords and tenants combine, and they would find it answer the purpose. There had been disappointment felt that they had not more reliable information with regard to steam cultivation, but they must bear in mind that the whole thing was in its infancy. It was only within five or six years that machinery at all approaching practical form had been in use, and sufficient time had not elapsed for the collection of facts; moreover, farmers had no time or taste for collecting facts. It was all to be got at by general impressions. In many instances they were told absolutely that the crops had increased. The roots had undoubtedly been benefited in strong soils. As great a success had been achieved with regard to reaping and mowing by machinery as with regard to steam cultivation. He contended that a farmer's education was not complete unless he had acquired a practical knowledge of the management of machinery.

MEMORIAL OF THE LATE DOWAGER COUNTESS OF ELLESMERE, AT WALKDEN MOOR, MANCHESTER.

THIS monument is to the memory of Harriet Dowager Countess of Ellesmere, who died in 1866. She was widow of the first and grandmother of the present earl. Her good works among the labouring population and others on the estate will long be remembered, and the memorial which forms the subject of our illustration is intended to commemorate them.

Walkden Moor, the site of the monument, is near Worsley, the seat of the Earls of Ellesmere, and in the middle of the colliery district included in their extensive property.

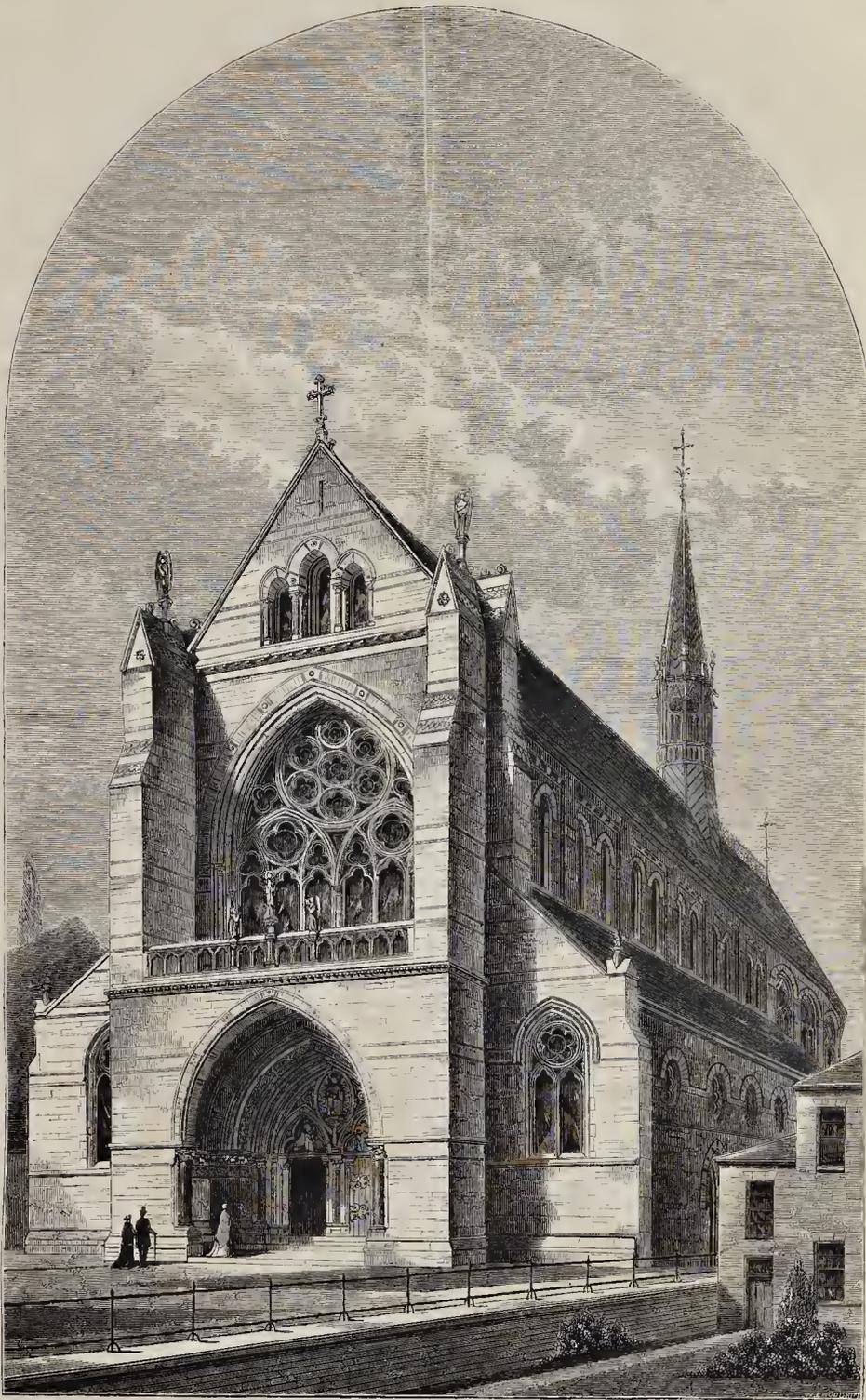
About fifty designs were submitted for the monument in answer to an invitation by advertisement. Mr. G. E. Street was consulted by the committee, and their final decision was made in accordance with his opinion.

The architect whose design was accepted, and is now being carried out as shown in the accompanying illustration, is Mr. T. G. Jackson, of London, Fellow of Wadham College, Oxford.



MEMORIAL OF THE LATE DOWAGER COUNTESS OF ELLESMERE, WALKDEN MOOR, MANCHESTER.

MR. T. G. JACKSON, ARCHITECT.



ST. MARY'S NEW R. C. CHURCH, KENSINGTON, MIDDLESEX.—MESSRS. GOLDIE & CHILD, ARCHITECTS.

[See p. 507.

MEMORIAL OF
THE LATE F. W. FAIRHOLT.

A HANDSOME mural "brass," let into a slab of black marble has been prepared for this purpose by Mr. J. G. Waller, and is about to be fixed up in the church of Stratford-upon-Avon. It is thus inscribed:—"Frederick William Fairholt, F.S.A., artist and author, bequeathed his Shakespearean collection to the town of Stratford-upon-Avon. He died April 3, 1866, and was buried at Brompton. This tablet is erected by his memory by his friend and executor C. R. Smith." Above this there are three small crocketed canopies with a shaft at each side. Within the centre is the letter F, crocketed with a pen and pencil. The foliage used is artificial, and the effect of the whole unpretentious and good.

The remark will not be out of place here, that Mr. Fairholt, by the disposition he made of his property, which was not large, has benefited the public to a much greater extent than is done by the majority of persons who die with ten times the amount of money at their disposal.

COMMITTEE ON LABOUR AND WAGES.

The Social Science Association have appointed a committee for the purpose of spreading information as to the natural laws regulating the rate of wages and the supply and demand for labour. A great want of information exists as to the nature and operation of these laws. Mr. Overend, Q.C., has stated to the executive committee that, in his opinion, "almost all the crimes in trade matters originate in ignorance." It is this ignorance, wherever existing, which the association desire to remove. In forming the committee they have sought to present to employers, to the working classes, and to the country generally, a list of names calculated to inspire confidence in the disinterestedness of the promoters of the object in view and in their ability to carry on the work wisely and efficiently.

Besides spreading abroad information on the laws which regulate wages, an attempt will be made to induce employers to avail themselves of the last amendment of the law of partnership, which enables them, without risk, to pay their work-people, in part, by granting them a share in the profits, so as to give them in some degree the interests and feelings of proprietors; and also to promote amicable conferences between operatives and their employers, such as have so long been in successful use at Nottingham and elsewhere.

We are enabled to give a list of the committee.—Messrs. Edward Akroyd, M.P.; Rev. Samuel Bache; Arnold Baruchau; T. B. L. Baker; Thomas Barnes, M.P.; James Beal; Thomas Beggs; Adam Black; C. H. Braoebridge; Thomas Brassey, jun.; Thomas Briggs; H. C. Briggs; Samuel Brown; the Right Hon. H. Anstin Bruce, M.P.; Charles Buxton, M.P.; Sir T. F. Buxton, bart., M.P.; Nathaniel Caine; David Chadwick; Edwin Chadwick, C.B.; F. S. Corrance, M.P.; Samuel Courtland; Right Hon. William Cowper, M.P.; Rev. R. W. Dale; W. T. S. Daniel, Q.C.; the Hon. George Denman, Q.C., M.P.; Sir Wentworth Dilke, bart., M.P.; George Dixon, M.P.; Earl Ducie; Lord Dufferin and Glendebone; Andrew Edgar, LL.D.; William Ewart, M.P.; William Fairbairn, LL.D., F.R.S.; Professor Fawcett, M.P.; H. W. Freeland; George Godwin, F.R.S.; Sir Francis H. Goldsmid, bart., M.P.; Julian Goldamid, M.P.; Walford Greatorex; E. O. Greening; Right Hon. Russell Gurney, Q.C., M.P.; Thomas Hare; G. Woodruff Hastings; William Hawes; Charles Hawkins; Edwin Hill; Frederic Hill; M. D. Hill, Q.C.; W. B. Hodgson, LL.D.; Lord Houghton; John Howell; Thomas Hughes, M.P.; J. K. Jeffrey; Thomas Jessop; Professor Stanley Jevons; Hon. Arthur Kinnaid, M.P.; W. C. Levy; Right Hon. the Earl of Lichfield; Danton Lupton; Lord Lytton; J. McClelland; Horace Mann; Hugh Mason; Samuel Morley; Walter Morrison, M.P.; J. W. Murland; Charles Neate, M.P.; William Newmarch, F.R.S.; W. Overend, Q.C.; Charles Paget; Rev. Mark Pattison; Professor Lyon Playfair; John Plummer; Edmund Potter, F.R.S., M.P.; Hodgson Pratt; Robert Rawlinson, C.B.; Earl Russell, K.G.; Arthur Ryland; W. Lucas Sargant; Russell Scott; William Shenae; Sir J. Kay Shettleworth, bart.; Robert Slater; Rev. S. A. Sneathal; Robert Stuart, Q.C.; Colonel Sykes, F.R.S., M.P.; P. A. Taylor, M.P.; J. Pitt

Taylor; Seymour Teulon; William Tite, F.R.S., M.P.; R. R. Torrens; H. S. Tremenehere; Sir Walter C. Trevelyan, bart.; E. Carlton Tufnell; Sir Harry Verney, M.P.; Thomas Webater, Q.C., F.R.S.; T. W. Weguelin, M.P.; Sir J. Eardley Wilmot, bart.; his Excellency M. Van ds Weyer; Professor John Wilson.

The meeting whereat this committee was appointed was presided over by the Right Hon. W. E. Gladstone, M.P. The speakers were (in the order of their speaking) Sir John Kay Shuttleworth, Mr. (Godwin, Mr. Ludlow, Mr. Applegarth, Mr. Neate, Mr. G. W. Hastings, Mr. Dering, Mr. John Ruskin, Mr. Hare, Mr. Mundella, Mr. Thos. Hughes, M.P., and Mr. Taylor.

A FEW THOUGHTS ON STRIKES, TRADES UNIONS, LABOUR, AND CAPITAL.

SIR,—At no time in the history of our country has the relation of employer and employed been more unsatisfactory, or the war between capital and labour been more deadly. The harmony which once existed between the contending parties is gone, and a new order of things is in existence. The hewers of wood and the drawers of water believe they are unfairly dealt with by the upper and employing classes, and are by combination fighting for a larger reward for their labour. Although this movement is more noticeable among those who receive weekly wages, there is not any doubt but that the movement has extended to every class of society. Any one who can for a short time cast aside class prejudices, and impartially view the present state of things, must come to the conclusion that the working classes are not alone in an unsatisfactory condition, but that the body politic is almost rotten to the core.

As the condition of the labouring classes is largely influenced by the actions of the classes above them, I think it may be fairly assumed that the agitations which have for some time characterised them are, after all, but a reflex of the selfishness of the other classes. In looking around we see that political life, as represented by the ruling parties, is out of joint. Principle, which ought to be the guiding star, is cast to the winds,—one section trying to outbid the other. Their only aim seems to be place, and the distribution of State loaves and fishes, whilst great social and educational measures are neglected, to the nation's injury and loss. Can it be wondered at, that under this low state of morality, the workmen should make demands which are, in many instances, injurious to their class? The present state of the nation is more unsatisfactory than it has been for a long time. The registrar's returns state there is a large increase in pauperism, and a decrease of trade, whilst local taxation is also on the increase. These are matters which affect all classes, and if a change do not soon take place, must bring disaster and ruin to every portion of the community. The workmen seeing the apparent prosperity, and that a rise take place in various articles in daily use, demand a higher price for their article—labour; and looking at it from their point of view, there seems nothing wrong in that demand. Nevertheless, I have often thought the members of trade societies place too much reliance on their unions to gain whatever demands they may in their ignorance or wisdom think fit to make. Their place of meeting are not fitted for a calm consideration of the important subjects brought before them; and under the excitement of Boniface's adulterations, they are ready for war upon any real or imaginary issue. Often the boast is made that a thorough union of the working classes would accomplish any desire, forgetting that there is a limit to the price of every commodity, and that by raising its price to a fictitious value, they in the end do an injury to themselves, and society soon finds other means to supply its wants; or else there is an influx of outsiders into their trade or trades which is paid so much better than others, so a corresponding fall takes place, and the last condition of that class is worse than its first. Society in the aggregate is generally left out of account by the unionists, and they act as though there were no opposing force to their demands. What I more particularly find fault with is their rashness in not calculating the effect that a rise of wages creates. Often a strike takes place, and society is plunged into a wage war by the crochets of a few individuals, without the slightest prospect of a successful result; and even if it happens that

success is by some chance with the operatives, it is but the prelude to a general rising of other trades. As war between two countries on a great continent excites the passions of all others, a wage war is no exception, but causes a general commotion and a general rise in all commodities consumed by them. If not at once apparent in the price, the difference is made up by adulteration; and, on the whole, the apparent gain is a loss. It also appears to me that the workmen cannot by their strikes interfere with or limit the employer's profits, and, therefore, they cannot affect his position in the relations which he before had with his men. The employer would still have the same amount of capital in his business, and his interest or profit on his capital would remain; but it would affect the workman, as the enhanced cost of the article to the consumer would restrict the demand, whilst he received less for his money; and his income in many instances being fixed, a less quantity would be produced and a less number of labourers required. Those thrown out would have to seek other employment, or be a burden to their society. Such appears to me to be the effect of a continual agitation for a rise in wages. Although it is an imperfect sketch, it might be enlarged; but I think it is born out by the experience of the past few years and in the reports of the great trade societies.

Another fallacy of the unionists I will touch upon. At the Manchester conference, it was assumed by the whole of the delegates that the low remuneration of slop-workers and others was due to their not having a union. The delegates forgot that the value of slop-work and other easily learnt trades, which require no mental and but little physical energy, is fixed by society, or, as some have it, by the law of supply and demand; and it is self-evident to every one who has passed a moment's rational reflection on it that all departments of labour which are easily acquired will always be badly remunerated, and all the unions in existence cannot for even a short period alter what is a natural law. I am not one of those who are blind to the advantages of association, or want to abolish trade unions; but I think, in spite of all the leaders claim for them, their action has not been always beneficial to the workers, and that great improvements are needed to make them really advantageous to society. Being disappointed of a ticket for the meeting on Saturday at the rooms of the Society of Arts, I jotted down a few thoughts as my contribution, and have sent them to you, air, thinking that they may not be out of place in the columns of the *Builder*. JACK PLANE.

RIVER POLLUTIONS.

THE RIVER THAMES.

In the third report by the Rivers' Pollution Commission, that on the Aire and Calder, it is stated that rivers are polluted and obstructed by semifluids and solids, to the extent of hundreds of thousands of tons annually. The fluids, consisting of town and house sewage, as also of dye-refuse and waste washing and scouring water; the solids being furnace-ashes, foundation material, sludge from reservoirs, road scrapings, and every other kind of refuse in a solid form, thrown away by a large population. Whatever restrictions Parliament may put on river pollution in general, we think that the casting in of solids and of sludge, will be prohibited. The solids and sludge may be abstracted, both from sewage and from waste dye-water, and experiment has shown that even the colouring matter of black dyes can be taken out by mere liming and mechanical filtration, either through furnace ashes or through Needham's press. Solids and sludge are extracted from sewage by rining and subsidence in several places, and with most beneficial effects to the adjoining streams, as the volume and weight of sludge abstracted shows. London, by some means, appears to have escaped the obligation of removing sediment and sludge from its sewage before discharging it into the Thames, hence the regret now as to blocking this river at Barking, both above and below this point. The Metropolitan Board sorely form a strange notion of their duties if they think that the purification of the Thames is effected by what they have done and by what they are doing. A writer in the *Engineer* (July 3rd) states that "about 1,338 tons of solid filth finds its way into the river at Barking daily;" this makes no less than 488,370 tons of solid filth

annually. This weight and volume may probably be in excess, and the terms, "solid filth," a little confusing. The statement as to volume and weight may, however, not be far from the mark. If the Metropolitan Board is compelled (as it ought to be) to remove the solids and sludge of sewage, there probably will be not much less than 300,000 tons of sludge to abstract and deal with annually. At Birmingham, the corporation of that town has to deal with upwards of 30,000 tons of sludge per annum, and the work is imperfectly performed. London may be set down at ten times the population of Birmingham, and if the weight of sewage-sludge is also ten times greater, there will be some 300,000 tons per annum to be removed. This vast body of sludge has, however, been sent year by year through the Barking sewer months into the unfortunate river Thames, which was to have been purified by the very costly operations of the Metropolitan Board. What is the meaning of this pollution? What is it capable of doing? 300,000 tons of sludge would form a bank having a cross-sectional area of one yard, or 9 square feet, 170 miles in length, or it would form a lake of sludge of sixty-two acres in area and one yard in depth; or it would coat both banks of the Thames with sewage-mud 20 miles long, 17 yards wide, and 9 in. thick. It is not assumed that fouling of the Thames in this form and to this extent actually takes place; as that which is soluble of this sludge in the tidal water is scoured up; and, with the estuary and river mud, oscillates about; but some of the foul sewage-matter coats the margin of the river both above and below the point of discharge, just as Sir G. Gurney stated would be the case. Those who navigate the river find foul banks of sewage-matter, and the engineer to the Thames conservators complains of the obstruction caused to shipping; those who work on the river, and also those who live on both banks in the vicinity of the outfalls also complain loudly of the stench they have to endure. Are these to be all the results of the Metropolitan Main Drainage Works, which have cost some four millions of pounds sterling?

COMPETITIONS.

Basingstoke Mechanics' Institute.—The committee having received eighteen designs, have selected one which was found to be the joint production of Messrs. Messenger & Gundry and Mr. W. Seymour, of London.

Slough Church.—The committee have made their final choice of the plans for the new parish church. The plans selected are those of Messrs. F. & H. Francis, of London, whose motto in the competition was "In Domino confido." The tower is at the south-west angle. The principal entrance is by a south porch. The church will accommodate 1,200 persons, and it will cost about 10,000l. The site is between Mackenzie-street and the Stoke-road, near the railway station.

THE KINESCOPE, A NEW PHOTOGRAPHICAL BIJOU.

MM. LANCOIS & ANCIERS, of No. 14, Rue de Castiglione, Paris, have constructed a clever little apparatus, to which they have given the name of *kinescope*, showing objects in relief and in motion. To show them in relief does not require couples of dissymmetric photographs, as those used in this apparatus are microscopic, and each of the photographs is separately shown in relief. The movement consists only of two different positions of the subject, the first and the last, without passing through the intermediate positions, so that two images only are necessary. The apparatus, thus amazingly simplified, is contained in a small oval locket, the greatest length being about $\frac{1}{2}$ in., and the two photo-microscopic cylinders are placed in the centre of and perpendicular to the face of the *brevete*. They represent the same object in two positions, and the effect of change of position is obtained by a very simple mechanism. The two photomicroscopic cylinders are placed in a vertical guide, surrounded by an india-rubber membrane, on which rests a vertical pin, terminated by a small button on the top of the locket. For instance, in the locket we examined, on looking through the central aperture, the normal state of the apparatus shows a little child holding in its outstretched hand an india-rubber ball, which he

contemplates with evident pleasure, the head being bent towards it. But, if the button be pressed down with the finger, the force exerted on the coudonchoc changes the relative position of the cylinders, and, the first image disappearing, the second image is brought to view, showing the ball thrown up into the air, while the head is thrown back to watch the movement of the projectile. If the motion of the finger be rapid enough, the images succeed each other instantaneously; and, owing to the persistence of images on the retina, the illusion of the child tossing up the ball is perfect. Thus, by this very ingenious idea can be produced the effect of a distant or departed friend appearing full of life.

FROM AUSTRALIA.

Melbourne.—St. Patrick's (R. C.) Cathedral, in course of erection on Eastern-hill, is making progress. The whole plan of the cathedral comprises nave, transepts, and choir, with aisles to each on both sides. The choir has an apsidal end, and five chapels open out from the aisle which surrounds it. There are to be two towers with spires, each 220 ft. in height, at the south-west end of nave, and a lantern tower and spire, 330 ft. in height, at the intersection of the nave and transepts. The extreme length of the church inside is to be 345 ft., and to extend across the whole Reserve to Albert-street. The width inside of nave and aisles is 76 ft. The inside length of the transepts is 160 ft., and the height to the ridge of the roof is 92 ft. The design proposes remodelling the present house for the bishop, to form part of the grammar-school buildings, and includes a plan for a new house for the bishop, with chapter-house, sacristies, cloisters, &c. Comprehensive as is the design, it is only intended to complete it by instalments, and at present the works only of the nave and aisles, with the two western towers, have been commenced. The nave and one aisle are now roofed in, and nearly completed, and the stone vaulting of the second aisle is making rapid progress, so that, in all probability, this part of the church will be completed in four or five months; and, when it is completed, the transepts and central towers will be commenced as the next instalment. The fittings inside are all temporary. One of the towers is up, ready to receive the spire, and the other is complete to the floor of the upper belfry. Some of the bells have been hung in the eastern tower. The stained glass in the principal window of the nave is by Messrs. Hardman, of Birmingham. The subject is the Ascension of our Lord. The works of the cathedral have been carried out, under the superintendence of Mr. Denny, by Mr. Young, the contractor, who has recently executed the Independent church in Collins-street. The architect is Mr. Wardell, now inspector-general of public works.

The City Council has begun to move in the matter of sewerage, and there has been an interview between the Sewerage Committee and the Commissioner of Public Works. They went to look after a special grant of 200,000l., made for Melbourne sewerage in 1853. The Commissioner of Public Works replied that nearly six times that amount had since been spent in supplying Melbourne with water; and he implied that to mention the 200,000l. at this time of day was somewhat cool. In the mean time Dr. Girdlestone, the health officer, is keeping the Health Committee up to their work, and there is to be a *coup* upon those sources of pollution the cesspools which drain into the streets and the unmade lanes, and especially upon an open sewer which drains from the hospital into Swanston-street.

The place called the Western Market, where some bluesome ruins have been an eyesore for a long time to the architectural appearance of the west portion of Collins-street, is now turned to account as a site for a pile of buildings in course of erection, which, when finished, will form a block having a frontage of 230 ft. on Collins-street, 300 ft. on William-street, 230 ft. on Little Flinders-street, and 300 ft. on Market-street, arranged for twenty-eight large and distinct places of business. The Anglo-Italian style of architecture has been adopted. In each of the four respective façades there is a central pile with wings of increased heights to that of the remainder, and to these there are groups of coupled Roman Doric columns, supported upon panelled and moulded stylobates, and surmounted by the

usual Roman Doric entablature. The windows in both stories are circular-headed, those on the ground story having rusticated piers and arched heads; and the others will be finished with archivolts, impostes, and enriched keystones. The entablature over these is of the Ionic order, with a halustrated parapet with moulded piers and blockings, and each pier finished with an enriched finial. The whole has been designed and is being carried out under the superintendence of Mr. John M. Barry, architect. The *Australian News*, which keeps its readers well posted in illustrations of new buildings, gives an engraved view of the buildings.

The City Council have ratified a contract for the construction of a portion of the new cattle and sheep market, at Flemington. Designs had been called for and premiums awarded for two approved plans. But neither plan was adopted, from their inapplicability in some respects to the views of the Corporation, and the city surveyor was accordingly instructed to execute a design embodying such portions of the premium plans as were considered most adapted to the extent of the ground and the requirements of the cattle salesmen. This plan has, for convenience, been subdivided, and the first portion of the work about to be undertaken has been let to Messrs. Plant & Parker at 9,399l. The market committee of the City Council determined to use red gum for posts, and that only of the very best quality procurable. The contract embraces the erection of delivery and cattle yards and calf-pens, and will cover about nine acres. There will be no less than 340 gates required for admission to the drafting and cattle yards, and calf-pens. There is a considerable amount of levelling to be done, and the yards are to be pitched throughout. The present contract is for the accommodation of cattle and calves, and as soon as the work is finished, the old sheep-pens will be entirely remodelled at a further cost, which will increase the expenditure by something like 20,000l., making the gross outlay upon the whole yards little short of 30,000l.

FROM IRELAND.

Cork.—On the last day of the period fixed for raising the sum of 12,000l. required to complete and open the cathedral for divine service, there was a large meeting held in the Protestant Hall, the Bishop of Cork being in the chair. The Rev. Mr. Gregg stated how the collection stood. They had collected 9,401l., and there was consequently a deficiency of 2,600l. He then announced amid enthusiastic cheering that Mr. Francis Wyse, of the city of Cork, and lately connected with the famous distillery, desired him to say that he had noticed the manner in which all classes had contributed towards the work, and that he would make up the deficiency. The whole amount was thus subscribed as promised, and the work proceeds with all possible speed.

PROVINCIAL NEWS.

Doncaster.—The building recently completed for the Doncaster Infirmary and General Dispensary has been formally opened by the mayor and the Rev. J. Campion. There are altogether five wards,—one male accident ward, two male medical wards, and two female medical wards, which are constructed to contain twenty-five beds. There is also accommodation for two nurses. The full complement of beds, however, has not been fitted up, twelve being thought sufficient for present requirements. The beds are fitted up in a style precisely similar to that adopted at Manchester, and are provided to meet the necessities of different cases, some with spring mattresses, some with hair mattresses, and others with flock beds. The ventilation is all by the windows, the result of the inquiries made by a committee appointed in connexion with the Leeds Infirmary to investigate the subject, being to the effect that window-ventilation was upon the whole the most reliable and the best. The majority of the windows are louvres, being divided into four sections, which work on a lever, and are opened by a vertical rod. They open so that the air enters in an upward direction, intended to prevent draughts being felt by the occupants of the beds below. The blinds, a patent of Messrs. Gardner & Son, Glasgow, are constructed of thin strips of wood, and while requiring no washing, which seems to

be regarded as an advantage, are durable. There is no fever ward.

Ringwood.—The new corn exchange at Ringwood, Hants, has been opened. It is in the Italian style of architecture, and occupies a position in the centre of the town. It was designed by Mr. Thomas Henry Wyatt, of London, architect. The front of the structure towards the street is three stories in height, part of the upper story being arranged in the curved roof. The building is entered through a stone archway of 7 ft. clear opening. The exterior of the archway has cinctured three-quarter columns, and a stone cornice over same, projecting and forming a balcony, which is enclosed with a wrought iron railing. The central part of the building over the doorway has a semicircular-headed window, the opening of which is broken up by the wood-work of the frame. The general facing material is red brick, and all the dressings are executed in Bath stone. The exchange hall is 72 ft. long, and 37 ft. 6 in. wide. It has an open-framed timber roof, with glass to the upper portion. The sides of the hall are relieved by the introduction of red brick piers or buttresses. The general facing of the interior is yellow brick, red work being used in the arches, impost, &c. The west side has semicircular-headed windows, and the east side wall is occupied by blanks corresponding in outline with the windows on the opposite side, at the end of the hall. The balcony or platform is about 19 ft. by 9 ft. At the top of the grand staircase, and entered from a spacious landing, is a large room over the lower offices and corridor; this is a room 40 ft. by 19 ft., and 14 ft. high, and is, we believe, to be used for magisterial and other purposes. The rooms in the upper portion of the exchange are arranged as bedrooms in connexion with the White Hart Hotel adjoining. The building of the exchange and the whole of the work in connexion therewith has been carried out by the firm of Joseph Bull & Sons, of Southampton, and no clerk of the works has been employed.

MONUMENTAL.

The Palmerston Memorials.—It is finally settled that the inauguration of the Palmerston memorials at Romsay shall take place on Tuesday, July 21. A special service will take place, and a sermon be preached by the Bishop of London. At the termination of the service a procession will be re-formed and proceed to the market-place, when the statue will be uncovered, and an inaugural address be delivered by one of the late Lord Palmerston's colleagues. The park and grounds at Broadlands will be thrown open, and the band of the Royal Marine Artillery will perform there. In the evening the vicar will illuminate the western window of the abbey.

The Jones Memorial at Sandhurst.—A new monument is about to be erected in the chapel of the Military College at Sandhurst in memory of the late Lieut. General Sir Harry Jones, G.C.B., who was long the governor of the college. The monument, which is the work of Mr. Giffin, of London, is of white Carrara marble upon a black ground. At the top are carved the old Ordnance arms and a field officer's sword, and at the bottom, on the plinth, his family arms, &c. The central part, or table, is surrounded by a carved wreath of oak-leaves, bearing the names of the many engagements in which he had served, and the inscription.

CORN HARVESTING IN WET WEATHER.

THE present season is suggestive of anything but wet corn sheaves; but an experiment which has been tried at Gilwell Park, near London, depends in no way upon a rainy sky or a given day for its importance. Mr. G. Gibbs, who resides at Gilwell Park, has just succeeded amongst twenty competitors in winning the prize offered by the Society of Arts for the best practical essay on the question how to harvest corn in wet seasons; and on the occasion referred to he invited a party to witness the apparatus at work. Asks described by the *Gardener's Chronicle*, the hot breath of a steam-engine diverted from its ordinary exit is driven, by means of a blower, into a cavity underneath an artificial floor of sheet-iron, which floor is crocketed with hollow upright cones or funnels, open at the apex, and placed at such intervals as to allow the wet sheaves to be stooked upon them, as close as may

be, to receive the drying blast up through their centres, from the funnels on which they stand. Of course the chamber is closed as soon as the sheaves are thus disposed within it; and the heat inside is soon considerable, absorbing every particle of moisture, and allowing the stooking process to be quickly repeated upon another wagon or cart-load of sheaves—that is, wet-fresh from the field. For the treatment of damp, or half-made hay, a simpler plan is adopted, the hay being merely shaken before the drying blast of the engine, the effect of which in rapidly driving off every particle of moisture caused some surprise among those present.

OPERA AND STAGE.

Royal Italian Opera, Covent-garden.—Gounod's "Romeo e Giulietta" goes remarkably well at the Royal Italian Opera House, and has given a triumph to Madlle. Patti especially. We cannot agree, however, with those critics who have said that the acting of this lady in the part (good as it is) is equal to her singing. There was a want of elegance in her movements at times which might with ease be remedied, and this would greatly increase the spectator's pleasure. Of her singing no one word of qualification need be said: it was unexceptionable from beginning to end. Signor Mario acted and sang his part on Monday evening charmingly. Signor Boggiolo, as *Friar Lawrence*, Signor Cotogni as *Mercutio*, Neri-Baraldi as *Tybalt*, Petit as *Copulet*, and Madlle. Locatelli as the page, all deserve more than a word of praise. The scenery is admirable: we must particularly notice the ball-room, a Venetian interior with a wealth of carvings, marbles, inlays, and colourings, and the gardens and terrace at night.

The Princess's Theatre.—It is much to be regretted, in the present dearth of talent, that so graceful, touching, and, on occasion, powerful an actress as Miss Kate Saville is should be so often absent from the London stage. A new version of Mosenthal's "Deborah," titled "Ruth," gives her, in the part we have known as *Leah*, scope for the display of her abilities. It was fully taken advantage of, and secured her the hearty and unanimous applause of the house. She was exceedingly well supported by Mr. J. G. Shore, certainly one of the cleverest and most versatile actors on the stage. An actor new to London, Mr. Allerton, is playing *Hamlet* here with considerable intelligence and art; Mr. Shore making an excellent *Horatio*.

CONVERSAZIONE OF THE INSTITUTE OF ARCHITECTS.

THE *conversazione* of the Royal Institute of Architects was held at the House, in Conduit-street, on Wednesday evening, the 1st of July. The rooms and approaches were painted and decorated on the occasion, large numbers of flowers lending their aid with pictures and models to form a sparkling *ensemble*. The principal contributors were the president (Mr. Tite, M.P.), who received the guests, Professor Donaldson, Mr. F. Leighton, R.A., and Mr. Sandys, whose picture of *Medea*, an elaborately finished work, attracted considerable attention. Mrs. Marrahle contributed some fine Indian jewelry. Amongst these present, about 600 in number, were Professors Scott & Donaldson, Drs. Bird, Druitt, Barlow, Oppert, Dickson, Sir Bartle Frere, Colonel Sykes, M.P., Messrs. Beresford Hope, M.P., E. M. Ward, R.A., E. Smirke, T. H. Wyatt, E. Corbould, Charles Mayhew, Vaux, H. Baker, B. Ferrey, Slater, W. P. Griffith, F. Cockerell, G. Trneffitt, F. M. Brown, Critchett, Pugin, Marcus Stone, Chas. Martin, Wybnd, M. D. Wyatt, Westcott, Woodward, C. Fowler, W. Cave Thomas, G. Mair, Grantham, Dunning, L. Wyon, H. Roberts, E. Hall, Walter Severn, Worthington, Gordon Hills, A. Donaldson, E. B. Lamb, W. Papworth, Collman, A. Moseley, F. Marrahle, Allom, Hiscocks, Darbyshire, Edmeston, Spiers, Hakewill, Lamair, Blashfield, P. Anson, Burges, Houle, Roger Smith, D. Brandon, W. White, H. Oliver, Lewin, J. Norton, C. Eastlake, Tarn, J. Thomson, H. Shaw, Sidney Godwin, G. Godwin, &c., &c.

There were also many ladies. The band of the Coldstream Guards played during the evening in the Architectural Exhibition gallery, which was open for the occasion.

CONFERENCE OF INSTITUTIONS AT THE SOCIETY OF ARTS.

THE seventeenth annual conference between the Council of the Society of Arts and the representatives of the Institutions in Union and Local Educational Boards was held on Friday, the 19th ult., at twelve o'clock, noon. Mr. William Hawes, F.G.S., chairman of the Council, presided.

The Secretary having read the annual report of the Council.

The Chairman invited discussion upon the report, and also upon the programme of examinations for the ensuing year, as well as upon a list of subjects which had been suggested.

The only resolutions formally agreed to in course of the discussions were the following:—

"That this conference, having heard a statement of Mr. Curwen's plan for a system of prizes and certificates in elementary musical composition in connexion with the Tonic Sol-Fa School, beg to recommend them for the adoption of the council."

"That this conference, agreeing with the Metric Committee of the British Association for the Advancement of Science in the importance of diffusing information on the metric system of weights and measures, highly commends the proposal to institute a prize to be given to the candidate who exhibits the greatest knowledge of the principles and practice of the same, and commends the subject to the earnest attention of the council."

"That the council be requested to enter into communication with the Government, with the universities, and with such other bodies concerned in public education as it may seem expedient, with a view to ascertain how far it is possible to combine the various examinations that are now in use, and to render them more generally useful in promoting the general and technical education of the people."

The Chairman said the last four questions on the list, Nos. 6, 7, 8, and 9, appeared to form one class, and they were, therefore, considered together, but no formal resolution as to them was agreed to. The conference, however, was agreed as to the desirability of opening museums and galleries in the evenings. There was a difference of opinion as to Sunday afternoons. The Council have announced in the Journal of the Society of Arts that a discussion having taken place on the subject of workmen's holidays at the conference of representatives, the council would be much obliged to any manufacturer or other employer of labour who, having tried the plan of allowing his workmen to take their holidays at once, rather than piecemeal, would communicate his experience to the secretary.

SUFFOLK PRIZE COTTAGES, 1867. AGRICULTURAL ASSOCIATION, IPSWICH.

THE Suffolk Agricultural Society have published the plans for a double cottage to which they awarded their offered premiums of 25l. and 15l., as well as four other of the plans. They give, also, a general specification and particulars of cost. For 4s. the publication may be obtained; and though we do not discover anything particularly new in the plans, many will find the purchase a good investment. The committee give the following hints:—

"Employ a tradesman to whom you can with confidence advance, if necessary, 40l., in order that materials may be purchased with ready-money. Give your orders in September, so that the builder may prepare all woodwork, and do such brickwork as weather will permit, and when wages are the lowest. If stones and sand are plentiful, before deciding to build of brick, inquire as to concrete lump, which the committee are assured by a gentleman, who has used it extensively, makes a stronger and drier work at half the cost of brickwork, thus effecting a saving of about 20l. in a double cottage. By brick-on-edge hollow work a considerable saving in brick is effected. By pan-tiling instead of slating about 8l. is gained."

PREMIUMS OF THE INSTITUTION OF CIVIL ENGINEERS.

THE Council of the Institution of Civil Engineers have just awarded the following premiums for original communications submitted to the Institution, and read at the ordinary meetings during the sessions 1867-68.

1. A Telford Medal, and a Telford Premium, in books, to G. Higgin, for his paper, "Irrigation in Spain, chiefly in reference to the Construction of the Henares and the Esla Canals in that country."
2. A Telford Medal, and a Telford Premium, in books, to C. P. Sandberg, for his paper "On the Manufacture and Use of Rails."
3. A Telford Medal, and a Telford Premium, in books, to Lieut.-Colonel O'Connell, R.E., for his paper "On the Relation of the Fresh Water Floods of Rivers to the Areas and Physical Features of their Basins."
4. A Telford Medal, and a Telford Premium, in books,

* Mr. J. T. Clarke, Newmarket; see letter in *Royal Agricultural Journal*, vol. xxiv, part 2.

to W. Wilson, for his "Description of the Victoria Bridge on the line of the Victoria Station and Pimlico Railway."
 5. A Telford Medal and a Telford Premium, in books, to C. Douglas Fox, for his paper "On New Railways at Battersea; with the Widening of the Victoria Bridge and Approaches to the Victoria Station."
 6. A Telford Medal and a Telford Premium, in books, to J. Wolfe Barry, for his paper "On the City Terminal Extension of the Charing Cross Railway."
 7. A Watt Medal to Edwin Clark, for his paper "On Engineering Philosophy; the Durability of Materials."
 8. A Telford Medal to W. Jarvis McAlpine, for his paper "On the Supporting Power of Piles; and on the Pneumatic Process for Sinking Iron Columns, as practiced in America."
 9. A Telford Premium, in books, to T. Logan, for his paper "On the Benefits of Irrigation in India; and on the proper Construction of Irrigating Canals."
 10. A Telford Premium, in books, to Allan Wilson, for his paper "On Irrigation in India."
 11. A Telford Premium, in books, to Wilfrid Airy, for his paper "On the Experimental Determination of the Strains on the Suspension Tie of a Bowstring Girder."
 12. The Manby Premium, in books, to A. C. Rowden, for his paper "On Floods in the Nerunda Valley; with Remarks on Monsoon Floods in India generally."

CIRENEOSTER CONGRESS OF THE BRITISH ARCHEOLOGICAL ASSOCIATION.

The proceedings of the Congress will be as follows:—

Monday, August 10.—At Cirencester. — Inaugural address of the president (Earl Bathurst) at 3.30 p.m., at the Assembly Rooms. — Examination of the church and town-hall.—Dinner at the Assembly Rooms.

Tuesday.—At Cirencester.—Inspection of the antiquities of the town, under the guidance of Mr. John Brasenuder.—At 11 o'clock the Roman Amphitheatre.—Visit to the Roman Wall at Watermoor, the tessellated pavement at Mr. Brown's and the pavement at the Barton.—Roman capitals and antiquities in the Abbey grounds.—Luncheon at 2.30.—Then to the Museum of "Corinthus Antiquities."

Wednesday.—Excursion to Ranbury Rings.—Maisey Hampton Church and Fairford Church.—Lunch at Fairford.—Visit to Bibury Church.

Thursday.—Excursion to Trewhary camp.—Akeman-street.—Crudwell Church.—Mismisbury Abbey Church and Cross, and Abbot's Hall.—Oxford Park.—Ancient stones at Kemble, and visit to the Agricultural College of Cirencester.

Friday.—Excursion to Daglingworth Church.—Dunstable House.—Elstone Church.—Lunch at Birdip Hill.—Return by Brimsfield Church and Castle, Miserden Church, and Edgworth.

Saturday.—Visit to the newly-discovered Roman villa at Chedworth.—Return to Fossebridge to lunch.—Examination of Chedworth Church.—Calmeden Wayside Cross, and North Cerney Church.

Evening meetings each day (except Monday), at the Assembly Rooms, for the reading of papers and discussions.

SEWERING WOLVERHAMPTON.

A WORK of great importance to the borough of Wolverhampton has been formally begun by Alderman Hawkesford, the chairman of the sewage committee of the corporation, laying, at the Atherley Junction, certain of the masonry necessary to the carrying out of the system of sewerage by which that town is henceforth to be drained, at an estimated cost of 40,000*l.* The whole of the sewage of the borough is to be taken into one outfall. For mitigation, the Barnhurst Estate of Mr. Hellier, consisting of somewhat over 283 acres, was bought for 28,000*l.*; and two fields, comprising over nine acres, were purchased on the west side of the canal, and immediately adjoining the Shrewsbury Railway, for the purpose of constructing the outfall sewer and filter-beds, and as a communication between the canal and the Barnhurst Estate. The nine acres were an addition to the work upon which the 40,000*l.* were estimated, and the price of "The Barnhurst" is not included in that larger sum. But there is every reason to conclude that when the estate has been brought fairly under irrigation, the rent will be sufficient to meet the outlay under that head.

RAILWAY MATTERS.

The two last girders of the viaduct across the Solway Firth, which forms the chief engineering work on the Solway Junction Railway, have been laid by Mr. Brogden, of Ulverston, the chairman of the directors, in the presence of the engineers and leading promoters of the undertaking. The bridge is 1,940 yards in length, and, with its sea embankments at each end, forms a road across the sea nearly two miles in length. About 1,800 tons of wrought-iron and 2,900 tons of cast-iron have been used in its construction. The bridge is formed upon iron piles

* Has previously received a Telford Medal.

screwed and driven into the subsoil. The foundations proved better than had been anticipated, and the work is said to be of great solidity. This railway bridge will form a new connecting link between England and Scotland, and will provide a short route for the rich iron ore of Cumberland to the Scottish iron masters.

An Act has just passed through Parliament for the making of a tramway in the town of Street. This is the first instance where Parliament has sanctioned the construction of a tramway along a high road, and is, therefore, considered an important precedent. The cost of making it, as estimated by the engineer, Mr. Hamilton Fulton, is 3,800*l.* per mile. By its completion all the material facilities of a railway will be secured, and if such tramways can be generally constructed throughout the country for the sum estimated by Mr. Fulton, they will probably be adopted, and so save a considerable outlay in horse-power and in the expense of the wear and tear of the road, and doubtless will become valuable feeders to the railways.

A Mr. Kerr, of Edinburgh, has invented a reflector for a locomotive, by means of which the engineer is able to see the rear of his train, the conductor, and all who are either getting on or off, without moving from his seat. It can be arranged for any length of train by simply changing the angle of reflection. It has been tried on the Jeffersonville-road, and pronounced to be a success in every respect.

A NEW PLAN FOR STATING ADDRESSES.

Sir,—If the following plan were adopted, as it might be, all over the world, it would save much trouble and inconvenience with regard to communication between persons living at different parts of a town, country, or the world.

It is simply to mark, in towns, on all streets running east and west, or nearly so, the minutes and seconds of longitude; in those running north and south, of latitude; in their regular succession, from one to sixty, and upon each door a figure representing the number of thirds of latitude and longitude.

In the open country, the degrees and minutes would suffice in their proper places, and the latitude or longitude, in degrees, minutes, seconds, and thirds, on every guide-post or milestone. This would soon be learned and easily understood, and would make it much easier for letter-carriers and others to find their way in large towns; besides which it would educate the people in the science of geography much better than half the books written on that subject.

In London the figures would run in regular succession from Bow to Tyburn; and wherever a person's address might be: for example,

6' 31" 15" W.

51° 3' 9" 45" N.

it would be perfectly easy to trace it out without asking the way, or requiring the name of the street or the number of the house.

A second of latitude is about 101 ft., and of longitude about 62 ft., in the parallel of London.

WALTER SCARBELL.

BLOOD PRODIGES.

SOMETIMES, during the hottest weather of Midsummer, bread, paste, meat, &c., and a few other substances, are liable to become suddenly covered with a vivid carmine stain, exactly resembling arterial blood. Only a day or two ago, a pot of paste made for me in the evening had come, during the night, coated with this brilliant crimson parasite; once or twice before I have observed it during the hottest days of July, and each previous time on bread, first appearing as a blood-red spot, and rapidly spreading over a large surface. I have tried to cultivate it, but without success, as it appears to require some peculiar state of the atmosphere, moist air at once destroying it. It may probably have been observed by other readers of the *Builder*; if so, it may be at once known by its *vivid crimson hue*. Its growth is very rapid, and its occurrence most capricious; it is of great interest, as affording in itself a clear explanation of the many apparently well-authenticated instances of "bleeding hosts," and of waters used at the sacrifice of the Mass being suddenly blood-

stained or transformed into real flesh and blood. The persecution of the Jews in the thirteenth century, at Rotil, near Frankfort, when 10,000 were murdered, is said to have been caused by some Jews "torturing" a host till it bled. The plant itself is little understood, and is at times referred to as an alga, or water-plant, but it probably belongs to the fungus tribe.

Every reader of the *Builder* must have observed claret-colored gelatinous patches near old walls in damp places; they look very nasty, are seldom bright in colour, and have been compared to the dregs of port wine: these patches often grow on the ground near walls, creep up the mortar and adhere to the bricks, and look like a coating of dirty red jelly. To this plant many old writers referred when describing omens of fearful presage in blood issuing from the ground, trickling down walls, &c. It is a common alga (*Palmella crustacea*).

Allied to the latter are the large lumps of quivering green jelly (*Nostoc commune*), which are sometimes strewed in such abundance along paths and grassy roadsides in the autumn, and of which no traces were to be seen an hour or so before. They come up after showers, often in abundance, and in large trembling sticky masses. Country-folk call them "fallen stars" (1), and more aptly, "witches' butter." W. G. S.

THAMES EMBANKMENT STOCK-TAKING.

Sir,—The following is suggestive.
Southern Embankment.—From Ginn-House-alley, near Vauxhall Bridge, to Westminster Bridge.—Of this contract 136,000*l.* remain to be done. The progress during the twelve months ending June 30, 1868, was 43,320*l.*

Northern Embankment, Contract No. 1.—From Westminster Bridge to Somerset House.—Of this contract 65,000*l.* remain to be done. The progress during the twelve months ending June 30, 1868, was 68,800*l.*

Northern Embankment, Contract No. 2.—From Somerset House to east end of Temple Gardens. This contract is finished.

Northern Embankment, Contract No. 3.—From east end of Temple Gardens to Blackfriars Bridge.—This contract was let on June 19 to the gentleman who has the Southern Embankment contract. It is to be finished in a year. Amount of contract 126,500*l.* JASPER.

LONGDON AND ELDERSFIELD DRAINAGE.

Sir,—Can you inform me why the Longdon and Eldersfield drainage contract has been given to a Mr. Field, when such name did not appear in the list of those who tendered, as quoted in your publication of 27th of June last. Ours was tendered.

ONE WHO TENDERED.

"ENGINEERING FIELD WORK"

We are much obliged for your notice of our book by W. D. Haskell, but wish to remark that "Engineering Field Work," vol. 1, just published, is a second edition of that work, published by us in 1858, revised and rewritten, with some parts, that are not now required, omitted, and new matter added. We think it ought to be known that while we were preparing this second edition, Mr. Lockwood published his work on "Land and Marine Surveying." We are inclined to mention this from your saying, the almost twin books simultaneously appeared. Of course ours was the first book, from having, as we before said, been published (that is, the first edition) ten years ago; so if there is any copying done by the author, it must have been done from our book into "Land and Marine Surveying." We cannot help adding, if our position had been reversed, and Mr. Haskell had brought this work to me, we would not have published it, knowing he had already written a work on the subject, which work was published by us ten years ago (1858).

ATHERLY & CO.

UNAUTHORISED GAS COMPANIES.

VICÉ-CHANCELLOR MALINS has decided a point of considerable importance affecting water and gas companies. The matter arose out of the proceedings of two rival gas companies at Cambridge, and the principal question was, whether one of those companies, having no Act of Parliament, could be restrained by injunction from opening streets and roads for the purpose of laying down pipes and mains. The feature of the case, however, was the expression of the Vice-Chancellor's strong dissent from the decision of Lord Chancellor Cranworth and Lord Justice Turner in a well-known case, *The Attorney-General v. The Sheffield Gas Company*, which case, the Vice-Chancellor said, was cited before him about once a fortnight. He was surprised that two learned judges should have come to the conclusion that the general admitted license exercised by

an unauthorised company to break up the streets of a great town like Sheffield was not such a nuisance as called for the interference of that Court. It was afterwards approved by a decision in the Court of Queen's Bench that it was a nuisance, yet that decision of the two learned Judges was held to be the law in all analogous cases. His Grace the Vice-Chancellor was glad to have an opportunity of expressing his strong dissent from that decision, and his dissent to the opinion of Lord Justice Knight Bruce, who differed from the opinion of his two learned brethren. So far as the matter before him was concerned, in so far as the Sheffield case applied to it, the matter was overruled by a recent decision in the Court of Queen's Bench, and he therefore warned the defendant company that they were committing a nuisance and could not proceed with their works without an Act of Parliament. He should, after the bill had been amended to meet a collateral point, grant an injunction against the defendant company.

ELECTRO-TELEGRAPHIC PROGRESS.

The Atlantic Telegraph promises, should no disaster occur, to become one of the most remunerative undertakings of modern times. At the recent meeting of the shareholders a dividend at the rate of 8 per cent. for the nine months ending April last was declared, and from the statement of Mr. Cyrus Field it is likely that an increased dividend will be declared at the next meeting. The receipts under the reduced tariff are more by 100 per cent. than they were previously, and it is probable that a further reduction will shortly take place. Under the 25th tariff the receipts were 505^{l.} per day; under the 10th they were 579^{l.}; and under the five guineas, 693^{l.} Mr. Field stated that the company was in a position to do six times the amount of business it is now doing without adding a shilling to the expense.

Towards the close of the banquet given to Mr. Field, it was announced that telegraphic messages addressed to the chairman (the Duke of Argyll) had just been received from America, in response to two of those sent by his grace during the evening:—

"From H. Seward, in the name of his Excellency Andrew Johnson, President of the United States, Washington.—Your salutations to the President from the banquet-hall at Willis's have been received. The dinner-hour here has not arrived; it is only five o'clock; the sun is yet two hours high. When the dinner-hour arrives the president will accept your pledge of honour to our distinguished countryman, Cyrus W. Field, and will cordially respond to your Highland aspiration for perpetual union between the two nations."

From Mr. Cyrus Field's daughter, in acknowledgment of the duke's congratulations:—

"New York, 4th p.m.—I thank you most sincerely for the kind words you have spoken of my father, causing me to feel that we are friends, although our acquaintance is thus made across the sea and in a moment of time."

From San Francisco the following telegram was despatched to Mr. Cyrus Field:—

"The Governor of California presents his compliments and congratulations."

The Governor of Oregon telegraphed as follows:—

"The people of Oregon salute you as the world's benefactor, and offer you their hand across the waters as a token of their high appreciation of the services which you have rendered to mankind. Let our kindest wishes in your behalf be our representative at your meeting."

The Governor-General of Cuba also forwarded a reply to the Duke of Argyll.

METROPOLITAN BUILDING ACT AND EXEMPTIONS CLAIMED BY RAILWAY COMPANIES.

District Surveyor of Kensington v. Kell, Waring, & Lucas.—Professor Donaldson, an district surveyor, summoned the defendants, underpinnings, for neglecting to give notice of underpinning the sewer at No. 18, Cromwell-place, which they were carrying on in connexion with the retaining wall of the Underground Metropolitan Railway Company, at the distance of about 2 yards from the said retaining wall.

The defendants pleaded that they were contractors under the railway company, and consequently exempt under Part I of the Building Act; that they had purchased the premises in question; and that the Act of the Company, under p. lxxxv., of 1867, sec. 22, gave them power to underpin houses and buildings within 100 ft. of their railways.

The district surveyor, in reply, contended that it was not sufficient that the premises in question should belong to, but should be used for the purposes of the railway company, which did not appear to be the case, as a mere building operation could not be so interpreted; and he contended the case of Tolley v. the same parties, as

reported in the *Builder* of February 8th, 1868, and decided by Mr. Arnold against the defendants. In regard to the power of underpinning granted by the Act of 1867, it would be seen that in the preamble the following words occur:—

"And whereas it has been found, in the construction of the railways under the powers of the Acts already obtained by the company, that in many instances the works of the company interfere, or threaten to interfere, with the stability of the buildings, which are not necessary for the purposes of the company, and the safety of which might be easily secured without permanent interference with the occupation thereof, and it is expedient that the powers heretofore contained should be granted to the company for securing the stability of such buildings, subject, nevertheless, to the restrictions hereinafter also contained."

Therefore as these premises were purchased for merely enabling the company to carry out their works, by underpinning this building, which, in the words of the preamble, was "not necessary for the purposes of the company," the exemption clause did not apply to this case; and to constitute their exemption, the buildings must not only belong to, but be used for the purposes of the Railway.

The magistrates, Mr. Self, held that the defendants ought to have given notice.

MAREZZO MARBLE.

The entrance-hall of the House of the Society of Arts, in the Adelphi, has been lined from floor to ceiling, including skirting, wall-covering, and cornice, with this new material, Marezio Marble. It is somewhat similar in appearance to Senghita, as we have had occasion to observe when describing it on a previous occasion, but its application appears to be more extensive: it takes a good polish, and is said to be moderate in cost.

Its basis is cement. The manufacture of the material in the form of slabs is simple. The veining of the stone intended to be represented is carefully copied on a sheet of glass, and of course dried. On this prepared surface is poured the cement, coloured to the tint required; and the whole, when dry, is removed from the glass, and polished in the usual way. The markings extend some depth, for if the surface be chipped they are still apparent in the substance of the material.

The decoration at the Society of Arts consists of panels of violet vein, with Bardiglio mouldings bordered by rich antique jasper, and with Egyptian green skirtings. The soffit of the arched doorway to the left of the entrance is executed in one piece, representing a beautiful formation of Bardiglio marble. The chimney-piece and ornamentation for the clock are included. The effect of the whole harmonizes with the Mosaic pavement, and the result is a very handsome apartment. We are disposed to think that some of the combinations of colour might have been more happily made, but that does not affect in any way the capabilities of the material.

CHURCH-BUILDING NEWS.

Easton.—The chief corner-stone of a new church (St. Gabriel's), at Upper Easton, has been laid. The site of the new building is close to Messrs. Leonard & Bonit's colliery. It is intended to accommodate about 700 people. It will consist of a nave, transepts, and chancel, and will be built chiefly of bricks. The original cost was estimated at 2,100^{l.}, but after the foundation had been dug it was discovered that the ground had been previously worked, and it was found necessary to build foundation walls of 18 ft. to 20 ft. in depth. The consequence is that the original estimate has been increased by about 400^{l.}

Bathaston.—A vestry meeting has been held at Bathaston, the vicar presiding, when a report was presented from the church restoration committee announcing the completion of the work, and stating that a sum of upwards of 1,800^{l.} had been raised towards the enlargement, resating, lighting, &c., of the church, and that after paying all expenses a small balance remained in the hands of the treasurer. A subscription is now being raised under the auspices of Mrs. Rogers for the purchase of a new font.

Streatham.—The chief-stone of the new church of St. Peter and St. Paul, Leigham-road, has been laid. The church, to be built of coloured brick with Bath stone dressings, is from the designs of Mr. R. W. Drew. The length will be 80 ft., and

this breadth 52 ft.; and the seats, 870 in number, will all be free. The cost is estimated at 4,000^{l.} From its elevated position the new church will form a noticeable addition to the buildings which dot the hill. The tower will not be built with the first contract, and the church is planned so as to be capable of extension. Messrs. Perry, of Stratford, are the contractors; and Mr. J. Meadows clerk of the works.

Clifton (Derbyshire).—The foundation-stone of the chancel of Clifton church has been laid. At a vestry meeting held in the spring, it was resolved that, to make a chancel, an apse should be added at the east end of the church, and also that a vestry and organ-chamber should be built on the north side near the apse. Suitable designs having been provided by Messrs. Slater & Carpenter, of London, architects, Mr. W. Thoreley, of Ellastone, was selected to be the builder. The proposed alterations, when completed, will afford an increased number of sittings for the congregation.

Birmingham.—The foundation stone of St. Anne's Church, Cato-street, Nechall, has been laid. The building is oblong on plan, and consists of nave, a small chancel, and north, south, and west galleries. The principal elevation is in Cato-street, where there will be a west gable, in which are three large lancet windows. There is also provision for a spire, to be built hereafter. A centre doorway from Cato-street opens into the body of the church, and there are side entrances leading to the galleries. The walls will be built entirely of brickwork, no stone being used in the church excepting for the steps and the font. The roof over the body of the church is of one span, the timbers being exposed to view. The building will be covered with tiles, and the church will be plastered inside. The entire cost, including galleries, will be 2,177^{l.}, and the building will afford accommodation to 810 adults. Mr. J. A. Chatwin is the architect, and Mr. J. Briley the builder.

Yazley.—The parish church of Yazley, about two miles to the west of Eye, between Ipswich and Norwich, has been re-opened, after having undergone a restoration. The repair of the chancel devolved upon Sir E. C. Kerrison, the lay impropriator, and he determined to pull down and rebuild it. The tower has not been touched externally, and several cracks may be seen. The north wall of the nave is brick, and has been stuccoed, but in several places the plaster has fallen. The roof of the nave is of lead, and in the restoration nothing appears to have been done to it. The ceiling of the porch is groined, and has been restored. Both north and south walls of the chancel have been rebuilt of flint, with white stone dressings, but the east wall has been left. In the nave the walls have been replastered, the columns cleaned; for the pews solid oak benches, with carved poppy-head ends, have been substituted; the windows have been touched up, and the stonework of the two-light east window of the aisle restored. The nave is lighted by two clearstory windows, as well as by those in the south aisle. Here, as, indeed, throughout, the flooring is new, the passages being paved with Minton's encaustic tiles, those in the nave and aisle plain red, but in the chancel a pattern is formed. In both the north and south walls are two new two-light windows, filled with cathedral glass, with an edging of blue. The roof is of oak and is open, the principals springing from stone corbels. Mr. Blackburn, of London, was the architect; Mr. Rampling, of Eye, the builder; Mr. Vine, of Eye, did the stonework; Mr. Neale, of Eye, the plumbing and glazing; and Mr. Frost, of Watton, was the wood carver. The total cost of the restorations is said to be about 1,000^{l.}

Enderby.—The church here, having been almost entirely rebuilt on an enlarged scale, has been consecrated and re-opened for Divine service. The edifice has been almost entirely rebuilt at the sole expense of Mr. Brook. The designs and plans for the building were provided by Mr. E. Birchall, of Leeds, and he has adapted the style of the ancient church to the extended requirements. The contract for the building was taken by Mr. J. Finn, of Leicester. The church now consists of a nave of five bays, with side aisles, and a chancel of three bays. There is also a vestry added to the chancel, and an organ-chamber adjoining it. The windows are of geometrical form, with tracery, and are filled with different coloured glass. The roof is supported by clustered columns, with moulded arches in Bath stone and red coloured labels of Alton stone. The chancel window, which is of stained glass, contains the following subjects:—"The

Nativity," "The Entombment," and "The Ascension of Christ." The tracery is filled with cherubim and seraphim in the act of adoration, the *Agnus Dei* being the centre subject. The roof and seats are of deal. The tower, which as yet has undergone but little alteration in the exterior, but which it is now intended completely to restore, has been considerably altered in the interior. The tower-arch has been restored, and a small stained-glass window, with the figure of St. John the Baptist, and the beheading of St. John, as the subjects, has been placed there instead of the door, which originally opened into the tower. A new peal of five bells has been furnished, cast by Mr. Taylor, of Loughborough. The stone work has been executed by Mr. Firz; the woodwork by Messrs. Taylor & Son, Thurston; and the plumbing and gas-fitting by Mr. Alfred Adams, of Littlethorpe. The restoration of the church will cost over 5,000l.

Seal.—The new church on Seal Chart, erected at the expense of Mr. Horace Wilkinson, has been consecrated. The edifice is situated in the vicinity of a road leading in the direction of Seal Chart on the one hand, and Stone-street, &c., on the other. Mr. Constable was the builder of the church and a school connected with it.

St. Deny's, Southampton.—The new church at St. Deny's has been consecrated by the Bishop of Mauritius. The structure has been built in the Early English style, from designs furnished by Mr. Gilbert Scott, and the work has been carried out by Mr. Fletcher, of Salisbury. The church is constructed of red brick, with Bath stone dressings. At present there is a nave, with chancel at the eastern end of a circular form, a north aisle, and north chancel, and doubtless the structure will remain in this condition till its enlargement is absolutely necessary, when a south aisle and chancel will be added. The contract for the work, as it exists at present, is about 5,000l. The church, we understand, will accommodate some 700 persons. The pews are of stained deal. The roof is also of stained wood. The principals supporting the roof rest on brackets, carved with designs characteristic of the style of architecture. The windows are plain quarry lights, but are arched. The doors, also are arched. An anonymous donor offered to contribute 3,400l. towards the structure if an additional 3,000l. could be raised. 1,000l. more are still required.

Wilton, Bristol.—We are asked to say that the chancel of All Saints is paved with tiles supplied by Mr. Godwin, of Lugwardine; not Minton's, as stated.

STAINED GLASS.

R. C. Church, Teignmouth, Devon.—A stained-glass window was placed in this church a few days ago, at the instance of Captain Keating, and containing in the centre opening the Crucifixion, and at the sides the figures of St. John and the Virgin Mary, upon diapered ground-work. In the tracery are the I. H. S. and ornaments. The work was executed by Messrs. Holland & Son, of Warwick.

Blidworth Church.—This church, which has for some time possessed a stained-glass window of the Nativity, the gift of Colonel Welfitt, has been further provided with one emblematical of practical Christian charity. It has been executed by M. M. Marchal, of Metz.

Welford Church (Nottingham).—The movement for erecting a window in this church to the memory of Henry Kirke White has, under the management of Mr. Davies, the rector, proceeded satisfactorily. A design for a stained-glass window, to be placed in the south side of the church, has been prepared by Messrs. A. & W. H. O'Connor, of London. The design, which is in two compartments, gives a representation (why we do not know) of the Star of Bethlehem; one compartment shows the Virgin and Child, and the other the Wise Men making their Offerings. Along the top of the window are figures of angels. The window is to be placed in the church in September next.

Kimbolton Church.—We are requested to state that Messrs. Lavers, Barrard, & Westlake produced the window already announced as having been placed in this church.

St. James's, Carlisle.—The decoration of the chancel of this church has now been completed, the small windows on each side of the apse having been filled with stained glass, corresponding in form and colouring with the window at the east end of the chancel which was put in previously to the opening of the church. The

windows were designed and executed by Messrs. John Scott & Son, stained glass manufacturers, Carlisle. Each window is composed of one large panel, and contains in the centre a pictorial representation of an incident in sacred history, surrounded by a rose border on an azure and ruby ground. The subject of the left window is the raising of Jairin's daughter. The window on the right side of the apse contains a delineation of the youthful Saviour disputing with the doctors in the temple. The west window is large, and if it were also filled with stained glass, the strong light which streams through it would be softened, and a more pleasing effect would be produced. Two of the three stained glass windows in the chancel have been presented to the church by Mr. Nelson, of Murrell-hill House, and the third by Mrs. Nelson.

SCHOOL-BUILDING NEWS.

Stockport.—The corner-stone of Wesleyan day and Sunday schools, in the southern part of the town, has been laid. The building consists of three wings. The first, which is at the corner of Brentnall-street, its external dimensions being 74 ft. by 40 ft., is two stories high. The lower story is divided into numerous class-rooms, fitted up with galleries; the upper story being all one room, 25 ft. high, lighted at the sides by a large three-light transome window, and at each end by large seven-light transome windows, and fitted up with large galleries extending across the room. The second wing, which is adjoining and facing Wellington-road, 30 ft. by 17 ft., consists of the principal entrance vestibule, with a stone staircase for access to the large rooms above, with infants' class-room adjoining. The third wing is also two stories high, its external dimensions being 43 ft. by 25 ft., the lower story of which is to be used for the infants and the upper story as a lecture-room. The ground-floor of the school is elevated 4 ft. higher than the path. The style of architecture will be Tudor Gothic, faced round the principal elevations with bricks, embellished with stone quoins, millions, and transomes, with moulded and sunk tracery heads. The principal gable of the wing will have a large projecting window, 20 ft. wide and 38 ft. high, the other elevations being carried out in similar way. The contractors are Messrs. T. & W. Meadows, Heaton Norris; the architect is Mr. T. H. Allen, Stockport; and the probable cost of the buildings (including the fixtures, &c., and the land) will be about 3,600l.

Books Received.

The Life of George Stephenson and of his Son, Robert Stephenson: comprising also a History of the Locomotive. By SAMUEL SMILES. New edition, revised and enlarged. Loudon. Murray.

THIS fresh edition of Mr. Smiles's capital volume on the Stephensons includes a new preface, in which the author gives a review of the progress of railways and railway traffic since the appearance of the volume in its original form ten years ago. As the author regards the present edition as probably the final one, he has taken pains to render it, by careful amendment and revision, worthy of public acceptance. It includes a history of the railway locomotive in its earlier stages, uniform with the early history of the steam-engine, given in vol. iv. of "Lives of the Engineers," and a fuller memoir than had yet appeared of Richard Trevithick, with a portrait of him. The volume contains an alternative title-page, as "Lives of the Engineers," vol. iii.

We may quote a passage from the conclusion of the preface, to show the number of persons now employed on railways in the United Kingdom, and the author's views of the present and prospective state of railway management:—

"A few words in conclusion as to the number of men employed in working and maintaining railways. According to Mr. Mills 186,437 men and officers were employed in the working of 13,283 miles open in the United Kingdom in 1865, besides 63,923 employed on lines then under construction. The most numerous body of workmen is that of the labourers (81,284) employed in the maintenance of the permanent way. Being mostly picked men from the labouring class of the adjoining districts, they are paid considerably higher wages; and hence one of the direct effects of railways on the labouring population (besides affording them greater facilities for locomotion) has been to raise the standard of wages of ordinary labour at least 2s. per week in all the districts into which they have penetrated. The workmen next in number to that of

artificers (40,107) employed in constructing and repairing the rolling-stock; the porters (25,881), the plate-layers (12,801), guards and brakemen (5,769), firemen (5,265), and engine-drivers (5,171). But besides the employees engaged in the working and maintenance of railways, large numbers of workmen are also occupied in the manufacture of locomotives and rolling-stock, and in providing the requisite materials for the permanent way. Thus the consumption of rails alone averages nearly 400,000 tons a year in the United Kingdom alone; while the replacing of decayed sleepers requires about 10,000 acres of forest to be cut down annually and sawn into sleepers. Taking the various railway workmen into account, with their families, it will be found that they represent a total of about three-quarters of a million persons, or about one in fifty of our population, who are dependent on railways for their subsistence.

While the practical working of railways has, on the whole, been so satisfactory, the case has been very different as regards their direction and financial management. The men employed in the working of railways make it their business to learn it, and, being responsible, they are under the necessity of taking pains to do it well; whereas the men who govern and direct them are practically irresponsible, and may possess no qualifications whatever for the office excepting only the holding of so much stock. The consequence has been much blundering in the part of these amateurs, and great loss on the part of the public. Indeed, what between the confusion of the directors, and often unjust legislation of Parliament, on the one hand, and the carelessness or incompetency of directors, on the other, many once flourishing concerns have been thrown into a state of utter confusion and made, until railway government has become a by-word of contempt.

And this state of things will probably continue until the fatal defect of Government by Boards—an extremely limited responsibility, or no responsibility at all—has been rectified by the appointment in France, of executives consisting of a few men of special ability and trained administrative skill, personally responsible to their constituents for the due performance of their respective duties. But the discussion of this subject would require a treatise, whereas we are now but writing a preface.

Whatever may be said of the financial mismanagement of railways, there can be no doubt as to the great benefits conferred by them on the public wherever made. Even those railways which have exhibited the most "frightful examples" of scheming and dissipation, so soon as placed in the hands of practical men to work, have been found to prove of unquestionable public convenience and utility. And notwithstanding all the faults and imperfections that are alleged against railways have been admitted, we think that they must, nevertheless, be recognized as by far the most valuable means of communication between men and nations that has yet been given to the world."

Metal Work Trade-Book.

MESSRS. J. BATCLIFF & SONS, of Birmingham, have issued a catalogue of their "Medieval and Metal-Work," and claim to bring into great prominence than others do the services of the sculptor and the chaser to assist in producing works of the character peculiar to the twelfth century. With much that is clever and original in the designs, they are for the most part not Medieval in character. They are too spiky, and where not too spiky too "pretty." They had better put away the word Medieval, and let their designs stand on their own merit.—which is considerable.

VARIORUM.

Mr. C. Roach Smith's "Collectanea Antiqua" (Parts III. and IV., vol. vi.), contains besides the biography of the late F. W. Fairholt already referred to, notices of the late Dawson Turner and Hudson Gurney. It is certainly sad, that men like these should pass away, and be so soon lost sight of as they are. Some relative or friend should supplement what Mr. Smith, without special materials at command, has well and kindly written. The numbers of the "Collectanea" before us are altogether good ones.—Bernard Quaritch's "General Catalogue of Books, arranged in classes," 1868 (15, Piccadilly), is a portly volume of 1,130 pages, and contains the titles of many books of which it is desirable to know the whereabouts.—The *Popular Science Review* for July contains some very interesting papers, especially one on "The Study of Chemical Geology" by David Forbes, F.R.S.; one on "Animals between Birds and Reptiles," by Professor Huxley; and one on "The Great Eclipse of August 17th of this Year," by R. A. Proctor, F.R.A.S.—"Iron Ship Building." With practical illustrations. By John Grantham, C.E., &c. Fifth edition, with supplement and index. London: Virtue & Co. 1868. This is an enlarged edition of an elaborately illustrated work, consisting mainly of engravings. The supplement traces the progress made in iron ship-building up to the present time.—"Observations and Suggestions on the Railways of the United Kingdom." By F. E. Causton & Sons, 47, Eastcheap. The chief object of this pamphlet is to show how the railways may be immediately rendered more serviceable and beneficial to the public generally than they now are, and much more remunerative to their proprietors. This, the author rightly thinks, would be done simply

by low fares and charges, say "for second-class to a rate of one penny for every five miles, and of third-class to one halfpenny for every five miles" for goods and parcels also the rates to be largely reduced,—parcels under 14 lb. say, for one penny each, and proportionally for greater weights. But why should not first-class passenger fares be also reduced? Second and third class carriages ought to be improved and made more safe, as by means of cheap stuffing or cushioning. Why should the less wealthy classes be less safely conveyed than the more wealthy, or why should they be thus forced to pay more than they can afford? Passengers who can afford first-class tickets are not so placed under the screw to force higher fares out of them, although they can as a class far better afford it.

Miscellaneous.

BARNSELY.—At a recent meeting of the local Board of Guardians the clerk read a letter from the Poor-law Board on the subject of the workhouse hospital accommodation, recommending the guardians to take into consideration as early as practicable the erection of an entirely new infirmary, detached from the main building. A committee was appointed to take the matter into consideration, with power to consult an architect and report to a future meeting of the Board.

PRESENTATION TO BISHOP SELWYN.—A few old New Zealand colonists, resident in England, have presented to the Bishop of Lichfield, who was now sailed for New Zealand, a pastoral staff. The staff, executed by Messrs. Cox & Son, of London, is of massive silver, with the top crocketed and jewelled, the knob below the crook pinnacled and chased, and the stem of polished ebony with silver bulb and base. An address was read to the bishop on behalf of the donors by Archdeacon Paul, prebendary of Lincoln.

IMPROVEMENTS IN HIGH HOLBORN.—The crossing from Gray's Inn-road to the south side of Holborn having been rendered highly dangerous to pedestrians since the removal of Middle-row, and consequent widening of the carriage-road or the increased traffic, the Metropolitan Board of Works have caused a cast-iron gas-lamp pillar to be erected in High Holborn, at its junction with the carriage-road of Gray's Inn-road. The pavement around the pillar is raised, so as to afford a place of refuge to persons crossing; this is also inclosed with iron posts, in order to prevent carriages from being driven on the raised pavement. At the Holborn viaduct workmen are actively engaged in filling up the hollows between the arches with gravel dredged from the river, and dry brick rubbish, so as to form a solid foundation, preparatory to being paved with cubic blocks of granite. At the western terminus of the viaduct a pillar is to be erected with brackets, each supporting a lantern with four burners. The place in which the pillar is to stand is of large diameter, perfectly circular, and is intended to afford a place of safety to foot-passengers crossing the main thoroughfare.

GENERAL BUILDERS' ASSOCIATION.—The annual meeting of this Association was held in St. George's Hall, Bradford, on the 7th inst. Mr. Whiteley presided. The secretary read the reports of sub-committees on the subjects of working rules, the establishment of a builders' fire insurance, the amalgamation of the labour registration offices established by the Association in various towns, and those of the free labour registration of London, and other matters. A lengthy discussion arose on the proposition to approve the working rules drawn up by the sub-committee appointed for that purpose. The first of these rules provides that payment by the hour shall be adopted by all members of the Association on and after the 1st May, 1869, and that due notice of this be given to the operatives. Others of the rules provide that a court of arbitration between employers and employed be formed, and that the rule restricting the use of worked stone be abolished. A very strong feeling in favour of the adoption of the rules was manifested, but it was finally resolved that the report of the sub-committee be referred to the branch associations, and that they send delegates to the September meeting, with power to vote upon a question.

"THE SONG OF THE SHIRT."—The sitting female figure by Mr. Marshall Wood, which under this title attracted deserved attention in the Paris International Exhibition, is now on view in the gallery belonging to Messrs. H. Graves & Co., Pall-mall, and will well repay a visit. The attenuated form, and the care-worn face of the poor shirtmaker are represented with grace as well as touching truth.

BAK-CUTTING MACHINE.—In an article on the Sawmill at Cummertrees, the *Annan Observer*, says:—"The most serviceable improvement that has been introduced into their works by Messrs. Matthews & Boyd, is the bark-cutting machine, invented by Mr. Jonathan Thompson, engineer, Penrith, which can, with only three men to attend it, do the work of forty men and sixty women in the ordinary way by hand."

FIRE ON THE MOORS.—By the fire in Yorkshire nearly 4,000 acres of moorland have been left black and desolate, with probably scarcely a living bird, or animal, or vegetable, excepting the largest trees, over the wide expanse. The grouse and rabbits which abound on these moors have been destroyed, and sheep grazing thereon have in some instances perished. A fire somewhat similar has been burning for the last few days on Chat Moss. The fire has passed over a considerable area.

THE GREAT DOME AT WASHINGTON.—The dome of the Capitol at Washington is the most ambitious structure in America. It is 108 ft. higher than the Washington monument at Baltimore, 68 ft. higher than that of Bunker Hill, and 28 ft. higher than the Trinity Church spire at New York. It is the only considerable dome of iron in the world. It is a vast hollow sphere of iron, weighing 8,200,000 lb. Directly over your head is a figure in bronze, "America," weighing 14,985 lb.—*New York Observer*.

THE ART TREASURES OF WALES.—An Exhibition of Works of Art is being got up at Ruthin, Denbighshire, North Wales, to commence on the 4th of August, and remain open to the public for a month. Mr. Cornwallis West, of Ruthin Castle, is an active promoter of the undertaking; while Mr. Chaffers, the collector, is principal superintendent. The promoters, who in the new townhall at Ruthin have a very convenient set of apartments for the proper display of the collection, are very sanguine of success.

BROUGHAM AND BISMARCK.—It is said that the charming chateau inhabited by the late Lord Brougham at Cannes, is to become the residence of no less a personage than the statesman Herr von Bismarck. The story goes that General Bulow, who had just concluded a bargain in the name of the illustrious minister, set to reading the famous distich of Ovid inscribed on the colonnade:—

"Inveni portum; spes et fortuna valet;
Sed me miseris, ludicræ nunc alios."

A young gentleman who accompanied him asked, wagslily, if this was to become the motto of the Prussian minister.

THE HOLY SEPULCHRE.—A letter from Jerusalem in the *Moniteur* says:—"The works for the reconstruction of the cupola of the Holy Sepulchre, which have been carried on with extreme rapidity, appear to be approaching their termination. At the end of last year the iron ribs were completed, and the lantern placed on the summit. An idea could then be formed of the elegant proportions of the new dome. The previous edifice, being too flat, had a heavy appearance. The present cupola, being about 6 ft. higher, and surmounted with a cross, rises more conspicuously above the surrounding buildings."

THE BIRMINGHAM WORKHOUSE SCHOOLS.—At a recent meeting of the local guardians, Mr. Biddle said the Poor Law Board's architect and medical examiner of plans had conceded all that the guardians asked in reference to the workhouse schools, except that they wished the building to be a little wider and longer.—Mr. Hawley: And to have a large bath, to teach the boys to swim.—The architects (Messrs. Martin & Chamberlain) reported that they had had two interviews with Dr. Smith, the medical examiner of plans, and Mr. Savage, the architect to the Poor Law Board, with reference to the plans of the proposed new schools for 300 boys. Mr. Hawley moved that the plans, modified in the manner indicated in the report, be sent to the Poor Law Board for their seal. This was agreed to.

CLEAN ROADS.—R. T. writes:—"It is computed that three-fourths of the dirt on the London streets arise from horse-dung, either as pulverized dust or mud. It causes much damage and annoyance, ill-health, and ophthalmia. To remedy the above, I would hook a wire basket with hinged front on the vehicle immediately behind the animal, so that the upward motion of the tail would open the front (by means of a thong fixed to the crupper) to receive the droppings, to be emptied into parish receptacles if necessary. All shop sweepings ought to be thrown into the dust-hin. I hope no squamisher will expect an apology for this dealing with Nature."

THE PROPOSED PAXTON MEMORIAL AT LEIGHTON BUZZARD.—The members of the Leighton Buzzard Working Men's Mutual Improvement Society have had a meeting at the Cedars, the residence of Mr. J. D. Basset, where they presented an address to Lord Charles J. F. Russell, advocating his lordship's suggestion, made at the inauguration of the recent industrial exhibition, to establish in this town an educational and popular institute, to be associated with the name of the late Sir Joseph Paxton, as we have before mentioned. It was resolved in course of the proceedings, "that the proposed memorial shall be called 'The Paxton Institute,' and shall be devoted to the advantage of the working-classes and the inhabitants of the locality generally." A committee was appointed to carry into effect the proposed Paxton Institute.

PUBLIC MUSEUMS AND LIBRARIES.—A meeting has been held at the Society of Arts for the purpose of urging upon the Government "the duty of placing upon a footing worthy of national institutions the public museum of inventions and free scientific library connected with the Patent Office." The objects of the association by which the meeting was convened are the opening of the national collections on week-day evenings, and the promotion of the adoption of the Free Libraries and Museums Act. Professor Leone Levi occupied the chair, and was supported by a considerable number of gentlemen interested in promoting the extension of public museums and libraries. Appropriate resolutions were agreed to, including one authorizing the Chairman to petition Parliament through Mr. Layard and Lord Lichfield.

THE LIVERPOOL ARCHITECTURAL SOCIETY AT WYNNSTAY.—The annual excursion of the Liverpool Architectural and Archeological Society took place on Saturday, Wrexham and the neighbouring locality of Wynnstay being the scene of the Society's visit. There were about thirty in the party. After their visit to Wynnstay they partook of dinner at the Wynnstay Arms Hotel, Wrexham. The chair was occupied by Mr. F. Horner, the president, and the vice-chair by Mr. William Hay, one of the vice-presidents; and the company included the Mayor of Wrexham, Mr. Walker. Afterwards the party visited the parish church of Wrexham, and several ascended the tower, from the summit of which a most extensive view of the surrounding country is obtained. Shortly before ten o'clock the visitors left the Wrexham station, and returned by rail to Liverpool.

THE COST OF THE NEW WORKHOUSE FOR SOUTHAMPTON.—At a recent meeting of the local Guardians, a letter was read from the Poor Law Board as to the letter of the Guardians forwarding a statement to show the manner in which the £8,800, borrowed by the Guardians for the erection of the new workhouse had been expended, and also a statement showing the purposes for which the further sum of 7,000, was required. The estimated cost of 4,689, for extra works seemed to the Poor Law Board to be rather large, being nearly 23 per cent. on the amount of the original contract. Before determining what further amount they should authorise the Guardians to borrow, they requested some general particulars of the several items. The Deputy-President thought that the Poor Law Board were not warranted in asking for such information, and that the architect should not be called upon to go into an explanation of detail in matters which should rest for the present entirely with himself and the builder. A committee, however, was appointed to consider the letter, and to furnish the information required by the Poor Law Board. The architect mentioned that there had been matters in connexion with the foundations of the workhouse building that could not be foreseen, and which had tended very considerably to raise the expenses which had been incurred for extras.

ENGINEER OF NEW WORKS FOR ST. PANCRAS GUARDIANS.—The guardians of St. Pancras have elected Mr. S. Tinney for the office of resident engineer and clerk of the works, at the Leaveland Schools, at a salary of 300*l.*, with house, coal, and gas.

SOUTH KENSINGTON MUSEUM.—The number of visitors during the week ending the 4th of July, was, on Monday, Tuesday, and Saturday, free, 14,755; on Wednesday, Thursday, and Friday (admission, 6*d.*), 3,806; National Portrait Exhibition, by payment, 2,089: total, 20,650.

ARCHITECTURAL AND ARCHEOLOGICAL SOCIETY OF DURHAM AND NORTHUMBERLAND.—The second general meeting of this Society has been held at Dunstanborough, Bamburgh, and neighbourhood. The committee met at Alwrick at an early hour, and drove *via* Rock and Rennington (visiting the churches *en route*) to Embleton. The ruins of Dunstanborough Castle were then visited. A pleasant drive along the coast brought the committee to North Sunderland and Bamburgh, where the castle and churches were inspected. After staying all night at Belford, the committee drove to Old Bewick, by Chetton and Chillingham, where the old chapel and old British camp were visited by the party and described by Mr. Greenwell. The committee dined with Mr. Langlands and several friends at Old Bewick. They returned to Alwrick by way of Egingham, and reached Newcastle at a late hour after a most pleasant excursion.

METROPOLITAN DRINKING FOUNTAIN ASSOCIATION.—The annual meeting of the members and supporters of this useful association has been held in St. James's Hall. The chair was taken by the Hon. F. Byng. Mr. John Lee submitted the report from the committee. It expressed a hope that the generous support the association had hitherto received would not fail it until public free supplies of water for man and beast were placed in all the leading thoroughfares of the metropolis. The association had now 117 fountains and 99 troughs under its care and supervision, and although they were spread over an area of something like 100 square miles, and were exposed to all the injury which thoughtless mischief, willful malice, and unavoidable accident could inflict upon them, yet so efficiently had the supervision been carried out that at the present time there was not a single one out of repair. The total amount received during the year had been 3,649*l.*, but of that sum no less than 1,340*l.* had been contributed for memorial fountains of special designs, and on special sites chosen by the donors. The report complained that in the establishment of cattle-troughs the society had not received that amount of support they had a right to expect from the Society for the Prevention of Cruelty to Animals, which had offered simply a sum of 10*l.* for each trough, which was only equivalent to one-year's maintenance. Eight fountains and thirty-five troughs had been erected during the year.

THE BATH AND BRISTOL COLLIERY PARTNERSHIP, LIMITED.—The prospectus of this company states that at Twerton, about two miles from Bath, ten miles from Bristol, and 103 miles from London, a colliery has been opened on the Somersetshire coal-field, and the present lessees, Messrs. F. & D. Brown, have expended thereon about 10,000*l.* Seams of coal, seven in number, and of the aggregate thickness of 26 ft., have been discovered, and, to a great extent, placed in order for mining, removal, and sale. It admits, therefore, of being worked with safety and economy. The colliery is near the Kennet and Avon Canal, and half a mile from the Great Western Railway. It is convenient for the supply of Bristol and Bath, and there is only one colliery nearer the metropolis. The proprietors desire to complete and extend the works by the addition of a second shaft, and other arrangements, for effecting with greater economy large and profitable deliveries of coal. These objects it is thought may be best obtained through the instrumentality of a small limited partnership. The partners would have to provide a capital of 26,000*l.* On this capital it is calculated that a net annual profit would be earned of 16,320*l.*, enabling a dividend to be paid of 30 per cent., and leaving a sum for reserve, improvements, and extensions. The proposed capital of the company is 35,000*l.* This is probably the first partnership under the Limited Liability Act brought out for public participation without any board of directors, solicitor, &c.

MR. LONGFELLOW.—Mr. John Watkins, of Parliament-street, has made some excellent photographic portraits of this distinguished poet. On Tuesday last, Mr. Longfellow sat to Mr. E. Goodwyn Lewis for a crayon portrait.

THE DEBTS OF THE METROPOLITAN BOARD OF WORKS.—The total amount borrowed up to January last was 3,073,000*l.*, of which 1,520,633*l.* 6*s.* 8*d.* have been repaid, leaving the sum of 6,552,366*l.* 13*s.* 4*d.* still outstanding. The rates of interest at which the money has been borrowed vary from 3½ to 4½ per cent.

THE OPENING OF THE ABBEY MILLS PUMPING STATION OF THE METROPOLITAN DRAINAGE WORKS.—It was announced at the last meeting of the Metropolitan Board of Works that, as the Duke of Edinburgh could not open the Abbey Mills Station, there would be no public opening and no invitation to members of Parliament.

DEATH OF THE INVENTOR OF THE REAPING MACHINE.—Mr. John Common, of Denwick, near Alwrick, has recently died, in the 91st year of his age. He is held to be entitled to renew for his many useful inventions and improvements in agricultural implements, especially for the American Reaper, of which he is known as the original inventor.

PROPOSED REMOVAL OF BILLINGSGATE MARKET. A proposal is now before the Corporation of the City of London for the removal of this ancient market to some central part of the City, where it can be brought in direct communication with various railroads. The Markets Committee of the Common Council have reported that the most eligible situation would be in connexion with Farringdon Market, or some spot adjoining or near the new Meat and Poultry Market at Smithfield.

THE PROPOSED NEW ASYLUM IN WARWICKSHIRE FOR IDIOTS.—The committee appointed at the last sessions to consider the question of founding a new Asylum for Idiots has presented to the Court of Quarter Sessions for the county plans and estimate for the new building, which had been prepared under the guidance of Dr. Parsey, the medical superintendent of the county asylum. The estimate was 10,000*l.* The purchase of the land had been completed for 1,500*l.* The committee recommended that the plans should be forthwith forwarded to the Commissioners in Lancashire for approval. The report was received and adopted. The site of the new building is close to the present asylum at Hattou.

HYDE PARK AND FINSBURY PARK.—In reply to questions in the House of Commons, Lord J. Manners said that it was not proposed to cut down any more trees of the slightest importance in the present year for the purpose of making a drive in Hyde Park to the north of the Albert Memorial. It was only proposed this year to make the drive at the south side of the Albert Memorial, to rebuild the lodge at the other side of the Queen's-gate, and also to carry the drive from the Serpentine straight across to the Exhibition-road. Next year it would be necessary to propose a further vote for relaying the grounds to the north of the Albert Memorial, on which occasion explanations would be given of the intentions of the Government. As to Finsbury Park, Mr. Tite said that the Finsbury Park Act dated ten years back, at which time the Government of the day undertook to defray half the cost of the park. In consequence of the opposition and rejection of the first vote of 50,000*l.* towards the expense of the park, the Board had an extremely difficult duty thrown upon them, for they had not only to pay the original outlay but also to maintain the park. The Board, therefore, decided, instead of purchasing 230 acres, to purchase 130; and they were now enclosing the ground at a cost up to the present of 94,000*l.*, but which would exceed 100,000*l.* before the work was completed. With the view of diminishing the cost to the ratepayers, the Board had resolved to lay out a portion of the land for holding purposes, without, however, damaging the larger area of the park, which amounted to 110 acres.

TENDERS.

For alterations and additions to a detached house at Stamford-hill. Mr. Herbert Ford, architect. (No quantities).—

Hayworth	273 0 0
Kent	298 0 0
Lewis	682 0 0
Crab & Vaughan	561 0 0
Freedy & Son	493 0 0

For alterations and additions to house No. 242, Blackfriars-road. Mr. George Perry, architect:—

Pearman & Fothergill	21,325 0 0
Axford	1,175 0 0
Gadsby	1,016 0 0
Bishop	993 0 0
Bamford	870 0 0
Langmead & Way	970 0 0
Macey (accepted)	940 0 0

For a lodge at Erit, Kent. Mr. Herbert Ford, architect. (No quantities).—

Kelph	187 5 0
Grumbrell	2,991 0 0
Willis	167 0 0
Catchpole (accepted)	164 0 0

For alterations to Star Life Assurance Office, Moorgate street, City:—

Weekes	23,930 0 0
Dove	2,560 0 0
Clummen	2,991 0 0
Bennett	2,880 0 0
Cloogh	2,575 0 0
Nixon	2,795 0 0
Cole	2,550 0 0

For villa at Lower Sydenham, for Mr. G. Sully:—

Morrill & Ashby (accepted)	4,440 0 0
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For new chancel, spire, roofs, &c., and restoring St. Mary's Church, Walkworth, Northamptonshire. Mr. O. H. Driver, architect. Quantities by Mr. R. O. Harris:—

Jacker & Shaw	4,180 0 0
Orchard	3,888 0 0
Kimberly	3,790 0 0
Davis, bricklayers	3,493 0 0
Franklin & Son	3,450 0 0

For additions to Grove Hall Lunatic Asylum. Messrs. Tolley & Dale, architects:—

Fawcett	23,449 0 0
Rivet	1,573 0 0
Perry & Co.	1,707 0 0
Perch	1,907 0 0
Abraham	1,696 0 0
Hill, Keddall, & Waldram	1,888 0 0
Hedges (accepted)	1,698 0 0

For alterations, &c., to premises, Southwark-street. Mr. N. S. Joseph, architect:—

Conder	2,503 0 0
Hill & Keddall	1,807 0 0
King & Sons	453 10 0
Newman & Mann	403 0 0

For Sandy National schools, Beds. Messrs. Wm. G. Heberston & Pite, architects:—

Cowland	21,990 0 0
Patinson	1,900 0 0
Curter & Son	1,807 0 0
Curvin	1,737 0 0
Twelvetares	1,678 0 0
Field	1,595 0 0

For alterations and additions to the vicarage-house Mucking, Essex. Mr. Charles Innes, architect:—

Curbet	2,256 0 0
Place	895 0 0
Rivet	893 0 0
Blake	735 0 0
Davey	769 0 0
Lilleystone	730 0 0

For villa residence, St. Peter's-road, Croydon. Mr. Brooks, architect:—

Henshaw	22,178 0 0
Goodwin	2,449 0 0
Holledge	1,925 0 0
Langmead & Way	1,750 0 0
Wells	1,744 0 0
Cowland	1,690 0 0

For country house at Wantage, Berks, for Mr. F. F. Bullock. Mr. J. P. Spencer, architect. Quantities supplied:—

Briant	23,213 0 0
Dover & Co.	3,000 0 0
Nightingale	3,727 0 0

For alterations and additions to 19, Great Windmill street, for Mrs. Kemp. Messrs. Olazie & Son, architects:—

Nightingale	227 0 0
Nightingale	227 0 0
Batchelor	177 0 0

For national schools, Harst Pierpoint, Sussex. Messrs. Gaulty & Gibbins, architects:—

Stanbridge	22,200 0 0
Lockyer	2,405 0 0
Chappel	2,075 0 0
Cheesman	2,470 0 0
Howell	2,468 0 0
Kirk	1,470 0 0
Nash & Co.	1,922 0 0
Nightingale	1,838 0 0
Hill & Co.	1,870 0 0
Holland (accepted)	1,807 0 0
Wasey	1,583 0 0

For the erection, above basement, of house, for Dr. Edward Davies, in Grosvenor-road, Wrexham. Mr. Edward Jones, architect:—

Samuels	22,350 0 0
Owens	2,390 0 0
Rogers	2,155 0 0
Rogers (with alterations)	2,140 0 0

* Accepted.

For two brick bridges and four iron and brick bridges, proposed to be built at Goldings, near Hertford. Mr. John B. Badcock, architect and engineer:—

Fleet & Newey	110,665 12 6
Dixon	8,180 0 0
Floyd	7,400 0 0
Crampton	7,230 0 0
Shaw & Co.	7,110 0 0
Conch	6,880 0 0
Clarke	6,886 0 0
Jackson	6,128 0 0

The Builder.

VOL. XXVI.—No. 1328.

Alleyn's College of God's Gift, Dulwich.

EW buildings, extensive and handsome, are being erected for Dulwich College, and it may be hoped that the Institution is about to be re-organized. A magnificent future is before it if proper advantage be taken of circumstances. The 10,000*l.* invested by the "poor player" for the purposes of education and charity have become many hundreds of thousands, and will continue to augment enormously. Rightly applied, what an immense amount of advantage may be obtained from it. That Dulwich College has heretofore fulfilled its mission, few will be found to assert.

Two very valuable papers, recently published in *Macmillan's Magazine*,

give the story of the foundation in a pleasant form, and help us to some facts. Edward Alleyn, the founder of Dulwich College, was born on the 1st of September, 1566, in the parish of St. Botolph, Bishopsgate, where his father, a gentleman by birth, followed the calling of an "inholder." The Pye, near Devonshire-square, was the name of the inn, and there Edward Alleyn first saw the light. His father died when our hero was only four years old. His mother contracted a second marriage with an actor named Browne. At an early age Alleyn manifested a great aptitude and liking for his stepfather's calling, and was initiated while still in his early teens into the mysteries of the stage. He rose rapidly to eminence in his profession. Heywood calls him inimitable, and the best of actors. Sir Richard Baker's Chronicle tells us that Alleyn and Burbage were "two such actors as no age must ever look to see the like."

Like Shakspeare and other players of the time, Alleyn early became a part-owner in theatrical property. He acquired a partnership with Henslowe, in the Rose Theatre, at Bank-side, in close proximity to the Globe, where Shakspeare a few years earlier first assumed the huskin. In 1592 he married Henslowe's step-daughter. Henslowe's Diary (Dulwich manuscripts), gives the date of the wedding in the following terms:—"Edward Alen was married unto Jone Woodward the 22 daye of October, 1592, in the iij and thirtie yeare of the Queene's Ma^{tie} Rayne, elizabeth, by the grace of god of England, france, and Iarland, defender of the fayth."

The picture afforded by existing documents of the domestic life of Alleyn, his wife, her mother, and Henslowe, at their home "harde by the

chapel ohynde, by the banksyde neere Wynchester House," is a pleasant one.

Alleyn acquired by his marriage a property in Sussex, which he disposed of in 1596 for 3,000*l.* He withdrew from the stage for about a year (1598-9), and lived in retirement at the house of a friend (The Brill, Lewes) in Sussex. He then resumed his position among the foremost players. At a city pageant on the 15th of March, 1603, in honour of King James's visit, Alleyn, attired as Genius, recited a congratulatory address to his majesty. Dekker reports (1604) that his speech was delivered with "excellent action, and a well-tun'd, audible voice."

In 1604, Alleyn and Henslowe purchased from Sir W. Stuart, for 450*l.*, the patent office of master of the king's games of bears, hulla, and dogs." The speculation seems to have turned out a good one. Alleyn was the chief, if not the sole proprietor of the Fortune Theatre, between Golden-lane and Whitecross-street. The property became a source of much trouble to Dulwich College in after years, but in Alleyn's time it appears to have proved a very remunerative speculation. It was commenced in 1600, and opened for representations in 1602. He was now a prosperous, yet withal a very thrifty man. Between 1606 and 1611 he bought numerous estates, most of them copyholds of the manor of Dulwich.

Alleyn appears to have taken up his residence in Dulwich in 1607. He occupied the Manor House, afterwards called the Court House, an old-fashioned stuccoed residence, which is still tenanted. He now resolved to found and endow in his own lifetime an institution like the Charter House, for the reception of aged pensioners and the nurture and education of orphan boys. He began his building in 1613, and completed it early in 1617, on a plan which he appears to have originated, and in the development of which he was assisted by Benson, his builder. The specification for Benson's work is still preserved, with memoranda showing payments made to him as the work progressed. Henslowe died in 1616, and his wife in 1617, and their property fell to Alleyn in right of his wife. This of course added to available resources for setting the college going. Much tedious negotiation ensued with Lord Chancellor Bacon and the officers of the Star Chamber, before Alleyn could secure the royal authorization of his scheme.

The Letters Patent of King James, dated June 21st, 1619, at last empowered Alleyn to found the College of God's Gift at Dulwich, to endure for ever, for the maintenance of poor men, women, and children, and the education of poor children; the college to consist of a master, warden, four fellows, six poor brethren, six poor sisters, and twelve poor scholars; the Archbishop of Canterbury to be visitor thereof. On September 13th, 1619, he formally established the college by an inaugural ceremony, followed by a banquet. His diary-record of the event runs as follows:—

"They first heard a sermon, and after the instrument of erection was by me read, and after an anthem, they went to dinner."

Inigo Jones is mentioned as amongst the guests on the occasion.

By deed dated April 24th, 1620, Edward Alleyn conveyed the lands specified in his Letters Patent to the sole use of the members of the corporation which he had established. A second statute provides for a large addition to the members. The original statutes are now superseded by the scheme of 1857, so that it is unnecessary to speak here of their unwise provisions.

The founder's preference for the four parishes named by him as those from which the poor scholars and brethren and sisters should be selected, was based on his perception of the doctrine that property has its duties as well as its rights. He owned theatres and houses in St. Saviour's and St. Luke's; his patrimonial

estate was in St. Botolph's; and he had acquired by purchase the whole lordship of Dulwich, in the parish of Camberwell.

The old buildings are capacious, having regard to the limited numbers they were built for, and comprise a chapel, dining-hall, parlour, library, school-room, kitchen, and appurtenances. They occupy three sides of a square. In the rooms, corridors, and staircases of the college are numerous pictures and portraits bequeathed sixty years after the founder's time, by Cartwright, the actor, as well as pictures left by the founder himself, his own full-length portrait, and portraits of later date. These are distinct from the collection forming the well-known picture gallery, which is a modern supplement to Dulwich College.

Alleyn's first wife died in June, 1623. He soon after married Constance, daughter of the well-known Dr. Donne, Dean of St. Paul's. The marriage is recorded in the parish register of Camberwell Old Church in the following terms: "Married, December 3rd, 1623, Edward Alleyn, Esq., to Mrs. Constance Donn." Alleyn, who was older by six years than his father-in-law, Dr. Donne, lived less than three years after his second marriage. The date of his will is 13th November, 1626. He died on the 25th of the same month (though his gravestone erroneously states the 21st), and was buried in accordance with that clause of his will which runs—

"My body I will to the earth from whence it came, without any vain funeral pomp or show, to be interred in the quire of that chapel which God of His goodness hath caused me to erect."

A polished black marble slab lies over his remains in the College chapel, bearing the inscription:—

"HERE LYETH THE BODY OF EDWARD ALLEYN, ESQ. THE FOUNDER OF THIS CHURCH AND COLLEGE, WHO DIED THE TWENTY-FIRST DAY OF NOVEMBER, A.D. 1626, ÆTAT. 61."

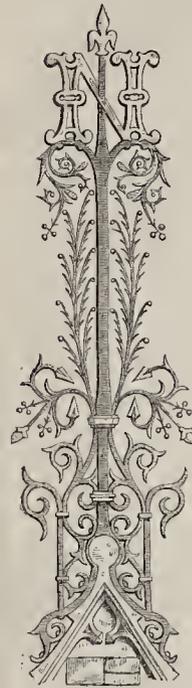
All who cherish the memory of Alleyn, and of the good old times in which he played so well his earthly part, would rejoice to see an earlier stone, and a memorial of Joan Alleyn formerly in the chapel, restored to the light of day. They should be dear to Dulwich as memorials of that old English worthy to whom the place owes so much.

The original College buildings, according to *Macmillan*, soon proved wanting in stability. Serious dilapidations, entailing heavy expenditure for renovation, mark the whole history of the College. Within a dozen years of the founder's death the steeple fell, and occasioned an outlay which swamped the salaries of all the higher officials, and necessitated a partial suspension of other ordinary expenditure for half a year. Not long after, the whole east wing fell down, and part of the other.

In 1667 other portions of the college fell down. The chapel register tells us, under date May 28th, 1703, "The colledge porch with y^e treasury chamber, &c., tumbled to y^e ground." In 1740 the east wing was so dilapidated as to necessitate rebuilding. From 1812 to 1833 the expenditure on repairs and restorations exceeded 22,000*l.* In more recent years, up to 1866, the outlay under the same head has been proportionately heavy.

In 1857 the Charity Commission gave Dulwich a new scheme, and pensioned off the members of the dissolved corporation.

The range of instruction now embraces the usual English subjects, with Latin, Greek, modern languages, mathematics, physics, mechanics, chemistry, and natural sciences. At present only one modern language (French) is taught, and science is postponed until the new buildings are ready to receive the boys, now crowded into a set of inconvenient rooms in the old college. It seemed at one time that suitable buildings could be only hoped for, but never seen, by the present generation. Mr. Rogers, chairman of the governors, when laying the foundation-stone of the new schools, on the 26th



June, 1866, stated that the money paid by the two railway companies, whose lines intersect the estate, had put the College thirty years in advance of what would otherwise have been its position.

Of the new schools, now nearly completed, we give a view and plans.* The main buildings are of four stories, and comprise residences for the under-master of the Upper School, and the head-master of the Lower School, besides library, board-room, &c.: a detached house will be built for the master of the college. One wing takes the Upper School, the other the Lower; both communicate by a cloister with the central hall, for collective gatherings, such as speech-day celebrations.

They are intended to fulfil the intentions of the Act of Reconstitution of the charity of 1853 so far as the educational part of the scheme goes. The acreage appropriated for the school buildings, official residences, administration offices, with play-grounds and play-fields for both schools, is 25 acres. A further area of 20 acres is reserved adjacent, to be hereafter appropriated for boarding-houses or other college requirements as may be found desirable. The precincts are thus about 45 acres,—equal, we believe, to those of any public school in England.

The new buildings are designed to provide accommodation for 600 boys, equally divided between the upper and lower schools for education on the class-room system and according to the "curriculum" provided by the Act of Parliament.

Foundation scholars, who will be clothed, fed, and educated free of all cost to their parents or guardians, will be accommodated to the number of twenty-four in the upper school and thirty-two in the lower school. The various usual appendages to great schools are also provided, such as libraries, reading-rooms, day-rooms, bath-rooms, and so on, with hat and coat rooms and lavatories, of course. The buildings are disposed so as to keep the upper school complete in the south wing and the lower school in the north wing, while the central mass of building (connected by the play cloisters with each wing) will contain the great hall, library, lecture-theatre, laboratory, &c., which are for the common use of both upper and lower schools.

The governors have been enabled to build the new college buildings at the present time in consequence of having received large sums in compensation for land taken by several railways traversing the estate, and being permitted by the Charity Commissioners so to apply these sums. But for these circumstances they could have raised the funds only by sinking their annual rental to such an extent as would have been liable to cripple the immediate efficiency of the schools when built. As it is, this special fund will provide the cost of building, and rental (which is on the increase) will provide means for carrying out the scheme liberally and well. Let us hope this will be done.

The estate which forms the rich endowment of the College consists of about 1,400 acres of as beautiful and attractive land for building as is to be found within five miles of London, and is being occupied with villa residences of an superior kind, pains being taken to preserve its present beauty while developing its resources in this respect.

The income in the founder's time was 800*l.* per annum. The last year's income from rental of Dulwich estate was about 13,000*l.*, of which about 4,500*l.* were absorbed by life annuities to the members of the late corporation, in accordance with the Act of Parliament, leaving 8,500*l.* if not more, available for the educational branch, the eleemosynary branch, and general estate and administration expenses.

The governors have founded two scholarships of 60*l.* a year each, and propose largely to add to these as their expected resources will gradually allow. An income of at least 20,000*l.* a year may be plainly seen in the middle distance.

It is probable the report of the Public Schools Commissioners which refers to Dulwich, will result in some important changes both affecting the division of the school into upper and lower schools, with different endowments; and also as to the appropriation of some parts of the building in a different manner to that at first intended, and in relation to which first intention they have been designed. All this, however, is at present unsettled.

The four parishes of St. Botolph, Eishops-

gate; St. Luke, Old-street; St. Saviour, Southwark; St. Giles, Camberwell, equally participate in all the benefits of the foundation; but it is anticipated that ample room will remain for scholars from all parts of the country as at our other English public schools. The plans also will admit of enlargement should it ever be found necessary.

The governing body consists of nineteen governors, of whom eleven are appointed for life by the Crown, and the remaining eight are made up by two governors from each of the above parishes, who are elected by the vestries for a term of seven years.

The new buildings, which are from the designs of Mr. Charles Barry (the architect and surveyor to the governors), are approaching completion under his personal superintendence.

The style is Northern Italian of the thirteenth century, of which beautiful examples are seen at Milan, Verona, Parma, Pavia, &c. The materials are almost exclusively brick and terra-cotta of various colours; the use of which latter material has been of late much studied, and the manufacture for building purposes brought to considerable perfection. The roofs are covered with Taylor's patent dull red tiles, glass tiles being inserted where light is required.

The whole building will be of fireproof construction, substantial and good, with only sufficient ornament to be appropriate to its position and objects, and the important rank it is hoped that Dulwich College will take in future times.

The contract for the buildings (exclusive of finishings, fittings, &c.) has been taken by Mr. Downs, of Union-street, Southwark (whose tender was the lowest sent), at 62,000*l.*; and the fittings, finishings, &c., will cost an additional 15,000*l.* The present contract does not include a school chapel, for which, however, an appropriate position in the general plan is reserved, and which will, it is hoped, be commenced ere very long.

Class-rooms provide about 12½ ft. floor per boy, 250 cubic feet per boy, and are about 15 ft. in height.

The terra-cotta work is being executed by Mr. J. M. Blashfield, of Stamford. A paper on this interesting subject was read by Mr. Barry at the Royal Institute of British Architects; part of which we print in our present number.

A few lines concerning Dulwich Picture Gallery will be in place. One Noel Desenfans, a picture-dealer residing in London, had been commissioned to form a collection of pictures for Stanislaus, king of Poland, and had bought many in consequence. Political changes prevented the fulfilment of his commission, and when he died he left all the pictures he had in consequence acquired to his intimate friend Sir Francis Bourgeois, R.A., a Londoner, though of foreign extraction. Bourgeois determined on bequeathing them to the country, and, according to the story, asked John Philip Kemble where he should build a gallery to contain them. Kemble, an actor, suggested Alleyn's College at Dulwich, and the advice was taken. The present gallery attached to the college was built from the designs of Sir John Soane, in 1812. Bourgeois, reserving a life interest to Mrs. Desenfans, left 2,000*l.* towards the building, and 10,000*l.*, the interest of which was to meet current expenses. Mrs. Desenfans gave up her life interest, and left 4,000*l.* in addition. The bequests having been invested when the Funds were very low, are now represented by a total of 17,500*l.* Consols. We heard with pleasure at the last "speech-day" that it is in contemplation to establish an Art-School near the Gallery, the pupils of which may get their general education at the college with the other boys.

LONDON: ITS CHARITABLE AGENCIES AND WANTS.*

WHEN energetic, pious, charitable people arrive in London from villages, or other small spheres, where they have been accustomed to see much of their poorer neighbours, visit them, advise them, sometimes relieve any pressing wants that merited misfortune may have brought to them, sometimes entertain them, and more frequently assist in educating their children, they generally find themselves unable to continue this branch of well-doing. They would

often like to treat the dismal houses of the slums as they have been accustomed to regard the cottages of their country quarters, but they do not know how to begin, or how their attempt might be received. This difficulty was felt, a few years ago, by a young barrister, among others, who, however, surmounted it, and has now recorded his experiences for the benefit of those in a like position. He points out a few ways in which it is easy for the new comer to London to help the poor, and gives information of some of the most prominent existing agencies, to the end that they may place themselves in communication with them if they think proper. His work is not intended to supersede such parochial machinery as may be already in existence, but rather to supplement it with information concerning the more general charities available for the deserving poor. In the course of visiting it is frequently the case that some families never require pecuniary aid; that those may be materially assisted by advice of various kinds, letters of recommendation, information in cases of sickness, where to obtain surgical appliances gratuitously, and other help that the well-informed are able to give the unformed. The work is quick with suggestions to laymen of the modes in which they may make themselves useful to their fellow-creatures. Its pages disclose, too, that there are among us numbers of professional men who have not yet learnt to believe in the efficacy of compounding by money for personal service, and who, undisturbed by the distractions of the great metropolis, spend their leisure among the poor, consoling, sympathising, helping, and teaching.

Mr. Bosanquet informs us that when he first came to live in London he used to tell persons who begged of him in the streets to go to their clergyman, or to some one who knew them,—not to come to one who knew nothing of them. This was under the supposition that there was as much intercourse between the rich and poor in London as there is in villages, and that there could be no really deserving persons without a friend better off than themselves to whom they could go for advice and help. But he soon found that respectable persons might be reduced to beggary and starvation without any such assistance being available. To make the inadequacy of the existing systems clear, he gives an account of the growth of London in the days of yore, and in the present century; of the church-building movements previous to 1856; of those subsequent to that date; and of the principal charities. The Society for the Promotion of Christian Knowledge is the oldest in London. It was founded in 1698. The first district visiting society was founded in 1812, and now nearly every parish has its society, chiefly composed, however, of ladies. The number of these is too frequently insufficient. The author tells of one parish in the south of London divided into twenty-eight districts, twenty-seven of which were hopelessly vacant, and the twenty-eighth undertaken by the clergyman's wife. In 1835 the first paid agency was introduced by the London City Mission. This association divides the metropolis into districts containing about 500 poor families, and appoints an agent to visit from house to house, who is either under the superintendence of the clergyman of the parish, or of a non-conforming minister, or of a layman. There are 351 of these missionaries now at work. Then comes the Bible Society, with its 230 Bibles-women. Ragged schools, refuges, reformatories, services in theatres, are next touched upon. The Pure Literature Society is another attempt at improvement. Some young barristers, who regretted the class of publication most eagerly bought up by the working-classes, combined to help forward a more wholesome kind of mental fare, and to assist in establishing libraries in connexion with working men's clubs, hospitals, and other institutions. There are two other societies that visit and relieve the poor, the Metropolitan Visiting and Relief Association; and the Society for the Relief of Distress; and, besides these, there is the Mendicity Society, whose begging-letter department is one of the curiosities of London. With all this, there is great need of much more. "In some places," says Mr. Bosanquet, "the poor are over-attended; whilst in others they are allowed to starve in soul and body. There is no sufficient understanding between the different agencies, and, consequently, there is a want of system, and thoroughness, in the way the work is done." He calls for an undenominational organization, when it would be less frequently the case that one cholera patient should have three bottles of

* London: Some Account of its Growth, Charitable Agencies, and Wants. By Charles B. Bosanquet, Barrister-at-law. London: Hatchard & Co. Piccadilly, 1863.

* See pp. 530, 531.

brandy and his next-door neighbour none, than it has sometimes been. We are told by a clergyman that there was only one family in his district that kept a cook, and that was his own; and another clergyman is quoted who stated there was not a family in his district whom he could ask for a shilling, and not a family who would not be glad to accept one from him; while in some parishes there are so few poor that they run a risk of being spoilt with too much attention, and in others there is actually no employment for willing workers, nor use for contributions. Organization and distribution of forces and funds are clearly wanted.

People who doze away their Sunday afternoons will be startled to hear how these few leisure moments are seized by ardent spirits, who have worked as hard as the dozers have throughout the week, to go about and do good. It is on Sundays, it is argued, that the poor are left most to themselves, and a little unofficial visiting with reading or conversation with them in their homes has been found welcome in quarters hitherto considered unapproachable. The infirmary of a workhouse, where many of the inmates cannot attend chapel, is a place where a little attention of this kind is sure to be appreciated. Schools, too, afford ample scope for great working powers. Some of the ragged schools have been founded and are worked exclusively by young professional men. Mr. Bosanquet gives an account of the families in a *cul de sac* among whom he first broke ground. It requires an effort, he admits, to make acquaintance with strangers, but when effected the result is sure to be satisfactory. How the first plunge, as he calls it, was made in his instance the reader must ascertain by reference to his volume.

We pass on to remind our readers what has been done for London by the dwellings improvement associations towards making up for the arrears of two centuries. There are eight of these societies at work, and much private effort has been made in this direction, foremost among which must be recognised the munificence of Mr. Peabody and Miss Counts. The overcrowding and other insufficient sanitary arrangements that first attracted attention in the reign of Queen Elizabeth, and had been gradually getting worse and worse as the people settled down again after the Great Fire and time passed by, were first grappled by the Society for Improving the Condition of the Labouring Classes, who about the year 1814 began to build a range of improved houses at Bagnidge Wells. In 1847 a lodging-house for single men in George-street was opened by the late Prince Consort, which is now always full. Another single man's lodging-house, formed out of three old houses in Charles-street, is also always full, and brings in a net return averaging 12 per cent.; but here the society has only a short lease, and no sinking fund has been provided. In 1850 the model building for families in Streatham-street was finished, which contains fifty-four tenements, which are much sought after by respectable mechanics. This brings in 4½ per cent. This society has also improved old houses in Tyndall's-buildings and Wild-court, Drury-lane. Altogether it provides accommodation for 350 families and for 258 single men. It issues a quarterly publication called the "Labourer's Friend." The Metropolitan Association began to build in 1845, and its first block, for 110 families, in Old St. Pancras-road, was opened in 1847. This is now paying 6 per cent. The Soho-chambers, taken on lease and fitted up as lodgings for single men, have never filled well, and are still a loss to the association; neither have the Metropolitan-chambers, built in 1849 at Mile-end, for 254 single men, paid well; but ninety-six cottages, built at Peuge, near the Crystal Palace; Gathie-buildings, near Chelsea Bridge; and Ingressre-buildings, near Golden-square, are more popular. Owing to the experiments of this society taking the direction of providing for single men, whose requirements have since been considered by the Common Lodging-house Act, their operations do not appear to have been so successful as they have been in reality, for 2 per cent. has been the average interest paid to the shareholders until quite recently, when it has advanced to 3½. The St. George's, Hanover-square, Parochial Association for Improving the Dwellings of the Labouring Classes, was the next to take the field. The capital consists of donations. It owns two buildings, one in Grosvenor-mews, with thirty-two tenements of two rooms each, purchased for 3,200l., and another in Grosvenor Market, containing forty-seven

tenements. The Marylebone Association, also local, composed of shareholders, began by paying 1 per cent., and is now paying 3½ per cent. This society is considered by our author to have been more successful than any other in keeping and improving the people whom it found in occupation of the old houses which it purchased. Gray's-buildings, Duke-street, Manchester-square, twenty-ones houses, densely packed with poor Irish people, have been taken in hand, and are still let out in single rooms, at about 2s. 6d. a week, after their remodelling. Experience of this class of tenant shows that it is unwise to lay water on to the upper floors, for the sink is sure to get stopped up by mense, and disaster ensue. A new block, in Lisson-grove, belonging to this association provides for 418 families, in single and double rooms, at 2s. and 3s. 9d. per week. The Strand Buildings Company, 1857, owns but one pile of dwellings, in which the tenants pay 4s. to 5s. 6d. a week, for two rooms. The Central London Dwellings Improvement Company, of which our author is one of the hon. sec., was formed, in 1861, by gentlemen most of whom belonged to Lincoln's-inn, who wished to see for themselves whether it was not possible to provide good accommodation for small tenants without loss. So far this company has purchased three freehold properties and one long leasehold, all in the neighbourhood of Drury-lane, thoroughly cleaned and repaired them, and let them out again, often to the same tenants they found in them, in single rooms, in "rooms and slips"—that is, with a portion of the room partitioned off—and in two rooms. About 180 families are comfortably housed by them, and their dividend varies between 3 and 4 per cent. The London Labourers' Dwelling Society has paid 5 per cent. from the first. Its promoters had some experience upon which to base their operations. They were shareholders in the very successful Cottage Improvement Society at Hastings, and simply applied the plan they found answered well in the country to London, under the same auspices. They purchased houses in St. George's-in-the-field to begin with, which brought a dividend at the end of the first half-year. Subsequently they purchased houses in the east of London and in Lambeth, and they are now covering part of the famous Vauxhall Gardens with houses built in flats, and furnished with every necessary appliance for the family of a mechanic. At present the society houses 215 families, some of whom pay 7s. and 8s. a-week; others 1s. 6d. for a single room; and others, occupying a whole house at 12s. per week, are allowed to take lodgers. The next company that appeared upon the ground was the Improved Industrial Dwellings Company, Limited, 1863. This owes its existence to the example of Sir Sydney Waterlow, who built a block, containing twenty tenements, to the north-west of the railway station, and strongly advocated an extension of the experiment. The net profit of this block is said to exceed 8 per cent. The company formed with a view of multiplying this class of buildings has blocks in Old St. Pancras-road, in Wapping, and Southwark, which provide homes for 376 families at rents varying from 7s. 6d. to 4s. 6d., neatly plastered and papered, furnished with sink, scullery, and closet, and supplemented with a drying-ground on the flat roof; but these only bring in a dividend of 5 per cent. They have, too, additional property in Farringdon-road, containing 168 tenements and 12 shops. This company is the last of the metropolitan associations who have as yet made much progress. The Lambeth Association has a pile of dwellings, with external galleries, that is seen from the South-Western Railway; but it has not made much way. Miss Counts's Columbia-squares, and Mr. Peabody's still more recent gifts, are fresh in everybody's recollection. And yet with the combined efforts of these open-handed givers, not so many families have been provided for as have been turned out of small houses in the last ten years, under Parliamentary powers, to effect improvements of other kinds. "Improved dwellings of different kinds have been provided, on the closest calculation I can make," says Mr. Bosanquet, "for 3,500 families; it is obvious that, though this is not an inconsiderable result in itself, it is quite out of proportion to the wants of a city containing 3,900,000 inhabitants, the majority of whom, of course, are mechanics, labourers, or irregular poor." Our author suggests that a commission should be appointed to ascertain the best mode by which overcrowding may be effectually diminished. He also suggests that mechanics should be encouraged to build

themselves houses in the blocks we have been mentioning, as they are assisted to do by building societies in the suburbs.

It is disheartening to find that small tenants will not always second the efforts that disinterested people make in their behalf. Their drains are constantly getting stopped up through their gross carelessness, such as would warrant the dismissal of any servant from a respectable house. Pieces of flannel, rags, green stuff, are constantly found in them, and even a hammer and a spoon have been found to be the cause of their obstruction. As there never will be a day when people will voluntarily visit the houses of the poor to clean their drains for them, it is very essential that they should be instructed in this simple matter when the rooms are let to them; and perhaps it would be well if it were clearly understood that carelessness in this respect would be the just cause of notice to quit. Owing to this disregard and the frequent changes of the very poor, it is not considered safe to calculate on clearing more than 50 per cent. of the nominal weekly rent of rooms in the lowest class of house property in London. "Repairs and rates, collection, bad debts, and empty rooms swallow up the other half. If any but the simplest and strongest fittings are put into such houses, they are a permanent source of expense."

The modes in which poor relief is administered in Elberfield, in Paris, in New York, and amongst the Jews in London, are shown as, in some particulars, affording useful information. In conclusion, Mr. Bosanquet gives extracts from the papers of an association of which he is lay-secretary, formed since his book was planned, for the organisation of the efforts of lay-helpers for the disease of London, in which Sunday work, evening work, day work, and general work are laid out for the acceptance of the eager souls anxious to give their personal services to the poor. He advocates the appropriation of a fixed proportion of a man's income to religious and charitable purposes, and urges that all should be ready to give and glad to distribute. If the squalor of London were found in a village some one would be sure to take the matter up. The size of London should be no discouragement, for the number of workers is also large. Mr. Bosanquet recommends new-comers not to take too much in hand when first to their work, but to choose whatever branch they feel most fitted for, and make themselves masters of it; and he reminds people not able to visit the poor that they can still exercise consideration on their behalf, and materially improve matters by such simple means as ordering work in slack seasons, and any necessary repairs and renovations to property to be done when possible in the winter. His work, as we have said, abounds in suggestions for the profitable use of spare time, and is written in a commendable spirit.

ON TERRA COTTA, ESPECIALLY AS USED IN THE NEW BUILDINGS FOR DULWICH COLLEGE.*

Difficulty in Use of Terra-cotta.

It is but fair to point out some of the disadvantages in the use of this material that do certainly exist, and cause much vexation at times to the architect. Of these, perhaps, the most embarrassing is the arrangement necessary to have the terra-cotta blocks made and ready on the ground almost before the rest of the work is begun, in order to work in when wanted as the bricklayers progress. At times this is found impossible, and annoying delays in the general work take place, for which clients will be apt to blame their architect. The lesson, of course, to be learnt from this is, to carefully mature the design at the outset, instead of our contenting ourselves, as we now too often do, with a mere sketch of what is intended, with the hope and intention of working in parts as time goes on and the work proceeds. I am not sure that architects ought to object to this, since it must produce decision of thought and precision of detail, which may be an advantage in an educational point of view, and is a serious corrective to indolence of thought in design.

There is some considerable extra labour in the office put on the architect by the use of terra-cotta, arising from the necessity of making all

* From a Paper by Mr. Chas. Barry read at the Institute of Architects, June 2nd.

full-sized detail drawings full 1-12th larger than the work is to finish, in order to allow for its contraction, which I have already said is in that proportion. I have found it necessary, therefore, to make two drawings for all such parts: one made with the usual 12-in. scale, for the use of the general contractor, the calculation of bending courses of the breaks, and the like; the other made with a special scale, 13 in. in length, but divided into twelve parts, representing inches; and with this scale making all drawings (full size) which were to be issued to Mr. Blashfield.

Another disadvantage is, of course, the risk in making and burning, which has been adverted to, the annoying result being sometimes that all the pieces of a large window or door are perfect except a few, but these few being equally essential with the rest, the work must stop till new blocks in lieu of the defective ones are made,—a matter generally of several weeks, or a temporary block must be put in and replaced with the proper one when ready.

Next, there is the difficulty (which is, indeed, only a maker's difficulty) of burning blocks which are to constitute jambs, strings, and continuous features, so as to be perfectly true and correct in the mouldings. That this is only a maker's difficulty and will be got rid of, if the use of terra-cotta in England receives the encouragement that it seems to me to deserve, I cannot doubt; the marked improvement that has taken place in this respect in the work sent up now to Dulwich, compared with that at first sent, is a complete proof of this. At the same time let it be remembered that the joints and surface of adjacent blocks can be brought into truth after being set, by rubbing down with sharp sand and water; nor if the ware is properly made, homogeneous throughout its mass and well burnt, is there any risk from rubbing down of getting a less lasting weather surface. I found this process of rubbing down much needed with the first work sent to Dulwich; but as I had contracted with Mr. Blashfield to fix his work himself, true and correct, the expense thus caused to him, without repayment, produced such increased care in the making, drying, and burning, that little or no such rubbing down is now needed. The same remark may be made as to the lines and arrises of mouldings made in lengths: there is no reason for their having a round or concave edge; but to prevent it, certain precautions must be taken before the work is burnt, and it is only necessary for architects who use terra-cotta to let the makers know that they will not pass defective in this and some other respects, to ensure that perfection in line, surface, mitres, and the like, which is necessary to good effect. Here, however, I would say that, of course these risks are much reduced if the size of the blocks is not great, and all idea of imitating the large blocks which are to be had in stone is given. There is no difficulty in this, and, indeed, it is a questionable taste to attempt it, even if it were easily practicable, inasmuch as a peculiar distinctive effect arising from the size of its pieces may, and should, perhaps, be preserved, and make at once evident to a spectator that he is looking at a terra-cotta building, no less than is now the case with a stone or a brick one.

Cost of Terra-cotta Work.

I will now touch on that question of so much interest and importance to architects, viz., that of cost: and in doing so, I think it right to say that although I shall mention some actual facts by way of examples which, as far as they go, are highly satisfactory, yet, in my opinion, the cost of terra-cotta would be largely reduced, if it became, as I hope it may become, a material far more largely employed in this country than it has been. The items which make up the cost of terra-cotta are, of course, in the first place, the clay or clays used, and their necessary weathering, mixing, and duly amalgamating; and in this part of the process greater experience will lead to greater certainty, as to the best mixtures with reference to colour, homogeneity, quality of contraction, power to resist weather, and mechanical strain, and hence some of the economy to which I have alluded may arise with greater demand for the work. Next there is the manual labour of working the clay into forms required, which I am sure, from my own observation, may be much reduced and superseded by mechanical appliances, if the cost of machinery can be incurred. Next there is the air drying, the time this process takes, and the shed space required for extensive works. Next the masons' work,

while the material is hard and dry, but not burnt, to make the blocks or mouldings true and square in their arrises, &c. Next the cost of kilns and their wear and tear, and the cost of fuel. In each or all of these items in the manufacture, we cannot doubt that more economical arrangements might be made than those now found in terra-cotta manufactories; but as all such appliances and machinery are in the first instance costly, it becomes essential that the manufacturer should clearly see such a probable demand by architects and the public for his work as may justify him in the outlay necessary. At the same time, with all these drawbacks, the economy of terra-cotta, as compared with stone, is great. Speaking in general terms, I think I may say that taking cube for cube as fixed in a building, terra-cotta costs a little less than the soft stones, as Bath, Caen, &c., while, as regards Portland, the average difference would be about 35 to 40 per cent. The greatest economy is to be found when there is much work either in extra-cutting of mouldings (which cost nothing extra in terra-cotta over ordinary mouldings) and in artistic modelled work; when, as I have already said, under-cutting and almost full relief of features is as cheaply produced as low relief. In these cases the economy is often several hundred per cent. over hard stone. Plain strings, friezes, and plinths cost comparatively more in terra-cotta than other and more enriched works in the material. To give the members of the Institute some useful facts, I will mention that the ground-floor windows at Dulwich, shown in the drawing exhibited, have been made and fixed complete for 19*l.* each; their cost in Bath stone would have been 20*l.*, and in Portland 28*l.*

The principal floor windows, which are of rather elaborate design, have been fixed complete for 41*l.* each. They would cost in Bath stone 57*l.*, and in Portland 86*l.* This cost includes the modelling the busts in high relief, which are all different, and represent from carefully sought out authorities where they can be found, men of literature, science, and art, philosophers and sages of antiquity. There are also the Muses, and a few fanciful and original female heads taken from the most familiar characters of Shakespeare. These windows do not come, with all their work, to more than 5*l.* 6*d.* a foot cube. The second-floor windows have been fixed complete for 10*l.* each; they would have cost in Bath stone 19*l.*, and in Portland 28*l.* 10*s.*

The cornice will be seen to be richly treated, the whole is terra-cotta, save only the corona, which is formed of a slab of Portland stone, bonding right through the wall. When this was designed I did not know so much of the qualities of terra-cotta as I do now, or of its transverse strength; but in a future case I should not hesitate to make these slabs in terra-cotta. The cost per foot run of this cornice, which is 15 in. projection and 4 ft. high (exclusive of the stone corona), fixed complete, is 33*s.* a foot run. In Bath stone it could not be done for less than 80*s.*, and in Portland 120*s.* per foot run.

A double-sided moulded coping, suitable for balustrades, walls, &c., 14 in. wide and 9 in. high, costs in terra-cotta about 2*s.* a foot. It would cost in Portland 3*s.* 9*d.* to 4*s.* The cost of terra-cotta for garden balustrades, vases, terminals, and the like may be stated to be between that of cement and stone; for instance, a bust, heroic size, can be modelled as an original work in terra-cotta, and completed for 10*l.* or 12*l.* A statue life-size for 25*l.* Balustrades of ornamental character, with base and capping complete, for 12*s.* to 15*s.* per foot run. The cost of the open parapet to the railway viaduct of the Brighton Railway Company in Dulwich was, exclusive of vase and coping, only 5*s.* a foot run of a thickness of 6 in.

I have referred to solid terra-cotta blocks, and those made hollow with an average thickness of 2 in. of material. The specimens in the room will explain what I mean. There is no physical difficulty in producing solid terra-cotta, and using it as enbe-stone; the only difficulty being the long time such blocks, if of large size, take to dry thoroughly and equally throughout their mass, and to be thoroughly burnt in the kiln. In almost all cases no consideration of strength renders this use of solid blocks necessary, as the strength of hollow-filled blocks is very great, and quite sufficient in nearly all cases. I shall advert to this part of my subject again; but meanwhile, as we are upon cost, I will say that solid terra-cotta blocks can be made in ordinary colours at about 3*s.* 6*d.* a cube foot. If the blocks are made hollow and filled

in with broken terra-cotta or brick in Roman cement, the cost may be stated at 3*s.* 1*d.* a cube foot; these pieces include all ordinary face-work in mouldings, panels, &c. The relative cost taken in the same way would be about 5*s.* 6*d.* for Bath stone, and 9*s.* for Portland stone.

In this place I may properly say a word as to the filling in referred to. This, it is found, should always be done with good Roman cement, and not Portland, lias, or other cements, which all contain more or less lime in a free state. Particles of lime may be found in a latent state in nearly all the ordinary Portland cements. These particles do not slack or expand for a long time after the cement has apparently set; and when they do in a confined space, such as a hollow terra-cotta block, they do so with expansive force enough to crack a block several inches thick. Roman cement does not seem liable to this, and may, I think, be safely used: also pozzuolana, thoroughly slacked lime, and clean sand. It requires about one peck of sand and one peck of cement to make solid a cube foot of terra-cotta with a thickness of 2 in. of that material. These hollow blocks so filled in may be very thoroughly and economically bonded together in the most solid way by pieces of galvanised hoop-iron being turned into the hollows of adjoining blocks before the cement filling is run in.

In the work at Dulwich college it will be seen, on reference to the section on the wall, that I have used these filled-in blocks bonded into the walls just as stone would be used, and I think this is the only legitimate way in which to employ the material, and give it its true value as a building material. Mr. Scott, in one of his works, calls terra-cotta "the highest development of brick." As such it should, I think, be used, bonding into the work as brick does, but in proportion to the size of brick or block employed. In some works recently executed this has not always been done, and terra-cotta has been put on as face slabs, or filled in to brick openings, like a wood sash or door frame would be, and not bonded at all. I have endeavoured to obtain information from actual sectional measurement of how the terra-cotta was treated in this respect by the old Italian architects, but without any definite success. All the published works show external profiles and views, but never, as far as I can find, the section. I believe myself that the old architects, like ourselves, sometimes bonded in and sometimes did not, and that the instances of the first method remain to us for our instruction, while the others have become more or less ruinous.

Strength of Terra-cotta as a Building Material.

The next part of my subject will be the strength of good terra-cotta as compared with that of stones in ordinary use. At my request Mr. Blashfield has had a series of interesting experiments made by Mr. Kirkaldy, of The Grove, Southwark, whose special attention for some years has been given to testing the strength of materials of all kinds with a degree of precision and philosophical nicety that render his results most useful and perfectly reliable. The following table will show the results, and will, I am sure, convince architects that we have here a very trustworthy material:—

Portland stone stood a crushing strain of...	283 tons.
Bath " " " " " "	83 " "
Terra-cotta block of similar size, as above seen	412 " "
A good hard stock brick has also been tested (Exp. No. 710) of the usual size, about 9 in. by 4½ in. by 3 in. and stood	17 " "
A terra-cotta block (Exp. No. 671), nearly the same size, of 12 in. by 4 in. by 3 in. stood a strain of	125 " "

The experiments have been made with different shaped pieces of terra-cotta, some of them solid, some hollow but left empty, and some with the hollow blocks filled in, as I have done at Dulwich, with brick and Roman cement. The result of experiments shows that the filling in doubles the strength of the hollow blocks, as the one showed signs of cracking with a strain of forty-two tons to the square foot, and the other required eighty-six tons to produce the effect. In these two experiments, I should mention that the ware was 1½ in. thick only, while the thickness of that used at Dulwich is always 2 in.

The first experiment showed that a solid 12-in. cube of terra-cotta will not show a crack until a crushing strain is applied of 442 tons to the square foot; and to crush a hexagon stable-floor brick 4 in. diameter and 2½ in. thick required no less than 855 tons. Mr. Blashfield informs me

that the terra-cotta of the specimens here experimented upon is a composition of clays from Cornwall, Devon, Poole, and Northampton, banded together and mixed with ground-glass, felspar, Lynn sand, and pulverized terra-cotta fragments. Before leaving the experiments, it may be remarked that the clays which are technically termed "fire clays," and resist the largest amount of heat, are the weakest against a crushing or transverse strain, and those which flux or run at a less heat are the strongest. The pieces experimented on, which were hollow, were filled with Roman cement twenty-seven days before the trial. With a longer time, the cement would have been more completely hardened, and a greater pressure would have been resisted, but this was done to represent roughly what would actually be the case in the progress of a building.

General Remarks on other Qualities of Terra-cotta.

The relative absorption of terra-cotta and stone, such as Bath stone, as a measure of possible decay, is also interesting. It has been found to be very considerably less, but I have not had the time (as I had intended) to test the proportions accurately, not only as compared with Bath, but with Portland and other stones.

When it was subject of debate with Mr. Page, whether stone paving or terra-cotta tiles should be used for the footways of Westminster Bridge, he was anxious to test its wearing capabilities for foot traffic, and had an experiment tried by grinding together with sharp sand and water a terra-cotta tile 12 in. square and a similar piece of York stone. The friction was continued for five hours, at the end of which it was found that the terra-cotta tile had lost 1.16 in. of thickness, while the York stone had lost 1/4 in. The cost of such tiles as those of which this pavement is composed can now be stated at 7d. a square foot, exclusive of cost of laying. The tiles for Westminster Bridge were made and pressed by hand; they have stood the wear of six or seven years in as busy a thoroughfare as any in London, with no very serious wear. If made now, they would, however, be pressed by machinery, and be much harder and more durable.

It is necessary here to caution my hearers that all that has been said is of course only applicable to terra-cotta in the proper sense of the word; that is, a "body" composed of such materials as have been above enumerated, very carefully mixed and blended, and very carefully burnt, with a proper regard for the greater or less amount of firing which experience teaches is required for different "bodies." Some materials, I am informed, are offered as "terra-cotta" in the market which are nothing but clay and common sand. Such compositions will not bear, without great distortion, the necessary firing heat, and are consequently soft on surface, with little transverse strength, and not durable. This ware, of course, has the specious advantage of being much cheaper, and therefore architects should be very careful to test the terra-cotta of any particular maker before deciding to use it, if they do not wish the surface of their work in a few years' time to flake off like had brick.

There has recently been discovered at Watcombe, in Devonshire, some very excellent terra-cotta clay nearly pure from all foreign matter. The ware made from this, without any mixture of other substances, is said more nearly to resemble the best Italian terra-cotta than any other. It belongs to Mr. Allen, of Watcombe, a gentleman of scientific knowledge, who has spent some time and made many experiments upon it, and it has been analysed by Dr. Percy, at the laboratory attached to the Museum in Jernynstreet.

It has not yet been largely introduced into the market, but as it is found in an enormous mass not far from the surface, and as it is considered that it can be put on board ship at Watcombe for about 3s. a ton, no doubt it will receive the attention its merits may deserve.

There is, no doubt, much more interest taken in this material quite recently than for a long time previously. Among former instances of its use I may advert to the statues, panels, reliefs, capitals, friezes at Buckingham Palace, which were executed by Croggon. Rossi executed the statues, antefixæ, pateræ, &c., at St. Pancras Church, at a cost, by the way, of 12,000l. Buhh made the bassi reliefs in the façade of the Opera House in the Haymarket; Messrs. Cubitt a great deal of ornamental terra-cotta work to the London and North-Western railway station at Broad-street, City. They have also done work

in cornices and strings at Darleston Hall; and some terra-cotta work at Columbia Market, lately erected for Miss Burdett Coutts by Mr. Darbyshire. Mr. Blanchard has done several large works recently, among them the Charing-cross and City terminus hotels, the Star and Garter Hotel, and nearly all the terra-cotta work at South Kensington; he also executed a large number of garden works for my late father, as well as the capitals to the Corinthian columns of the façade at Cliefden House, near Maidenhead. Mr. Blashfield has executed considerable works for India in public and private buildings at Bombay and Moorsheadabad, also for buildings in New Zealand; while at home, he has done the work at the Duke of Cornwall Hotel, Plymouth, for Mr. Hayward, architect; the Sun Fire-office, Charing-cross, for Mr. C. Freeman, architect; Hall and Allen's new warehouse, St. Paul's-churchyard, for Mr. R. Tress, architect; the townhall, Farnham; some work at Castle Ashby and the New India Office, for Mr. Digby Wyatt; Holy Trinity Church, Barking; sundry parapets, panels, &c., for the viaduct in Dulwich, of London, Brighton, and South Coast railway; and the works at New Dulwich College, under my own direction, are also among his recent works.

For grave-stones and sepulchral monuments in the open air terra-cotta seems peculiarly suitable, as it is fondly hoped by relatives that these memorials from the living of the dead shall remain unchanged for ever. In terra-cotta there would be no falling off of decorations, no obliteration of inscriptions as we now see in the case with the stone monuments in our churchyards and cemeteries.

The following rough and no doubt very imperfect list of some of the best moulded brick remains in England will have some interest, and can no doubt be largely added to. It shows that a considerable development of the use of this material took place in the Eastern counties, possibly from the abundance of clay and comparative scarcity of building stone in those counties. I have endeavoured to fix the dates to these works as well as I could from Butler, Smith, and the "Baronial Halls" of England.

	Date.
Little Wenham Hall, Suffolk	about 1260
Oxburgh Hall, Norfolk	Reign of Edward IV.
Eton College	Henry VI.
West Stowe Hall, Blackburn	Henry VII.
Suffolk	"
Nether Hall, Essex	"
Tattershall Castle, South	about 1455
Blickling Hall, Castle Erpingham	"
Norfolk	Reign of Henry VIII.
Giffard's Hall, near Ebbury, Suffolk	do.
East Basham Hall, Suffolk	do.
Wolterton Hall, near East	do.
Essex	do.
Hampden Court Palace	do.
Oxhed Hall, South Erpingham	do.
Norfolk	Elizabeth.
Holland House	about 1607

The growth of interest in making terra-cotta is perhaps represented in an encouraging way, when I name that in the International Exhibition of 1851, only eighteen exhibitors were represented, while that number was more than doubled in 1852, and I believe a still larger number presented themselves at the Parish Exhibition of last year.

There need be no jealousy or fear on the part of masons that, if terra-cotta be largely substituted for stone, their trade will be injured. It is but a new material for them with only this peculiarity, that their work with it lies in the manufactory when the clay is in a rather hard dry state. Then they can work mouldings, mitres, &c., in it with ease and perfect truth,—then stone-carvers may add their work of taste and fancy in a material soft and plastic enough to give them free scope, but to become as their hands leave it, by being then burnt, an imperishable work. In the building, also, terra-cotta should always be fixed by a mason, and not an ordinary bricklayer.

I have now touched, I believe, on all the more important points connected with the subject I had in view, viz., the wider introduction of terra-cotta for architectural works than for many years past has been the case, and can only hope the patience of my audience has not been quite exhausted. Much might of course be said of the application of such a material for decorative purposes, simply such as diaper wall enrichments, balustrades, terminals, bases, statues, fountains, garden edgings, and other matters connected with garden architecture where no great qualities of strength or wear are necessary, though the indifference of cotta to weather, and especially to frost, makes it particularly valuable for these purposes and far superior to any stone,

while its cheapness is a further recommendation. For internal decoration its capabilities of being made in a great variety of colours, any of which can be enamelled and blended with portions gilt, silvered, or bronzed, make it peculiarly suitable; in short, I may repeat the remark made at the commencement of this paper, and say we have here a material which, for structural, decorative, and many useful purposes, has not received from us the study and attention it deserves, nor so much as it has received in past ages of the world. If architects could be now led to give this study, and try to introduce terra-cotta generally into their works, the manufacturers would be encouraged to spend money in producing a material which would be unequalled. Such encouragement was given thirty or forty years to the different kinds of stucco and cement, and with important results in this respect; but, after all that has been done and discovered, that material is but a perishable one after all, needing constant painting to preserve it, and subject to many other inconveniences. Terra-cotta, on the other hand, when well manufactured and burnt, is practically everlasting and unchanging in its effect artistically, and it may be, in some ages to come, when our stone and stucco buildings may have become ruinous or altogether disappeared, that, as in Egypt, as in India, as in America, so the terra-cotta works of England may remain as one of those "landmarks of the civilisation of mankind" in England to which Sir Charles Lyell alludes.

PICTURES PURCHASED BY THE ART-UNION OF LONDON.

The following are amongst the principal works selected by the prizeholders of 1868 since our first statement:—

From the Royal Academy.—The Head of the Glen, G. E. Hering, 200l.; Rustic Gallantry, C. Landseer, R.A., 150l.; Under the Willows, W. Field, 60l.; The Musical Genius, E. Opie, 40l.; Sunshine, J. H. S. Mann, 31l. 10s.; Look, here's Punch, T. K. Pelham, 30l.; The Baths of Caracalla, Rome, E. H. Fahey, 20l.; The Evening Hour, J. V. De Henry, 20l.; Haymaking near Henley, late H. J. Boddington, 15l.; East Ashore, A. Corbould, 15l.; The Confluence of the Bore and the Yare, Yarmouth, G. Eaton, 15l.; In the Island of Capri, D. W. Deane, 15l.; A Moorland Stream, T. J. Banks, 15l.

From the Society of British Artists.—"About Nelson" scene on board a Yarmouth lugger, T. Roberts, 75l.; Pembroke Castle, A. Clint, 50l.; The Grand Canal, &c., Venice, W. Henry, 50l.; Ewaddonnan, near Land's End, H. K. Taylor, 45l.; A Lesson in Lace-making, H. King, 45l.; Junction of the Moselle and Rhine, Mrs. P. Phillips, 45l.; The Dogana and Ducal Palace, Venice, J. B. Pyne, 40l.; "Now came still Evening on," &c., W. Gosling, 40l.; Antinual Morning, Lledr Valley, R. Harwood, 40l.; Tan-y-Ralt, North Wales, A. Pantou, 40l.; Off Folkestone, J. E. Meadows, 35l.; Entrance to a Dutch River, J. J. Wilson, 35l.; "In Ruins now," &c., R. H. Wood, 30l.; Girl Knitting, E. J. Cobbett, 30l.; The Farmyard, H. B. Gray, 25l.; View of Lacraal, Norway, A. Duncan, 25l.; The Path through the Wood, G. Wells, 25l.; Rochester—Winter Evening, G. A. Williams, 25l.; Cookham on Thames, W. Williams, 21l.; A Farm near Ougar, Essex, E. L. Meadows, 17l. 10s.; Barnard Castle, Durham, E. W. Robinson, 15 guineas; Elaine, Miss E. Perry, 15l.; On the East Oakmead, Dartmoor, H. Moore, 20l.; The Penmaen Mear Mountains, A. J. Woolmer, 15l.

From the Society of Painters in Water-colours. Maple, Durham Loch, W. Evans, of Eton, 35l.; Cartoon Gallery, Knole, Kent, J. Nash, 26l. 5s.

From the Institute of Painters in Water-colours. Harvest, J. Absolon, 52l. 10s.; Desenzano, Lago di Garda, North Italy, C. Vacher, 50l.; Piazzetta of St. Mark, Venice, W. Telhin, 40l.; Arundel Castle, J. Fahey, 15 guineas.

FRESQUES IN THE ROBIN-ROOM.—Mr. Cowper asked in the House of Commons when the public would be admitted to see the frescoes painted by Mr. Dyce in the Queen's robing-room in the Houses of Parliament. Lord J. Manners said that he believed the frescoes referred to were quite fit to be inspected by the public; he was not able to state precisely how soon the room would be opened, but he trusted it would be ready very shortly.

THE DEAN CEMETERY, EDINBURGH.

We were never much in love with Scotch burying-grounds: we mean, in love with their architecture; for there is many a little kirkyard with its venerable firs and yews, underneath whose shade—

"Each in his narrow cell for ever laid,
The rude forefathers of the hamlet sleep,"

and where their descendants smoke their pipes and exchange their mulls of a Sunday as they discuss the past week's news during the half-hour preceding the minister's arrival in his Geneva gown and hands, inexpressibly dear to us, owing either to its associations or to its picturesque or quiet, secluded situation. But a Scotch churchyard is not, *per se*, "a thing of beauty"; indeed, there is too often about it much that is in execrable taste and even repulsive, the burial vaults (where there are such) being ordinarily enclosures guarded by nosseonly walls and a rusty iron gate, or encased in iron rods, and filled with rank grass and nettles growing as they list.* The Glasgow Necropolis and the Dean Cemetery in Edinburgh, however, are exceptions to the general rule; and some description of the latter and the sepulchral monuments it contains will, it is trusted, prove acceptable to the readers of the *Builder*.

This cemetery has been in existence for little more than twenty years, the wood and shrubbery, however, being of much older date. It is charmingly situated, overhanging, as it does, the precipitous bank of the Water of Leith, opposite the little village of the Dean, an ancient suburb now almost absorbed in the city. It is beautifully wooded with venerable oaks, sycamores, elms, firs, hircles, willows, yews, and hollies, some of the latter of which have attained a height of 80 ft., as well as with younger laburnums, lilacs, hawthorns, mountain ashes, and foreign pines. The greatest care is bestowed upon the trees and ornamental shrubs, the turf is smoothly shaven, the parterres are trimly kept and well stocked with flowers, and the whole place is resonant, from morn till dewy eve, with the melody of song-birds. Mossy ivied walls support the terraces overhanging the river, to whose very edge the wood descends. Over beyond the north wall rise the turrets and eave roofs of Stewart's Hospital, while behind the grand natural screen formed on the west boundary by a row of sycamores and willows appear the two open lantern turrets of the Orphan Hospital. Standing on the upper terrace, you may get through the trees charming glimpses of the grand old Castle rock, the General Assembly's spire, the dome of St. George's, with Arthur's Seat forming the background of the picture. The sylvan beauty and peaceful seclusion of the situation cannot be surpassed; and, indeed, unless the recollection of some near and dear one buried there dims the eye, there is no pleasanter spot than the Dean Cemetery.

Till the year 1845, upon this charming spot stood the House of Dean, the baronial residence of an old and proud, but now extinct Scottish family, the Nesbits of Dean. The mansion dated from the end of the sixteenth century, and is said to have served Sir Walter Scott as a prototype for Tully-Veolan House, the residence of the barons of Bradwardine, in his novel of Waverley. Many of the pieces of sculpture in *basso-relievo* which ornamented the windows and doors of the old mansion are now let into the walls of the cemetery. Two of these are especially remarkable. On one of them, which occupied the upper part of a pointed arch, is represented a judge upon a throne, with a lamb in his arms. His left hand holds a drawn sword, and his right a pair of scales. "Two lions rampant stand on either side, as if contending litigants on the poor lamb; and the one resting his fore paw on the sword, and the other placing his paw in one of the scales." On the other piece of sculpture, which formed the pediment of a dormer window, a man is seen armed with a stout pole, with a hook at the end, by which he grasps it. A goat is running towards him, as if hitting at him, while a bear seizes it (the goat) by the waist with its teeth, and another is lying

* Prior to the passing of the Anatomy Act in 1832, most of the graves of the better classes were fenced in in this unwholesome way in order to protect them from desecration, which the Scotch people have always held in great horror.

† An eminent American essayist has recently thrown out the suggestion that it were good to scoop out of the tombstones cavities so as to catch and retain the rain, and thus induce the birds to come and sing over the graves.

dead beyond. Mr. Daniel Wilson, the antiquary, supposes that the first-mentioned *basso-relievo*, as it has the Hopes' arms sculptured beneath it, may refer to a family alliance with the Great Lord Advocate, "though the key to the ingenious allegory has perished with the last of their race."

Apart from its historical associations, its natural beauty, and that of many of its monuments, there is much interest attached to this necropolis. Considering how short a period it has been in existence, and how prevalent is the desire to be buried with one's fathers, it is surprising how large a number of illustrious dead lie there interred. Many of the brightest ornaments of Edinburgh society in the early part of this century—men distinguished and world-known in the battle-field, and in the more peaceful fields of art, philosophy, literature, law, and medicine, there repose peacefully side by side. In the north-west corner, where we are almost tempted to say that "lawyers most do congregate," lie Francis Lord Jeffrey, the celebrated critic of the *Edinburgh Review*; Henry or rather Harry Cockburn, the author of the "Memorials of his Time;" and their brother judges of the Court of Session, Lords Rutherford and Humsyde. There, too, are deposited the remains of Thomas Thomson, jurisconsult and antiquary. A red granite obelisk marks the resting-place of John Wilson, professor of moral philosophy in the University of Edinburgh, but better known as the accomplished editor of *Blackwood*; while close to it, and marked by a white marble monument surmounted by a foliated cross, is the grave of his scarcely less talented son-in-law, William Edmondstone Aytoun, author of "Bothwell," the "Lays of the Scottish Cavaliers," and many humorous contributions to *Blackwood*. A cenotaph of freestone in memory of that other John Wilson, of Scottish vocalists *fugate princeps*, who died and was buried at Quebec, stands close to his namesake's monument. A mural monument and medallion placed against the north wall marks the spot where lie the remains of the author of "The Constitution of Man," George Combe; while close to it is the grave of the kind and genial John Burt, president of the Royal College of Physicians of Edinburgh. Among others buried here may be mentioned Lord Murray; the gentle naturalist, Edward Forbes; Professor Fleming, known from his works on natural science; the great limner, Sir William Allan, president of the Royal Scottish Academy; the architect who did so much to beautify Edinburgh, although his buildings are not all faultless, William Playfair; and Robert Reid, Crown Architect for Scotland. A lofty cenotaph in the form of an obelisk keeps green the memory of the colonel, officers, and men who perished in Bulgaria and the Crimea, or fell in action during the campaign of 1854-55.

There is perhaps nothing more surprising to any one acquainted with the general characteristics of Scotch graveyards than the marked dissimilarity between the monumental erections in such and those in the Dean. Not a single "thru-stone" is to be found. The headstone with its cherubim with trumpeters' cheeks and expanded wings, has disappeared. We doubt if you could discover either sculptured skeleton, death's-head, cross-bones, or hour-glass. These more pretentious tombstones which were ornamented with pillars and pilasters, pediments and flying buttresses, so as to resemble a dormer window of the French Renaissance period, and of which the Greyfriars' churchyard contains so many examples, are altogether unrepresented. But, in place of these, what an endless variety of sepulchral monuments have we not got! Egyptian obelisks and pyramids of stone and granite; Grecian cyclostyle and peristyle temples; columns of the five orders, broken and unbroken, with doves and butterflies about to take flight from them; sarcophagi; "storied urns and animated busts" set on pillar or pedestal; statues of sorrowing matrons and virgins, and of sympathising angels; crosses of every description, the plain, the wheel, the Runic, the crosslet, the decorated; altar tombs; long tapering coffin-stones coped *en dos d'âne*; ornamental chains hung on pall pillars; bronze and iron railings imitating natural foliage; mural monuments—Medieval, Decorated, Flamboyant—in some instances forming niches containing sculpture, or holding slabs of marble or of polished granite for inscriptions, or for bronze

or stone medallion portraits; in others forming arcades, with details belonging to the most ornate period of the Decorated style.

And, if such has been the improvement in the taste which has erected these outward symbols of affection and regret, so also has there been a marked improvement in the tone and style of the inscriptions. If there be much "sculptured marble" there is, at any rate, no "pompos lay" nor mendicant sentiment. No child will be tempted in the Dean Cemetery, by the continued recurrence of fulsome praise of the departed, to imitate of his mother where they bury the wicked people. Such inflated inscriptions, as are but too common in every place of sepulture a century old, find no place there. We know only of one exception, which we shall afterwards quote, as the fatality has been often admired. Ordinarily the inscription records nothing more than the name and age of the deceased, with the date of his or her death, and perhaps some suggestive or consolatory text of Holy Scripture. Byron, who in one of his early poems says,—"My epitaph shall be my name alone," elsewhere observes that a name and a date are all that are required above one's grave,—and we agree with him. Let us be thankful that the occupation of the epitaph-writer is gone; and, as we wish ill to no one, let us hope, as we believe, that he is more profitably employed writing poetical pills of Jewish-made clothing or Parr's Life Pills. Conspicuous, too, by their absence, are heraldic shields and coats of arms. It seems as if it were that those who have raised monuments to their departed friends were anxious only to indicate the spot where they lie buried, and to leave their fame, when such exists, to be perpetuated by their own good works,—those

"Footprints on the sands of time;
Footprints, which perhaps another,
Sailing o'er life's solemn main,
Some forlorn and shipwreck'd brother,
Seeing, may take heart again."

We shall now offer some general observations on the styles of the monumental erections of the Dean, and direct particular attention to a few of the more noteworthy. Perhaps the obelisk is more numerous represented than any other kind of sepulchral monument. The material most frequently employed is polished Peterhead granite, either grey or red; but there are many examples executed in freestone and marble. In nearly every instance the dictum of most writers, that obelisks should never be placed on pedestals, has been disregarded. For our part, we agree with the authorities that the doing so is an error of judgment. It were much better to do, as did the Egyptians, elevate them on a cubical die narrower at the top than the bottom, with two or three steps under it. Where the greater part of an erection increases in width as it approaches the ground, the eye travelling downwards should not be unpleasantly arrested, as it is by the perpendicular lines of a pedestal. Let any one visiting the Dean contrast with its obelisks the graceful and easy manner in which, as it were, some of the Runic crosses (take, for example, that erected in memory of William Ambrose Moreland) rise from the ground. The cross in question is a very effective one. It is about 20 ft. in height, the material being Peterhead granite highly polished. The shaft, which is surmounted by an open-wheel cross, is a quadrangular prism, diminished upwards; and has its north face divided into three compartments, or panels, filled with sculptured hieroglyphics. It is placed on a block, or die, which with convex sides, is broader at bottom than at top. Underneath it are three steps, and the whole rests on a large slab. The die, the shaft, and the cross are of red granite, while the steps are of grey. On the north face of the die the inscription is chiselled out in such a way as to leave the letters red while the ground is grey. The whole reminds one forcibly of the Iona crosses.

To return to the obelisks, our sculptors would do well to imitate the Egyptians, who, as Professor Donaldson has pointed out, made the face of each side of the obelisk convex with the effect of rendering the light much softer upon the surface, and the shades less crude. The pyramids of some of the obelisks are ornamented in very questionable taste with a sculptured chaplet, or wreath of flowers, set as angularly and jarringly as the Light Huzzar balances his forage-cap upon his head.

The Egyptian Pyramids do not admit of imitation on a small scale. It is the vast size of these structures rising from the level sands of

* "Memorials of Edinburgh," by Daniel Wilson, vol. ii. p. 145.

extensive flat country, and the notion or idea of almost superhuman power and energy which they are calculated to suggest, coupled with their known antiquity, which give them their interest. In themselves they are not beautiful. Accordingly the writer cannot approve of the taste which induced the late Lord Rutherford, a distinguished and most accomplished lawyer and judge, no doubt, to erect in memory of his wife, a pyramid, which is probably not more than 12 ft. high. Built of blocks of red granite, which required teams of horses to transport them to the cemetery, it has yet the appearance of a model, and that on the smallest scale possible, intended for no other purpose than to illustrate a lecturer's description of the Pyramids. It stands near the west wall upon a large sandstone base or plinth. In its east face there is a square-headed opening fitted with a bronze door, on which are medallion portraits of his lordship and his wife, with an inscription underneath. The door has the effect of further dwarfing the size of the monument. We promised to give the inscription, and here it is:—

Sophie Francisca
Uxor
Cœlestis Mariae
Contra Votum Superstites
Mœrens Pœsult
Andreas Rutherford
Et Sibi
M. D. C. C. C. L. I. I.

The Latinity is good enough, and has been much praised; but we fancy we remember reading something very much like the words before, when at school.

The Dean Cemetery contains several good examples of sepulchral monuments, which are made in imitation of the long narrow tapering stone coffins of the thirteenth and fourteenth centuries, with the covers coped *en bas d'âne*, and ornamented with crosses. There is one monument of this description especially worthy of attention, namely, that erected in memory of James Murray, of Wick, his wife, and son, who perished in the wreck of the *Royal Charter* in 1850. The coffin, which is mounted on a massive slab of stone with good mouldings, is of polished red granite, picked or hollowed out on the top, like the matrix for a brass in the shape of a cross *florissée*. At the head of the coffin-stone, and between two lovely hawthorns, rises a pediment-shaped canopy, containing a pointed trifoliated arched recess with hood-mould and side pillars, with polished grey granite shafts. In the upper part of the recess there is the figure of an angel in white marble, and beneath the angel a red granite panel, which contains the inscription. The sides of the pediment are enriched with crockets, and the apex crowned with a wheel cross, the wheel of which is ornamented with the dog-tooth moulding. Besides these, there are other horizontal tombstones made in imitation of those which prevailed during the second half of the fifteenth century, having the form of a cross, and when seen from above presenting the appearance of a church's roof. Sometimes two such are placed alongside of one another to cover two graves,—that of husband and wife. There are examples, too, of horizontal gravestones made like the covers of the sarcophagi, which were in vogue from the fifth to the tenth centuries.

Table or altar tombs are not infrequent, ornamented with panelling, medallions, and otherwise. That of Lord Jeffrey, erected out of the surplus funds subscribed by the public for the execution of the marble statue of his lordship in the Parliament House, is of fine Etny freestone. It is elevated on three steps. A stone medallion portrait occupies the centre of a panel inserted in the die which faces the nearest footpath. Another good altar-tomb is that (by J. McEwen, sculptor) of Adam Mercer, F.R.C.S. It is surrounded by tall pillars and intermediate panels of iron rail-work. The tomb of Sir John Peter Grant, of Rothiemurcus, is another good example. Upon the adjacent wall, in a white marble panel, which is let into a slab of white sandstone, an angel holds a scroll, with the name of the deceased and the date of his death.

Many of the mural monuments are in the shape of pedimental canopied recesses or of blank arcading, which are often highly decorated. Among others we may notice the monument to William Anderson, of Cleadon. The pediment, which is carried on columns with highly ornate capitals and bases, has foliated drip-stones, an extremely rich finial, and intermediate rows of the ball-flower ornament placed in a hollow moulding. Within the recess is a

pointed arch, springing from elegant pillars, and containing a slab of white marble, in the upper part of which is a small trefoiled panel, with the monogram I.H.S.

The hurrying-ground of Findlay Anderson is marked by an arcade of three pointed arches, recessed under a low-browed arch, which springs from the upper part of buttresses at either side of the structure. Above all there is a lean-to stone roof, beneath the eaves of which is a hollow moulding, ornamented with the ball-flower. The openings in the arcade are occupied by slabs of white marble, intended for the reception of inscriptions. The shafts of the columns of the arcade are divided by cinctures.

Very conspicuous is the monument erected by his widow in memory of James Buchanan, the founder of the "Buchanan Institution" in Glasgow.* This is a Greek choragic monument, in the style of that of Lysicrates at Athens, commonly called the Lantern of Diogenes. It is an open cyclostyle of seven composite pillars.

Here we take farewell of the Dean, a cemetery where, to quote the language of a writer in *Blackwood*, describing the kind of last resting-place he should wish to find,—"a friend may freely come and cheat his fancy, and give breathing to his affection, without having to seek sexton or bundle for key, and a permission to be paid for. Not too gay for sorrow, nor too sad for love; but where there may be an indwelling sanctity that may hallow both; whence sorrow might receive comfort and love trust; where there is a sweet green shade for the tales of the young, and a lingering sunshine upon many a sod to rest the aged as they sit. . . . Such is a scene of peace. Here the living may hope to "sleep with their fathers."

WATER-COLOUR PAINTING.

The ancient adage, *Arx longa*, must be taken with a qualification. It is perhaps only strictly true in one sense. Art is tardy in growth: it is long in arriving at perfection. If viewed in another light, we must contest the truth of the apothegm. Art is not long minded in the sense of memory: it is not permanent in the production of excellence. The most lamentable shortcoming connected with the art of painting, for instance, is the total loss and oblivion of many of its greatest discoveries and most valuable traditions. When chemical success has once been attained we have a right to expect it to be permanent. Strange stories are told of the jealousy with which Titian regarded the secret of his colouring; but the fact that the colours of Perugino, to say nothing of feebler colourists, are now in any carefully preserved works of that great master bright and fresh, while those of Reynolds, probably the most anxious experimentalist in colour of any English artist, more generally faded to the hue of blotting-paper, is anything but satisfactory.

While oil painting is still so far involved in mystery that modern artists are unable to reproduce the permanent tones of the Early Italian masters, it may not be any great matter of wonder that water-colour should be entirely *en vauir*. Yet it does strike one as unaccountable, on a visit to the Water-Colour Exhibitions, not only that a new style of colouring should have come into vogue within the last quarter of a century, but rather that there should be attempts at so many different styles, and that artists in this branch of study should not rather commend their labours, by deciding what were the true qualities of this medium, and in what manner these qualities are most successfully developed. This, which is a mere matter of the mechanics, or rather the physics, of art, is independent of those subtler qualities of grace, and truth, and sense of light and colour, in which the distinctive individual peculiarity of the artist lies. If a student in water-colour were to visit the exhibitions with the view of learning from the counsel of the best masters how to practise the art, he would be likely to come away more puzzled than enlightened.

In some cases you see such an evident resolve to deal with water-colours as with oil, that you are at a loss to know why the artist adopted the more perishable medium. He may reply that he trusts to the protection of glass, but the answer will be that any one who knows what ho

is about, and who has an oil painting worth preserving, will do the same. It is almost incredible that any artist or amateur who has observed how much the exposure of a painting for even the term of a single season in the crowded rooms of the Royal Academy acts upon the freshness of its tint should not consider the glazing of a picture to be a far more essential requisite than a gilded frame.

The old idea of a water-colour drawing, that of a rapidly-drawn permanent sketch of scenery, preserving the freshness and contrast of colour, but holding the same position in landscape that crayon does in portraiture, and not intending to compete with the more patient toil of the painter in oils, we fear must be held to be exploded. On the contrary, in the use of water-colours (and, in a very noticeable instance indeed in that of oils) there becomes apparent an actual return towards one of the features, long held to be barbarous, of Egyptian or Assyrian art. Our limners do not, indeed, engrave or relieve in marble, and then colour their work, but they occasionally lay on relief and colour at the same time, and produce a surface which, whatever it may be, is not either smooth or level.

It may be true that an artist has the right not only to select the medium most obedient to his touch, but to deal with that medium so as to produce the effect which he desires. Gozzini has a prescriptive claim to a certain freedom from rule; but the question will arise whether genius would not produce something more worthy of its powers by adherence to than by departure from the traditions of art. In finishing paintings with an irregular or relieved surface, for instance, there must in the first instance be found a greater liability to injury, and a less probable durability of work. Then the point of view from which the picture can be seen with satisfaction will be more restricted. If instead of a work which is more or less admirable from distinct points, and under different lights, you obtain one which is only properly visible at one distance and in one light, you have, *pro tanto*, an inferior production. You regret that the time and the talent devoted to the latter were not bestowed upon the former.

One word may be added as to the pest, trouble, and annoyance of all the exhibitions of the season,—namely, the catalogue. It is hard to look at these productions in any light except that of an imposition on the public. The information which they afford is the minimum, the price at which they are charged is the maximum. In these days of cheap literature the extortion of sixpence for a bare list of 300 pictures, or of a shilling for one of four times the number, is sheer imposition. It is a method of raising a tax on the public under a false pretence. To those persons who are the most likely to need a memorandum of the contents of the exhibition the catalogue is useless, unless profusely annotated in pencil during their tour round the rooms. To find any individual work, or to visit consecutively the works of any individual artist, by means of the catalogues, is a matter of extreme difficulty and annoyance. The principle of the numbering is often more inexplicable than that which has guided the position of the pictures. Frequently number and position seem entirely unconnected. Then, occasionally we find some favoured artist occupying a comparatively large space, by dint of a poetic quotation; while in the majority of instances there is nothing to direct the attention of the visitor to the idea embodied in the painting. A list of works and authors is, of course, indispensable. Such a list should be furnished to every visitor as a part of the consideration for the entrance fee. If a more detailed catalogue is prepared, which would be often very serviceable, it should be guided by some principles of explanation or of description, as in the case of the Portraiture Exhibition at South Kensington, in which, however, we have taken occasion to point out certain shortcomings. But every artist who exhibits should make a point of doing justice at once to himself and to the public by attaching once to the frame of his picture a small piece of gilded wood, on which title, and signature, and any essential brief description, should be legibly printed in black. The constant and most annoying distraction of the attention from picture to number, from number to page of the catalogue, then to the title, and then to the artist's name, which is the source of so much weariness and fatigue to any conscientious visitor, would thus be avoided. You would not be exposed to the risk of missing the very picture you came to see, or of being guided in your

* Mrs. Buchanan, it is worth recording, has recently subscribed the magnificent sum of 5,000*l.* towards the erection of the new Medical Hospital in Edinburgh.

attention by the density of the crowds which render invisible the more popular paintings. The injustice, involuntary injustice, let us hope, of hanging committees would be thus, to some extent, counterbalanced.

To this requisite, which no artist, and no connoisseur can deny to be extremely desirable, there is one sole objection. It is not that of the cost to the artist, for that would be amply repaid by the additional publicity which would thus be given to his work and his name. Ninety-nine people out of a hundred, on being shown a picture, inquire what does it represent, and whom it is by. Deny them this information, and the picture fails to take hold of the attention sufficiently to effect a lodgement in the memory. Expect them to put these questions three hundred, or twelve hundred times to a catalogue, and you must be unaware of the normal limit of human patience. The one objection is, if we allow the pictures to tell their own story, people will not buy our shilling catalogue. That is the true cause of the continuance of a barbarous custom, injurious to artists, extortionate, wearisome, and unjust to the public. We hope that our artists will make a stand—that they will announce for themselves their own names and their own subjects, and that they will refuse to lose a considerable part of the benefit which they might derive from a public exhibition, by having the due exposition of their names and designs stuffed for the sole sake of selling a few half pages of names at sixpence or a shilling a bundle.

MANCHESTER CITY POLICE AND SESSIONS COURTS.

The foundation-stone of the new City Police and Sessions Courts has been laid by the Mayor of Manchester (Mr. Robert Neill). The site of the new building is in Minshull-street, Bloom-street, and was formerly used by the paving department of the corporation. The style of the building will be that type of the Pointed Gothic of which examples abound in Florence, Siena, Pisa, Verona, and other cities of the north of Italy. At the angle of Minshull-street and Bloom-street will be placed a clock-tower, the fourth in number, occupying the central portion of the block of buildings, surrounded by offices and corridors, which, it is hoped, will prevent the noise and bustle of the adjoining streets from being heard in the courts themselves. The basement or cellar is raised 6 ft. above the footpath in the street, in order to give the opportunity of effectually lighting and ventilating the various rooms and passages, especially those connected with the cells for prisoners. The floor of the basement is 8 ft. below the footpath, so that the entire story will be 14 ft. in height. A broad corridor or passage, 15 ft. wide, extending along the back of the building, 14 ft. high, and two shorter passages at right angles with the main corridor, give access to the cells, which are of various sizes. About half of the cells are placed under the police-courts, and the remainder under the Court of Quarter Sessions. It is proposed to provide each cell with a water-closet and lavatory, screened off in the corner of the cell, the materials used being, as far as possible, non-absorbent, and the apparatus self-acting. The windows in the passage will be large and numerous, glazed on the inside with obscured plate-glass of great strength, and protected outside by wrought-iron bars similar to those recently fixed at the City Gaol and police-stations.

The main entrance into the building, for the use of the magistrates and persons officially connected with the courts, is in Minshull-street, in the centre of the façade. A spacious porch and vestibule give access to the principal staircase, at the foot of which is the porter's lodge and inquiry office. A small room for the governor of the City Gaol is on the right of the entrance. The frontage to Minshull-street may be let off wholly or in part for offices. The remainder of the ground-floor is occupied by the halls for the public, for witnesses, and rooms for prisoners awaiting trial. In the centre of the building is a large open area, 43 ft. wide, with entrance for the police-van to drive into the interior court, and a large yard for the use of the police. This open area divides the building into two portions, separating the part appropriated to the police-courts from the sessions side of the building. It will be closed at the end by gates, and will be an important aid to light and ventilation.

The large halls for the general public on each side are 84 ft. by 23 ft., exclusive of the compartments for witnesses, solicitors, court offices, partitions, &c., which are screened off by glazed partitions. That on the police-court side is entered from Bloom-street, in the centre. The witnesses' rooms, male and female, have private access on each side of the general entrance, and also a door from the large hall. Each of these rooms is about 16 ft. by 11 ft. 6 in., and will be open to the general hall above the glazed partition, which will reach about 8 ft. above the ground.

The object in the arrangement of the courts has been to concentrate, as far as possible, the business of the court, and to bring the prisoner, the witness, and the jury, the barristers, &c., as near to the bench as possible. The warming and ventilation of the courts is a subject to which especial consideration has been given, and provision is made in the construction of the court walls for passing heated air from the basement, through a series of cavities or flues, into the courts. Air-ducts, in suitable places, will convey the supply of fresh air to such positions in the courts as may be desirable to secure a complete and constant change in the atmosphere of the court. A heating-chamber and boiler-house are provided in the cellar, and a large channel for fresh air is constructed under the former room, to convey fresh outer air to the heating-chamber, which, after being warmed, passes into the court or courts at the time in use. The extraction of the vitiated air from the courts will be provided for in various ways.

The foundations are being executed by Mr. Thos. Clay, of Andeshaw, under the direction of Mr. Thomas Worthington, of Manchester, who is the architect of the building.

THE TRADES MOVEMENT.

Free Labour Association.—Colonel Maude and a deputation from the Free Labour Registration Association, London, have attended a meeting of manufacturers, merchants, and others in the Mayor's Parlour, Town Hall, Manchester, and explained the objects of this association. Mr. H. Nicholls was in the chair. Colonel Maude gave a history of the foundation, objects, and progress of the association, from which it appeared that through it, it was attempted to afford to those men not in connexion with any trade union the real advantages of a union without any of its drawbacks; that is to say, it was not only a benefit society, but a registration society, by which means men received support when in need, and when out of work might ascertain where work was to be had. By the rules provision was also made for the prevention and settlement of disputes between the men and their employers by means of conciliation and arbitration. Each workman undertook not to interfere in any way with another workman in any contract he might make with his master. Already the association, whose head office was in London, had established branches in Liverpool and other large towns, and the number of members in the society was 13,000. In reply to questions, Colonel Maude said the association had received very limited support, and it had been placed in an unfortunate position in consequence of its only having been brought before the public in times of strikes and disputes. Owing to that it was looked upon as an organization formed to help the masters. Nothing, however, was further from the truth, it being for the benefit of those who wished to be free workmen.

Wolverhampton.—The success which has attended the adoption of the principles of arbitration upon the method of Mr. Rupert Kettle, was celebrated in Wolverhampton, on Monday last week, after quite a jubiliant fashion. Arbitration is practised in this town by the carpenters, the plasterers, and the bricklayers, but not yet by the masons and the labourers. Mr. Kettle had remembered with much pleasure the annual holidays of the operatives of the French towns, and at the last arbitration meeting he suggested that some such yearly holiday should take place in Wolverhampton, masters and men, and their families, cordially fraternising during the festivities. The suggestion was taken up, and on Monday "the first annual demonstration in commemoration of the adoption of the principles of arbitration as a medium for the settlement of trade disputes," as the hills termed it,

came off. The occasion was made a general holiday throughout the building trade there, the masters having closed their shops for the purpose.

Birmingham.—The master builders say they have now a sufficient number of non-society men to carry on all their works. The matters in dispute with the union men were the worked stone question, piecework, and sub-contracting. On these, and all other questions, the non-society men accept the masters' rules. They have been engaged for twelve months certain.

TRADE SOCIETIES AND COMBINATIONS OF WORKMEN.

The Bill introduced by Sir Thomas Fowell Baxton and Mr. Richard Young to repeal and amend the laws relating to trade societies and the combination of workmen has been issued. The preamble recites the Acts 6 Geo. iv. cap. 129, and 22 Vict., cap. 34; which by clause 1 are repealed.

Clause 3 provides that,—

"From and after the passing of this Act, if any person shall, by violence to the person or property, or by the threat of such violence, or by the threat of the commission of any offence punishable by statute for or in relation to any trade, or by the threat of the loss or forfeiture of any office, or by the threat of the loss of any employment, or work, or to return his work before the same shall be finished, or prevent or endeavour to prevent by such means any journeyman, manufacturer, workman, apprentice, or other person, not being hired or employed, from hiring himself to, or accepting work or employment from, any person or persons; or if any person shall use or employ violence to the person or property, or the threat of such violence, or the threat of the commission of any offence punishable by statute for the purpose of enforcing any person to belong to any club or association, or to contribute to any common fund, or to pay any fine or penalty, or on account of his not belonging to any particular club or association, or not having contributed or having refused to contribute to any common fund, or to pay any fine or penalty, or on account of his not complying or refused to comply with any rules, orders, regulations, or resolutions made to obtain an advance or to reduce the rate of wages, or to lessen or alter the hours of work, or decrease or alter the quantity of work, or to regulate the mode of carrying on any manufacture, trade, or business, or the management thereof; or if any person shall, by violence to the person or property, or by the threat of such violence, or by the threat of the commission of any offence punishable by statute, force or endeavour to force any manufacturer or person carrying on any trade or business to make any alteration in his mode of regulating, managing, conducting, or carrying on such manufacture, trade, or business, or to limit the number of his apprentices, or the number and description of his journeymen, workmen, or servants; every person so offending, being convicted thereof, shall be imprisoned for any term not exceeding three calendar months, with or without hard labour."

Clause 4 enacts that a mere combination for trade purposes shall not be deemed a conspiracy.

Clause 7 provides for the legality of trade societies established for the purpose of raising funds for the mutual relief and maintenance of their members, wives, &c., during such time as the members thereof shall be unemployed; provided that no such society shall be deemed to be established for an unlawful purpose by reason of its being subject to rules, or of its imposing penalties of a restrictive character respecting the terms upon, or the mode in which, or persons with or by whom any trade-work shall be done, except such rules as are or shall be declared to be illegal.

Clause 8 provides for the punishment of officers of trades unions found guilty of embezzlement.

The Act is to be cited as "The Trades Societies Act, 1868."

AN EPITAPH IN KENSAL GREEN CEMETERY.

Among the more recently erected monuments in Kensal-green Cemetery is a marble bust of or to Mr. Sam Collins, who was, we believe, a great music-hall favourite a few years ago. The bust and pedestal are very well executed, and the monument altogether is in good taste, except the inscription, and that is—well, very curious, to say the least. Here it is—

"A loving husband and a faithful friend,
Ever the first a helping hand to lend,
Farewell! good-natured, honest-hearted Sam,
Until we meet before the great 'I am.'"

This, we presume, is the effusion of some comic brother of Sam's. We thought that this style of epitaph had died out with the last century.

BERKHAMPSTEAD CASTLE.

THE Castle of Berkhamstead stands in the parish of Berkhamstead St. Peter, in the county of Hertford, and geologically, upon the lower chalk. Its position is in a chalky bottom, on the left bank of the Bulborne rivulet. Between the stream and the castle the ground is naturally low and marshy, but it is now traversed by the Grand Junction Canal and the London and North-Western Railway, which, with the water-course and the turnpike-road, separate the castle from the town.

To the east and north-east of the castle the ground rises steeply towards Whitehill and Berkhamstead Common. To the west and north-west it rises more gradually towards Berkhamstead-place. Between the two, towards the north, is a comb or nearly dry valley, occupied by the old park, called the Berkhamstead estate, and in this valley stands the castle, about 400 yards from its termination in the river.

The constituent parts of the castle are a mound; an inner *enceinte* or ward; an inner ditch; a second *enceinte*; a second ditch; a third *enceinte*, enveloping the northern half only; a ravelin upon the west face; and a third or exterior ditch, also confined to the northern half of the work.

The mound is wholly artificial. It is conical, about 60 ft. high and 40 ft. diameter at the top, having steep sides and a wet ditch round three-fourths of its circumference. Its top was crowned with a circular shell of wall, about 8 ft. thick, of which the foundations only remain. Up its southern side is a certain wall, much ruined, and about 8 ft. thick. This commences at the ground level at the top of the mound, and runs into a fragment of the *enceinte* wall of the inner ward. It evidently connected this wall with the shell tower, and was probably, as at Tamworth, parapeted on either face of its rampart walk. It was not continued down the further side of the mound, which was not a part of the *enceinte*, but a citadel placed outside it, and connected with it only by a single wall.

Probably the ditch of the mound was originally continued all round it, and simply traversed by the wall. Much of the ditch between the mound and the inner ward is filled up, probably very recently, as the works are now in progress, the object being to connect the level sward of the *enceinte* with the mound for pleasure-purposes.

The inner ward is an oval space, about 500 ft. north and south by 300 ft. east and west. It is encircled by a wall about 7 ft. thick, and now about 20 ft. high, and which may have been 4 ft. to 5 ft. higher. Traces of the crenellations are visible. This wall is broken down in parts, but nearly three-fourths of it remain. The northern, or end opposite to the mound, is concave, the ditch of the mound having been run into it. There is a fragment of a mural tower on the west face, much mutilated and apparently rectangular. In the east face are two openings, one of which may have been a postern. In the north-east quarter a cross-wall seems to have belonged to a domestic building. The gap for the main gateway is at the south end. There are no traces of towers there, and there do not appear, judging from the wall, ever to have been any. The interior *terre-plain*, or platform, is level, no terrace against the wall, and no trace of a bank against which the wall could have been built. Outside the wall is a space of about 5 ft. broad, beyond which the ground falls sharply towards the wet ditch.

The inner ditch is carried quite round both mound and inner ward wall, being in plan an unbroken oval. It is deep and everywhere wet, and in parts it opens out into a pool. This is the case where it gave off the ditch, embracing the mound, now in part filled up, and in the south-eastern quarter, where its overflow escapes into the river.

Outside, and forming the counterscarp of this ditch, is the second or middle *enceinte*. This is a steep and narrow bank, carrying a walk of about 8 ft. broad, having about an equal slope upwards towards the inner ditch, and outwards towards the outer. For about its northern two-thirds this bank is very uniform, but at the south-west quarter it swells into a small mound or cavalier, about 22 ft. in diameter at top and about 20 ft. high, close to which the land has been cut away to effect a modern entry. Opposite to this, on the south-east quarter, is another rather larger mound, about 30 ft. across and 25 ft. high; and at this point the bank

makes a loop outwards, which somewhat destroys the symmetry of its plan. These two mounds are evidently intended to flank the extremities of the outer bank.

This middle bank is perforated by a modern culvert at its southern part, by which the waters of the inner ditch escape; and a few yards east of this the bank is crossed by two parallel walls, 13 ft. apart, and which evidently belonged to the outside of the main entrance.

The second or middle ditch, also deep and wet, envelops the middle bank very regularly. At present it is wanting on the south side, for a short distance, having been filled up and converted into a road when the railway was constructed.

Outside this ditch is the third or outer *enceinte*, a steep bank, which forms the counterscarp of the middle ditch, and envelops rather more than the northern half of the castle. It is about 10 ft. broad above, and is strengthened outside by eight bastions, also of earth, placed at distances of from 60 ft. to 150 ft., and each, at top, about 30 ft. broad by 40 ft. projection, and rounded. The five best marked of these, being steep and about 20 ft. high, lie to the north-west. A small streamlet coming in from the north then cuts the line, and to the east of this, covering the north-east and east faces, the bank is continued for about 580 ft., strengthened by three bastions, which, however, are low, and have nothing of the sharpness of the others. These latter three have scarcely any ditch, but the other five have at their feet a ditch, which, even now, is boggy, and no doubt was once a formidable defence. South of this outer bank, and ranging with it so as to cover the west face of the castle, is an earthwork of very doubtful character. Its lines are rectangular, it has a ditch, and it much resembles the early ravelin which were common in the fifteenth century, and not unknown in the fourteenth and thirteenth.

Connected with its ditch is a pond, which appears to have been a mill-pond and fish-stew. No doubt all these extensive ditches were turned to account, and fed the mill which is known to have been attached to the castle.

Berkhamstead is altogether a very striking and a very peculiar fortification. The mound was no doubt a Saxon castle, and, as was not uncommon, had its own defences. The inner *enceinte*, though not, as is usual, encircled by a bank, was encircled by a steep slope and ditch, which, with a palisade, would have been a very sufficient defence in Saxon times. These probably were the whole of the Saxon works, and within them may well have been held the famous Council of Berkhamstead in 637. The two outer works seem to be later. The outer certainly, from its bastions, must be later than the Conquest, and the middle bank is far too slight in its construction and too sharply preserved to be of remote antiquity. But it is remarkable that there is no trace of any other than the inner *enceinte* wall, and it is pretty evident that there never was any other. The earthworks, except the mound, would not have carried a wall, and had such been built it would have been liable to be mined and overthrown with very little trouble. Evidently these banks were crested with palisades, and probably careful cutting into them would show traces of the stakes.

Further, it is singular that though there is a second and a third line of defence, there is no middle or outer ward. These lines of defence include ditches only, and not the space which, however narrow, was always left between the walls of Norman castles for the assembling their defenders. Here the garrison of the two outer lines must have been drawn up in line close in rear of the stockade, with hut room to pass between it and the ditch in their rear.

It should be mentioned that an earthwork, composed of bank and ditch, and known locally as Grimsdyke, traverses the high road above the town, and there are several barrows in the immediate neighbourhood. The Berkhamstead earthworks are quite peculiar, but the neighbourhood is rather rich in military earthworks of a circular character, among which, to the south and west, may be mentioned Bushwood, Hawridge, Cholesbury, and, at a greater distance, Kimble.

The masonry that remains is all of chalk flint rubble, hatched in a pure white mortar, and probably faced with coarse flints, picked if not squared. Here and there parts of the face remain. This work may be Norman, or it may be later, though probably not much. The absence of towers is remarkable. There is no asblar at all. This, no doubt, was removed when

Berkhamstead-place was built, but there could not have been very much of it.

Berkhamstead was a seat of the Kings of Mercia, and the place of a council of magnates in 697, summoned by Wightred, king of Kent, and, at the time of the Conquest, it belonged to Edmar, athane of Earl Harold. It was evidently a strong place, for when the Conqueror gave it to his brother Robert, Earl of Mortaigne, amongst the vassals there was a certain "Fossrins," whose duty must have been to clean the castle ditches. Robert is said to have fortified it with a double ditch and rampart, and he held it at Domesday. Moreover, under the Conqueror, it was expanded into a very extensive honour, of which it was the seat. The manor is named, but not the castle, in Domesday.

The castle seems to have been held by King Stephen and by John with the earldom of Cornwall. It had suffered in Stephen's wars, and John gave it, 1206, to Geoffrey Fitzpiers, Earl of Essex, who rebuilt or restored it, and may have erected the present walls. Prince Louis laid siege to and obtained it in 1226. The attack was from the north side, and it held out for a considerable time.

Richard earl of Cornwall and king of the Romans, brother to Henry III., held it. He wrote to his brother from hence in 1261, and died here in 1271-2, as did his wife Isabel Marescal in 1239. His son Edmund had the castle, town, and balmoit. In 1299 the castle was returned as yielding no rental; but the millpool and the castle ditches let for the fishing at 20s. per annum. There was then a water-mill and a park with deer. It was a part of the dower of Margaret of France, the second wife of Edward I., who died 1317. Edward II. gave it, with the earldom of Cornwall, to Caveston; and to Prince Edward, as duke of Cornwall, came the castle, manor, vill, park, and honour of Berkhamstead, the lands of which extended into Herts, Bucks, and Northamptonshire. By Edward III. it was ordered to be put in order for the residence of John of France, and the Black Prince was here not long before his death. It was also used by the favourite of Richard II., Robert de Vere, Marquis of Dublin, who had licence to inhabit it. Here, also, died Cicely Nevill, the mother of Edward IV.

Queen Elizabeth leased it to Sir Edward Carey, whose grandson employed its material to build Berkhamstead-place, since which it has been leased to various persons, and was finally sold to the Egertons, the owners of the adjacent park of Ashridge.

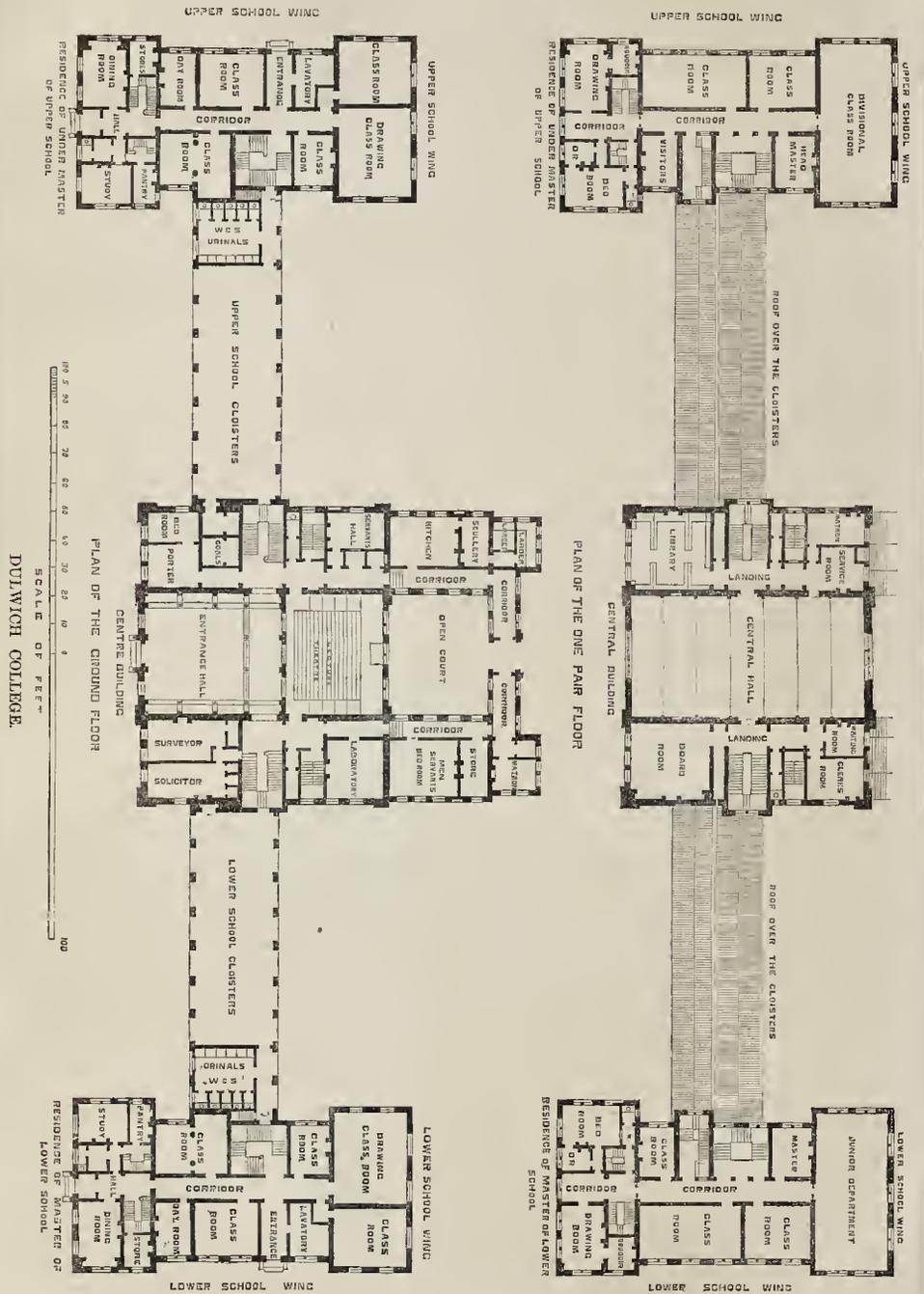
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FROM IRELAND.

Dublin.—Premises, with frontage to Middle Abbey-street and rear to Princes-street, have been in part rebuilt or remodelled and altered respectively for the *Nation* and *Weekly News* journals, Mr. Alexander M. Sullivan, T.C., proprietor. The facade to the former street is of Italian character, with cement ground-floor piers and entablature, the superstructure of brick, with cement decorations. Mr. Lyons, architect; Mr. Meade, builder. Messrs. Ross & Murray executed all the works in connexion with hoiler, engine, and other machinery, gasfitting, &c. —A large building of its kind has been erected at Lower Sheriff-street, with frontages of 60 ft. and 40 ft. respectively, for Mr. W. Meagher, T.C., wine and spirit merchant, &c. The height to apex of roof (which is high-pitched and ornamented with cresting from Sun Foundry, Glasgow) exceeds 50 ft. The architect was Mr. Lyons. Messrs. Clark & Co. fitted up the lower portion of the establishment with their self-coiling steel shutters.

St. Paul's Oburch, Glensgarry, has been consecrated. The church is built on ground given by Lords Longford and De Vesce, the lords of the soil. It was erected in accordance with the bequest of the late Miss Shannon, in order to provide for the spiritual wants of the Protestants of the surrounding locality. The foundation-stone was laid some time since by Lord Longford. The church is in a commanding situation. There are sittings for a considerable number of persons.

Belfast.—The foundation-stone of a new Orange hall has been laid in the famed Sandrow, Belfast, by the now noted Mr. William Johnston, of Ballykilbeg. The proceedings were witnessed by a large crowd of artisans and labourers, amongst whom they excited considerable interest.





THE COLLEGE OF GODS GIFT, DULWICH, SURREY.—MR. CHARLES BARRY, ARCHITECT.

[See p. 522, ante.]

SCHOOLS OF ART.

The Nottingham School.—The results of the national medal contest amongst the students of all the Schools of Art in the United Kingdom have just been made known. The Nottingham School has again this year taken the lead of all the provincial schools of art in the kingdom. The schools (to the number of 117) compete for ten gold medals, twenty silver medals, and fifty bronze medals; in all eighty medals, or one-tenth of the entire number. Nottingham obtained one gold medal, one silver medal, six bronze medals, and two Queen's prizes; total, ten awards. This year Nottingham and London are equal, each having obtained silver medals, Edinburgh this year having obtained the gold medal for this subject. Only one other provincial school (Dublin) has this year, along with Nottingham, obtained a gold medal for original designs. The Mayor of Nottingham's silver medal for the best original designs for lace has been awarded to George Broadhead, a lace draughtier, in the establishment of Messrs. Ward & Cope, who also obtained the gold medal, both being for designs for lace curtains.

The Stoke and Fenton School.—The awards made by the Science and Art Department to this school on the works submitted for the annual examination, were as follow:—National competition, one silver medal, four bronze medals; free scholarships for one year, the Science and Art Department paying their fees, have been awarded to nine students for advanced works; book prizes were awarded to five students. In addition to the above, twenty-seven students passed in the art examination in March last, of whom seven took prizes for excellent papers.

The Dorchester School.—There is said to be a marked success in the progress of this school under the direction of Mr. Dewar Campbell, and it may now be regarded as one of the permanent educational institutions of the town. The result of the inspection of the year's work by the Department of Science and Art at South Kensington, to which some 600 specimens of the pupils' drawings, paintings, &c., had been forwarded, is that prizes have been awarded to Mr. Joseph Dibben, builders' foreman; to a coach painter, in the evening class; and to another student in the afternoon class. Mr. Dibben is also recommended to a free studentship in the school during the next year.

FROM AUSTRALIA.

Sandridge (Melbourne).—The Wesleyan church was recently completed and opened. It is designed in the Early English style of the thirteenth century, and consists of nave, north and south transepts, chancel, vestries, porches, &c. The nave is 64 ft. long and 32 ft. wide, the transepts each 25 ft. by 23 ft. The chancel for choir, organ, &c., is 22 ft. by 21 ft. 6 in. The main piers are open to the ridge, the height from floor to ridge in nave being 44 ft., and in transepts 36 ft. The nave is lighted by a large Gothic-headed window of four bays with stained-glass borders in the east gable. Each of the transepts has a similar window, though smaller, having only three bays; the church is also lighted by small diamond-paned windows between the buttresses. The west gable is surmounted with an octagonal bell-turret. The turret and spire are of Point Vendinet freestone and bluestone intermixed, which, for greater strength and resistance, is cramped throughout with iron, cement also being used for building instead of the ordinary mortar. All the main walls are built of bluestone, in sneaked rubble work; the windows and doors with white moulded brick dressings, as also the corbels, string mouldings, &c., the arches being red and white brick alternately. The church is seated for 530 persons, but provision has been left in the walls by stone corbels, &c., for the erection of two galleries capable of containing 200 more. The total cost of the entire structure is 2,200l. The first portion, consisting of a part of the nave only, was erected in 1861. The architect was Mr. William Ebdon, engineer to the Melbourne and Hobson's Bay Railway Company.

St. Kilda.—The new public market at St. Kilda has been opened. The buildings, which face Walkerman-street, consist of a centre avenue, 100 ft. long and 20 ft. wide, and two smaller divisions on either side for vehicles, 14 ft. wide.

Ballarat.—The Ballarat Gas Company have declared a dividend of 6 per cent. on the last year's business. The company have promised

to reduce the price of gas to 16s. 3d. the thousand cubic feet.

Geelong.—The Mechanics' Institute, Geelong, has been completed. The reading-room, which is said to contrast favourably with those of Melbourne or Ballarat, is well furnished with the leading colonial, European, and American newspapers, magazines, reviews, &c. The entire building covers an area of 130 ft. by 54 ft., and comprises hall; lecture-room, 50 ft. by 30 ft.; reading-room, 43 ft. by 20 ft.; library, 30 ft. by 20 ft.; three class-rooms, secretary's office, and private apartments. The upper story, which is the most recent addition, contains the lecture-room and two class-rooms. The front, facing Ryrie-street, presents a combination of Italian and Grecian styles. The total cost of the edifice is 5,600l. The paper already named gives a good view of this building, as well as of others, in the same issue which contains the illustration already referred to.

HARVESTING IN WET WEATHER.

In an essay on this subject, Mr. E. Eddison says,—"I have dried corn in a room into which hot air was forced by a blowing-machine, and on a small scale I have tried the drying of the ears cut off close to the straw; but I have no present intention of repeating the experiment, the cost being too great." He describes the principle of corn-drying adopted by Mr. Gibbs, of which we have already spoken. It consists of forcing currents of hot air into a chamber in which wheat-sheaves are placed, the chamber being made with two compartments, so that one may be emptied and refilled while the other is "baking."

The blowing of sheaves through a slanting spout on the stack, after being dried, is also alluded to.

Mr. Gibbs obtains his hot air in this way:—"We found an old 8-horse portable steam-engine, with the chimney off; and an iron fan, of 4 1/2 ft. diameter and 2 1/2 ft. wide, in a sheet-iron case, was placed close to the open smoke-box, drawing in the hot air, and delivering it between the two bottoms of the drying chamber. To intercept sparks a screen of malt-kilo wire is placed between the fan case and the smoke box. The engine drives the fan by means of a belt off the fly-wheel; and, working at only 10 lb. pressure of steam, drove the fan with a speed of about 600 revolutions per minute. To avoid smoke, anthracite coal or coke is used. It is evident that by simply increasing the velocity of the fan to double or treble (by working at a high pressure of steam), double or treble the volume of warm air may be injected into the chamber, and thus either the thirty-two sheaves be dried in a shorter time, or a larger number of sheaves be dried in the same time."

Boilers can be constructed purposely for this work; indeed, upright boilers (as those of Woods & Cocksedge) are already in use, which have no tubes at all, while other boilers (as some of Tuxford's) have flues and tubes too—either construction promising safety in this air-heating process. It is predicted that this novelty of desiccation will be the fashion, if need be, by next harvest. Any building of brick walls, lined inside with galvanized sheet-iron, is precisely adapted for keeping in the heat. Ample apertures for egress of the damp air must be provided. The engines are in the farmer's hands in readiness, and a fan is one of the simplest pieces of machinery to make, buy, or keep in order.

ACCIDENTS.

A MAN has been buried alive near the Loughborough-road station of the Metropolitan Extension Railway, where a number of new streets are being constructed. A very large and deep excavation had been made, for the purpose of procuring a supply of sand for mortar, and a man was engaged in getting up the sand and gravel. He incautiously began to dig under the perpendicular side of the excavation, and although cautioned of his danger, he did not desist. The man that cautioned him went away, and in about ten minutes it was noticed that he was nowhere to be seen. The side of the cutting had fallen in, and completely buried him. A number of workmen immediately set about the removal of the fallen earth, and he was eventually got out still alive, but fearfully injured. His thighs were broken in several places, and his chest nearly crushed in. He was removed to the hospital in a hopeless state.

The railway offices at Daisie Station on the North British line have been burned to the ground. It is supposed the fire originated in a cellar below the ticket office, which was situated

on the north side of the line. The cellar was used for lumber, and it is said that there was a quantity of straw in it at the time, which had been ignited by a spark from the engine of a goods train which passed shortly before.

A serious conflagration has just occurred at Auerbach, in the Oberpfalz, Bavaria. More than two hundred buildings, a hundred of them dwelling-houses, were consumed. Three men met their deaths, and three others were severely injured. At Kuppenheim, near Rastadt, in Baden, twenty-five dwellings, with nearly everything they contained, have become the prey of the flames. The church was partially burnt, and the bells fell inside. One child was stifled, and a fireman lost his arm. The disaster is attributed to children playing with matches.

THE PROPOSED RAILWAY TUNNEL BETWEEN SCOTLAND AND IRELAND.

MR. L. LIVINGSTON MACASSEY, C.E., and Mr. William Scott, C.E., a Fellow of the Royal Scottish Society of Arts, have just published a report on the proposed railway tunnel between Scotland and Ireland. This project is, of course, a different one from that of an embankment recently proposed in the House of Commons by a member of the bar, as a panacea for all the ills of Ireland. In the tunnel scheme the tunnel extends from Cushendun, Antrim, under the sea, north-easterly, descending with a uniform gradient of 1 in 60 for about a mile and a quarter, when it intersects a projection of sand-bank on which would be placed a ventilating shaft. The tunnel then proceeds due north-east, keeping nearly parallel to the bottom of the channel, and about 50 ft. below it, having the gradients of 1 in 60 and 1 in 82, to the lowest point in its course, which is about five miles from the Irish land. It then begins to ascend with gradients varying from 1 in 100 to 1 in 700, being still parallel to the bottom, when the land on the Scotch side is reached at Leak's Point, with a gradient of 1 in 60. Here would be another ventilating shaft of similar dimensions to that on the Irish side. The tunnel would be then continued through the head of the Mull of Cantyre to Gleastrone, where the entrance would be located. The total length under water would be fourteen miles and three furlongs. The material would be chiefly sandstone and brick. The bore would be mainly through mica shale. The total cost, including two connecting railways, is estimated at 4,224,490l. The estimate of probable traffic is set down at 12,699,778. 6d., and the dividend at 5 per cent.

WORKMEN'S HALL, HITCHIN.

A WORKMEN'S HALL has been erected in Brandstreet, Hitchin, under the superintendence of Mr. James Shilcock, architect. The total cost, including site, has been about 2,000l., furnished by Messrs. Sharpley, Tuke, Seeborn, and A. and W. Ransom. The hall is intended generally for the behoof of the working men of the town, and will be used for meetings, entertainments, classes, and whatever else is deemed conducive to the combined amusement and instruction of the members. We believe the donors retain the control of the structure, but furnish it rent-free to the members, who will have to pay some small subscription. It is intended, if possible, that the institution shall be self-supporting, with the exception that there shall be no rent to pay. The other disbursements need be but small. There is no financial difficulty to be apprehended; nor will the experiment fail of success, if it should prove that the working men of the town show a readiness to appreciate and enjoy the means provided, with a view to their physical enjoyment and their intellectual advancement. The large hall, round which a gallery runs, will accommodate about 350 persons: there is a small platform at the upper end, and both floor and gallery are provided with comfortable seats. Above this hall is another lofty chamber, which will probably be used as a class-room, when the projects of the donors are more fully developed. There are news-rooms, supplied with a fair selection of newspapers and periodicals; a game-room, fitted with a bagatelle-table and conveniences for playing chess and draughts—gambling being of course rigidly forbidden; and there is a kind of retiring-room, where men who want to study or avoid the talk of the common rooms,

may read or meditate without boisterous or distracting interruptions. Outside there is a lavatory, plentifully supplied with soap and water; and every necessary convenience is applied on the premises. Tea, coffee, and plain eatables are provided, at a cheap tariff; and smoking will be permitted in some of the apartments. The place, as regards accommodation, will be "a public-house without the beer."

MAIDSTONE MUSEUM.

A CORRESPONDENT writes to us from Maidstone in reference to our notices of the local museum there. He wishes to say that "since the death of Mr. Pretty, the late curator, the contents of the museum have been in such a phase of transition that the getting out of a catalogue has been impossible," and that "what has been done and is doing to restore the place is owing not a little to the agitation of the present curator, backed up certainly by the liberality and influence of Mr. Randall." We did state that the collection had been largely added to through the liberality of the latter gentleman, the executor of the founder of the museum. A large number of the objects in the museum have been presented by private individuals, whose names are attached to their gifts. All we intended was to note the more interesting features of the collection, giving the names of the principal benefactors of the institution. We willingly make the correction that "the Pilgrims' Chapel was the Newark edifice now known as St. Peter's Church, not All Saints," as was stated in our account.

PROTECT THE POLICE.

Sir,—As many of the improvements of the day, in regard to building, &c., have sprung into existence through your able advocacy, I trust I may be pardoned for venturing to suggest another.

On the three days of the "Handel Festival," at the Crystal Palace, it was painful to witness the sufferings of the police, who were exposed for many hours to the terrific influence of a broiling sun (the thermometer being 100°). It occurred to me at the time, so it doubtless would to other individuals, that an avenue of plane trees on each side of the road would not only afford shelter to these poor fellows while on duty in front of the Palace, but would considerably add to the beauty of the building itself. R. P. N.

* * * We can scarcely imagine any objection to this very sensible proposition.

CRUSHING WEIGHT: WROUGHT AND CAST IRON.

THE ARCHITECTURAL DICTIONARY.

A CORRESPONDENT, signing "T. M.," writes,— "Will you allow me to call attention to the article 'Crushing Weight' in the Dictionary of the Architectural Publication Society, and to ask which of the two tables therein numbered I. and III. is the least likely to mislead in seeking to learn whether a cast or a wrought iron column will bear the greatest crushing weight? By the first table we are told that the breaking weight of a wrought-iron column is nearly three-fourths greater than that of the cast-iron column; while by the third table we are informed that a cast-iron column will bear as a safe load twice as much as a wrought-iron column. Wrought-iron being generally considered a safer material to trust than cast-iron makes these tables still more perplexing; in fact, breaking weight of Table I. for cast-iron is very little over safe load of Table III. for the same material."

No doubt if "G. R. B.," the writer of the article, were in a state of health that would permit him to attend to the question, the seeming discrepancy would be readily explained. Table I. appears to have been made by himself from the formulae given in the text, which can be worked out by our correspondent; and the writer says on p. 169, that "Table I. is to be used only as an approximation to truth under the conditions hereafter mentioned," showing the care with which it has been drawn up. Table III. is prepared from Morin, as stated in

the article, and has probably been worked out from the results of earlier experiments. Our correspondent might usefully refer to the *Builder* for 1857, p. 321, for remarks made by "G. R. B." himself, "on the unsatisfactory character of the recorded observations upon the subject of crushing weights."

We opened some works of reference on the subject with the following result. Gregory, "Mathematics for Practical Men," 1862, p. 380, says, "The strength of a column of cast-iron of given dimensions being 1,000, the strength of a column of wrought-iron of the same dimensions would be 1,745; of cast-steel, 2,518; of Baltic oak, 1088; and of red deal, 785." Hurst, "Architectural Hand-book," p. 22, gives, cast-iron, 100; wrought-iron, 79; steel, 180; English oak, 18; and red pine, 15.

With reference to the observation that "wrought-iron is generally considered a safer material to trust than cast-iron," we must direct our correspondent's attention to the statement that "Engineers assume in practice that wrought-iron may be safely submitted to a compressive strain of 4 tons, and cast-iron of 6 tons," in Hurst, p. 209.

THE STORAGE OF WATER.

RESERVOIRS AND WATER SUPPLY.

Sir,—The following extract from a letter which I received some years ago from Sir Arthur Cotton may, perhaps, be useful to your readers.

J. H. C. C. GODSMAN, C.E.

"I am, of course, very ignorant of the nature of the rivers of England, and of that of the surface of the country they drain, but I am greatly surprised that in all the papers I have seen of river navigation there I have never seen any investigation of the question of improving it by storing up water in the winter in tanks. This is, I believe, one of the modes adopted in Russia; though from the account I have seen of it I should suppose that it had been very imperfectly carried out, yet it seems to have answered to a considerable extent.

In Madras I finally consider that a project which does not, on a rough examination, offer a prospect of giving 1,000 cubic yards of water a year for every rupee of capital expended, may be thrown aside,—not because water is not worth purchasing at that rate, but because there are innumerable situations in which it can be obtained without a greater expense. Allowing for the difference in the value of money there and in England—about six to one—on the one hand, and our clumsy way of executing earth-work entirely by human labour on the other, which may double the cost as compared with such work in England, the above rate of one rupee per 1,000 cubic yards would be equivalent to 6s. for that quantity in England, or more than 3,000 cubic yards per l.

I cannot but think, however, that in England, but particularly in Wales, where there are good basins, and the land is less in value, water might be retained at the rate of at least 5,000 cubic yards per l. If this, or anything like it, be the case, could not running rivers be improved as to their navigation by simply storing waters towards the source of their feeders?

For instance, in your report on the Severn* it is stated that in a very dry summer the quantity of water passing down the Severn was only 3,000,000 cubic yards a day; I should suppose that to prevent the quantity falling below 9,000,000 cubic yards per day would not require more than 300,000,000 cubic yards for the whole summer, which at 5,000 cubic yards per l. would cost about 60,000l. It appears that 200,000l. have already been expended in the four weirs and locks before constructed, and that 50,000l. more was required. It would therefore seem that if water could be stored at less than 1l. per 1,000 cubic yards, it would be incomparably better to provide for the summer droughts in this way than by means of weirs, as being a mode entirely free from the vast objections to which weirs are liable; indeed, all objects would be promoted at once by thus regulating the flow of waters in the rivers.

All this is, of course, little more than a guess on my part; and yet, after so many years' attention to the subject of storing water, I cannot think that there are not rivers in England where tanks might be used with advantage."

* Report to the Admiralty upon the Improvement of the Severn Navigation. Printed by order of the House of Commons, 11th August, 1848.

REMOVAL OF LARGE TREES.

At Nesham Hall, Durham, the seat of Mr. James Cookson, vast improvements were made in the park scenery by the transplantation of full-grown trees from ranges and hedge rows, so as to open out vistas, and to formylvan groups. Mr. Newton, who about two years back commenced the landscape gardening there, adopted a new method of raising up and withdrawing some of the most umbrageous and ornamental denizens of the forest, and in locating them in positions, suitable for effect, as viewed from the mansion, or other parts of the grounds. A hedge-row of 100 years growth, little tributary to adornment of a park, in this instance furnished fine samples of arborage, which were successfully transplanted, and now, in the second year, are in a flourishing condition. An oak, measuring 54 in. girth, and spanning a diameter of 36 ft., was taken up with a ball of earth weighing 10 tons; a sycamore, 35 ft. high, spreading over a diameter of 44 ft., weighing with hole and mass, 16 tons. Another sycamore larger still, and weighing 17 tons, were, together with various others, drawn over a loose and soft surface, and successfully planted.

As to the *modus operandi*, Mr. Newton had a frame constructed simply of two pieces of timber, 12 ft. long, connected by two other pieces of 6 ft., to which, being secured by bolts, was attached a strong triangular frame of iron, having also bolts. This framework could be separated and placed under the tree.

In the first place, the soil was dug away and the road formed; and the two longer timbers were inserted under the ball, one on each side; tunnelling under the ball was then commenced; planks, shod with iron, were laid down, and rollers laid under the framework for the wheel to run on. By means of a hauler's crab, a double block pulley, and the strength of eight men, the trees were drawn up the incline on to the level, the rollers working out and being replaced, as in the action of a common mangle; thus each tree was carried the required distance, without losing any appreciable quantity of earth; thence a descent was made to the site on which the tree was to stand.

Earlier in the spring, previously to removal, the soil had been dug out around the block, in trenches about 5 ft. or 6 ft. deep, leaving a nearly square ball of earth; and on this preparatory process depends the success of transplantation, for whilst the tree stands *in situ* for the season, it becomes partially disconnected and prepared.

On replantation, new fibres will spring in the prepared mould, and if done sufficiently early in the season, and before germination, the vigour of the tree seems to be scarcely affected.

An idea of the extent of operations at Nesham Park may be gleaned from the fact that some 25,000 yards of soil were removed for the purpose of opening out a view towards the river Tees. Some of the richest earth was used to make a kitchen garden, and to improve the park and ornamental grounds, whilst the coarser material was employed in the construction of terraces. T. H. H.

NEW LAW COURTS.

Sir,—As the return laid before Parliament does not contain all the correspondence, I shall feel obliged if you will publish the enclosed letter, which would not have been necessary if the letter referred to had been printed.

EDWARD M. BARRY.

"2, Abingdon-street, 29th June, 1868.
Sir,—I have just seen the Parliamentary papers presented to the House of Commons in reply to the motion of Mr. Henckell on the subject of the new Law Courts.

Mr. Street's memorandum calls for no remark from me, except that I feel bound to point out that he relies entirely upon the reports of Departments Committees and others, who were not the judges, but only the professional advisers of the judges; while I rest my claim on the reports of the judges themselves, whose decision the competitors were informed would be treated as "final" by Her Majesty's Government, and on the faith of which promise I in common with the other competitors agreed to enter the competition.

I take this opportunity of calling your attention to the no doubt, accidental omission from the return of several letters respecting the award of the judges, which have an important bearing on the facts of the case.

I allude particularly to a letter from me to the Right Hon. the Earl of Derby, the then First Lord of the Treasury, dated 20th of January, 1868; a letter from me to the Right Hon. G. W. Hunt, then Secretary to the Treasury, dated 29th of February, 1868; and some letters from Mr. Street written about the same time,—1 om, &c., (signed) EDWARD M. BARRY.
G. Selator Booth, Esq., M.P."

The glazing is of rolled cathedral glass, of three or four tints, intermixed with white crown bullions, the leadwork forming various patterns to suit the windows. The carving throughout has been executed by Sansom; the ornamental tiling in chancel by Godwin, of Lugwardine; the ornamental ironwork, from the architect's designs, by Messrs. Hart & Son; the marble-work was executed by W. H. Burke & Co. The architect was Mr. Bassett Keeling.

Walsall.—St. Peter's Church, Walsall, has been re-opened for divine service after being closed for several weeks for the purpose of being restored and decorated. The work of restoring the edifice was undertaken by Mr. G. B. Nichols, architect, West Bromwich. The whole of the ground-floor pews have been swept away and open pews substituted, with plain bench ends of pitch pine, the divisions being of red pine stained and varnished. The aisle floors are paved with red, buff, and blue quarries. The chancel has been divested of the wood panelling, cast-iron railing, and the cast-iron window, and a stained glass window has been put up representing the patron saint, by Mr. T. W. Cam, of Smethwick, which is the gift of Mr. Butler, one of the churchwardens. The floor is now paved with Minton's tiles, and a new railing put up, which is of oak, supported on four wrought-iron standards, executed by Mr. Job Edwards, of Wednesbury; this, with the railing to the pulpit, is presented by the architect. The organ, which formerly stood in the front gallery, has been removed within the arch of the tower. The contractors were Messrs. J. & T. Taylor, of Walsall. The decorations have been executed, under the direction of the architect, by Mr. Arthur Gee, of Stafford, decorator.

Wentworth.—The parish church of Wentworth, Cambridgeshire, has been re-opened after repair both internally and externally, at a cost of over 1,000l. The chancel had previously been partially rebuilt, and its floor laid with Minton's tiles, at the expense of the late Dean of Ely, who also re-seated the body of the church with open benches, and now the rest of the church has been rebuilt, the tower restored, and its windows renewed with stone, and a new porch substituted in the place of a very decayed one of wood. The plaster ceiling of the nave has given way to an open timber roof, supported on corbels of carved stone; an arch of stone now divides nave from chancel, an Early English window fills the east end of the chancel, and a reredos of stone, painted under the direction of Mr. F. Preedy, the architect, who furnished the designs for the whole work, which was carried out by Messrs. Freeman, of Ely, builders.

Hampnett.—The parish church has been re-opened, after restoration, for divine service. Mr. Street was the architect employed to survey the building and furnish plans for its restoration, in accordance with which the work has been carried out. On the restoration about 650l. have been expended.

Market Drayton.—The new cemetery has been consecrated by Bishop Trower, acting for the Bishop of Lichfield. The building consists of two stone chapels, surmounted by a spire. The stone, with the exception of the dressings, was excavated by Messrs. Brassey & Field, in cutting the Wellington and Market Drayton Railway, which runs close past. Mr. C. Wright, of Nottingham, was the builder, and the designs were supplied by Messrs. Clarke, of Nottingham, architects. The chapels and lodge will cost about 1,200l., not including the stone. The land, of which there is about four acres, cost about 1,000l.

Kelsall.—The church at Kelsall, dedicated to St. Philip, was consecrated by the Bishop of Chester, on the 9th instant. The church, which has been built chiefly at the expense and through the exertions of Colonel Tomkinson, of the Wiltshires, and members of his family, was completed about seven years since; but there being then difficulties in the way of the conveyance of the site, and other preliminaries to consecration (which have since been overcome) it was opened for divine service by licence granted by the late Bishop Graham. The building, which is a small structure, is fitted up with open benches, capable of affording accommodation for 150 adults and 80 children. The church is in the Early Gothic style of architecture of the thirteenth century, and consists of nave, chancel, sacristy, and organ recess on the north side of the chancel, together with bell-gable constructed over the chancel-arch. The architect was Mr. Thomas Bower, jun., of Nantwich, and the work has been principally executed by local workmen.

Worthing.—On the 10th, St. George's Church, of which we have given a view in a previous number, was consecrated by the Bishop of Chichester, before a large congregation. It is at present only partly built, the tower, spire, and transepts being left for a future time. Mr. George Truefit is the architect, and Mr. Longhurst, of Worthing and Hastings, the builder; the glazing and gasfitting having been done by Messrs. Cook & Son. The walls of the edifice are externally of stone, and internally of brick, with a space between. The tile borders and chancel paving were presented by Mr. R. P. Daniell, a gentleman well known in Worthing; and the font was presented by a lady in the town. At the luncheon which followed the architect's health was drunk.

DISSENTING CHURCH-BUILDING NEWS.

Leves.—The foundation-stone of a new Presbyterian church, to be called the Hamilton English Presbyterian Church, has been laid, in Market-street. Mr. W. F. Poulton, of Reading, is the architect, and the contract has been taken by Mr. J. W. Sawyer, of Dulwich. The church will be in the Lombardic style of architecture, and will include a chapel capable of accommodating 300, a school-room, class-room, sessions-house, and vestry. The interior dimensions of these will be: chapel, 58 ft. by 32 ft.; school-room and class-room, 46 ft. by 19 ft.; sessions-house, 21 ft. by 16 ft.; and vestry, 16 ft. by 10 ft. The front elevation, including a bell-turret, is 54 ft. The entrance is in the centre, and will consist of three doorways, separated by columns, and surmounted by round arches. The principal window is also in the front, and is divided into five semicircular lights of equal dimensions. The materials to be employed are red brick and Bath stone dressings. The cost of the building, including the site, will be about 2,500l., of which sum 1,300l. have been already raised, and 3000l. are promised by the Presbyterian Church Building Committee.

Brighton.—The foundation-stone of a new Wesleyan chapel has been laid, in Norfolk-road. The contractor for the erection of the building is Mr. John Chappell, of Steyning and Brighton; the architect is Mr. C. A. Ellison, of Liverpool; and the work is being carried out under the immediate superintendence of Mr. Arthur Loader, of Brighton.

Northampton.—The foundation-stone of a new Baptist chapel, in Grafton-street, has been laid. The architect is Mr. Ingman, of Northampton, and the builders are Messrs. Clark & Heap. In the spring of this year the building fund was considered large enough to justify the old chapel being taken down and the new chapel being commenced, and tenders were advertised for, in accordance with the plan furnished by Mr. Ingman. Messrs. Clark & Heap's tender, at 1,236l., was accepted. The purchase of the ground and old chapel, with two cottages, was 600l., making a total estimated cost of 1,836l. Towards this sum 917l. have been received. The foundation-stone of the new school-room was laid on Easter Monday.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

Barton-on-Trent.—The new church which has recently been erected here, at the sole expense of Sir Humphrey de Trafford, bart., of Trafford Park, has been formally opened. The edifice is dedicated to All Saints. It is designed in the Geometric English Gothic style, in harmony with the family chantry founded by Sir Humphrey and Lady Annette de Trafford, and erected at a cost of 3,000l. Attached to the same is a presbytery for the rector, and there are also sacristies and cloisters. The church, which is 140 ft. in length and 54 ft. in width, principally consists of a nave, in which the whole of the benches are placed, the aisles being little more than cloisters, and a chancel 40 ft. in length, having a width of 20 ft. The nave opens into aisles with seven moulded arches, which, together with the supporting columns, are formed of Runcorn red and Painswick white stone, alternately, with carved capitals intervening. From these spring rectangular arches, supporting the aisle roofs, which terminate on responds against the aisle walls, where they are again intersected by the arches over the windows. The roof of the nave is composed of

English oak and Savannah pitch pine, inlaid with various coloured woods, enriched with gilding. The chancel pavement is composed of crimson marbles, enriched with encaustics, and the communion rail is of brass. The sides of the chancel are filled with Riga oak, with carved and moulded hacks and tracing panels, the armlets being adorned with quaint representations of curious animals. The altar is placed some 4 ft. above the level of the nave, and is executed in Carrara, Sicilian, Sienna, and Devonshire marbles, and Caen stone. The reredos extends across the whole width of the chancel, on which are ranged angels in the attitude of adoration. On the tabernacle four carved angels, with uplifted hands, support a jewelled silver gilt crown which forms the canopy. On the front of the altar is carved the "Annunciation," and on either side of the tabernacles are groups representing the life of our Lord. The chancel is lighted with eleven two-light tracery windows, which are filled with stained glass. This portion of the work has been executed by Messrs. Powell & Hardman, of Birmingham. Below the window sills is a carved cornice, from which are suspended hangings of crimson velvet. Externally the church is erected in Stanton free-stone, with dressings and walling of Yorkshire parapet. Behind the de Trafford chantry rises the gabled roof of the chancel. The nave and aisles are comparatively plain. There is seating accommodation, exclusive of the gallery, for about 400 persons. The whole of the work has been carried out, at a cost of 16,000l., from the designs of Mr. E. Welby Pugin, by Mr. Glaister, of Liverpool.

Books Received.

A General Gazetteer in Miniature. By R. BROOKES, M.D., and A. G. FINDLAY, F.R.G.S. New edition corrected to the last date. By J. A. SMITH, editor of "Joyce's Scientific Dialogues," &c. London: W. Tegg, 1868.

Brookes's was a good old gazetteer; but a good old gazetteer may be a bad new one unless it be really and thoroughly "corrected to the latest date." We are sorry we cannot say much in favour of this edition of "Brookes's Gazetteer." In the first place, it is not one gazetteer merely, but two; for there is a superficial gazetteer of nearly 100 pages, called a supplement, appended in separate alphabetic arrangement, instead of being incorporated with the original, even although something like one half of it consists, not of new headings (which, however, would have been no proper excuse) but merely of information additional to that given under headings already entered in the body of the Gazetteer, as is somewhat awkwardly announced at the head of the supplement. Nor is this additional information by any means altogether new. Thus, under the head of London in the supplement, the occurrence of the plague in 1665 is announced, together with a considerable amount of information of similar antiquity. Then, again, a great mass of the less out-of-date statistics, instead of being digested and properly placed under the respective headings, either in the main gazetteer or in the supplement is stuck in at the end, all together, as an appendix. The result of this may be conceived by all who turn up the Gazetteer for information under any one heading. Thus, while, in the appendix, we find that the population of Berlin in 1858 was 438,961, we are told, under "Berlin," in the main body of the Gazetteer, that "the population is 236,830, or nearly one-half less in 1868 than it was in 1858! Apart from these serious defects, we find the information given to be otherwise very unsatisfactory. For example, under "London" we find that Westminster Bridge "is being removed," and Blackfriars "is to be removed." The Parliament House are "now erected;" but the Metropolitan Underground Railway seems to have as yet no existence, any more than other metropolitan lines, although lines terminating in the metropolis (not all of them) are noticed. Nothing has as yet been done with the Thames Embankment; and as for the new sewerage works, they are not worth mentioning. The Clyde at Glasgow is still an insignificant stream, notwithstanding the conversion of it into a first-class river; so that though "the river is navigable for vessels of eight feet of water as far as the bridge," the larger vessels stop at Port Glasgow or Greenock, at the mouth of the river, to unload. We regret to be severe on any well-intended work, but

really there is no excuse for treating the public to a stale hash of this sort. Who is really to blame for it is not so clear: it does not necessarily follow that the editor named is so, although he has made himself responsible for all shortcomings.

British Mosses: their Homes, Aspects, Structure, and Uses with a Figure of each Species. By F. E. TRAPP. Bell & Daldy.

The number of students of cryptogamic botany in this country is so limited, that publishers are often deterred from producing works like the handsome volume before us, the work of a lady, which affords a capital introduction to the study of British mosses. It is illustrated with an elaborate engraving and brief scientific description of each species, and as it gives a key to the genera, cannot fail to be of real use to amateurs. It is beautifully printed on toned paper, and bound in green and gold; the plates are well etched and singularly faithful to nature. Some, however, represent herbarium specimens, and the subjects are lavishly spread over more plates than appear necessary. Nearly all the recent cryptological additions to our flora are to be found in the work. The author's name is not given after the specific name in the descriptions; this oversight should be remedied in a future edition, as the name of the founder of a species is quite as important as the specific name itself, and should on no account be omitted from a scientific book.

We must compliment Miss Tripp on the production of so good a book, and trust her ability and enterprise will be rewarded.

VARIORUM.

"The Royal Guide to the London Charities, 1868-9." By Herbert Fry. Sixth annual edition. London: R. Hardwicke." We have already borne witness to the value of this extraordinary list of London Charities. We have merely to add that, as time passes, Mr. Herbert Fry is able to extend it, and to remove such accidental errors as may have crept in. Mention of the book is appropriate in our present number, wherein we have spoken of the charitable wants and shortcomings of London.

"Shakespeare for a shilling! Longfellow for a shilling! both issued by F. Warnes & Co., under the heading "The Chancery Classics." Of all the compliments tendered to Mr. Longfellow during his brief visit to London (and we have heard of a few), the admirable poet will probably find none greater than this expression of a belief that his admirers in England are sufficiently numerous to make his shilling edition pay. It is printed with large clear type, contains recent poems, and consists of 628 pages.—Messrs. Routledge, who also have issued a shilling "Shakespeare," have given additional value to it by printing on the title page "Edited by Charles Knight."—Messrs. Longman, Green, & Co. have published Macanlay's two fine essays, "Milton" and "Machiavelli," in clear type for sixpence. Cheap and good.

Miscellaneous.

"CLEOPATRA'S NEEDLE."—Once more the suggestion gets abroad that we should bring from Alexandria the obelisk that belongs to us. Some years ago we gave an estimate of the cost of doing this, by one who was willing to undertake the work.

NEW SHOREHAM CHURCH.—The efforts made to restore this interesting edifice have been brought to a standstill, and the work now rests entirely with the parishioners. The cost of restoration is estimated at between 9,000, and 10,000; and a large sum has been promised by gentlemen of the county and others interested in the proposition; but their subscriptions are to be forthcoming only on condition that the church is restored, not merely repaired; also that the parishioners will lend some aid. It appears that 2,500,000 are required from the latter; and the Committee recommend, as the only mode of raising this sum, that a special rate be made under a special Act of Parliament, which gives them the power, and the rate thus made mortgaged for a term of years. It is said that this method has been adopted with great success in many parishes.

INTERNATIONAL ARCHEOLOGICAL CONGRESS.—The International Congress of Archeology and History, organised by the Society of Rhenish Antiquaries, will be held at Bonn, in September next. It will open on the 14th and close on the 21st. The Prince of Prussia is the honorary president. A list of questions for discussion has been printed.

EXPERIMENTS ON EXPLOSIVE MIXTURES.—We notice that "a course of experiments on gunpowder and other explosive mixtures, is about to commence at Woolwich, under the direction of the Ordnance Select Committee." We would remind the authorities and others interested in this subject, of the article "Explosions of Gunpowder Stores" printed in the *Builder* of 1865, p. 760, which contains a valuable collection of facts on the subject not before brought together.

NEW PIER AT MORECAMBE.—A new pier is about to be constructed at Morecambe. The length will be 950 ft., and the general width 20 ft. At the entrance the width will be about 40 ft., and here a refreshment-room and offices will be erected. At intervals there will be recesses, where sitting accommodation will be provided; and at the pier-head,—which will be 130 ft. long and 40 ft. in width,—there will be refreshment and retiring rooms, and facilities to enable visitors to get on board boats or steamers. The pier is the property of the company, and the cost will be 9,000, or 10,000.

IMPROVED DWELLINGS FOR THE WORKING CLASSES OF SALFORD.—At a meeting of gentlemen interested in the project for obtaining improved dwellings for the working classes of Salford, articles of association (as a "limited" company) have been signed, and ordered to be forwarded to London for registration. The articles provide that the Board shall not consist of fewer than five, or more than seven gentlemen, and five were appointed, namely, the mayor (Mr. H. D. Pochin), Mr. Oliver Heywood, Alderman Cawley, Mr. Henry Russell Greg, and Alderman Davies. Subscriptions to the amount of 8,000, have been received, and the intention is to purchase property in the worst part of Salford, and replace it with property of an improved description.

RESTORATION OF CHESTER CATHEDRAL.—The Dean has succeeded in obtaining promises of subscriptions to the extent of about 11,500, in addition to the 10,000 assigned to this purpose by the Ecclesiastical Commissioners before the county meeting, when this subscribed sum was made over by him to the committee then appointed "to co-operate with the Dean and Chapter" in this undertaking, and "to act on behalf of the subscribers to the restoration fund." The committee held their first meeting in the Chapter-room on Wednesday, the 10th of June, when additional subscriptions to the amount of about 900, were announced. On the 24th of June it appeared that further subscriptions to the amount of about 1,200, had been received, thus making the sum raised since the county meeting about 2,100. The work of restoration was actually begun before the county meeting, the 10,000 assigned by the commissioners being already at the disposal of the Dean and Chapter. The stone employed is from the Runcorn quarries, and all the evidence which has been obtained, according to our authority, the *Chester Courant*, tends to show that it is excellent, both in durability and in facility of working. It is, of course, red in colour, but of a lighter tint than that used in the original construction of the cathedral, and which seems to have been taken from the quarries within the city itself. Sheds have been erected in St. Oswald's churchyard, a plan having previously been made, so that each tombstone can be replaced in its original position; and the masons have been for some time at work on the stones intended for the buttresses near the east end. The state of the walls in this part of the Cathedral was found on examination to be even more perilous than had been supposed. The present work is in the hands of Mr. Haswell, of Chester, who, like his father before him, has already had much to do with the stone-work of the Cathedral. Each portion of the work is priced under the direction of the architect, and is under the inspection of Mr. Frater, the clerk of the works; and it is understood that if satisfaction be given, successive portions of the choir will be restored on this method. However, it is the wish of the Dean and Chapter to place the nave and southern transept in the hands of a contractor. For this purpose a considerable accession to the funds must be made.

LOOK TO YOUR COIN DEPOSITS.—The *Northern Whig* states that all the coins, documents, &c., deposited according to custom in a cavity in the foundation-stone of the Orange Hall, in Sandy-row, Belfast, which had been laid on Saturday week, were on that night, or early next morning, carried off by some thief, and have not since been heard of.

THE WEST LONDON SCHOOL OF ART.—The prizes to successful students are to be presented in the theatre of the Geological Museum, on this Saturday evening, the 18th inst. by Mr. Beresford Hope, M.P. The success of this school has been considerable. Though the latest established of the ten metropolitan Schools of Art, it is teaching more than a fourth of the entire number of artisans (1750), taught in the whole of the London schools!

HOLBORN VIADUCT.—With reference to the Holborn Valley improvement, Mr. Haywood, the engineer, states that, since his last report, the works to the churchyard of St. Sepulchre's have been completed. The whole of the houses between that churchyard and Snow-hill had been removed, and the works of the viaduct at that spot had been resumed, and were being actively pushed on. The three public staircases at the angles of the Farringdon-street bridge had been carried up to some height, and the stonework had been prepared and was ready for fixing. Some of the granite for the abutments had arrived, and the rest was shortly expected. The subway sewer and vaults in the western approach street between Hatton-garden and Holborn had been completed, and the pavement of the street at that spot was now being laid. The pavement of the circus was also approaching completion.

THE RACE TO THE NORTH POLE.—After we have tried for the best part of a century to reach this goal or win this race, we give in just as others, benefitting by our experience, are starting for the winning-post. The French expedition, according to a statement in the *Moniteur*, may now be considered as certain of being undertaken. The delay has hitherto been occasioned by the want of funds, which the subscriptions entered into have not yet brought up to the required standard. Owing to the activity of M. Gustave Lamher, sub-committees have been formed in all the departments of France, thus making the expedition a national undertaking. When the necessary amount is subscribed, measures will be immediately taken for the purchase and equipment of a ship. The departure of the German and Swedish expeditions for the same destination will in no way diminish either the chances of success or the importance of the French expedition, and it will only act as an incentive to the starting of that expedition.

HOUSES OF LEGISLATURE.—The cubical contents of the Senate Chamber at Paris are 240,000 ft.; it has 208 seats for members, and 430 seats in all. The Chamber of the Corps Legislatif has 277,000 cubic feet of space, 372 seats for members, and 712 seats in all. The cubical contents of the House of Lords at Berlin are 83,000 ft.: seats for members, 278; total seats, 471. House of Representatives at Berlin, 200,000 ft.: seats for members, 416; total seats, 827. The cubical contents of the House of Lords at Florence are 253,400 ft.: members' seats, 372; total seats, 787. Chamber of Deputies, 467,000 ft.: members' seats, 492; total seats, 944. At Washington the cubical contents of the Senate Chamber are 244,000 ft.: members' seats, 88; total seats, 876. House of Representatives, 409,000 ft.: members' seats, 312; total seats, 1,312. At London the cubical contents of the House of Lords are 173,000 ft.: members' seats, 270; total seats, 466. The present House of Commons of the United Kingdom is 68 ft. long by 44 ft. wide on the floor; on the gallery level, 83 ft. by 45 ft.; height, 44 ft.; cubical contents, 127,000 ft.: members' seats, 428; total seats, 691. The new house now proposed by Mr. Barry would be 63 ft. by 63 ft. on the floor; 74 ft. by 71 ft. on the gallery level; height, 39 ft.; cubical contents, 154,300 ft.: members' seats, 569; total seats, 899. The cubical contents would be less than those of any other of the popular Chambers above named; but in the number of members' seats it would exceed them all; and in the total number of seats it would exceed Paris and Berlin, but be exceeded by Florence and Washington. It would be shorter than any of these Houses of Commons. The House of Representatives at Washington is 112 ft. by 74 ft.

HASTINGS SEWERAGE.—The new intercepting sewer for Hastings is now complete, and the event is to be celebrated by a dinner on Monday, the 27th inst.

VICTORIA STATION AND PIMLICO RAILWAY COMPANY.—The half-yearly meeting of this company has been held. The adoption of this report was carried unanimously, and a dividend for the last half year, at the rate of 4½ per cent, was declared.

THE PIMLICO CARPENTERS' AND JOINERS' CLASSES.—In connexion with these classes, a public meeting on the subject of Technical Education is to be held on this Friday, the 17th inst., in St. Gabriel's Schools, Pimlico. Earl Granville, it is stated, will take part in the proceedings.

GIFT TO BARNINGHAM CHURCH, YORKSHIRE.—Mr. Augustus Sussex Milbank, a godson of the late Duke of Sussex, has presented an illuminated coron with four lamps, enriched with ruby and crystal settings, to this church. It bears the inscription in Medieval characters, "Given by Sussex Milbank, 1868." There accompany it two lamps for the reading-desk of corresponding pattern. The whole are from the manufactory of Messrs. Hart & Son, of London. The only other chandelier in the church was given by an ancestor of Mr. Milbank 130 years ago.

THE ARCHAEOLOGICAL INSTITUTE CONGRESS.—Lancaster has been fixed upon this year for the annual congress of the Royal Archaeological Institute of Great Britain and Ireland. The inaugural meeting takes place on the 28th inst., and the congress will sit until August 4th. Colonel Wilson Patten, M.P., Chancellor of the Duchy of Lancaster, is the president, and the programme of the week's proceedings has been thus arranged.—On Tuesday, July 29, the inaugural meeting will be held in Lancaster Castle, and on the same day the principal objects of antiquarian interest will be visited. A reception will be held by the mayor of Lancaster in the evening. On Wednesday morning there will be a meeting of sections and an excursion to Heysham. Papers will be read in the evening. On Thursday the great excursion will be to Dalton Castle, Peel Castle, and Furness Abbey, where a lecture will be delivered and the rains he described by Mr. E. Sharpe. The mayor of Barrow-in-Furness gives a déjeuner. On Friday there is again a meeting of sections and more excursions, and so again on Saturday several excursions to localities of interest in the neighbourhood are proposed. On Monday, August 3, there will be an excursion to Bolton Abbey, Barton Tower, and Shepton Castle; and on Tuesday the final meeting will be held, and papers will be read in the sections. Excursions are also projected to visit the Art Treasures Exhibition at Leeds in the course of the week.

PROPOSED DRINKING FOUNTAIN, &c., FOR LEWES.—A meeting has been held at Lewes to take into consideration the proposal to erect a drinking-fountain in some central part of the town, and supplemental troughs for cattle. Mr. Crosskey said he introduced the question at a recent meeting of the Market Committee, and the general feeling seemed to be against having drinking-troughs for cattle. In the first place, there was an objection raised that there would be a chance of spreading the foot and mouth disease, if healthy animals drank at the same place as those which might be diseased. One would be efficient to propagate disease: one calf brought the cattle plague into this district. Another objection was that the cattle would not drink; and it was further alleged that the owners would not let them do so, because bullocks did not look so well in the market after a good drink of water. Besides all this, it was stated to be positively injurious to cattle to drink after having been driven. Mr. De Putron said another objection held by some is that calves will only drink muddy water; but if so, they had better provide muddy water than nothing at all. Mr. Parsons did not think that the drinking-fountains would propagate disease. He mentioned as a fact that separate flocks coming to the fairs in the neighbourhood were placed in the same fields without any objection that such a course would be likely to spread disease. After some discussion a committee was formed, consisting of the gentlemen present at the meeting, the residents in the vicinity of the spot where the fountain is proposed to be placed, and gentlemen of the town who transact business in the market.

LEEDS EXHIBITION.—The visitors in the week ending Saturday, the 11th inst., numbered, by season tickets, 5,787; by payment, 18,243; total, 24,030.

"LETTERS BY SIR THOMAS LAWRENCE."—The first of the letters given in our last number (p. 506, ante) was dated, by a misprint, 1867. It should be 1827, as the two following letters would serve to indicate.

ST. PANCRAS NEW INFIRMARY.—The Poor-law Board have given their sanction to the plans for the St. Pancras New Infirmary at Highgate, and have empowered the guardians to raise a loan of 40,000l. for building the same.

ROYAL GALLERY OF ILLUSTRATION.—A piece by Mr. F. C. Bernard, the author of "A Yachting Cruise," under the title of "Inquire Within," will be performed for the first time on Monday next. Mr. and Mrs. German Reed, Mr. John Parry, and Miss Annie Sinclair, will take part in it.

SOUTH KENSINGTON MUSEUM.—The visitors during the week ending the 11th July amounted on Monday, Tuesday, and Saturday, free, to 23,302; on Wednesday, Thursday, and Friday (admission 6d.), 3,248; to National Portrait Exhibition, by payment, 1,935; making the large total of 34,485.

ORGAN FOR GLASGOW CATHEDRAL.—A movement has just begun in Glasgow for getting an organ of the largest size into the cathedral. The sum of 3,000l. is spoken of as necessary. An unsuccessful attempt was lately made by the Rev. Dr. Cunningham to introduce an organ into his church at Crieff.

A CHURCH STRUCK AT BRIGHTON.—At Brighton the recent storm raged at intervals, and the lightning struck the tower of St. Peter's Church. One of the pinnacles was completely shattered, and a considerable portion of the lead roof torn up and displaced, some of the rubbish being forced down into the belfry and clock-tower.

BARNARD CASTLE.—At a meeting held in the Witham Testimonial, the Rev. F. Brown, M.A., vicar, in the chair, it has been resolved that Mr. Pritchett, of Darlington, architect, shall be associated with Mr. Haswell, architect, in making a preliminary survey, and report, upon the state of the fabric. The subscriptions amount to 1,850l.

WANT OF LUNATIC ASYLUM ACCOMMODATION.—The annual report of the Commissioners in Lunacy deals with the want of asylum accommodation which now exists in different parts of the country. Middlesex, Lancashire, and Yorkshire are described as having been for some time conspicuous for their lack of proper institutions for the reception of the insane poor.

THE SURVEYORSHIP OF THE HOLBORN DISTRICT BOARD.—The Holborn Board of Works have rejected a motion brought against their surveyor, Mr. Isaacs, for accepting the additional post of surveyor to the Hon. Society of Gray's Inn, in contravention of their regulations forbidding private practice. They have also, on the recommendation of a committee, rescinded the prohibitory resolution, which has been in force eleven years. The motive adduced on the part of the Board was that they did not wish to cramp a young man of fine abilities, and one in whom they had full confidence. The motion was carried by thirty-two votes against eleven.

TENDERS.

Table with 2 columns: Contractor Name and Amount. Includes entries for Mr. A. Davis, Ramsay, Henderson & Cairns, King & Sons, Breeze & Co., Hearle, Ward, and others for various construction and repair works.

For various reparations to the parish church of Christ Church, Newgate-street, E.C. Mr. H. H. Collins, architect:—Fisher 497 10 0 Shaw 366 0 0

For a villa residence in Tufnell Park, Holloway. Mr. George Treaditt, architect:—Carter (accepted) 21,350 0 0

For the Tufnell Arms, Tufnell Park, for Mr. Page. Mr. George Treaditt, architect:—Exclusive of the bricks. Heath, jun. (accepted) 21,400 0 0

For alterations and repairs to House, No. 9, New Quebec-street, Portman-square, for Mr. Ades. Mr. C. Crapp, architect:—Brett 2312 0 0 Water 239 0 0 Taylor 225 0 0 Godden & Webb 225 0 0 Waters 234 0 0 Colson 215 0 0 King (accepted) 201 0 0 Mitty, Brothers 180 0 0

For new church, St. Mary's, Strood, near Rochester. Mr. A. W. Bloomfield, M.A., architect:—Brown & Robinson 26,675 0 0 Vaughan 6,452 0 0 Stamp, architect 6,456 0 0 Wallis 6,386 0 0 Hill & Sons 6,328 0 0 Wheeler 6,300 0 0 Anson 6,258 0 0 Ford & Sons (accepted) 5,983 0 0 Futeher (withdrawn on account of an error) 5,099 0 0

For alterations, Holloway-road. Quantities prepared and supplied by Mr. Wagstaff, architect:—Wiltshire & Sons 2810 0 0 Lacey 777 0 0 Williams & Son (accepted) 777 0 0

For New Wesleyan Chapel, Ealing. Messrs. J. Tarring and C. J. Quantities supplied:—Brook 4,825 0 0 Myers & Son 6,189 0 0 Adamson 6,141 0 0 Kirby 6,069 0 0 Chamberlain 6,049 0 0 Dove, Brothers 6,009 0 0 Higgs 5,862 0 0 Saunders 5,840 0 0 Nye 5,769 0 0 Hill 5,670 0 0

For New Congregational Church, Hanwell, Middlesex. Mr. C. Jones, architect. Quantities by Messrs. Richardson & Waghorn:—Waters 21,633 0 0 Adamson 1,793 0 0 Myers & Son 1,783 0 0 Nye 1,635 0 0 Gibson 1,610 0 0 Gibson, Brothers 1,630 0 0

For the erection of a public-house, shop, and premises, Lower-street, Deptford. Messrs. Hill & Son, brewers. Mr. Edward W. Fry, architect:—Excavators, Bricklayers, Masons, Slaters, and Plasterers' Work W. & G. Denner 2,890 0 0 Carpenters, Joiners, and Ironmongers Work Wiso 2,450 0 0 Plumbers, Glaziers, and Painters' Work Friend 2,208 10 0 Slaters, Bellhangers, and Gasfitters' Work Christian 2,150 0 0

For the erection of a pair of villa residences, Victoria-road, New Barnet. Mr. J. Sergeant, architect. Quantities supplied:—Bamber 21,100 0 0 Twelvetrees 889 0 0 Burle 836 0 0 Clewley 831 0 0 Layley 827 12 6 Ginger 827 0 0

For house and office, Bromley, Kent, for Mr. J. A. Alop. Mr. C. H. Dwyer, architect. Quantities supplied by Mr. E. O. Harris:—Gammon & Sons 21,907 0 0 Amand 1,897 0 0 Payne & Balding 1,835 0 0 Nizon 1,855 0 0 Perry 1,834 0 0 Taylor 1,797 0 0 Nutt & Co. 1,759 0 0

For the restoration of St. Mary's, Frensham, Surrey. Mr. John M. K. Hahn, architect. Quantities furnished by Mr. J. Barnett:—Duke 23,138 7 2 Marden 1,846 0 0 Goddard & Son 1,594 0 0 Birch 1,592 0 0

For alterations, &c., at the Holborn Viduet Hotel, for Mr. Simpkins. Messrs. Maybaw & Calder, architects:—For general Works Emor 2,339 10 0 Benstead & Son 821 0 0 Turner & Son 800 0 0 Curtis 777 10 0 Eaton & Chapman 750 0 0

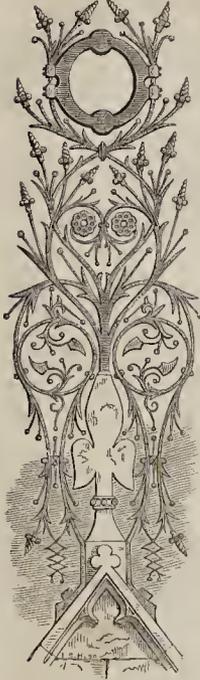
For Peuterer's Works Browning 117 0 0 For Gas Fittings Comyn, Ching, & Co. 88 0 0 * Accepted.

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The Builder.

VOL. XXVI.—No. 1329.

Asylums for the Imbecile Poor of the Metropolitan District.



OUR readers will remember that at the beginning of the present year the Board acting for the Metropolitan Asylum District offered premiums for the best designs that might be submitted for two proposed asylums for the Imbecile Poor: one to be erected in Leavesden, near Watford, Herts; and the other in Caterham, near Croydon, Surrey. We gave at the time some particulars of the designs sent in, and stated that a design by Messrs. J. Giles & Biven had been selected, and would be carried out at both places with merely such differences as might be enforced by differences in

the sites. This design we now illustrate by a view of the buildings, a block plan showing the general arrangement of them, and plans drawn to a larger scale of the administrative portion, the Dormitories, and the Infirmary.*

These asylums being the first of their kind that will be erected under the new arrangements, a full description of the intended buildings will interest many of our readers, and for this, where the engravings are insufficient, we shall go to the designers' own statements.

The small plan shows that the central administrative block extends from the south front, facing the road to the lower part of the ground northwards. The south front is occupied by the medical and official department, the centre by the stores department, the extreme north by the laundry and engineer's department, to obviate nuisance from steam and the necessarily offensive exhalations. The corridor to these buildings has a fall of about 1 in 30, to meet the natural fall of the ground, without resorting to steps.

From the central kitchen, right and left, are corridors (10 ft. wide), with the workrooms of the females and the workshops of the males each on their respective sides, occupying the space which forms the connecting link between the administrative department and the blocks on either side, and convenient of access from both. The entire width between these is 110 ft., giving space for the erection of the chapel without interfering with the free passage of air.

At right angles with this corridor, north and south, on either side, extend the corridors connecting the blocks. These are 8 ft. wide, one story high, and fireproof, both sides having windows, with tops opening, so as to admit of the free passage of air through them. By this means each block is entirely isolated. The infirmary block occupies the south end of each corridor, and next these, on either side, are placed the steward's and matron's houses. It has been thought better in each case to give a small detached house at a distance from these central offices, than apartments immediately adjoining them. Practically, these officials spend a certain number of hours each day at their business, and after that time it is thought equally convenient and more agreeable to be somewhat removed from the scenes of their duties, but within call if required by the head attendants.

There are on the female side five general blocks, each for 160, and one infirmary block for 60 patients. This gives 860. On the male side are three blocks of 160 each, and a shorter one for 110. These, with the infirmary block, give 650. This shorter block can, if required, be extended to the general size, and will accommodate 50 more.

The extreme length of the corridors from the kitchen to the most distant blocks is 180 yards on the female, and 138 on the male side.

The detached infirmary, for infectious diseases, is placed in the rear, north of all the buildings, so that the prevailing winds which blow south-west would not pass from it to the other buildings.

The chapel is placed on the left of the administrative block, rather than in front of it (as at first seemed its best position), because it is believed that a large detached chapel in front of the entrance to such a building must have a gloomy effect, and practically throw into shadow that to which it should be but an accessory.

The engineer's house is on the right, within easy reach of the boiler and engine-houses, and those parts of the building likely to require his attention. The chaplain's house is on the right of the main body of the buildings, and near the main road. Both these have private access to their houses without passing the asylum grounds.

Administrative or Central Block.

This being the great centre—the store-house—the manufactory of everything consumed by so great a number of people, it is of

the highest importance to its economical working, that every apartment within it shall be neither so unnecessarily large as to cause waste in building and require extra labour and attendance, nor so small as to impede the due and proper execution of each attendant's work.

There are fireproof corridors to every part of the building; every apartment, it is claimed, can be reached without passing through any other; each is accessible both from the male and female sides, and all food, stores, clean linen, &c., can be obtained for their respective patients' blocks without either sex of attendants trespassing on the department of the other.

Male and female departments of attendants are separated day and night by the door across the centre corridor, and that across the corridor by the female's visiting-room.

In the front and centre of the main building is what for convenience of examination we may call

The Official and Medical Department.

Here is the principal entrance-hall, on one side of which are placed the board-room, waiting-room, clerks' offices, &c., and on the other the medical superintendent's residence, a house complete in itself, having bed-rooms on this floor above, in addition to the three reception-rooms, kitchen, scullery, &c. On the right is the board-room with retiring-room and offices, and the apartments of the medical assistants on the floor above them. It is also near the head attendant's offices and the visiting-rooms of both sexes.

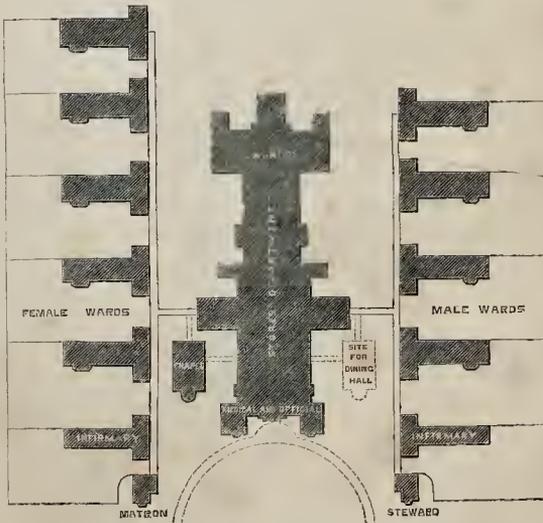
From each side of the entrance-hall branch two corridors, one to the male, the other to the female side of the buildings, thus giving from this point a separation of sexes both as regards patients and attendants.

On the outer side of these corridors are placed the visiting rooms for patients, with separate entrance, overlooked by the head attendant's office adjoining in each case. Here commences the

Attendants' Department,

male and female, on either side. These entrances are for all the subordinate officers, as well as the visitors to patients: thus no person can enter or leave the building without being seen by the head attendant on duty. On each side, and under the head attendant's supervision, are the staircases leading to the attendants' dormitories of each sex.

The centre of the administrative department



BLOCK PLAN: LEAVESDEN ASYLUM.

* See pp. 560, 561.

is occupied by the general store, large enough for separation of the different kinds of stores, and with small stores leading out of it. The steward's office is in the centre. On one side is a large open court, into which all carts containing beer, flour, or stores can be taken and unloaded under the eye of the steward and his attendants. Beyond this is the bakehouse, with scullery, &c., attached, and this extends to the line formed by the interesting corridor.

The kitchen is 50 ft. by 45 ft., by 25 ft. high, with through ventilation and light above, large enough to cook for fully 2,000 persons if necessary. The scullery adjoins the kitchen, and is 50 ft. by 25 ft., by 22 ft. high. Adjoining are the cook's larder and dairy, and a meat store is placed on the left conveniently near, in which all meat will be received and weighed before entering the kitchen to be cooked. Near these are cooks' store and kitchen servants' room, and, on the opposite side, a coal store for kitchen and the general daily distribution.

Outside the corridors, which enclose the kitchen, and in the north angle formed by these and the intersecting corridor leading to the patients' blocks, on the male side are workshops, and on the female side the work-room, with the matron's office and store, and the workmistresses' apartments and stores adjoining. Beyond these, and near the boiler-house, on both sides, are the bath-houses for both sexes, each containing twelve baths, with dressing-rooms and W.C.

The Laundry Department.

The linen, conveyed by trucks from the patients' blocks, will be brought into the "receiving rooms," passed into the "wash-houses" for either sex, and washed and dried either in the grounds or on the steam-horses, thence passed into the laundry, and folded, mangled, or ironed, as may be necessary. It will then be passed into the delivering-room, and there sorted and given out at the slides to trucks in the lobby.

It is calculated that about eighty female patients will be required to assist in the laundry, and, as great loss of time and inconvenience would arise if these were compelled to return to their respective blocks for their meals, a hall for dining has been placed close to the laundry, with a servants' mess-room adjoining. Close by the laundry is

The Engineers' Department.

This is kept distinct in itself, and is entered from the yard only. This position of the boiler and engine houses and their attendant workshops is, for convenience of supplying steam to the kitchen and scullery, bath-houses, laundry, machinery-room, drying-houses, &c., and it will be seen that economy of heat, and necessarily fuel and labour, will be effected by its position being central between these apartments. It will also be seen that the infirm patients' blocks of both sexes have their baths supplied from these boilers, one boiler-house thus supplying the entire establishment without waste of heat. Here also is placed the water-tower, with the smoke-shaft from the boiler within it. This tower will rise to a height of 65 ft., and have a cistern at the top containing 30,000 gallons, for the supply of water in case of fire in any block or part of the building—an efficient supply until the engine could be got to work. Fire-cocks, with hose, will be fixed on the staircases of each block, and at other parts of the buildings, by means of which, if kept right, any portion could be deluged with water in a few minutes.

Patients' General Blocks.

Of the blocks, which run at right angles to the intersecting corridor, all are, with the exception of the infirm block, precisely alike.

The ground-floor of each block is a day-room for the patients, 105 ft. by 36 ft. and 14 ft. high, with windows on the north side 6 ft. from the ground of day-room, on the south side within 3 ft., and with a large bay on that side also.

The designs differ from the plan followed in modern infirmary pavilion blocks of placing all the W.C.s and lavatories at the end furthest from the connecting corridor. It is essential that the class of persons here should be, with the least possible labour to attendants, constantly watched, and this could never be the case with those plans far removed from the centre of supervision.

Each of the two dormitory floors is alike, and accommodates eighty patients on a floor, divided by an iron partition and iron columns in the

centre. Each division has an attendants' room, a lobby for the patients' clothes at night (it being very undesirable for those to remain in the dormitory), a linen store, and a spacious lavatory.

Each attendants' room has a window giving supervision of each division of forty patients.

The windows of the dormitories, twelve on each side, are opposite each other, they are 3 ft. wide and 4 ft. from the floor. In all cases they come between the beds, and not over them. There are also windows at each end, giving through, direct ventilation to the staircase of each block.

Infirmary Blocks.

These blocks are in each case of three floors; each floor being in its internal arrangements alike, it being assumed that the ground floor would be occupied by the very infirm or epileptic patients, whom it would be undesirable and almost impossible to take up and down stairs. Should this not be the case, the ground floor could be used as a day-room for the sixty patients; although beds are shown over the entire floor of the wards, the end of each might be used as a day-room for patients becoming convalescent, and separated by a screen or partition from the other portion if required.

Each ward has three fireplaces, the windows are opposite each other, and within 3 ft. of the ground, it being more cheerful for the sick to see out of them. On each of the three floors are placed rooms for excitable patients—four in number. These are approached direct from the staircase, and have a lobby between the dormitory and them, so that noise may not annoy the sick.

With reference to ventilation and heating, all the corridors connecting the blocks have windows on both sides of their entire length, and those in the administrative block are lighted and ventilated above and, at intervals, at the sides.

Open fireplaces are employed generally throughout the buildings, and wherever gas is used it will be made the means of carrying off the vitiated air by means of galvanized iron tubes in the thickness of the floors, connected with the spare ventilating flues from the various rooms.

In order to keep up necessary movement of the air in the upper part of the ward, the whole of the windows, twenty-four in number, in each dormitory have a portion of their height, about 2 ft., working on a swivel, so as to open to any desired inclination. The top of this swivel-light is constructed as a cast-iron hopper-shaped frame, glazed in front and ends, but left open about 2 in. wide at the top, the opening being covered with fine wire gauze. The lower portion of all the windows will also be constructed so that the middle part, about 1 ft. in width from top to bottom, can be unlocked and turned upon a centre, and thus a flood of pure air be admitted when desired.

In addition to this, air-bricks are built into the wall at intervals, at the level of the ceiling, with fine zinc gauze covering the inside, and a sloping lip projecting about 6 in. from the wall, to give an upward current to the air and prevent down-draught. In order to disperse the stratum of foul gases, which is found to be about the level of what may be called the *bed line*, or about 2 ft. from the floor, there are a series of bit and miss gratings, lined with fine gauze, and communicating, by means of galvanized iron horizontal tubes in the floors, with the outer air.

The fireplaces are entirely of firebrick back and sides; and in order more effectually to distribute the heat in the wards and save fireplaces, a principle is adopted which has been found to answer extremely well. A fine convective fresh air to a chamber at the back and sides of the fireplace, where it is warmed, and passed by a pipe built in the wall to midway between each fireplace in some cases, and in others into the single patients' rooms near infirmaries, lavatories, clothes lobbies, linen-chests, and W.C.s, and staircases, where by means of a hit-and-miss grating it is let out.

The cost of each asylum, as now altered, is estimated at about 85,000l.

It will be seen that the whole of the buildings are of a plain, substantial character. No stone is used except in cills and door-steps. In the windows circular heads have been avoided, as entailing expense.

In the wards and elsewhere all the sashes are of cast iron.

The insides of the wards, corridors, staircases, &c., will be of brick, with neat joint, and coloured a light green or grey colour.

THE SCANDAL OF LEICESTER SQUARE.

LIBERTY is a grand word. Unfortunately it is one of those which involve much difficulty when definition is attempted. People are apt to attach very different meanings to the phrase. King James VI. of Scotland and I. of England defined a free king as a king who was free to make his subjects do what he chose. And many people even now hold that their own right to liberty includes the power to incommode their neighbours.

We have had recently brought before our courts of justice an instance of the respect shown by the law, and we may add by the police authorities of the metropolis, for the liberty claimed by an individual to perpetrate a public nuisance for his own pleasure. In no other part of the civilised world would such a degree of liberty have been successfully asserted. We must be pardoned if we think that it is an instance of the truth of the adage that there may be too much of a good thing.

The condition of the enclosure of Leicester-square has long been a scandal to those who have any regard for the proper maintenance of our public monuments, and for the dignity or even for the decency of the metropolis of Great Britain. The disgraceful condition of this enclosure has long been a subject of ridicule, of gibing, and of shame. One of those spots which, by a happy provision on the part of those who could form little anticipation as to the value of any open breathing-place in the enormous mass of houses that is so rapidly spreading over the counties of Middlesex, of Surrey, and of Kent, has been left available for a public garden, is converted, by the wrong-headedness of the proprietor, into a public nuisance. The happy situation, at the break and bifurcation, or rather trifurcation, of one of the great western lines of thoroughfare is especially appropriate for one of those oases of verdure and of flowers which the art of the gardener can so readily produce. The less said about some of the architectural surroundings, perhaps, the better. But where building of any description covers in a dense mass,—a large area,—the value of open space in an æsthetic no less than in a sanitary point of view is very great. The central portion of Leicester-square, if surrounded by a graceful railing and laid out and tended as an ornamental garden, would be a greater addition to the beauty of the neighbourhood than the architect alone could offer. The effect on the jaded passenger of a peep, in the midst of his daily cares, at the bright colours and graceful forms of vegetation so rarely brought before him, is not to be readily over-valued; and the influence on the health of any particular locality, and thus, indeed, on the whole great system of localities that we call London, of a well-tended and healthy pleasure, is of no slight importance. To retain, in the place which might be occupied by such a centre of pleasure and of advantage, a neglected enclosure, ragged and disreputable from rank weeds and overgrown grass, surrounded by a shabby palisade, only designed to keep the public out of a spot which ought to be adorned by the effigy of the Dog in the Manger, is a moral offence. It is in England alone that it would not soon be made plain that it was a legal offence. The doctrine that individual whim should not be allowed to interfere with the public welfare, is admitted elsewhere as an axiom. It is admitted to a certain extent in England, but the limits of that admission are not only narrow, but capricious.

If the owner of Leicester-square, not content with the pleasure of maintaining an eyesore in the face of his fellow townsmen, were to promise himself the further pleasure of establishing a *nuisance*, or of offending either of the other senses, we should lay hold of him as the perpetrator of a nuisance. If he were to think the spot appropriate for a lay-stall, and were to invite that large and useful fraternity who exercise the odorous calling of nightmen, to empty, provisionally, some of their enormous muck-trucks in the disputed area; if he were to found on it soap works, or a vitriol manufactory, or a powder magazine, or a bombproof building for the testing of gun-barrels, or an oil-mill, or a fireworks establishment, the worthy magistrates to whom the neighbours would rush for redress would speedily find a method of convincing the eccentric proprietor that he could not, under the circumstances, do what he liked with his own. But so long as the aggression on taste and decency is passive, the public is passive too. It

is difficult to see the logical line which we draw in the matter.

If a company that purposed to hurray amid the sewers and cellars from Euston-square or from Paddington to Charing Cross had put Leicester-square in the schedule of its bill, Parliament would have handed over the rights of Mr. Tulk to the invaders without the smallest scruple of hesitation. For any purpose of a commercial character that demands a legislative sanction, the power to help oneself freely to one's neighbour's property is freely accorded. If a whole town full of poor lodgers were to be turned out of house and home in order to allow a little breathing space around a railway station, a magnificent approach, or a mere open area, to be built on or no as the engineers and architects should afterwards think fit, Parliament would say with alacrity, "Take your Bill." It is only if the comfort, the health, and we may almost say the æsthetic education, of a large number of persons who form no corporate or commercial entity are concerned that the law dispensers and the law makers frown, and say "Private rights must be respected." In other words, as against inroads for the purposes of making money, private rights have but a very shadowy force, while as against public welfare they are unassailable.

Nor is the state of the enclosure in question purely a passive nuisance. Neglected vegetation is a source of ill-health, and to leave such a squalid spot in the midst of a great population amounts at least to an offence against sanitary prudence. And there is another point of view which should not be altogether ignored. Our neighbours find it to be a crime of no small magnitude to excite to "hatred and contempt" of the Government. As to the individual application of this rule, in many instances of press and other offences, we have nothing to say. We are not on the jury. We do not take fire so rapidly at the lucifer-match of a penny, or even of a threepenny, journal, as do our friends on the banks of the Seine, and we have no wish to interfere in their domestic difficulties. But the principle itself must be held to be involved in the very existence of any State government. Exciting to hatred and contempt is the commencement of that form of political aggression which our laws (rudely, it may be) denigrate and repress. Now while it would be absurd to speak (in language which would have found an echo within the last century) of the treasonable disrespect shown to departed majesty in the mangled and crutchborne state of what was once an equestrian effigy in this unfortunate square, it is impossible to deny that the influence which such neglect tends to exert is unwholesome. While monarchy is an English institution, it should not be allowable to present the effigy of an English monarch as an object for popular scorn. However indisposed we may feel to prevent the proprietor of Leicester-square from exciting "hatred and contempt" against himself, we have right to forbid him to do so with reference to the representation of an august personage which has so unfortunately fallen into such irreverent hands. It is probable that legislation may be silent on the subject, as the case was one which those grave and decorous ancestors to whom we owe the traditions of our common law could never have imagined to be possible. But we may be pretty sure what would have been the sort of summary justice measured out, at those periods of our history to which we look back for precedents, to the person who should have prostituted his freehold ground to the public display of such an outrage on loyalty, as well as on decency, as the nondescript royal effigy in question.

The Metropolitan Board of Works have laid siege to Mr. Tulk, the proprietor of the area of the square. That individual has set them at defiance, beaten them hollow, and no doubt laughs them to scorn. Our brief is for the public. It seems that the machinery of legislation has been set in motion in behalf of the Board, and that such is the increasingly cumbersome and awkward state of the mechanism that it has broken down by its own weight. In 1863 was passed an Act of Parliament, called 26 Victoria, cap. 13, "for the protection of certain garden or ornamental grounds in cities and boroughs." The express object of this Act, as may be gathered from its title, purported to be a means of despatching such cases as that to which we refer. It has long been matter of public notoriety that the result of our peculiar method of legislation has been to make laws which none but lawyers could understand. That, of course, is

but natural and proper, if the object of legislation be (as we suppose it confessedly is), the encouragement and multiplication of harristors and attorneys. But 26 Victoria has gone beyond that time-hallowed obscurity. It defies not only English grammar, English idiom, and English lay understanding, but legal acumen itself. The obstructive spirit that has inspired the owner of Leicester-square must have revelled in the consultations amid which the famous Act was framed. The Lord Chief Justice gave up the attempt to attribute to it any intelligible meaning. Public Journalists have taken the trouble to count more than 600 words which the indeters of this model law have crammed, or rather pitch-forked, into a single sentence. The result of this triumphant legislation is, that Mr. Tulk, without attempting to show that he had kept his inclosure in proper order, or avoided that "neglect" which it was the object of the Act to prevent, is entirely untouched by the enactment. The most flagrant instance of neglect which could have been present to the contemplation of the authors of the act is quite untouched by its provisions. Is it worthy of a great nation to allow the highest of all social functions, that of determination and amendment of the law, to be thus miserably trifled with?

Leicester-square is only one out of the many instances in which the architectural beauty and pictorial grandeur of the metropolis are destroyed by the loud-voiced self-assertion of private bad taste. It is time that this should be put a stop to. For those who regard architecture as merely a trade, which enables a speculator to stow away so many human beings, like rabbits in hutches, in the smallest possible space, and for the least possible cost, it may be all very well to ignore questions of taste. To those who attribute to architecture the higher functions of inscribing in noble edifices the successive phases of national history, and of educating the taste of mankind by an admixture of the noble with the useful, the subject is one of no trifling importance. It is, in our opinion, a positive injury to the young to bring them up in close contact with the hideous. Bad taste is an outward expression of an ill-informed or distorted mental vision. Pure and perfect taste is the gift of comparatively few, and even when originally present, is never independent of culture. To know how a certain object has been most satisfactorily attained is necessary to the fair development of the artistic faculty. It is thus that stately buildings, truthful and striking sculpture, fine paintings, have been at all times regarded by the wisest statesmen as important elements in national education. It is as recognising the importance of this branch of culture that we have collected a national gallery, not unworthy of the name, but we have housed it in an ill-adapted home, and we are about to build a new edifice, in which, we venture to hope, there may be a series of galleries in which the *chefs d'œuvre* that we possess or may acquire may be seen without interfering with one another. But what is the use of encouraging our youth to admire the works of Raffæello or Correggio within doors, while we condemn them to the view of caricature statues of Kings William III. and IV. without? How can we expect any result but ridicule if we say one minute, "Look! it was thus that Vandyck and Holbein drew the men and the women of their day," while we tacitly add—"and it is thus that we do honour to the victor of Waterloo and to the minister who piloted the vessel of the State through the dangers of the Corn-law question." We exhibit one on the top of a fine gateway, in the guise of the most gigantic scarecrow that disfigures any European capital. We fix, in the most unsuitable spot that can be selected, such a gaily caricature of the other that even the House of Commons revolts at the outrage. Better to revert to window-tax architecture, to tea-garden Corinthian, and churchwarden Gothic; better to attempt nothing higher in street architecture than a wall pierced with glazed rectangular holes at regular distances, than, while cultivating taste at one moment, continue the most ingenuitous outrages on its best established canons at another.

It is altogether unworthy of our position among civilized nations that matters like these should be left to chance, or to what may be worse than chance,—private caprice, or the extravagances of the uneducated dilettante. We are alone, among civilized nations, in this expression of our contempt for art, that we have not thought it worthy of administrative attention. In all other European states an

educated some department of the Government concerns itself with the guidance of the art education of the people. In one instance it is committed to a minister of public instruction; in another, it may be superintended by a minister of public works. In no two instances are the arrangements identical, but nowhere except in this country, is the subject actually ignored or neglected. It is impossible for an educated taste to become prevalent without some degree of guidance and direction from those who are competent to guide and to direct. It is (what many politicians hold to be the worst off-noon) positive waste of public money to buy pictures and build galleries while we lend the same emphatic solemnity of sanction to the worst outbreak of rampant bad taste that we do to the finest remnants of ancient art. Contrast the economical value, in its influence on the education of the youth of the metropolis, of the outlay on a Raffæello, a picture which it demands a certain degree of education (as well as a position and light, which are at present denied it) to admire, with that of the application of a similar sum to the expenses of a department of fine art, the permanent head of which might, as a non-political adviser of the ministry, be in a position to put a veto on the invasion of the best sites of the metropolis by statue-erecting Goths! The noble structures erected and now erecting in London can never produce their proper effect, whether on the admiration of strangers, or on the habitual feeling of the inhabitants, while they are flanked by abortions which defy the simplest laws of decent good taste.

COMMITTEE ON TECHNICAL EDUCATION.

At a meeting held at the Society of Arts on Tuesday last, Mr. W. Hawes in the chair, the committee on Technical Education received and adopted a report drawn up by a sub-committee, appointed by them on February 25th. The closing portions of the report, which bring together the recommendations of the committee, are as follow:—

Young workmen living frequently as lodgers in the houses of married workmen have now few facilities for study, and we believe that the creation of lodging-houses for these unmarried men, in connexion with evening classes systematically arranged, would greatly assist young workmen in their studies. Thus each man might have his own furnished room as a bedroom and study. Meals might be provided in common halls at a small expense; and regular evening classes might be held, the attendance at which should be a necessary condition of residence. A library, reading-room, and museum would complete the establishment, which would thus offer to our workmen something analogous to the collegiate life of our great universities. Notoriously vicious conduct would be followed by expulsion, and students who failed to pass satisfactory examinations would also lose the privilege of residence. The classes might also be open to married men and other non-residents, on the payment of sufficient fees. Gratuitous instruction and board might be given to a certain number of men in the form of scholarships and exhibitions, and certificates should be granted to all who pass good examinations. Some portion, if not all, of the funds required for an experimental college of this kind could be provided by taking advantage of the "Act to enable the Public Works Loan Commissioners to make advances towards the erection of dwellings for the labouring classes."

It appears that workmen are beginning to organise evening classes for themselves, appointing their own teachers and framing their own rules and terms of admission. Thus the trade union of Amalgamated Carpenters and Joiners have succeeded in establishing large classes both in London and Manchester. The chief difficulty met with by these men has been in finding suitable rooms for these classes. These efforts are especially worthy of encouragement, and the form of encouragement which would least interfere with the independence and self-reliance of the men would be assistance in finding meeting-rooms, either by paying the rent or by the erection of suitable buildings. It would indeed be lamentable if a movement of this kind were stunted in growth from the mere want of suitable places in which instruction could be given. Mechanics' institutions might offer accommodation in some cases, and grants

might also be made by Government through the department at South Kensington. Suitable guarantees that the rooms would not be used for improper purposes could easily be devised.

Have the Sub-Committee would call attention to the great necessity there is for sailors' institutes in the colonial and Indian ports, in many of which there are always from one to three thousand officers and seamen needing a building where their leisure time may be spent in self-culture, and where the proposed instructors could hold their classes.

In conclusion, the following series of resolutions express the recommendations of your committee as respects the action of the government of existing colleges or universities and of the leading men in each profession or business considered by the committee. An expansion of each of these resolutions has already been given, and should the wording of any one resolution appear ambiguous, the meaning attached to that resolution is to be gathered from what has been said above:—

It is desirable that Government should encourage systematic scientific instruction by the following measures:—

1. By adopting the recommendations of the Schools Inquiry Commission, for the introduction of the teaching of natural science into all secondary schools, and for establishing new science schools of the first grade, which schools should be on all points on a footing of equality with the endowed classical schools.

2. By co-operating with universities and colleges in holding examinations, which are, or may be, established for the purpose of conferring certificates or diplomas in connexion with systematic studies, intended to educate civil engineers, mechanical engineers, officers of the mercantile marine, metallurgists, miners, naval architects, and marine engineers, architects, merchants, chemists, and agriculturists.

3. By giving some official value to those certificates or diplomas, such as allowing certain diplomas to represent a given number of marks in competitive examinations.

4. By putting at the disposal of the leading colleges which give methodical courses of scientific instruction, and diplomas of recognised value, a limited number of nominations annually.

5. By assisting old and new endowments where local subscriptions or donations prove the value set on the instruction proposed or given.

6. By instituting night classes for workmen in connexion with all new scientific endowments, with access to a library.

7. By providing free libraries suitable for the use of the students in night classes generally.

8. By providing suitable meeting-rooms for night classes organised among workmen, for the purpose of obtaining scientific instruction.

9. By according liberal prizes to workmen for excellence in mechanical drawing.

10. By taking steps to extend and improve primary education.

It is desirable that colleges should encourage systematic scientific instruction by the following measures:—

1. By instituting methodical courses of scientific teaching, adapted to students intending to enter a profession or business among those which have been enumerated above.

2. By the establishment of diplomas, corresponding to the several courses of study in conjunction with Government, and with the leading institutes belonging to each profession.

3. By the establishment of fellowships and scholarships in connexion with those diplomas.

It is desirable that the leading civil and mechanical engineers, manufacturers, merchants, ship-owners, chemists, manufacturers, and agriculturists, should encourage systematic scientific instruction by the following measures:—

1. By the creation of scholarships and fellowships in connexion with those schools and colleges where methodical courses of instruction are given.

2. By co-operating in the examinations for diplomas.

3. By giving a practical value to those diplomas, such as would be evinced by a reduction of premiums to intending pupils holding such diplomas, and by attaching weight to the possession of a diploma when choosing among candidates for employment.

4. By granting distinct privileges, in connexion with the professional institutes, to all holders of recognised diplomas.

We here repeat the resolutions already quoted in order that all the formal resolutions may be found together:—

For the purposes of discussion, technical education should be deemed to exclude the manual instruction in arts and manufactures which is given in the workshop.

That the term "technical education" is understood by the sub-committee to mean general instruction in those sciences, the principles of which are applicable to various employments of life.

That technical instruction, as defined above, should not, as a rule, be given in separate professional institutions, but in institutions established for general education.

That, with a view to the development of a system of scientific education, it is desirable that schools be established having for their main object the teaching of science as a mental discipline. These science schools should prepare some youths for the higher courses of a college, and other less ambitious pupils for their professional pupillage.

That the subject of secondary instruction having been reported upon ably and deliberately by the Schools Inquiry Commission, the committee do not feel it necessary to enter into the details of this subject, while they desire emphatically to express their opinion of the necessity for the introduction of scientific teaching in all secondary schools.

That it is desirable that the higher scientific instruction should be tested by public examination, and that the proficiency of persons who pass these examinations should be certified by diploma.

That the preparation for the businesses considered by the committee is not sufficient until due scientific instruction has been followed by practical pupillage in efficient works.

The committee recommend employers of labour and others in the habit of taking pupils, apprentices, and clerks, to give the preference as far as possible, to those adducing evidence of the possession of adequate instruction in the sciences applicable respectively to their professions or occupations.

Your committee have reserved for separate consideration the technical education of those who are producers of works of fine or decorative art, or directors of art manufactures, understanding by that last term manufactures in which beauty or ornament is one of the chief objects aimed at.

It is necessary to bear in mind that for the production of works of an aesthetic character, scientific principles occupy a subordinate position, while a knowledge of the details of execution is desirable for those who design or guide the work of others. Moreover, it must be borne in mind that the taste of those to whom works of beauty appeal, is far more fluctuating than the demand for productions in which utility is alone considered.

Your committee are of opinion that one of the first conditions of progress is the cultivation of artistic knowledge and taste in all classes of society.

With this object in view, no less than with a view to the technical education of the art-workman, provision should be made for the teaching of drawing in all schools, primary and secondary, as a branch of general education, in order to train the eye and hand, and in order to cultivate habits of observation. It is essential that drawing should be part of the regular school course, and not an extra lesson; and, further, that it should be taught intelligently, not from mere copies, but from real objects.

The art-workman needs, in addition to a power of free-hand drawing, an acquaintance with geometrical drawing, in order that he may be able to execute work correctly, in accordance with the designs of the artist who directs him.

For artists, designers, and directors of art manufactures, the education should be a liberal one, in order that they may understand the feelings of those on whom they desire to make an impression. Their education should also be, to some extent, scientific, in order that they may have a knowledge of the properties of the materials they employ, and be able to adapt those materials to the structure of the objects produced, and those objects to the uses for which they are intended.

The recommendation already made with reference to other professions, namely, that the period of pupillage, or the earlier stages of practice, should be preceded by a special attention to those branches of knowledge which have a direct relation to their art, applies to the technical education of those who are concerned with artistic work. In this case that knowledge

should include not only scientific principles, but also a history of the various forms in which, prior to any scientific theory, some of the noblest conceptions have found their expression in works of art.

It is therefore desirable, both for the artist workmen and for those engaged in the highest branches of art, that opportunity should be given by access to museums and to evening classes, for the study both of the theory and history of art.

Your Committee are of opinion that the Universities may render great service to the technical education of those engaged in artistic pursuits, by the recognition of art as an element in general education, and by professional lectures. Some steps in this direction have been taken, by the regulations attaching importance to drawing in the Local Examinations; but your Committee would gladly see the practice carried further, and applied to the higher stages of academical education. They cannot doubt that the study of works of ancient and modern art would have a tendency, in connexion with literature, to diffuse culture throughout the nation, and to raise the standard of technical education.

SCIENCE OF COLOUR.*

ON a subject so attractive as colour, upon which of late so much has been written that is valuable, and excites the wish for more, and so much merely repeated from questionable authority, and apparently serving no useful purpose in art, it is a pleasure to meet with something original, in which thought and labour have not been spared, and the truth of Nature alone is sought.

The book before us is a work of much research, and seems to promise useful results. To give an idea of the contents, we will touch upon some of the more salient points in the order in which they present themselves.

In the chapter on "The Prismatic Colours and their continuous Combinations," the colours of the pure spectrum are described as "seen at once to constitute three conspicuous bands," red, green, and blue, though really changing gradually from one into another; the colours produced by combining parcels of the prismatic rays are thus detailed:—

"The strongest red and green and blue are obtained by throwing together all the rays in which these colours respectively predominate, and excluding the rest. The strongest yellow is produced by combining the red and green rays, and excluding the blue; the strongest sea-green by combining the green and blue rays, and excluding the red; the strongest pink by combining the red and blue rays, and excluding the green. When part only of the third band is excluded, the resulting colour is brighter but paler, until when all are included the pure white of the solar light is obtained."

After mentioning some neat experiments to prove these results, and showing that the colours of all natural objects whatsoever are combinations of those of the prismatic rays, the following striking proposition is laid down:—

"In every case the best colours are produced by rays which belong to some one continuous portion of the spectrum, beginning either at the one extremity or at the other, or at some intermediate point; or (in the case of crimson, pink, and purple) by two such portions, one at one end and the other at the other, all thrown together in their full intensity, while the rest of the rays are totally extinguished."

It follows from this that—

"The best natural colours are inferior to those which may be produced by artificial combinations of the prismatic rays, since there is no substance which transmits, without diminution, all the rays of any one portion of the spectrum, and totally absorbs or extinguishes all the rest."

Such being the case, it is very interesting to learn that, by one simple experiment, we may produce at once "not only the prismatic colours in their greatest possible purity, merging into darkness, but also the colours of all possible parcels of continuous prismatic rays, forming an ensemble of the loveliest colours the eyes can behold." This is done by obtaining the spectrum of an angular space of white upon a black ground, in conjunction with a similar space of black on a white ground; and the effect is elucidated by an explanation and scheme of the colours of the resulting spectrum, accompanying a diagram of the angular spaces. Such a spectrum may be used, our author suggests, "as a natural standard or exemplar of colours, producible with perfect truth in every place under

* Principles of the Science of Colour, concisely stated, to aid and promote their useful application in the decorative arts. By William Benson, architect. (Chapman & Hall.)

the sun, and universally applicable, for every colour in nature must be some shade of a colour included in it."

The next chapter recommends some further experiments with the prism, as novel in their application as the last, by which the prismatic colours, and their various combinations, may be seen in juxtaposition with their complementary colours. We are inclined to think that these experiments, simple and almost obvious as they are, constitute one of the most useful parts of the work. It is usual to suppose that red and green, yellow and purple, blue and orange, are complementary to each other; but here we see, by Nature's unerring pencil, that red is complementary to the sum of the blue and green rays, which our author designates sea-green; yellow to blue; green to pink. The experiments referred to are merely to look through the prism at a band of white upon a black ground, continuous with a band of black upon white; and at an edge of white against black continuous with an edge of black against white. It seems impossible for the most strenuous advocate of the conventional lists of complementary colours, met with in almost all treatises on colour, to deny that material corrections are required in the common doctrine on this essential point.

Another interesting use of these experiments is the exhibition of complementary colours equally luminous; and the distinction between a perfect complementary and a colour complementary only in hue, the former exhibiting in general the strongest possible contrasts.

The utility of such experiments with the prism, when properly understood, in educating the eye to a direct appreciation of colour, is obvious. They need, however, more precise directions how to use the prism, which is rather difficult for a learner to compass without instruction.

We may next notice some remarks on "intermediate colours," or those which lie in a direct gradation between two given colours. The mixture of pigments does not in general give true results. Rotation has been practised, but is not convenient. About a century ago Lambert, a German philosopher, used the simple and beautiful method of reflecting one of the colours by a slip of polished glass upon that part of the glass through which the other colour was seen. Here we have Lambert's method recommended and illustrated with an easy mode of finding that position of the eye in which equal proportions of the two colours are combined. It is needless to show how useful to artists, as well as to learners, such simple means of testing the correctness of gradations and contrasts of colour may be. Applying the glass to the coloured diagram accompanying the description, some common delusions are at once dispelled. A neutral grey, for instance, instead of green, is seen to be intermediate between blue and yellow; and olive green, the shade of yellow, intermediate between red and green.

In the chapter on the primary and secondary colours, the view maintained by Professor Maxwell in the "Transactions of the Royal Society for 1860" is advocated. Mr. Maxwell's experiments on the prismatic colours have never excited amongst practical men the attention they deserve. They consisted of most careful and trustworthy observations, by which he distinctly proved that certain red, green, and blue rays of the solar spectrum so far excelled their intermediate rays in depth of colour, that by merely mixing them the colours of these intermediate rays could be produced in their proper depth; from which, of course, the natural deduction is, that red, green, and blue

"Are simple elementary or primary sensations of colour, and that the hues of all the intervening prismatic colours are compound, caused by some two of these sensations being excited at once in excess of the third. For nothing can be more probable than that each simple sensation is produced with greatest power by rays of some particular period of undulation, and with less and less power, the greater the difference of the period; and if so, it may well be supposed that those prismatic rays which have the greatest depth of colour, that is, the red, green, and blue rays, are those by which the simple sensations are severally most strongly excited, each in equal excess, or very nearly so, over the other two sensations."

We need hardly say that this question of the simple sensations of colour lies at the root of all correct theory and rules of practice. With respect to the theory that they are red, yellow, and blue, now almost universally taught, both in our country and on the Continent, Mr. Benson

roundly asserts (in his preface) that it is "un-supported by a single rational experiment;" and in page 14, that

"That theory is entirely subverted, not only by the researches above mentioned on the prismatic colours, but by all scientific experiments on the mixture of colours, which show that red and green, yellow and purple, and blue and orange, are not complementary to each other."

We commend this question to the special consideration of those who direct the instruction given in the schools of design in the theory and practice of colour. If any reasons can be stated against the new, and in support of the hitherto accepted doctrine, let them be stated; but if the new doctrine be true, we cannot be too prompt in accepting it. The truth of Nature must be superior to groundless theory, as a foundation for all rules of practice.

We cannot leave this part of the subject without noticing another novelty, which strikes us as true and useful,—the doctrine of the double brightness of the full secondary colours. Hitherto the brilliant colours which Mr. Benson designates pink and sea-green have been almost neglected; in this work they both class with yellow, as the true secondaries, all of which ought to be as bright as the whole of the rays of their two respective components can make them. Why should the secondary formed by adding red to blue be the darkest of colours? There are bright strong colours of this hue in some flowers, as in the petunia, and it glows with matchless beauty in the solution of permanganate of potash, though we cannot, perhaps, imitate it well by pigments. As for sea-green, we cannot wonder at its being overlooked, since it very rarely occurs in nature, and there seems to be no pigment but the fading verdigris that represents it well; but this is no reason why it should be omitted in the theory of colour.

Mr. Benson groups together the three primaries and the three secondaries, together with black and white, as the eight principal colours. The double coloured diagram, showing the relations of these principal colours by the supposed addition of the primaries upon black, and by their supposed subtraction from white, each in three partly overlapping circles, deserves notice. It would be a good test of the relative merits of the two theories of primary and complementary colours, in an aesthetic point of view, to compare other diagrams formed on the like plan, with red, yellow, and blue for the primaries, and green, purple, and orange for their complementary secondaries.

The observations made in chap. vi. on the qualities of colour, the definition of richness or strength of hue, the distinctions between the depth, the clearness, the darkness, and the brightness of colours, the reasons why some colours may excel in depth and others in clearness, and the attempt to vindicate their comparative merits in these respects, will be found worthy the study of all who delight in colour. But here again we are led into doctrine which is entirely opposed to the theory introduced by the ingenious Field concerning chromatic equivalents. Mr. Benson thinks the results he alludes to

"May lead to rules concerning the proportions in which colours may neutralize each other more reliable than those which Field so hastily laid down from his experiments on the superposition of coloured glasses or solutions, the results of which he totally misunderstood, since the thicknesses of the coloured substances upon which he experimented, indicated anything rather than the quantities of the respective colours in the transmitted light."

Field, in his "Chromatography," maintained that the full red, yellow, and blue neutralised each other in the proportions of five red, three yellow, and eight blue. Mr. Hay, in the third edition of his "Laws of Harmonious Colouring" (1836), said that Field has proved in the most satisfactory manner that yellow, red, and blue are as three, five, and eight. In his beautiful work called "The Nomenclature of Colours" (1846), he gives a different estimate of the relative powers of the best pigments, for he asserts—

"It will be found that taking the purest powdered pigments that art can produce, and mixing them in the proportions of one yellow, two red, three blue, of equal intensity, a cool grey, such as is produced by mixture of black and white, will be the result."

Now, by using the slip of glass as recommended in this work, it is easy to see that the colours of our most powerful yellow and blue pigments, as King's yellow and Cobalt blue, neutralise each other in about equal proportions without any red; so, also, do those of our deepest and clearest, as French blue and lemon yellow. How can these facts be reconciled with the con-

clusion of Field or Hay? Can the latter be supported by any experiments more trustworthy than the mixture of pigments, or the superposition of coloured transparencies, the fallacy of which is now universally understood? Why continue to repeat a doctrine that is contrary to fact, and can only puzzle or mislead? We commend this matter, also, to the consideration of the Department of Science and Art.

The description and use of what Mr. Benson has called "the natural system of colours" is perhaps the most striking and attractive part of the work. Hitherto no scheme has been used which would find a place for all possible combinations of three primary sensations of colour, so that all direct gradations may be represented by straight lines; but, by the aid of the simple geometrical figure of a cube, this is perfectly effected, and the value of the idea is immediately evident in the facility it affords for conceiving and forming all sorts of gradations and contrasts, and harmonious arrangements of colour. The construction of the colour-cube is thus described (and the method may, of course, be applied to any three primary colours we may choose to adopt):—

"A point must be taken to represent zero, or black, the absence of all light, and three lines drawn from it at right angles with each other, in which and in all parallel co-ordinates red, green, and blue respectively must be supposed to increase in intensity from nothing upwards. Those intensities of red, green, and blue which together constitute white must be supposed to be equal, and will be represented by equal distances in the three rectangular directions. The outer extremities of such three equal lines will therefore be the places of full red, full green, and full blue, in some given intensity of white, and the lines themselves will contain the gradations from black up to those three colours. If, then, the cube of which the same lines would form three edges, be completed, it will obviously contain a place for every possible combination of red, green, and blue, from black, in which all three are not, up to white, in which all three are of full intensity; and the number of distinct combinations would, of course, be the cube of whatever number of steps are taken from black up to a full primary, both included.

The corner of the cube opposite to black would be full white; the corners opposite to red, green, and blue would be sea-green, pink, and yellow. The central point would be a neutral gray. The three sides which adjoin to the corner of black would respectively contain all those colours in which there is no red, no green, and no blue; while the opposite three which adjoin to the corner of white would contain all those which have full red, full green, and full blue. Thus the six sides may be distinguished by the primary which is absent, or fully present in each; and the twelve edges, being lines of which each is common to two sides, by the two primaries, of which each contains nothing or all.

The three diameters terminating in the middles of the opposite sides are designated primary axes, "because in them there is a change of one primary only." The six terminating in the middle of the opposite edges are called secondary axes, "because there is in them an equal change in two primaries, either in the same or in contrary directions." The four joining the opposite corners are in like manner termed tertiary axes, as having an equal change in all three primaries, "either all in the same direction, or two in the same, and the third in the contrary direction."

In every plane section of the cube the colours must vary according to simple laws of gradation in every direction, forming some peculiar natural harmony of colour. But those only which are perpendicular to the thirteen axes above mentioned are represented in colours, taking only one colour between each pair of the principal colours, which makes twenty-seven in all. In this way the same twenty-seven colours are arranged in thirteen different ways, grouped in each in a variety of natural harmonies of colour, the effect of which is very striking, notwithstanding the admitted imperfection in hue and inequality in strength of the pigments used.

In the first coloured plate, for example, we have nine groups, of nine colours each (being the sections perpendicular to the primary axes). The best idea of the nature of these compositions will be given, perhaps, by detailing the colours of the first set:—

Colours containing full Red.

Yellow.	Light Yellow.	White.
Yellow-red.	Light Red.	Light Pink.
Red.	Pink-red.	Pink.

Colours containing half the full Red.

Yellow-green.	Light Green.	Light Sea-green.
Dark Yellow.	Gray.	Light Blue.
Dark Red.	Dark Pink.	Pink-blue.

Colours containing no Red.

Green.	Sea-green Green.	Sea-green.
Dark Green.	Dark Sea-green.	Sea-green Blue.
Black.	Dark Blue.	Blue.

It will be seen that, in each set, the perfect

* The different kinds of homogeneous light, or prismatic rays, are distinguished by the length of the ethereal undulations or waves, in which, according to the now accepted undulatory theory, all light consists.

complementaries are found at equal distances in opposite directions from the central grey; also that the central colour in each group gives the general tone of the group.

In the remaining coloured plates there are six more groups of nine colours; four of seven; twenty of six; and the same number of three; all distinguished by their peculiar harmonies; some complementary to each other, and some more nearly related. But the great point of the system is, that it is suggestive of endless variations. Not only may the sections themselves be varied, but they may be wholly or partially combined symmetrically in endlessly varied ways, to aid which four plates are given, indicating numerous natural ways of combining the single groups. We look for a striking effect on all sorts of colour designs, when the principle here introduced becomes known; for it is not unlikely that, in this idea of sections of the colour-cube, we have a key to the infinite natural harmonies of colour.

It should be added, that the coloured plates and diagrams have been coloured by hand, the number of the different colours, and the manner in which they are arranged, probably rendering the application of printing difficult. This is to be regretted. In the choice of pigments (a list of which is given), the object seems to have been to take the best of each colour compatible with permanence, and to avoid mixtures as much as possible.

As supply naturally follows demand, one good result to be hoped for from an advance in the science of colour, is the further improvement of pigments. Of late years, some admirable pigments have been introduced, several of which are need with great advantage in this book; but there is room for more, especially for one capable of powerfully absorbing the red, and reflecting the blue and the green rays. The chemist who discovers a permanent pigment of this kind will confer a boon upon art. The deficiency mars the beauty of those harmonies in which the full sea-green ought to enter.

In the remainder of the work there are several points on which we should like to dwell, but space compels us to close. The chapter on the colour modifications of colours (under which treat Mr. Benson treats in a comprehensive and accurate manner of the effects known as "accidental colours," and "simultaneous and successive contrast") deserves particular notice; also that on the harmony of colours, in which many subjects for interesting discussion are compressed, and some new considerations advanced. The treatise concludes with a notice of those two distinct peculiarities of vision, "dichromism" and "defective colour-vision," neither of which is uncommon, though many persons affected by them are quite ignorant of the cause of the perplexity they feel about colours.

TERRA COTTA.*

THE first employment of burnt clay was probably for articles of domestic use; and the knowledge obtained in making water-bottles would soon lead to its use for the making of bricks, tiles, and other articles. The monuments of Nineveh and Babylon contain bricks with inscriptions more neatly made and of larger size than those in present use. Many of the bricks found by Mr. Layard were enamelled. The Egyptians made small figures of terra-cotta covered with inscriptions, and having an enamel supposed to be silicate of copper. The finest terra-cottas were probably executed about 400 years B.C., and the examples of this period, which are in the British Museum, testify to the durability of well-burnt clay. Probably some of the friezes, with mouldings and bas-reliefs, in the Museum, are of much earlier date. Pliny, in his thirty-fifth book, gives a long chapter to the art of pottery, and mentions the names of many great sculptors who wrought statues in clay, and also the cities famous for pottery.

The knowledge of every description of pottery possessed by the Romans spread with their conquests, and Germany, Spain, Gaul, and Britain retain fine examples of brickwork and tile and mosaic floors. From the remains of Roman potteries met with in England there can be little doubt that pottery was a most important manufacture here some sixteen centuries past. From Peterborough westward, along the valley of the

Nene, remains of Roman potteries extend for several miles. At Castor, in Northamptonshire, a kiln and a quantity of potter's tools were discovered, also moulded arch and hypocaust bricks.

The people of Lombardy and other states in Italy, mentioned by Pliny as famous for pottery, seem always to have preserved the knowledge of making terra-cotta for architectural purposes; and it is now in North Italy we find the most beautiful architectural terra-cottas. The elaborate terra-cotta enrichments of the new gallery at Milan, called the "Galleria Vittorio Emanuele," have been well executed by Boni, of Milan, from the designs of Signor Mengoni, architect.

The enamelled terra-cottas of Lucca della Robbia, in the fifteenth century, aided the introduction of the new style of ware called *Raffaello*, which was brought to great perfection about the sixteenth century at Pesaro, Urbino, Gubbio, Faenza, and Castle Durante. In the sixteenth century, Bernard Palissy painted tiles for walls and floors, and coated them with a thick enamel. Pottery was made at Majorca by the Moors about the twelfth century; and the Moors, who became for a time masters of Spain, spread the knowledge of making ornamental and enamelled tiles; probably the monks, who were the great conservators of the arts during several centuries, owed their knowledge of making encaustic tiles to the Moors. It is said that the Pisans introduced Moorish tiles for church decoration about the twelfth century, at which time the making of terra-cotta began to revive for architectural work in Italy.

From the time of the downfall of Roman power in England until about the thirteenth century, there are few evidences of brick being used in important buildings in England, except such bricks as were taken from the ruins of Roman works, as at St. Alban's Abbey and other places; and it does not appear that brick became again a favourite material for public works in this country until about the fourteenth or fifteenth century. The brickwork of Little Wenham Hall, Suffolk, is one of the earliest specimens: it is supposed to have been built about 1260.

The introduction of the Tudor style gave an impetus to the use of brick, moulded brick, and terra-cotta ornaments. During the fifteenth and sixteenth centuries many large mansions were erected in England of brick, having moulded brick cornices and terra-cotta ornaments. It is said that Trevigi and Holbein introduced moulded bricks and terra-cotta towards the end of the Tudor period.

During the seventeenth and eighteenth centuries many choice pieces of brickwork were executed, and in many parts of London mouldings and cornices of this date still exist. Towards the close of the seventeenth century, the stoneware potteries of Staffordshire began to be established; and about the middle of the eighteenth century plaster of Paris moulds began to be used by the Staffordshire manufacturers, and Wedgwood began his career in the making of terra-cotta vases and other wares. About 1750 the manufacture of stoneware was making progress at Lambeth; and about 1790 works were established at this place for making terra-cotta architectural details, statues, and vases, by a lady of the name of Coade. These works occupied a large space of ground in Pedlars' Acre, Lambeth, near to the wharf of Messrs. Eastwoods. They were first known as Coade's, then Coade & Sealey's, then Croggon's, and lastly as Routledge & Lucas's. They were closed, on the retirement of Routledge & Lucas from them, about twenty years since, and the moulds, models, implements, &c., were sold by Messrs. Rusworth & Jarvis.

The enterprise and good taste exhibited at these works were of the greatest value to the plastic arts. It is said Flaxman was employed on some of the models for these works, but it is certain that Bacon, Rossi, Bubb, Panzetta, and other leading sculptors who ranked high in the profession at the commencement of the present century, were employed at Coade's. The terra-cotta made at Coade's was of a warm stone colour, and its durability can be tested by very numerous specimens spread over England. The bas-relief representing the death of Nelson, at Greenwich Hospital, was executed by Bacon at Coade's. The frieze, the capitals, the trophies, and statues in the older part of Buckingham Palace were made there, and although the stonework on all sides shows great signs of decay, and the portion last built has been painted several

times, the terra-cotta Corinthian capitals are as sharp as when they left the kiln.

Croggon, successor to Coade, had a showroom on the north side of the New-road, a little eastward to Tottenham-court-road, and erected a terra-cotta front, part of which may still be seen with the paint which was put upon it after he retired, and leaving it fresh and clean.

About the commencement of the present century other manufacturers began to establish themselves in competition with Coade, among whom was Van Spangen, a Dutchman, who established the firm of Van Spangen, Powell, & Co., at Bow, about 1820. Van Spangen made ornamental moulded panels, keystones, rustic quoins, statues, tomb-stones, &c. His works were broken up about forty years since, and a large number of his models and moulds were purchased by the late Mr. Felix Austen, of the New-road, who was then commencing the use of Portland cement (first patented by Aspdin & Beverley, of Wakefield), combined with broken stone, ponded tile, and coarse sand, for forming what he termed artificial stone.

Also, about this time, Rossi and Bubb, who had been employed at Coade's works, began to manufacture terra-cotta for themselves. Rossi executed the large statues, the antifixes, the architect's enrichments, and the capitals for St. Pancras Church, New-road. Bubb executed the bas-relief in front of the Opera-house in the Haymarket, and many of the statues which ornament the terraces in Regent's Park. Mr. Bubb was marble mason, of University-street, Brown, the marble mason, of University-street, took his premises and kiln, and it is perhaps still in existence. Brown made a few terra-cotta articles, but soon abandoned the business.

About 1815, Charles Carter, of Dean-street, Oxford-street, who was connected with Parker & Wyatt, the first makers of what is called Roman cement, made a few architectural ornaments in terra-cotta, and also red incised tiles, and inlaid them with Roman cement to work with stone incised quarries inlaid with Roman cement. When Carter retired from his business, many of his things fell into the hands of Parker & Wyatt, and it was from seeing these suggestions of Carter's as to floor and wall tiles, that led Blasfield (who had become connected with the house of Parker & Wyatt) to inlay tiles with cement, and to make his first experiments in mosaic pavements, and this led to an acquaintance between him and Herbert Minton, and was the main origin of the sort of mosaic pavement, or Minton's tiles, which, beginning with him, are now so commonly manufactured and used.

In 1836, Sir Frederick Fowke, of Leicester, made some very good terra-cotta vases, which were spoken of in a Parliamentary report of this period.

In 1839, Blasfield employed Bubb to make experiments at Canford, for Sir John Guest, on Lord de Manley's clays, for making terra-cotta for use in building model cottages, and a small quantity of moulded bricks, tiles, and ornaments were made at that place, from sketches made by my father, and worked out in his office by myself. Bubb's health failing, Blasfield gave up the attempt to establish works in Dorsetshire, but continued to employ Bubb, who modelled a statue of Pomona for him for the late Sir William Middleton, of Shrubland Park, Norfolk.

About 1845, Herbert Minton executed copies of the Medici and Borgese vases, in buff terra-cotta with a thin glaze, from moulds furnished by Blasfield. Messrs. Cubitt, the builders, erected a kiln at their works in Gray's Inn-road about this date, to make architectural terra-cotta.

After the breaking up of Coade's works by Routledge & Lucas, several makers of terra-cotta sprang up. Moulded bricks were made at Glasgow, Tunstall, Ewell, Ludlow, at Worcester, and other places. Mr. Fulham, of Broxbourne, also began to make architectural works, and Mr. Blanchard, at Lambeth, who made specimens for the Exhibition of 1851, as did Messrs. Donlon, of Lambeth, and several other persons. The Earl of Leicester also made about this time some moulded bricks, chimney-shafts, and other architectural pieces, from drawings by Mr. Bodger, formerly in Mr. Pennefather's office.

Blanchard has executed nearly the whole of the architectural terra-cotta work for the new buildings at the South Kensington Museum, and numerous other large works.

Blasfield began to make terra-cotta at Mill Wall in 1848, and at Stamford in 1858. Previous to 1848, he made terra-cottas occasionally by

* By Mr. C. Barry. From paper mentioned in our last.

way of experiment, as in 1839 when he employed Bubb, but did not enter fully into the merits of the subject until about twenty years since.

When the governors of Dulwich College entrusted the works of their new college to me, without interference as to style or material (but only that inevitable trammel as to cost to which architects must perform submit) I felt that my old dream of long ago might be realized, and I have endeavoured to produce a building almost wholly in terra-cotta of varied colours, and striven to embody therein something of the stateliness, and at the same time elegance and fauoy in details of these old specimens. As a maiden essay, of course it is full of defects and shortcomings, to which no one is more alive than myself, but if it should help to lead others of my professional brethren with larger opportunities and richer experience to draw upon, to carry on the employment of terra-cotta in England, it will have served as useful a purpose as I could have hoped.

Terra-cotta, as my audience know, is a term usually applied to artistic works made of course clay or a coarser material than that used for fine earthenware or porcelain; it is generally of red or buff colour, but can have introduced into it by chemical materials other colours, and architects will readily appreciate at once the opportunity thus afforded of decorating in colour their works, in accordance with their own taste, with a material that shall endure as long as the fabric itself, with which their names are to be identified. As terra-cotta also admits of being glazed, a further opportunity for architectural decoration is presented for use.

The materials used are the clays of Cornwall, Dorset, and Northamptonshire—Lynn sand ground glass—China-stone—felspar and flint—also broken terra-cotta or burnt ware, pulverised. For very light porous articles fossil bone is used with terra-cotta. The variation of colour in white, buff, and red terra-cottas is due to the clays; other colours, such as black, grey, green, blue, &c., are obtained by the admixture of mineral colours with clays and other substances forming the body of the ware.

The whole of the clay and other materials are reduced by grinding them to powder of necessary fineness to suit the size and description of ware intended to be made. For fine ware, it is necessary to, what is termed, slip or wash these bodies together and evaporate a part of the water by means of a slip kiln. For large coarse ware, it is sufficient to mix the proper quantity of each substance together in powder, and after adding a given quantity of water, knead or pug it in a mill; and, to insure thoroughly blending all the bodies in the clayey paste, the operation of pugging should be repeated at least twice. Great care should be taken in blending clays, so that they are thoroughly mixed, or from unequal contraction in the clays the ware may crack.

The "body" or terra-cotta clay is better for being laid by for some days after it leaves the slip kiln, or the mill, before it is used. After the clay is prepared by the mill or by the slip kiln, it should be well beaten with an iron bar, and "wedged." The latter process consists of cutting a large lump of clay, many times asunder with a wire, and then throwing or slapping down the piece out on to the lump of clay from which it was taken off. This operation of wedging properly performed removes the air from the clay.

Clay thus prepared can be used by a sculptor for modelling a statue, or by a mason for running a moulding with a template. When the statue stiffens, it may be cut asunder with a wire and hollowed out; the parts can then be luted together, and the statue gradually finished and dried. After the statue is dry, the sculptor may dress it with the chisel, and correct any faults which have arisen in the drying. A moulding run by a template may be made solid if not much thicker than a brick; or it may be on its under side hollowed out; or it may be run on a saddle. The moulding can be mired and cut into lengths, and squared at the ends. When the moulding is quite dry, it may be rubbed with a piece of grit stone, and finally finished by a mason. The statue and the moulding may then be placed in a kiln and burnt, with very little chance of warping or twisting.

Bassi reliefs of large size may be modelled by a sculptor on a wooden ground, and treated in this way with perfect safety. The large bassi reliefs for the Wedgwood Institute are modelled in clay, sent in a frame of wood, with a cover, from Stamford to the schools at Kensington, and re-

turned complete from the modellers to be burnt at Stamford.

When the same form of design has to be repeated more than once or twice, it is desirable for economy, to make a model, and from that a plaster mould, and impress the clay into the plaster mould, the size of the object determining the thickness of the clay. For architectural work, the smaller the pieces, or the nearer the pieces approach to the size of a large brick, the more economical will be the work. At the same time there is no practical difficulty or objection to using terra-cotta in large pieces. These are then made hollow for the purpose of insuring equal hardness and contraction throughout, and if used, as at Dulwich, bonded into the walls as stone would be, they are filled at the work with fragments of terra-cotta in Roman cement. Although this has been done in this case, I am not at all sure that it is essential, as the transverse strength, even of the hollow blocks forming projections of cornices, strings, and the like, is very great, and I believe sufficient.

When moulds are used, and the clay has remained in them, say, for a piece of cornice equal to a cubic foot, about one hour, the mould may be removed; the plaster being porous, will have absorbed in this time a part of the water from the clay. The piece is then allowed to get tolerably hard and stiff, and the seams of the mould are removed. If the work is to be relieved, a modeller or mason will now undercut the work. It must be carefully watched in drying, so that all parts gradually dry at the same time, or it will crack or twist. The destruction of terra-cotta is far greater in drying than burning. Ornamental work that warps in drying is generally worthless; plain work, if it warps only, and does not crack, may be dressed and rubbed by a mason before it is burnt, and brought to a true surface.

The contraction in drying is about $\frac{1}{8}$ in. to $\frac{1}{4}$ in. to the foot, and about $\frac{1}{8}$ in. to $\frac{1}{2}$ in. in burning, or a total of $\frac{1}{4}$ in. to $1\frac{1}{2}$ in. to the foot. The fineness of the body and the colour of the clay has much to do with the contraction.

Terra-cotta of large size should be well protected from the violent action of the fire in the process of burning, and to effect this for large ware it is better entirely to muffle the inside of the kiln. A little more coal is consumed in a kiln having a muffle lining of brickwork 3 in. thick throughout, but the ware is more uniformly burnt, and it is never discoloured by the sulphur from the coals. Mr. Blashfield has, I understand, patented such a kiln.

To thoroughly burn a kiln containing some 25 tons of hollow terra-cotta ware $1\frac{1}{2}$ in. to 2 in. thick, will consume 20 tons of coal. To burn 20 tons of terra-cotta tiles thoroughly, the tiles being 12 in. by 12 in. by 2 in. thick, and packed closely in the kiln, will take 20 tons of coal,—weight of coal for weight of terra-cotta tiles when burnt. The tiles being subject to a pressure of 25 tons when moist, the particles are brought close together, and the fire does not so readily get through the body as it does through hand-pressed work.

Besides the above described risk in drying, there is also a risk in burning and cooling; first, from the muffle lining of the kiln sometimes giving way and exposing the ware to the violence of the flames from the furnace-holes, or from the kiln drawing in cold air from chinks and cracks in the process of cooling.

Having now described in general terms the mode of manufacture adopted, which, I should say, is taken from the practice of Mr. Blashfield, of Stamford, who has contracted for all the work at Dulwich College, and at whose factory and modelling-shops I have therefore been a frequent visitor, I would wish to point out some of the advantages which recommend terra-cotta as a building material to architects, in addition to its economy, of which I shall speak presently. Foremost among its advantages is the facility it affords to architects to see actually full size any of the more ornamental portions of their design, inasmuch as the material actually built in is the same as that modelled. There is no necessity, as in the case where stone is used for such purposes, to make a model in clay, then two casts in plaster—one in teglio and one in the round—with all the necessary imperfections which attend so mechanical a process; and then, when the model is thus produced, to take the chance of a mason (who is not the artist whose mind was embodied in the original model) being able to reproduce in a non-plastic material the design and delicacies of such model. In terra-cotta clay, on the other hand, the actual work

which is afterwards to be burnt and take its place in the building is the model itself, and bears the impress at once of the mind of the designer and the skill and knowledge of the modelling artist. It can be studied, improved, or modified, and, when quite satisfactory, burnt; and I would submit that a far better reflex of the personality of the architect will thus be found in a building than can ordinarily be the case. Again, except when there is much repetition, no moulds are of course used, so that bassi reliefs, enriched panels, friezes, sculpture of animals, foliage, or figures made in terra-cotta, and used in a building, cannot be copied; they are and must remain the sole originals, and thus have a greater value to the artist or architectural student than when it is possible to find the same composition placed in the different buildings in, perhaps, totally different positions and circumstances from those in respect of which it was originally designed.

Next, I would point out the opportunity it gives for brilliant effects of light and shade by the facility of what in masonry would be undercutting, but in terra-cotta is the application of separately modelled pieces of the material superimposed over the recessed parts while all are in a plastic state, and then the whole being burnt together into one homogeneous mass. I need not enlarge on the enormous economy in proportion to effect produced that this gives over work in stone.

Again, there is the opportunity of heightening the effect of a design by the use of terra-cotta blocks of delicately varied harmonious tints. These most easily available for building purposes are buff, of various shades, from gold colour to nearly brown; a light neutral tint, or grey; and any tint of red, from the plainest to the deepest. To these may be added many other colours produced by chemical materials mixed with the clay, but, of course, somewhat increasing its cost. Add to the above the facility for enamelling or glazing the surface, thus heightening the colour of any particular parts, and it will be seen that a chance is given to the architect who desires and will take the trouble to design in colour, which is not possible with other materials, unless at a fabulous cost, and even then, as when marbles are used, retaining their effect for only a few years.

Next, there is its indestructibility and freedom from decay by the action of the weather, whereas in England, and especially in the metropolis or other large towns, the effect of the weather and the acid gases the atmosphere contains soon disintegrates any soft stones, and a little later has a like effect even on hard ones, or marble, producing laminated surfaces, mouldering edges, and discoloration. With terra-cotta the reverse is the case. The acid gases in the air have no effect; the deposited dirt or soot washes off with the first heavy shower, and the work comes out again as pure and distinct as at the first. If it be said that this is perhaps not always desirable, and that a certain amount of decay adds to the picturesque effect of a building, I think it may fairly be replied that, if so, it is rather an evidence of the carelessness or defects of the design, if it be improved by such adventitious aids, the greater or less extent of the effect of which must be quite uncertain, dependent on local circumstances, and no creation at any rate of the architect's mind, whereas his knowledge that as in form so in colour any creation of his fancy will be handed down unchanged for centuries as it comes from him, will tend more than any stimulus to that tender carefulness of design which all architects ought to possess and foster, which will give them credit, and delight the taste of those who come after them.

WESTMINSTER ABBEY AND ST. MARGARET'S CHURCH.

ALLUSIONS having been frequently made to this not unsightly church, recommending its removal, in order to clear the view of Henry VII.'s Chapel, it may not be amiss to direct attention to the other side of the Abbey, which is crowded in, and concealed by, lofty walls and buildings, clustered together in the most incongruous manner. At the present moment there are in the city several churches under process of demolition, because while the resident population has dwindled away, the sites were wanted for business, or for the clearance of thoroughfares; but the *favours* for demolition ought not to be encouraged, unless in cases

of public expediency or necessity; and it must be also taken into account, that this important space bordering the Houses of Parliament and the Abbey which has been so lately adorned at great expense, would be again thrown into confusion for another year at least.

A glance at the confused and blinded condition of the extensive Abbey precincts on the southward and most ancient side, will at once disclose the necessity of opening out these inexplicable labyrinths of confusion.

The works now in progress upon the Chapter-house, that most venerable monument of art, demonstrate the necessity for clearances on this now unknown side, to show off the majesty of the cathedral. The interior of this ancient octagonal adjunct to the Abbey has a span of 60 ft. Seven flying buttresses have been reconstructed; some of which had been built in as partial walls to private houses,—one in Poets' corner, and others connected with the crazy and hideous old red brick houses and offices of the canons.

When it is considered that the enclosed precincts of the abbey, including its schools, refectories, cloisters, and adjuncts, represent an area of eleven acres, and that the space (humorously called the Dean's-garden alone (surrounded by buildings) contains over two acres—the whole enclosed by lofty walls 3 ft. in thickness; that a narrow way (College-street) bounds it in nearly a direct line from Victoria-street to the Victoria Tower, and the river bank; and that all the adjacent property, including the wide reach of Tothill-fields, belongs to the Dean and Chapter, the wonder is that the spirit of an improving age has not formed a grand thoroughfare to Millbank and Palace-yard; thus opening out the glories of the Abbey, and conferring a value upon hoarded and muffled spaces dedicated now to cloisters and canons' lodges, as formerly to the chambering and *pious* exercises of cowed priests and friars.

Soon after the first dawn of Christianity in these islands, so early as the sixth century, a monastery took station here, and authenticated history names Orthright as the first Canon, A.D. 604. Doubtless they had chapels, refectories, and dormitories; but the oldest foundations, as skillfully traced by Mr. Scott (who, in his researches after architectural evidences, actually found concealed under planks, masonry, and rubbish, the original accounts of disbursements on the chapter-house, cloisters, halls, &c.), were those erected in the reign of Henry III., between 1245 and 1269; and although a church had been built by Edward the Confessor, who reigned from 1042 to 1066, but little can be traced of those primitive foundations save that within the outer circle of the chapter-house an additional wall, 5 ft. thick, reduces the size of the crypt or basement story to the extent of 10 ft. in the diameter, and this was decidedly the original foundation.

Some of the most ancient and beautiful of the cloisters and cellars are ascribed to Abbot Littleton, but it is doubtful, from the mixed character of style, whether these were not founded in earlier times, and built over and transformed by him between the years 1376 and 1386.

It is clear that the nave of the Abbey was partly rebuilt under a commission from Henry V. A.D. 1413, issued to Whittington, the celebrated Lord Mayor, and Richard Harowden, the abbot; and in succeeding reigns, additions and renovations were occasionally superadded; the minor restorations having been effected by Sir Christopher Wren, after the Great Fire of London in 1666, and whilst St. Paul's Cathedral was in process of construction; so that there is an involvement of many styles throughout the structure.

As our great national fane, venerable for its antiquity, consecrated for over 1,000 years by the devotion of kings, prelates, and successive generations, this grand pile ought to be thrown open and disencumbered of the paltry lanes and mean tenements of its southern vicinage. The motley abodes of six canons and of the dean, raised in shapeless masses of red brick upon the cloisters and arches of primitive days, ought to be cleared away, and those cloisters, arches, gateways, and vaults transferred to the care of the architect who is now so ably conserving the remains of the chapter-house.

There is ample space along the dean's garden, with frontage to Great College-street, for the erection of six canons' mansions and a deanery; there is room to widen the street by 20 ft., and

to leave an open garden in the interval towards the Abbey, leaving the cloisters and other remnants of antiquity to be suitably rooted in—introducing plantation, verdure, and open aspect where such treasures are now sealed up.

What can be seen of the chapter-house when renovated? or of the perfect south side of the Abbey without such clearance? But there are other points to be considered,—the completion of the grand plan of *alcantours* for the Houses of Parliament. This can yet be secured by opening out from Victoria-street a nearly straight line southward, through College-street to the river bank, thus forming a noble and more direct route, clear of Dean's-yard, to Victoria-tower.

Thus a fine causeway might be secured from the West-End and the Victoria Station to the House of Lords, commencing at Strutton Ground, on an angle of frontage as yet unoccupied; in continuation, along the north side of Old Pye-street (a wretched remnant of squalid paper domiciles); thence cutting across three or four equally valueless tenements, and slick into College-street, at back of the school.

The modernization and laying out of College-street, the new arrangement of college and of canons' houses, the conservation of the Broad Sanctuary, and all the hallowed precincts, are of course left to the pious care of the Dean and Chapter.

As in all cases of improved thoroughfares in good parts of town or city, the new and more suitable houses would help to pay; but the utilisation of valuable space and the modern adaptation of valuable sites to better uses, must result in dignifying a long-neglected quarter of the town which, in its present condition, is a blot on the House of Peers and a discredit to the metropolis.

QUESTIONS AND REPLIES IN THE HOUSE OF COMMONS.

New Law Courts.—Mr. Alderman Lawrence asked the First Commissioner of Works whether notices would be served during the autumn on the owners of houses in Holywell-street, and also on the owners of houses in the line of a new street from the Strand to Lincoln's-inn-fields, in order that a Bill might be brought in during the next session of Parliament, to provide approaches to the site of the New Courts of Justice by the removal of Holywell-street and the formation of a new street from the Strand to Lincoln's-inn-fields. In reply Lord John Manners said the commission had made no recommendations for the purchase of that property for the purpose of making an entrance to the New Law Courts. However desirable such a proceeding might be as a metropolitan improvement, her Majesty's Government had no intention to bring in a Bill to carry the suggestion into effect. The Alderman then asked whether it was the intention of her Majesty's Government to give notices for the purpose of securing any approach to the New Law Courts: to which Lord J. Manners replied that the subject was under consideration.

Park-lane.—Mr. Gregory wished to know from the hon. member for Bath whether the Board of Works were going to pull down the public-houses on the eastern side of Park-lane, since the proposal to widen the lane through Hamilton-place had been rejected. In reply, Mr. Tite said that the proposals to pass through the Park and to relieve the traffic by widening Hamilton-place had both been proposed, discussed, and rejected within the last few years. It was proposed in 1836 to pull down Gloucester House, and to find the means required in the proceeds of the coal duties; but the Bills, introduced in 1866 and 1867, were ultimately withdrawn. This year another Bill was introduced, with the approval of the Government, but the proposal to pull down Gloucester House was unanimously rejected by the committee. They were thus again thrown back. The suggested pulling down of the public-houses was under consideration, as was also a fresh proposal to widen Hamilton-place, and he hoped to be able next session to bring in a Bill on the subject.

Regent's Park.—In reply to Mr. H. Lewis, the First Commissioner of Works, Lord J. Manners, said the works in the enclosure of Regent's Park were completed, and the water would be introduced almost immediately. The reason of the delay was the recent discovery of a defect in a drain, and the water could not be let in until the defect was remedied, which was now being done. It was not intended to cover the bottom of the lake with cement.

Mr. Canning's Statue.—Lord Stratheden inquired what steps it was proposed to take with a view to replace on a fitting site the statue of the late Mr. Canning. He advocated a site a little in the rear of the original position of the statue. Such arrangement, he added, would be satisfactory to the late statesman's family. The Earl of Malmesbury said he was most anxious to place the statue in a suitable position, but it was very difficult to please every one. The present site had been selected in obedience to the wish of the House of Commons, and no remonstrances against it had been received from the family of Mr. Canning. Lord Stratford de Redcliffe said he would prefer the site suggested by Lord Stratheden. He regretted that the Lord Privy Seal could not hold out any hopes of removal.

The Embassy-House at Therapia.—Mr. Monk asked the Secretary to the Treasury whether he would lay upon the table of the House the estimate, founded upon the plan of Colonel Gordon, which was selected by her Majesty's Government for the new Embassy-house at Therapia; and whether the contract had been entered into for the erection of that house. Mr. Selator-Booth was unable to lay upon the table the estimates and plans referred to, because, although the estimate would not exceed 10,000*l.*, the plan had been materially altered. Colonel Gordon had left Constantinople, and the gentleman now in charge of the building was the British Consul at Constantinople. He believed the interests of economy would be best consulted by leaving the matter in his hands. Everything had been done to insure that the work should be carried out economically.

THE POST-OFFICE AND THE TELEGRAPHS.

The select committee on this bill have agreed to the following special report:—

"Your committee have considered the several matters which they were specially instructed to inquire into, and are of opinion,—1. That it is not desirable that the transmission of messages for the public should become a legal monopoly in the Post-offices. 2. That it should be left to the discretion of the Postmaster-general, with the consent of the Treasury, to make special agreements for the transmission of certain classes of messages at reduced rates; but that any such special agreement should be laid upon the table of the House of Commons as soon as conveniently may be. 3. That security should be taken for insuring the secrecy of messages transmitted through the Post-offices, by making the violation of such secrecy punishable as a misdemeanour. 4. That the special circumstances at present attending the working of those submarine cables which the Postmaster-general may acquire, make it desirable that provision should be made for the working of them by leasing the same, in the first instance, to a company or companies; copies of any such lease to be laid before Parliament; but it may ultimately be found expedient that the Post-offices should itself work such cables."

The select committee also report that they have considered the bill and taken evidence thereon, which they have agreed to report to the House; and they have also gone through the bill and made amendments thereunto.

The committee resolved, that persons in the employment of companies, and not engaged by Government under the new regulations, should receive compensation if they had had an engagement of seven years, and are in receipt of a salary of 75*l.* In the clause referring to newspaper contracts, words were inserted including clubs, exchanges, and news-rooms. No newspaper is to have priority in reception of news or favour in rates.

The committee scheduled agreements between the Postmaster-general and the following companies:—The Great Western, the South-Western, the London, Chatham, and Dover, the South-Eastern, the North-Eastern, the Bristol and Exeter, the North British, and the Caledonian Railway; and between the following telegraph companies:—The Submarine, Reuter's, the Atlantic and Anglo-American, and the Universal Private Telegraph (Limited). This concluded the labours of the committee.

THE LATE MR. CLEPHAN, ARCHITECT, STOCKTON.—We hear with regret of the death of Mr. William Clephan, architect, Stockton. He had won the respect of a large circle of friends, and his death will be more especially felt by the members of the mechanics' institute, with which he had been connected since its organization. He took a great interest in horticulture and the fine arts.

IMPROVEMENTS IN CAMBRIDGE AND CAMBRIDGESHIRE.

The chapel of St. John's College, according to the local *Chronicle*, will be completed and opened in May next. The decorators, Messrs. Clayton & Bell, of London, are by their hand hard at work; the marble shafts are all fixed, and so are the open doors. The carving is nearly finished. The floor is not yet laid, and the windows are not yet filled in with stained glass. Mr. Scott's design is being carried out by the contractors, Messrs. Jackson & Shaw, and their representatives. Messrs. Clayton & Bell are also decorating the college-hall.

Master of Trinity College Second Court will be ready for the occupants of the seventy rooms in October. The rooms, which are all engaged, are in a very forward state, and are being fitted up. The doors are stained (oak), the walls covered with paper; the staircases will be lighted with gas, and the water supplied by the Waterworks Company. Each set of rooms consists of keeping and bed room, with gyp-room, the latter fitted up with every convenience. The contractors for the building are Messrs. Smith & Co., and the works are being superintended by Mr. J. Nicholls, with the aid of Mr. Rencher (clerk) and other assistants.

At Cains College, the alteration is of an extensive character. The college authorities have resolved upon building an entirely new court, the architect engaged being Mr. Waterhouse, from whose designs Messrs. Trollope & Son are working and making rapid progress, with the aid of their clerk, Mr. Tit. The style of architecture is the French Jacobean, with Castleton-ashlar stone and Ancaster dressings. The building will be three stories high, consisting of about sixty sets of rooms, which will be lofty, well ventilated, and suitably fitted up. The height of the court will be 55 ft., and the extent in Trinity-street 210 ft. The main entrance will be from King's-parade, under a tower, 106 ft. in height. Over the gateway will be figures, representing the founders of the college. To carry out this extensive alteration part of the Fellows' garden will have to be taken in, but the gates of "Honour" and "Humility" will be retained. In addition to the building of the new court, the contractors are engaged to almost rebuild the chapel, which is to have two towers. The interior is to undergo extensive alterations, including the creation of an organ-gallery, new screen, new communion-table, and the repaving of the floor. The chapel will be heated with hot water. Under the rooms of the new court will be wine-cellar for the use of the Master and Fellows. The whole will cost something over 20,000l.

In the town there are a new assembly and other rooms at the Guildhall, and a new Corn Exchange is spoken of. The "felt want" now demanding attention, according to our authority the *Chronicle*, is the improvement of the river Cam, its present condition being a hindrance to the University in their aquatic exercises.

In the county there are not many improvements. It is in contemplation, however, to build a middle-class county school. At the Ely militia depot there are to be built twelve houses for sergeants and an hospital for the men. The gas inspectors, on the part of the parish of Cottenham, have advertised for tenders for lighting the streets, roads, &c., of Cottenham with gas.

PRIZE MEETING OF THE WEST-LONDON SCHOOL OF ART.

The annual prize-meeting of this school was held in the theatre of the Geological Museum, Jermyn-street, on Saturday evening last. The chair was occupied by Mr. Beresford Hopo, M.P., the president of the school. The theatre was crowded. This is essentially an artisan school, and is teaching more than a fourth of the entire number of artisans (1,750) taught in the whole of the ten London schools.

The President expressed his deep regret that the drawings of the successful students could not be there exhibited; he said such an exhibition would have redounded to the credit of this school, which he described as the young and vigorous child of the South Kensington establishment, which he termed the "old hen." He said he had in his possession a statement of what this school had done, and, comparing its work to the work done by older establishments; but he should refrain from quoting these figures, as

they might seem to create an antagonism between these art classes, and he was desirous that the whole of the classes throughout the country should pull together. The importance of the work done by the West-London classes was shown by the fact that in 1867 there were 455 students, of whom 67 were draughtsmen and designers, 45 decorators, &c., 41 wood, stone, and ivory carvers, 9 modellers, 27 glass painters, 11 papier-mâché workers, 18 goldsmiths, &c., 23 engravers and diesinkers, 16 metal workers, 21 cabinetmakers, 31 upholsterers, 9 musical instrument makers, 43 carpenters and joiners, 11 machinists, 4 masons, 18 salesmen and clerks, and 23 teachers, with 35 miscellaneous. Remarking that he did not much like papier-mâché, as being often an imitation work, he went on to say that there were here a vast number of persons who were evidently studying art in order to advance them in their daily labour; while, at the same time, there was a lessening of others, such as clerks and salesmen, who were evidently studying art for art's own sake, and for the advancement of their own moral and intellectual nature. Art, he said, had become a necessity of the day; and even if we went to a tavern to take our food, we found, in place of the rough "forms" of hygone times, a mahogany and polished chairs to sit upon, in place of the rough "forms" of hygone times. He alluded to the ornamented railway refreshment rooms as another instance of the advance of refinement. Then he took the example of the general apartments and the furniture placed in them, and said that the cultivation of art gave the people a taste in the choice of their carpets and other household furniture, and this art-taste, too, could be exercised by women in their choice of bonnets, dresses, and even in the putting on of the crinoline. In passing, he congratulated those of the gentler sex present upon the discarding of the latter article from their costume; but he deprecated, amid some laughter, the "bathing-dress style" of attire now adopted by the sex. He proceeded to say that, in whatever they adorned or disfigured themselves, they were exercising a good taste or bad taste. It was of no use people describing themselves as "good plain people," and saying they left taste to painters and others connected with art, for they could not be "good plain people" without all turning Quakers; and, besides, there was a closer connexion between the cultivation of an art-taste and the advancement of the moral qualities than many people were ready to acknowledge. He urged that producers generally were now working up to a higher art-taste than they used a generation ago,—a result he looked upon as coming from those great Exhibitions which were now voted "a bore," but had really done this work in making the consumer look for a better class of articles, and encouraging the producer to supply them.

The prizes having been distributed by the chairman,

Mr. Ruskin said he had been struck by the youth of those who had gained prizes. They had all the world before them where to choose. With the immense advantages now before them, they might look forward, not only to honour, but to founding a school. They should recollect that if they were told to deny themselves, to do everything that was unpleasant, and to go through all sorts of hard exercise, the end of it was to please themselves and other people; for, unless their works of art were enjoyed by themselves, they would never be enjoyed by anybody else. The great object that workers in art ought to have in view was to make their work faultless. In fact, they had no business to have it anything else but faultless. All they did they should do earnestly. The president's expression of regret that he had not a third hand with which to shake in giving triple prizes, reminded him of Prudentia with three heads, looking every way. The old states were very difficult to draw, but they meant a good deal, and he thought this virtue of prudence was not enough insisted upon in our lectures on morality or art. He sometimes found he had done a great deal of mischief by what he had said and written, and he did not know that he had done more mischief than by those speeches and writings for which he had been most flattered, because he found that they led the students always to dwell too much upon what was exciting in art. The student should recollect that

all excellence in art was based on drawing. He ought to get a mastery of pure outline. Referring to the number of salesmen who had joined the school, Mr. Ruskin said he supposed salesmen were men concerned generally in the sale of decorative works who ought to know what they should recommend to the public, but it struck him that, with respect to that, there was rather too much influence at present exercised upon the mind of the public by salesmen, and too little by the artist, and that the artist was rather too much in the power of those who recommended his work. Students in art ought not to be ambitious of obtaining a recommendation of their works in early life; they ought to exercise self-denial in their endeavours to achieve excellence. In the beginning they might have to live on bread and water, but in the end they would live on ambrosia. In conclusion, Mr. Ruskin wished all of the students success, and congratulated them on having an admirable master.

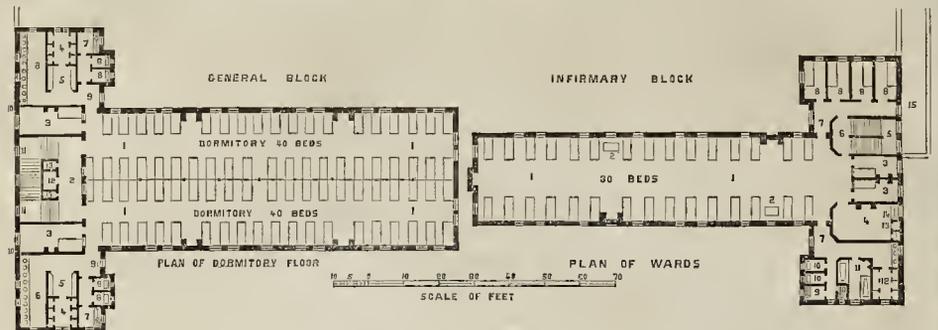
Mr. Digby Wyatt briefly referred to the satisfactory progress of the students of the school, a circumstance not less gratifying to the students themselves than to the masters, who had devoted so much time and attention to its management and control. It was a gratifying feature of the school that the young people who had taken the prizes were all more or less connected with the technical arts of the country. It was this connexion of art with technical industry that was the great want of the present day. A few years ago England was sadly behind some of the countries of Europe. We had made great progress lately, and no more successful combination of the two—the artistic and the practical—could be found than in the beautiful works produced by Mr. Peter Graham, and exhibited by his firm at the great exhibitions in London and Paris. The more his example was followed the more secure would be the industrial position of this country, and the wider-spread would be the roots and branches of its future prosperity and greatness.

Mr. Peter Graham dwelt on the importance, in a commercial point of view, of greater attention to the studies connected with art and industry. England had powerful competitors in every part of the world, and the only way to make that competition successful was to unite as completely as possible the study of art with technical industry. He proposed a vote of thanks to Mr. Hope for his attendance.

This vote was carried unanimously, as also a vote to Mr. Macdonald Clarke, the master, and the other officers of the school.

BUCKS ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.

The annual excursion of this society has taken place. The members and their friends were conveyed by a Great Western special train to Windsor, at single fares, and on its arrival the Castle was the first point of attraction. Mr. Woodward, the librarian, by desire of her Majesty, met the numerous company in the hall, and, after an introductory address as to date and elevations of the building, conducted them over the older portions of the interior, and the library, explaining every object of interest, more particularly the illuminations, charters, &c. Mr. Parker, of Oxford, then gave an interesting account of the exterior of the Round Tower, the Wolsay and St. George's Chapels. The construction of the latter was then explained, Mr. Parker dwelling more particularly on the beautiful stone vaulting and fan tracery of the nave and choir, the difficulty of the work, and how superior it was to the vaulting of Continental churches he had visited. The deanery was then inspected, then the cloisters, and, lastly, the Wolsay Chapel. The visitors then left for Eton College, where they partook of luncheon, liberally provided by the Rev. Mr. Marriott. They afterwards inspected the college buildings, including the library, where they were welcomed by Dr. Goodford, the provost, who showed and explained some of the most valuable works. Services in the college chapel was held at 3 p.m.; after which Mr. Parker gave a description of the building in its old and restored state. The annual meeting then took place in the college hall, Archdeacon Bickersteth, V.P., in the chair. Many new members joined. Dr. Goodford read a paper giving a history of the college from its foundation. The Rev. Mr. Marriott also read one on Vestments. The company (about eighty) then partook of a repast at the provost's residence.



REFERENCES.

Ground Floor Plan.
Administrative Block.

1. 1. Porch and Entrance Hall.
2. Porter.
3. Study.
4. Waiting-room.
5. Staircase to medical officers' rooms.
6. Under-clerk's office.
7. Clerk's office.
8. Board-room.
9. Kitchen.
10. Drawing-room.
11. Dining-room.
12. Larder.
13. China.
14. Entrance.
15. Water closet.
16. Lavatory.
17. Scullery.
18. Female waiting-room.
19. Male waiting-room.
20. Dispensary.
21. Wine store.
22. Stores.
23. Ale and porter stores.
24. General stores.
25. Female visitors' and attendants' entrance.
26. Male visitors' and attendants' entrance.
27. Male attendants' staircase.
28. Covered passage to chapel.
29. Stairs to cellars.
30. Beer-room.
31. Female attendants' staircase.
32. Head attendant's office.
33. Head attendant's living-room.
34. Open court for delivering stores.
35. Bakehouse.
36. Ovens.
37. Lobby.
38. Gateway for carts.
39. Female attendant's mess-room.
40. Male attendants' mess-room.
41. Mat and basket makers' room.
42. Workmistress's sitting-room.
43. Workmistress's bed-room.
44. Matron's office.
45. Matron's stores.
46. Female work-room.
47. Upholsterer's shop.
48. Shoemaker's shop.
49. Kitchen servants' room.
50. Cook's store.
51. Tailor's shop.
52. Male bath-house.
53. Female bath-house.
54. Dressing-room.
55. Uncooked meat-stores.
56. Coal-shed.
57. Dairy.
58. Open court.
59. Vegetable-store.

REFERENCES

(continued).

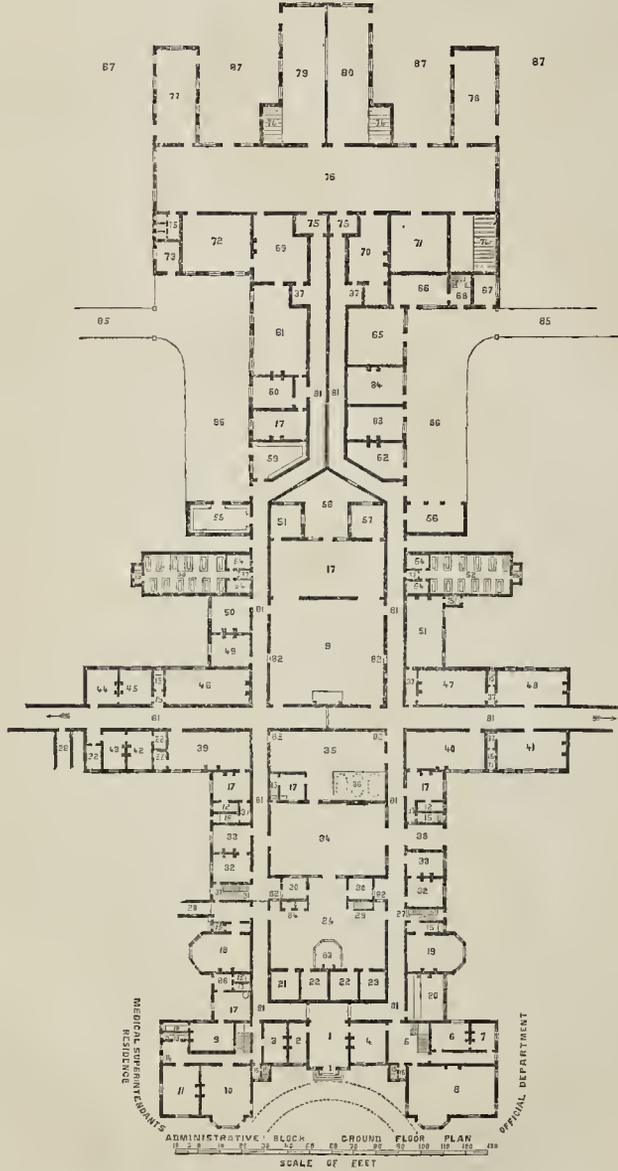
60. Laundry attendants' mess-room.
61. Laundry dining-hall.
62. Plumbers and painters' shop.
63. Carpenters' shop.
64. Smiths' shop.
65. Boiler-house.
66. Engine-house.
67. Clerk of works.
68. Water-tower.
69. Female sorting and delivering-room.
70. Male sorting and delivering-room.
71. Washing machinery-room.
72. Officers and attendants' separate laundry.
73. Coals.
74. Drying-horse.
75. Receiving-rooms.
76. Laundry.
77. Female washhouse.
78. Male washhouse.
79. Female foul washhouse.
80. Male foul washhouse.
81. Corridor.
82. Hatch.
83. Stewards' offices.
84. Closet.
85. Road.
86. Yard.
87. Drying-ground.

Plan of Dormitory Floors.

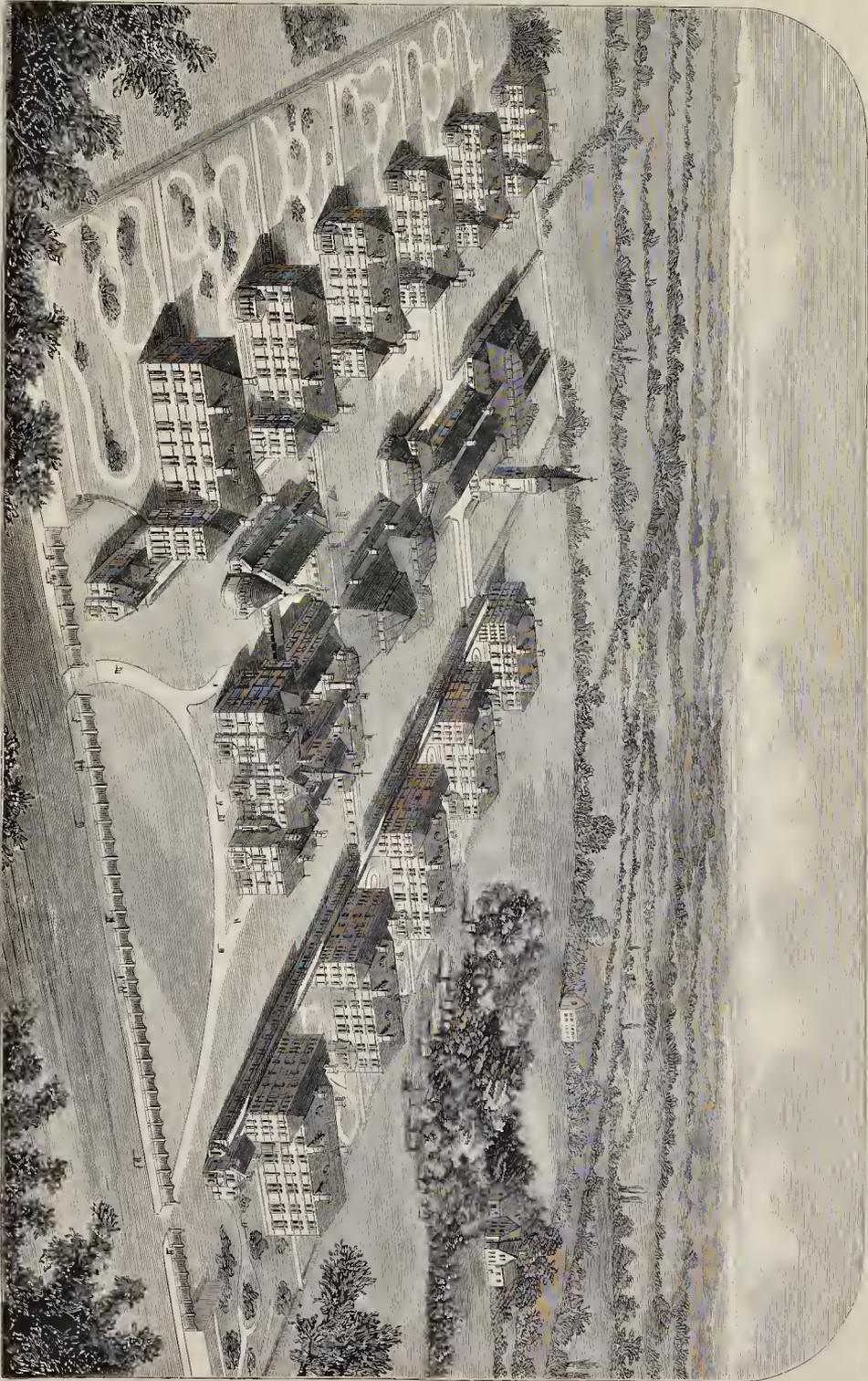
1. Dormitory.
2. Landing.
3. Attendants' room.
4. Linen-store.
5. Patients' clothes at night.
6. Lavatory.
7. Brooms and sinks.
8. Water-closet.
9. Lobby.
10. Fireproof roof of corridor.
11. To open for escape in case of fire.
12. Coals.
13. Shoot.

Plan of Wards.

1. Thirty Beds.
2. Table.
3. Attendants' room.
4. Scullery.
5. Staircase.
6. Landing.
7. Lobby.
8. Excitable patients' room.
9. Brooms and sinks.
10. Water-closet.
11. Bath-room.
12. Ward linen-store.
13. Lift.
14. Sink.
15. Fireproof roof to corridor.



ASYLUM FOR IMBECILE POOR.



PROPOSED ASYLUM FOR IMBECILE POOR AT LEAVESDEN WOODSIDE, NEAR WATFORD; AND AT CATERHAM, NEAR CROYDON.—MESSRS JOHN GILES & BIVEN, ARCHITECTS.

TECHNICAL EDUCATION FOR ARTISANS.

A MEETING was held at the School-room of St. Gabriel's and St. Saviour's, Mimico, on Friday evening, July 17th, to inaugurate the formation of a school for technical education. The Rev. B. Belcher, M.A., was in the chair.

Letters of apology for absence, but highly approving of the object of the meeting, were read from Mr. J. Stuart Mill, Mr. Godwin, Professor Jenkin, and others. Earl Granville addressed the workmen, and passed a very gratifying opinion on the operatives generally who reported on the Paris Exhibition of 1862, and said he hoped all encouragement would be given to this and kindred societies working for this end. The Amalgamated Carpenters and Joiners of London and Manchester are the pioneers in this movement, and they have every hope that the architectural profession and builders generally will give them their encouragement and support by donations of books, drawings, &c., for self-instruction.

THE ATMOSPHERE AND VENTILATION.

It is a generally received opinion that the ocean of air that surrounds the earth on all sides extends from the surface upwards to a height of about fifty miles, which is equal to one-eighth of the earth's semi-diameter. It is not, however, of uniform density throughout; for barometrical observations prove that one-third of its total quantity is contained within one mile in height from the level of the sea, nearly one-half within two miles, and nearly two-thirds within five miles. If it were everywhere of the same density as at the surface the whole would be contained within this last height; but in that case the physical conditions of the world would be very different from what they are.

The form of the outer surface of the aerial ocean is no doubt spheroidal, like that of the earth, but much flatter, owing to centrifugal force and the great rarefaction produced by the vertical rays of the sun at the equator. The air is an extremely mobile, transparent, and elastic fluid; very dilatible by heat, contractible by cold, compressible by pressure, and expandible by removing pressure. It revolves with the earth, accompanies the earth in its orbit round the sun; and, like all material substances within the influence of the earth's attraction, is obedient to the law of gravity. Hence it exerts pressure on all bodies, and transmits that pressure equally in all directions. Its pressure is equal to 15 lb. on every square inch of surface at the level of the sea,—that being the weight of a column of mercury 1 in. square and 30 in. in height, which the air balances, and by which its pressure is measured. The pressure, however, is variable, owing to variations of temperature, humidity, and elasticity, which causes the column of mercury to vary in height from 31 in. to 28 in. The mean pressure, therefore, is 29½ in., or 14½ lb. per square inch. Water is 13½ times lighter than mercury, consequently the pressure of the air supports a column of water 33½ ft. in height. For this reason water cannot be raised by the common pump, or by the syphon, higher than 33½ ft. Hence the total weight of the air is equal to that of a stratum of mercury 30 in. in height, or of water 33½ ft. in height, covering the whole surface of the earth above the level of the sea. The exact rate of decrease of pressure or density of the air as we ascend is not known; but it has been found to decrease very nearly in geometrical progression as the height above the sea-level increases in arithmetical progression. Thus at the height of 3.42 miles the pressure is 7½ lb. on the square inch, just half what it is at the surface level with the sea; at 6.84 miles it is 3¾ lb., or one-fourth; and so on, the pressure decreasing for each succeeding 3.42 miles one-half what it was at the preceding elevation.

The air grows not only less dense as we ascend, but colder and drier. Its greatest temperature, like its greatest pressure, is at the sea-level; but the temperature gradually diminishes thence nearly at the rate of 1° for every 333.4 ft. At great elevations cold is so intense that frost is perpetual, and moisture falls not as rain, but as snow. For this reason high mountain summits are always capped with snow, and the valleys are filled with glaciers, which gradually gravitate to the plains below, where the warmer air melts them, and the issuing streams form beautiful blue lakes and noble rivers. Thus

the glaciers of the Alps are the springs of the Rhine, the Rhone, and the Danube.

At all places on the earth's surface, and at all heights above it, the atmosphere is composed of 20.80 parts by volume of oxygen, and 79.20 parts of nitrogen, beside four parts in ten thousand of carbonic acid, and also of carburetted hydrogen. It contains besides a small quantity of aqueous vapour, with traces of ammonia, hydrochloric and nitric acids, sulphuretted air is constantly moving, and its temperature and elasticity are always changing, yet there is no appreciable difference in the relative proportions of its essential elements—oxygen and nitrogen. The quantity, however, of aqueous vapour, carbonic acid, and other extraneous substances varies considerably at different places according to circumstances. Common air being 1.000, the specific gravity of oxygen is 1.111, and of nitrogen 0.972. Oxygen, therefore, is heavier and nitrogen lighter than atmospheric air. Oxygen is the most important substance in nature. It constitutes not only one-fifth of the air, but eight-ninths of all the water on the globe, and perhaps about one-third of the whole solid matter of the globe itself. It is the vital principle of animal and vegetable life, and also of fire; indeed, neither animals nor vegetables could exist, nor fire burn, but for a very short time, in air that did not contain a proper proportion of oxygen. It vivifies our bodies, gives redness to the blood, supports the flame of life, and paints the bloom of the rose on the cheek of the fair.

The atmosphere possesses the valuable property of admitting light, and of dispersing and reflecting it in all directions. Were it not for this property, objects out of direct sunshine would be invisible, shadows would be deep black, apartments and places into which the direct rays of the sun did not enter would be in darkness, and the stars would be visible all day. By the reflective power of the air, however, all objects, in whatever position, have light thrown upon them; and they in turn, by reflecting the light they receive, are rendered visible, and produce impressions of their forms and colours on the eyes. The moisture in the air, together with the light of the sun's rays reflected through it, is the cause of the beautiful azure of the heavenly canopy above us, and of the rich emerald of the verdant carpet beneath us. The blue of the sky, as seen from the lower parts of the earth, assumes a deeper hue, approaching to blue-black, the higher we ascend. Hence, from the top of a mountain, the milky-way appears like a silvery flame, and the stars shine with greater brilliancy, and far more numerous, than at lower elevations.

The aqueous vapour in the air is invisible, and is derived from the evaporation of water. It is much lighter than common air, its weight being to that of air as 5 to 8. It is also very elastic, but that varies with the temperature. There is more moisture in the air in summer than in winter, and more in warm than in cold climates. When the air is so completely saturated that evaporation ceases, a fall of the barometer, a fall of the thermometer, and a fall of rain are often associated phenomena. Dew is formed when the objects on which it deposits are cooler than the surrounding air, and so causes a condensation of its moisture. Thus dew contracts on a leaf or a flower, moisture precipitates on a tumbler filled with cold water, and perspiration streams down windows and walls, because the objects are cooler than the air in contact with them, and its moisture is condensed accordingly.

In the absence of rain or dew vegetation is sustained by the moisture it imbibes from the air. Thus in tropical districts, where for months together there is no rain or perceptible dew, many trees and plants preserve their verdure by drawing water from the atmosphere. The quantity of moisture in the air has great influence on the spirits and health of man. When the air is too dry it absorbs moisture from the lungs and skin; and when it is too moist it prevents the evaporation of vapour from the body: hence an excessively dry or moist air is equally injurious to health. The most healthy hygrometric condition of the air is when the dew-point ranges from 10° to 20° below the temperature of the air.

The whole body of the atmosphere is put in motion by excessive heat in the region of the equator, and excessive cold in the regions of the poles. Thus the powerful heat of the vertical rays of the sun round the equator dilates the air, and causes it to ascend to a great height,

whence it divides and flows off, as upper currents, towards the poles; and the intense cold in the polar regions contracts the air, and causes it to descend to the earth, whence it flows off, as lower currents, towards the equator. The currents do not follow the directions of the meridians, but are converted by the rotation of the earth, and the gradual increase of rotatory velocity from the poles to the equator into oblique currents, which cross each other, or the upper ones follow the reverse directions of the lower. By this grand system of ventilation the warm vitiated air engendered on all parts of the earth is drawn into the upper atmosphere where it is purified and dispersed, and returned cold, fresh, and clear to maintain the world as a fit habitation for man.

The atmosphere contains many secrets, mechanical and chemical, electrical and vital: hence it is a vast field for research. Its functions are various and wonderful, beautiful to contemplate, and profitable for meditation. It is the distributor of heat and also of light; it is the great laboratory in which we pass our lives; and it presses on our bodies with a weight of fifteen tons: yet we see and feel it not. By its means light comes to the eyes, sound to the ears, and odour to the nostrils. It draws up from the sea the vapour which descends as snow on the mountain, rain on the land, and dew on the flowers. Its refractive power produces the morning aurora and the evening twilight; tints the clouds and the mountain tops with crimson, purple, and gold; and lifts the disc of the glorious sun above the horizon before he has risen and after he has set. When quiescent it scarcely stirs the lightest leaf, and renders a fluid surface like a mirror; when gently agitated it fans the sun's rays, and wafts the fleets of nations round the world; and when roused to fury it uproots trees, levels buildings, ploughs furrows in the sea, and smites the stoutest ships to pieces as if they were toys.

Four-fifths of the air we breathe are nitrogen, whose chief use appears to be to dilute the oxygen, and restrain its vital energy. The remaining one-fifth is oxygen, more than one-half of which is absorbed by the blood to nourish and sustain the body. The blood sets out from the left side of the heart, circulates through the system, and returns again to the right side every few minutes from birth to death. The outgoing blood is of a bright red colour charged with oxygen imbibed from the lungs by inhalation. In its passage through the system the oxygen, which is life, is given out by the blood to the body; and carbonic acid, which is death, is taken in by the blood from the body. The incoming blood is of a dark purple colour charged with carbonic acid, which, together with all the nitrogen, are exhaled by the lungs. The remaining oxygen is combined with hydrogen, and forms aqueous vapour, which is expired partly by the lungs and partly by the skin. The exhaled air, therefore, is extremely deleterious, and very injurious to health if breathed again. The emanations from the skin are copious, and consist of vapour charged with carbonic, acetic, and phosphoric acids, with muriate of soda and other peculiarly odorous substances. Hence the necessity for frequent ablution and change of clothing, so as to keep the pores of the skin open and in healthy action. We rid ourselves of liquid and solid refuse by drains and otherwise, avoid the dirty and the diseased, object to wear a garment worn by another, remove impurities from our food, and refuse to drink from a cup pressed by the lips of a friend; yet in our dwellings and in our public places of resort we continually draw into our lungs the offensive effluvia emitted from the lungs, skin, and clothes, not only of ourselves and friends, but of the promiscuous crowd.

The temperature of the air we respire is nearly the same as that of the blood, which is 98°; and it is much lighter than common air. Hence it always rises over our heads to the highest part of the rooms, whence it would escape into the external air if an opening into a pipe or a flue were there to enable it to do so; but as there is no such provision, and it cannot get away, it soon loses its levity, descends, and contaminates the whole of the air in the rooms until it becomes so vitiated as to be unfit for respiration. This simple law of ascension of heated or light air like a balloon to an elevation where its density is equal to that of the upper atmosphere points out that we should remove at the ceilings the rarefied air which is constantly rising there from the exhalations of our lungs and skin, and also from the candles,

lamps, and gas which we burn. Thousands of people are shut up by day as well as by night in small rooms without any supply of air or ventilation other than what comes in or goes out at the chinks of doors, windows, and fire-places. The wonder is, not that there are headaches, pale faces, and sickness, but that people can exist at all in such rooms. Those who work in close rooms without ventilation are more prone to consumption than those who work out of doors. The former breathe a foul heated air over and over again; while the latter breathe air more pure, and always changing. Under such conditions deaths from consumption in men are more numerous than in women; and this disease is more prevalent in men and women who work in company in crowded workshops than in those who work singly in their own apartments, because in the former the air is saturated with moisture, is warmer, and more foul and stagnant.

In ill-ventilated workrooms men strip to the skin, to enable them to bear the heat, which is intense, and almost stifling. Continuous breathing of polluted air, both in rooms and in workshops, causes lassitude of mind and body, and a resort to stimulants, resulting in habits of intemperance. Badly ventilated houses produce virulent diseases, which raise the death-rate; yet hundreds of houses are built yearly without any provision for ventilation. The lowest death-rate is 11 per 1,000, and the highest, 45 per 1,000. The lowest is inevitable, and arises from inherent natural diseases; but death-rates from 11 per 1,000 to 45 per 1,000 are referable to zymotic diseases caused by defective sanitary arrangements. The death-rate of the metropolis is 24 per 1,000; but if houses, drains, and sewers were properly ventilated, the drains and sewers trapped, and the sewers made self-cleansing, the people would become more healthy, hardy, and happy, and the death-rate would be reduced probably to 18 per 1,000. We see and feel that the all-bountiful Creator has done for us in ventilating our bodies by the respiratory apparatus of the lungs and the circulation of the blood; and also in ventilating the world by the respiratory apparatus of equatorial heat and polar cold and the circulation of the air: why, therefore, do not we apply the same principles in ventilating our houses, and drains, and sewers? This subject is an extremely important one, and it is to be hoped that it will shortly receive more attention practically than has hitherto been accorded to it. How to do it is known; and it would be done if the Metropolitan Board of Works, and the local boards and vestries, were to take it in hand, not piecemeal, but upon a well-organized system for the whole of the metropolis. Until it is done the poor will become poorer, the parish rates will be made higher, and the death-rate will be increased.

We have much to learn in regard to the constituents and properties of the atmosphere, and in regard to arranging pipes and flues, so as to produce motion in the air, in order to thoroughly ventilate houses. Only few houses, besides large mansions and public buildings, are built with any special appliances for ventilation. We either never consider ventilation as at all necessary, or suppose that so long as there is a door, and a window, and a chimney, nothing more is needed. Every room, however, in which we live, work, and sleep should be provided with means for removing the vitiated air in or near the ceiling, and for admitting fresh atmospheric air near the floor. This is the essential principle of ventilation. Ventilating pipes could be carried from ceilings down to the fire-places, and terminate in the ash-pits close under the fires. The heat of the fires would draw the unwholesome air at the ceilings into the ash-pits, whence it would pass through the fires and up the smoke-flues; and if the ash-pits were closed by doors, the underside of the fires would be supplied with air from the ceilings instead of from the floors. This method, however, would be inoperative in the direction required in summer, or when fires were not burning. The products of combustion from gas-jets could be carried off in the same manner; and also by placing funnels over the gas-jets flush with the ceilings, with pipes leading from them either into the chimneys or into the outer air. But chimney-flues afford the readiest and most practicable method for ventilation. Whether fires are burning or not, there are but few flues in which the draught is not upwards. By some means an upward suction is established, probably by the temperature of the flues being somewhat higher than the external air, or than the rooms; or by the wind passing across their tops aiding

the draught. Be it as it may, a light held at the upper edge of the fire-place or smoke opening is invariably towards the flue. If therefore an inverted funnel be fixed flush with the ceiling, with a pipe leading from it into the chimney, the air at the ceiling would be drawn into the funnel, along the pipe, and up the flue, like the air near the floor passing into the fire-place. By this method a vast number of existing rooms could be easily and cheaply ventilated. This process is somewhat similar to Dr. Arnott's chimney-valve, which communicates with a flue below the ceiling. The hot vitiated air, saturated with moisture, produced by breathing, and by burning candles, lamps, and gas, rises direct to the ceiling, whence it must descend to get into the valve. When, however, it begins to descend, it has lost its levity, and in consequence much of it sinks below the valve, and, mixing with the air in the room, deteriorates it. But by placing a funnel flush with the ceiling, with a pipe leading from it into the chimney, the noxious air passes away at once. Occasional draughts from the flue into the room would be less frequent by the pipe and funnel away from the flue in the centre of the room than by the valve close to the flue. The pipe must not be taken from the funnel into the outer air, as the fire, when there is one, would draw air through the pipe into the room and down from the ceiling into itself, like it draws air through a window when the top sash is pulled down. The funnel could be covered with a perforated ornamental flower screwed to it, the upper side of the flower being clear of the ceiling; or a domelet of perforated zinc could be placed in the funnel convex downwards. This would be much cheaper, and look nearly as well.

It would, however, be far better, while houses are being built, to construct ventilating pipes alongside the flues, or in combination with them. There should also be an arrangement of funnels in the ceilings, with pipes leading into the ventilating pipes. The heat of the flues would rarely draw the air in the ventilating pipes, and so induce upward currents, which would materially assist in drawing the vitiated air out of the rooms and fresh air into them. Pipes have long since entirely superseded brick drains, and why should not pipes supersede brick flues, not only in larger, but in smaller class houses? By a judicious arrangement of pipes for flues and ventilation—round inside for the flues, and square outside of the thickness of the walls, with the intervening spaces for ventilation; or square, with a dividing partition, one part for smoke, and the other for air—much of the room now occupied by the jambs and breasts of chimneys would be saved. Ceilings are usually made horizontal, but they soon become convex by shrinkage. For purposes of ventilation, however, they should be made as concave as possible from the cornices, with the highest point in the middle, where the funnels should be placed. Then the warm vitiated air on arriving at the ceilings would glide upwards to the funnels, and pass through them into the ventilating pipes, and thus a constant interchange of air in the rooms would be established. The outward currents from the ceilings would in most cases produce sufficient inward currents of fresh air through all the present points of ingress without requiring special apertures for its admittance. Still, however, one or more fresh-air openings could be placed at some convenient point in the floor or the skirting opposite the chimney.

No air will produce fire and light but oxygen; and both are extinguished immediately they are deprived of this gas. Respiration and combustion have the same effect,—the one kindles the body, the other the fire; and the one keeps the body, and the other the fire, burning and alive so long as each is supplied with food or fuel. All substances burn with greater brilliancy in pure oxygen than in common air. A flickering taper, or any burning substance, plunged into oxygen bursts into a brilliant flame, and burns with such splendour that the eye can scarcely bear the glare of the light, and the heat is intense. Improper application of air to burning fuel and gas produces imperfect combustion, waste of the carbon and hydrogen, and pollution of the air. Hence the more perfect we can consume coal and gas, the more heat and light we obtain therefrom, the less are the deleterious products from the combustion, and the less waste or loss in a money point of view. Great improvements have been made in stoves of late years, but the best of them are far from perfect. The fire-boxes should be arranged so that the fires can consume the carbon in the fuel without

smoke if possible; then the atmosphere would be less vitiated with the products of combustion; and a greater quantity of heat would be radiated into the apartments with much less consumption of fuel. Gas-burners should also be made to emit the gas from very fine holes, or very fine tubes, arranged close to each other; then the gas-jets issuing from the holes or tubes would be surrounded and fed with oxygen, or completely oxygenized; the united flame would be nearly white, and very brilliant; only a small quantity of sulphur would be evolved; and there would be considerably more light with the same expense of gas. That burner is best and the most economical which consumes the gas, not with a dull yellow flame, but with a brilliant white light.

JOHN PHILLIPS.

CEDAR FOR CABINETS.

The writer of the article on Cedar, in a recent number of the *Builder*, when recommending the wood as a lining for drawers, should not have omitted to caution his readers against employing it where geological specimens are to be stored. The aromatic resin deposits itself upon all descriptions of minerals, and ruins them so far as appearance is concerned. When I was in Rome some years ago, I made a collection of pieces of variously coloured marbles, small portions of the marble veneering on the ancient interior wall-faces, and brought them to England as *souvenirs* of the different buildings. These in the first instance I kept in a large cedar box, made on purpose to hold them. One day I read in the columns of the *Builder* that "geological specimens must on no account be kept in drawers lined with cedar, as the wood deposits a sticky resin," &c. Of course I went at once to look at my marbles, and found them covered with nasty glutinous spots, quite destroying the beauty of such things as the delicate perishable petrified mud from the Falls of Terni, though, no doubt, the gum could be rubbed off from smooth surfaces.

R.

"THE ADULTERATION OF LABOUR."

PRAY do not let the "Adulteration of Labour" pass away. That short passage, and the capital "case in point" immediately preceding it, the account of bad work on the railways, are most valuable for the good of the country's credit. From the wretched rubbish usually put on our doors and windows, in the way of fastenings that will not fasten,—and that make one mentally swear any number of times in a day—to the pier of Chichester Cathedral, and the damaged Manchester cottons, all is rottenness and sham. The disgrace to our country is a thousand times worse than one's own suffering by it.

II.

A MIDDLE-LEVEL SKETCH-BOOK.

THE accompanying outlines are copied from a MS. in the Royal collection in the British Museum, and form a unique example of an artist's sketches in the Middle Ages. They are made in pale colour in the margins of a Chronicle of Geoffrey of Monmouth, of the early part of the fourteenth century, and occupy a middle place between the careful drawings of Willard de Honecourt and the free sketches of Speed in 1610. Although we cannot readily trace any definite identity between the originals and the architectural monuments now existing, they are of extreme value, being of beautiful design and suggestive for modern designs. In London, however, we may, perhaps, trace considerable likeness to the great churches of Westminster Abbey, St. Mary Overy, and old St. Paul's. The other cities illustrated are Cantorbury, Ebrauc. (York), Chichester, Gloucester, Caerleon, and Rome, and the towns of Leicester and Colchester are also represented. The accessories of castles and walls I have omitted, as they are of the conventional type familiar to all conversant with ancient MSS. A cross, a mural ornament, and the head of Edward II. (?) will attract attention from their grace, force, or symmetry. There are also very clever sketches of heraldic shields, with coats of arms, small figures, and a battle piece full of vigour. The architect will at once be able to fix on the Early English triplet, or Early Decorated form of tracery, the double portal, the leaded spires, the crocketed canopy,

the gable with its trigonal widow, and the flattened doorway, and be pleased to see in these the germs of some of those exquisite elevations which modern talent seeks to rival and, as yet, cannot surpass. The seals of the period throw an illustrative light upon these very curious and interesting sketches of an English architect made five centuries ago.

MACKENZIE E. C. WALCOTT, B.D.

** Although interesting, we do not think it necessary to publish the sketches.

CRUSHING WEIGHT: WROUGHT AND CAST IRON.

The apparent contradiction pointed out in the *Builder* for July 18 (p. 534) in the statements made by various authorities as to the relative strength of wrought and cast iron columns is entirely owing to the confounding together of two distinct problems. The pillars experimented on by Mr. Eaton Hodgkinson (see *Phil. Trans.* for 1840 and 1857) had a length of not less than 30 diameters, in which the resistance to crushing does not come into play, the pillars being broken by bending; and it is in these only that wrought-iron bears a greater weight than cast-iron, the formulae being—

$$W = 42 \frac{d^{3.5}}{l^2} = \text{Crushing strength in tons of cast-iron pillar.}$$

$$W = 134 \frac{d^{3.5}}{l^2} = \text{Ditto wrought-iron ditto,}$$

both pillars being solid. If we put $d = 4$ in., and $l = 10$ ft., the cast-iron will break with 126 tons, and the wrought with 194 tons.

When a pillar has its length less than 30 diameters, but more than 10 diameters, it yields partly by bending and partly by crushing; and when the length is less than 10 diameters, its full crushing strength comes into play.

The crushing strength of cast iron is 49 tons per square inch of section, while that of wrought iron is 18 tons; so that for short pillars cast iron is much stronger than wrought.

Hence it is necessary to consider the mode in which the material is to be applied before we can decide whether cast or wrought iron is to be preferred. E. WINDHAM TARN.

The following table from Rankine's "Applied Mechanics," showing that the comparative strength of cast and wrought iron columns varies as the proportion of length to diameter is greater or less, may be of some use to your correspondent "T. M. M." It appears from the table that when the length is about twenty-six and a half times the diameter, the strength per section is equal, in cast and wrought iron; but when the proportion of length to diameter increases, wrought-iron offers the greatest amount of resistance, and cast-iron when the proportion diminishes.

Length	1	1	1	1	1
Diameter	10	20	30.4	30	40
Wrought	84,840	31,706	20,230	27,700	23,480
Cast	84,000	49,000	29,230	24,820	18,000

CHARLES BIRD.

ABOUT A LEAD PIPE.

SIR,—In your last issue, "N. & K." ask for information regarding the cause of a lead pipe (4 in. in diameter, and 6 lb. to the foot) having become in some places almost flat.

The pipe is used to convey water from a cistern on the roof of a mansion to the basement, a height of probably more than 30 ft.; the valve or sluice for cutting off the water is perhaps in the cistern, or somewhere at the top of the pipe. If so, the flattening of the pipe may be at once explained; for if the valve or sluice be closed when water is rushing down the pipe a vacuum will be formed within it, and an unbalanced atmospheric pressure equal to perhaps 14 lb. on every square inch be brought upon the outside; and this often repeated with great suddenness would pretty certainly crush such a pipe.

If the stop-valve be not at or near the top of the pipe my explanation fails, and "N. & K." should give all details of the arrangement. C. H. H.

SIR,—A question was asked by "N. & K." in your impression of the 18th instant, relative to the flattening of a leaden pipe. I have met with the same thing, and it was

supposed by the parties to whom it belonged to have been done wilfully, but on examination I found the following to be the cause.—In this case it was a 4-inch waste, made of lead, 6 lb. to the foot superficial, with a standing pipe and brass washer of the same size, viz. 4-inch, in the cistern. Now, when the cistern was quite full, and the stand lifted for the purpose of discharge, the water sank rapidly until the cistern was about half-empty, when a whirlpool formed just over the orifice in the cistern, the air passing rapidly through into the waste pipe. Now, it does occur sometimes that this whirlpool occurs, while a large portion of the water is still in the tank. Then it does not pass into the pipe so fast as that which is in the pipe passes out. The consequence is a partial vacuum is formed, and the atmospheric pressure on the outside causes the pipe to collapse. I prevented a recurrence of this by simply soldering a small pipe, or an air-pipe (say 3/4 inch) into the waste pipe below the cistern, and carried it over the top of the cistern (elsewhere would do, so that it was above the water line). I applied this ten years ago, and the flattening has not happened since.

I may add that, if the water is discharged from the tank by means of a valve or cock of the same size as the pipe, the sudden closing of the same before the whole of the pipe is empty would cause the damage, and the same remedy would prevent it. E. A. B.

"LAND AND MARINE SURVEYING" AND "ENGINEERING FIELD WORK."

SIR,—We observe in your issue of the 11th instant a letter from Messrs. Atchley & Co. referring to your notice of the above works, and we rely upon your courtesy to allow us also a few lines on the subject.

When Mr. Haskoll brought us the MS. of our book, "Land and Marine Surveying," we knew nothing of the work previously published; and being assured that the new work was entirely original, we considered—and do consider—that gentleman's character quite a sufficient guarantee of the truth of the statement, without troubling ourselves with any examination of his previous works. Since the appearance of Messrs. Atchley's letter we have had an interview with the author, and he reiterates most positively his assurance that every word of our book is original, and that so far from copying from "Engineering Field Work" he never once while writing "Land and Marine Surveying" looked into that volume.

We scarcely think it worth while commenting on Messrs. Atchley's ludicrous doctrine that, a man having once written upon a certain subject, no publisher is justified afterwards in publishing another work by him on the same subject, even after long years of additional experience and observation. Were such a rule to prevail men of scientific attainments and literary skill would often be precluded from laying before the public the results of their sometimes life-long labours, and many of the finest scientific works in our language would never have seen the light. Lockwood & Co.

** With this the correspondence must end.

FREE LABOUR v. TRADES UNIONS.

SIR,—Trades unionists consider that it is right for men of all trades to combine; let them ask themselves the question what the result would be if the farmers throughout the country entered into a powerful combination and (being supported by the importers of corn) doubled the present price of bread.

It is said on all sides that joiners, masons, bricksetters, plasterers, painters, &c. perform only half or two-thirds the work for a day's wages that they formerly did, although their remuneration is now 25 to 30 per cent. higher than previous to the alteration in the corn laws.

Why is there not to be free trade in English labour as well as in corn, cattle, coffee, tea, sugar, rice, &c.?

Were these necessities of life produced under the rules of trade unions, the cost would be so exorbitant that nine-tenths of the world would die of starvation.

It is a matter of little consequence to the public whether the regulations of a shield get, or a foreman's wages; but the present cost of building enhances the rent of every description of dwelling, and thus affects all classes of society.

There are thousands of hoys anxious to become joiners, masons, bricksetters, plasterers, painters, &c.; but the rules of the unions prevent them entering these several callings. The poor rates are thus immensely increased, and many of the working-classes driven (of necessity) to obtain a living by dishonest means. PRO BONO PUBLICO.

CONCRETE BUILDINGS.

SIR,—Can any of your readers, who have practically tested the merits of the new system of building by Portland cement concrete, inform me to what degree a concrete building is sensible to contraction and expansion? A. B.

TO CLEAN STONE.

SIR,—Can any of your readers inform me what will clean and preserve a soft sandstone similar to the stone quarried at Attleborough, Warwickshire? G. J.

LOWER FARES PRACTICABLE.

SIR,—A farthing a ton per mile gives a profit on the conveyance of coals and other minerals, requiring porters, cranes and other machinery, hooking, warehousing, and watching; whereas passengers can preserve themselves to and from the carriage, so compensating for extra carriage-room and insurance. A ton of men, women, and children I reckon twenty, so they cost one-twentieth of fifty farthings each. Approximating gradually from present rates (thereafter, there are surely obtainable increasing profits as each successive reduction becomes established and known. W. W.

THE ARCHÆOLOGY OF FREEMASONRY.

HAVE read a paragraph in your valuable periodical to the effect, that "a Masonic Archæological Society has been established in order to elucidate the antiquities and history of Freemasonry." I should be glad to have some further information relative to the society, the inauguration of which does not surprise me, as I have been aware that recent Masonic investigations have led to the discovery of the lost science of symbolism, by means whereof's rich mine of hitherto occult knowledge has been revealed. W. N. CALWOOD.

WORKMEN AND THE PORTRAIT EXHIBITION.

We have received an earnest request to submit the following appeal:—

"To the Authorities at South Kensington.

On behalf of the class to which I belong, I humbly solicit permission to view the portraits at South Kensington. The charge, 2s. (with catalogue), is a very serious matter to most of us. It means the price of eight dinners, I can assure you.

The slack time is approaching (personally and for my own trade it has set in) when we shall have plenty of leisure on our hands: but the money?

I have an idea that I should like fully to note the contrast as to style, colouring, &c. (*vide Builder*, a week or two ago), between the works of the present century and the supplemental collection.

Neither of the previous collections was seen by most of us for the reason stated above: and the time? Can you give us any facilities as to evening or Saturday? ONLY A TAILOR."

We solicit consideration for this request, and would suggest that the Exhibition should be opened on Saturdays at 2d.

CASES UNDER THE METROPOLITAN BUILDINGS ACT.

Caution to Builders.—On the 17th instant, at Clerkenwell Police Court, Mr. Frederick James Gribble, of Margate-road, Camden Town, appeared in answer to two summonses taken out by Mr. Henry Baker, district surveyor of St. Pancras. First, for erecting three houses in York-road, having wooden overhanging roofs, for which the approval of the Metropolitan Board had not been obtained; and also for omitting to render or parge the outside face of the chimneys, as required by Section 20. The surveyor having proved the case, the defendant was ordered to comply with his requisitions. Secondly, for neglecting to give notice of three other houses, adjoining the last. The defendant argued that, because the houses were exposed to view, and must be seen by the surveyor, the notice was unnecessary. He, the builder, had not attended to the remonstrance of the surveyor, nor had he obeyed the first summons of the magistrate. After a patient hearing, he was convicted in the penalty of 40s., and 42s. costs to the surveyor for loss of time, in addition.

CHURCH-BUILDING NEWS.

Stothdon.—The Church of St. Mary, which has been in a great measure rebuilt, has been re-opened for divine service. The work of restoration included the replacing of the north arcade in an upright position, rebuilding the north wall, and building a new south arcade between the nave and aisle. New roofs have also been put over the nave and chancel. The original heights of these roofs have been restored, the removal of the chancel arch having led to the lowering of the old nave roof. The western gallery has been removed, and the whole of the fittings renewed. The architect, under whose superintendence the works have been carried out, was Mr. Blashill, of London.

Lutterworth.—The whole of the workmen employed in the restoration of Leire Church have been treated to supper at the Hind Hotel, when upwards of 100 sat down in a large booth, specially erected for the occasion. The chair was taken by Captain Richardson, the son of the rector of Leire. Mr. J. Law presided at one table; the vice-chairs were filled by Mr. G. Law and Mr. King. The contractors are Messrs. J. & G. Law and Mr. King. Mr. Smith is the architect; and the other tradesmen connected

with the work are Messrs. Ade, Buswell, and Henley.

Swaffham Prior.—Various improvements have been reported of late in this village, the new reading-room being the most recent example. The principal feature of the parish, the Church of St. Cyriac, has not been neglected. For some weeks past it has been closed for repairs. It is now repaired. The entire building has been cleaned, painted, and repaired. A memorial window to the late Col. Alix has been placed in the south transept by his son, the present proprietor of Swaffham House; who has also presented, in conjunction with Mrs. Roberts, &c., two brass "coronae" for the nave, and a pair of antique "Glastonbury chairs" for the chancel. The vicar has also given a carved oak lectern for the lessons; and the screen and curtains have been removed from the southern transept, as they impeded the view of the new window. The work has been done by Messrs. Adams & Danby, of Swaffham, and Mr. R. Danby, of Brnwell.

Walton.—Within the last ten or twelve years Walton Church has undergone much restoration. The building is dedicated to St. Mary, and is in the Early English style. When it was built some five centuries or more ago a good deal of the cement-stone, so plentiful on that part of the Suffolk coast, was used in its construction, and though this material may be manufactured into an article for cementing together stones of a harder nature, it is not well suited for constructing the walls of a building; exposed to the action of the atmosphere it crumbles away, and hence Walton Church, as years rolled on, became very much dilapidated. Of the tower, there remained only one or two masses of stone a few feet high, and covered with ivy; the west end of the nave was entirely lost, and the chancel and south aisle were in a shabby condition. Some ten years ago the south aisle and vestry were restored, the nave newly fitted with benches, a carved pulpit and reading-desk put up, and new windows were inserted in the north wall of the nave, the cost of the restorations being about 800*l*. Since then the accommodation afforded by the church was found inadequate to the requirements of the parish, and it was determined to enlarge the church by rebuilding the western portion of the nave, which was wholly gone, and at the same time the restoration of the chancel was undertaken. The work was finished in the spring of the present year, but there was no formal re-opening. The restored portion of the nave, as described by the *Suffolk Chronicle*, stands upon the old foundations, but is much more artistic and eighty than the old part of the building; the new walls are faced with flint, and the buttresses have white stone dressings, whilst the old walls are of cement-stone with here and there bricks and stones of a harder nature, and are supported by heavy plain brick buttresses. The roof of the new part of the nave has a higher pitch than that of the more ancient, so that there are now three gradations,—the western portion of the nave, the old nave, and the chancel. There is a three-light west window. In the chancel is a stained-glass east window, put in by Mrs. Boby, Walton Hall, in memory of the late Mr. Boby; the east end has been rebuilt of red brick. Internally there is also a good deal of variety. The chancel is lighted only by the east window. There were formerly two windows in the north wall, but these have been blocked up. The roof of this part of the church is hammer-beam, that in the old part of the nave is plastered with some heavy beams running across, whilst the restored portion of the nave has an open-wagon roof, and that of the aisle is similar. The walls throughout have been touched up; the church is uniformly benched and paved. The cost of the restoration of the nave was about 450*l*, which has been almost entirely raised among the parishioners, who also contributed to the chancel restoration, the roof of that part of the church being restored by Mr. Richards, the lay proprietor of the tithes. Mr. C. Woolnough, Walton, was the contractor. A piece of land a little over a quarter of an acre in extent, adjoining the north side of the old churchyard, has been added to the burial-ground, the total cost, including walling in, being upwards of 200*l*. This addition has just been consecrated.

Liverpool.—The new church of St. Paul, erected on the north shore, Liverpool, the foundation-stone of which was laid a little more than a year since, was consecrated by the Bishop of Chester. The style is Geometric. The architects were Messrs. Calshaw & Sumner. The plan of the church consists of a nave about 70 ft. by 50 ft.,

having side and west galleries, with a wide open chancel 20 ft. deep, separated by the chancel arch, supported upon detached stone shafts, having enriched caps. The sides of the chancel are also divided from small side spaces opening into the nave by arches, thus giving a view of the chancel from all parts of the nave, and side galleries. The principal entrance in the west front is by the large porch 20 ft. by 10 ft., and from this to the nave by two sets of folding doors. The galleries are entered by separate doorways and staircases. The roofs are of open framed principals, resting on the outer walls, but also supported by light iron columns springing from those supporting the galleries. The seats consist of open benches, the whole of the wood-work being stained and varnished. The west front of the church and side porches are constructed of Yorkshire shoddies and Stenton stone dressings, picked bricks with stone dressings being employed for the remainder of the edifice. On the north of the doorway are a hells-tower and a spire rising about 90 ft.

Worcester.—The estimated cost of the proposed restorations of St. Andrew's Church will be about 2,000*l*., and the architect is Mr. W. J. Hopkins. Parishioners have already promised subscriptions to over 300*l*., the entire sum subscribed being now 457*l*., by less than a score of individuals. It may, therefore, be hoped that this ancient church will not be long suffered to remain in its present dilapidated condition. All the sittings will be free and unappropriated. More than a quarter of the amount required can scarcely be hoped to be raised in the parish.

DISSENTING CHURCH-BUILDING NEWS.

Stockport.—The chief stone of the new Baptist chapel in Greet-street has been laid. The edifice has been designed in the Romanesque style. The plan is nearly a square, the extreme external dimensions being 70 ft. by 65*½* ft. There were difficulties in the ground to overcome. The chapel will be built of red brick, the string-courses, bands, and cornices being in the same material. The porch, circular windows, and pinnacles will be in stone from the Hollington Quarries. The dimensions of the chapel will be internally 61 ft. by 53 ft., and 28 ft. to the ceiling. The organ-gallery is separated from the chapel by an arcade resting on columns, with carved capitals of Darley Dale stone. The vestries are placed beneath this gallery and behind the pulpit, separated from the chapel by a wooden screen. They will be contiguous to each other, so that on occasions they may be used as one room by removing the folding partitions. The baptistery will be under the platform, and will be lined with white tiles. The principal entrance to the chapel will be from Greet-street through a triple porch, which will form the principal feature to the front. The whole will be in stone, with clustered columns. Other features of the exterior are the circular windows, which will be filled in with stone tracery of geometrical design, and the pinnacles, which will have columns with sloping stone roofs. As the building is covered by a single-span roof, the turrets break up the extreme width of the gables. Separate access is gained to the vestries and organ-gallery from the front facing the Armory, the stairs being placed in the angle, which has been rounded off and covered with a turret roof. The pews are to be moulded deal, and arranged on the ground-floor in a circular form round the pulpit. The galleries will be on three sides of the chapel, and will have an ornamental iron railing in front. Ventilation will be secured through ornamental centre flowers in the ceiling. The total accommodation will be 1,000. It is proposed to heat the building with Haden's patent apparatus, and the gas-light fittings will be of sun-burners. The architects for the building are Messrs. W. G. Habershon & Pite, of London; and the contractors Messrs. Watkinson, of Ransington, Lincolnshire.

Braintree and Bocking.—The new Wesleyan chapel has been opened for public worship. It is arranged with three rows of open benches in the length, divided by passages on each side, approached from two porches at the end next the high road. At the opposite end is the platform, with a recess arched as high as the ceiling, and a transept extends on either side. At the back is a vestry and class-room, entered from the ground of the minister's house. The roof of the main building is in one span, the principal timbers being wrought and varnished, with a

flat ceiling of plaster half way up the rafters, the inner part of the roof being used for ventilation. A gallery extends across the end opposite the roof. The exterior is faced with red bricks, relieved with black band and arches, the windows and other finishings being of Bath stone of Early English design. A stone arch is gable at the junction of the roads form a porch common to one of the lower entrances and to the staircase to the gallery, which is placed in a tower finished with a spire covered with slates and surmounted by a vane. In the basement is a place for a furnace suitable for warming either by hot water or hot air. The ground story contains 320 sittings, and there are fifty-six in the gallery, besides sixty-four children's. The gallery could be extended along the sides and in the transepts, by which 116 additional sittings may be obtained. The cost of the building, exclusive of the land, has been about 1,400*l*. Mr. Frederick Barnes, of Ipswich, was the architect; and Messrs. Parmenter, of Braintree, were the builders.

Miscellaneous.

TESTIMONIAL.—At the annual dinner given by the firm of R. W. Kennard & Co., of Upper Thames-street, to their employes, the manager of the establishment, Mr. Joseph Crowther, received from the clerks, &c., a testimonial written on vellum, and illuminated by Mr. Leftwich, one who for many years was with him in the establishment. In return, a photographic portrait of Mr. Crowther was presented to each of those who signed the testimonial. Mr. Crowther has been fifty years in the same employment.

"RATTENING" IN LONDON.—Under this title the following letter from Messrs. Bunnett & Co. has been sent us:—Sir,—We have received a threatening notice, of which the following is a copy. We leave it to speak for itself.—Your obedient servants,

BUNNETT & COMPANY (Limited).
New-cross Works, Deptford, Kent, July 20.
"Messrs. Bunnett & Co. (Limited),—Gentlemen,—We have to inform you that a resolution has been passed concerning the system of piecework as most obnoxious to trades unions; and after the ensuing month, should you attempt to deviate from the tenor of this intimation, you must bear the consequences.—Yours respectfully,
From the General Secret Committee, July 15*th*."

CROPS FROM THE LONDON SEWAGE.—At the usual meeting of the Metropolitan Board of Works the chairman said he had received a letter in reference to the effects of sewage manure:—

"Herewith I have the honour to send duplicate specimens of the samples of our crops, which we are exhibiting at the show and garden, &c., at the Crystal Palace. Some of the samples are quite unprecedented. The sample of wheat is grown on a piece of land which bore the same crop last season. The oats, which are perhaps the most extraordinary ever seen, have been produced by the unexhausted manure left on the land by the application of 4,000 tons of sewage per acre last year to a piece of land, from which we got last season seventy-one tons of grass per acre. This is a conclusive refutation to those enemies who pretend that sewage farming exhausts the land."
Some specimens of wheat, barley, oats, potatoes, and strawberries accompanied this letter, and were of extraordinary size and quality.

THE RAILWAY WHISTLE NUISANCE.—The Londoners are beginning to find out that our anticipations as to this growing and insufferable nuisance were correct. The *Athenaeum* says:—

"We trust power will soon be obtained to check the monstrous abuse of the whistles of locomotives, especially at termini. Since the removal into the metropolis of these vast starting-places there is no spot out of hearing of those discordant instruments; and because of them, in the invaded neighbourhood, there is absolutely no silence. Placed in the hands of men who care for little beyond their own practice, almost nothing for the senses or rest of the neighbourhood, they are wantonly abused. Is there, beyond the habit of making the sounds of these things frightful, any reason for their being so dreadfully shrill and painful to the ear? A signal is a signal, we suppose, and as likely to be effective if it were made melodious as it is now, when discordant. Military signals receive attention, although they are given by musical notes, and not by hideous shrieks and terrible screams. As it is, some locomotives signal hoarsely and, comparatively speaking, pleasantly. Why not have two whistles to each engine, one to be heard afar, the other near, and both melodious? As they are now arranged these instruments are made to shriek in ten thousand ears in order that a pointman ten yards off may take warning."

In reckless and never-ceasing disregard of the public comfort we think no metropolitan railway can excel the Great Northern in respect of this truly monstrous nuisance. If the Holloway district was ever inhabited by the monsters of the Saurian order the hideous noises of the present era must closely resemble the acoustic horrors of that dreadful time.

"DUST HOY!"—Reader, did you ever inhale a breeze from a dust-cart when the contents of the basket are tipped over? Eyes, nose, mouth, and clothes suffer. Further trials and annoyances would cease if housekeepers would stamp their dust with a few pails of water the day previous to its removal.—R. T.

THE ALBERT PARK AT MIDDLESBROUGH.—This park is to be opened early next month by Prince Arthur, who has been deputed by the Queen to officiate at the ceremony, in her name. At one time hopes were entertained that the Queen herself, or at all events, the Prince of Wales, would have opened the park. The proceedings will constitute an event in the history of the iron metropolis of the north. Middlesbrough is the first of the northern towns—with the exception of Sunderland—to inaugurate a People's Park on a large scale.

A SUBSTITUTE FOR HAY AND STRAW.—A Country Rectory writes to the *Standard*:—It may not be generally known that the water used (*udora*) which is choking up our rivers and streams in all parts of the country might be turned to good account. It needs only to be led out of the water and dried in the sun. It then becomes sweet and pleasant. My rats eat it, and appears to like it, and it also makes very good litter for the stable. With the respect before us of hay and straw at a high price, these who have a supply of the *udora* near hand would do well to dry a large quantity for the coming winter."

STATUTES AND THE TRANSIT OF ANIMALS.—An influential deputation from the Royal Society for the Prevention of Cruelty to Animals, headed by the Earl of Harrowby, as president, he had an interview with the Duke of Marlborough, and President of the Privy Council, urging on the Government the importance of establishing by law public abattoirs similar to those to be found in the principal cities of Europe; and the necessity for legislative measures for the protection of animals during their transit from place to place by steamboat and railway. The Duke of Marlborough said it was manifest that he would remedy most shortly be provided.

ELECTRO-IRON DEPOSITS.—The *Scientific Review* discusses at considerable length the new scheme of producing, or rather depositing, iron by electricity, which has occupied the attention of French and German experimenters for several months. There is a great desire to keep it a secret; but the process is exposed to be analogous to the electrolytic. The iron so produced is nitrogenous, but pure. It will withstand the action of hydrochloric acid or sulphuric acid in cold, and will, therefore, not rust in the open air. It is of a clear grey colour, and takes a fine finish. With a weak current of a single Daniell cell, iron two millimetre thick is easily deposited in a fortnight.

POLLUTION OF RIVERS.—A case has been heard at Abingdon Assizes, in which Mr. H. P. St. John, of Donnington-grove, was plaintiff, and Messrs. Granville & Plumb, proprietors of the Abingdon Paper-mills, were defendants. The issue for the defendants in this case consented to submit to a verdict for plaintiff for 40s. damages and costs, to give an undertaking not to pollute the water in future, and to close a sluiceway complained of forthwith. The question involved was whether the owners and occupiers of land bordering on a river shall only be benefited by the water that they stream at the rate of the owner or owners of a paper-mill situated on its banks. The trial was one of the most interesting, and therefore heavy damages could not be obtained.

ANNUAL REPORT ON ST. GEORGE'S, HANOVER-SQUARE.—The annual report of the medical officer of health (Dr. Aldis) has been printed. Estimating the population of the parish at 91,500, the gross death-rate for the year ending March 31st was 19.5 per 1,000 living, but deducting the deaths of non-parishioners at St. George's Hospital (300), the death-rate was only 16.7 per 1,000. The rate varies greatly in sub-districts, the richer quarters being very low, and the poorer much higher than the average. In the model lodging-house, Gatliff's-buildings, erected by the Marquis of Westminster, the death-rate was more than 30 per 1,000 in ten months. This is supposed to be attributable to the state of health of the new lodgers in the building was opened, and partly to the unwholesomeness of new buildings, erected on and once marshy.

LINCOLN CATHEDRAL.—The timber gangway which for the last twelve months has formed a temporary bridge between the western towers of this cathedral, has been removed. The eight pinnacles of the western towers have now been renewed. The whole of the works have been carried out without accident to life or limb.

CHELTENHAM SEWAGE IRRIGATION.—A report of the local Sewage and Drainage Committee on the best means of carrying out the principle of irrigation recommended by Mr. Bateman, has been made to the local board. In this report, and basing on an appended report by the borough surveyor, Mr. D. J. Humphris, the committee recommended the conveyance of the sewage from the Hatherley tank to Hayden, where land can be obtained for irrigating purposes, and further on to land at the Barrow with the same view. The estimated cost of the works, exclusive of extension of the sewer to the Barrow, is 7,000*l.*, and inclusive thereof 8,500*l.* The cost of the land at Hayden, if purchased, would be 10,500*l.*, and of fifty acres at the Barrow 4,000*l.*

ESTABLISHMENT FOR NURSES.—At a recent meeting of the governors of the Middlesex Hospital, it was resolved to erect a suitable building in connexion with the hospital as a residence for women to be trained and educated as nurses for the sick in hospitals and private families. It is intended that the building shall afford accommodation for sixty-six pupils, each being provided with a separate apartment. There will be a refectory, laundry, bath-room, and every accommodation for a model building. The sum required to carry out this object is calculated to be about 6,000*l.*, towards which the Marquis of Westminster has contributed the handsome donation of 1,000*l.* Twelve governors gave at the meeting 100 guineas each, and smaller sums, amounting to 300*l.* were also subscribed, making a total of over 2,500*l.* subscribed in a few days towards the promotion of this very important establishment.

OZONE.—This remarkable substance has lately been the subject of numerous researches. It has been shown by Dr. Schar, of Berne, that ozone, as well as substances impregnated with it, will kill animalcules with certainty and rapidity; and, as recent researches seem to place it beyond a doubt that most epidemics, and cholera among the number, are owing to microscopical, great hopes are entertained of its being possible to use ozone in hospitals as a disinfectant; and, perhaps, to extend its use still further. As might have been foreseen, however, from its being a very active form of oxygen, it exercises an irritating action on the respiratory organs, a drawback which must necessarily reduce its application to sanitary purposes within narrow limits, except in a condensed form, such as chemists know the permanganates of alkalis, or Condy's fluid, to be. In this form, indeed, ozone is already largely used in hospitals as a disinfectant, and also internally, as what we may call a sanitary condiment.

COMPETITION FOR A STATUE IN FRANCE.—Never was so great a fiasco experienced by the French as that which has just greeted the competition for the statue of Ingres, to be erected at Montauban, says the Paris correspondent of the *Birmingham Journal*. Thirty-six models had been sent for approval. The sight was hideous. Thirty-six varieties of the same ugliness. Every character of vulgarity had been essayed by the artists. The man was ugly enough in nature, but even his worst enemies could not deny that he was the Belvedere Apollo compared to the majority of these reproductions of himself. The good, honest, unpoetical matter-of-fact painter is in one case threatening the heavens with his mail stick, in another tearing the few hairs which remain upon his bald head in his search after inspiration. He bends his brow to earth, he raises it to the clouds, he pinches his nether lip, he presses his forehead upon his nose. The jury have declined to accept any one of the hideous attempts, and the competition is to be re-opened at a future period. The consequence of this egregious failure has been a deluge of lamentations on the decay of art in France, which bears out the terrible denunciations made by Alexandre Dumas Fils in the preface to the last edition of his works, wherein he declares that under the Second Empire France is beholding her laurels disappear one by one, and that where she has stood first for many generations even in the realms of art, she is being fast consigned to the second place.

INTERNATIONAL TRIALS OF REAPING AND MOWING MACHINES AT BERLIN.—At this contest, one of the largest and most important ever held, and for which more than forty machines by the chief English, American, and Continental makers were entered for competition, after elaborate trials extending over several days, the first and highest prize offered, viz., the prize of 200 thalers and a gold medal, was awarded to Samuelson & Co.'s self-raking reaper; the prize of 50 thalers and a silver medal to Samuelson & Co.'s grass mowing machine; the prize of 50 thalers to Samuelson & Co.'s "Eclipse Reaper." One-half the total money prizes offered and a gold and silver medal were awarded to Samuelson & Co.'s machine.

TRADES ARBITRATION CASE AT LEEDS.—Mr. Rupert Kettle, judge of the County Courts of Worcestershire, who, as our readers are aware, has organized a system of Courts of Arbitration at Wolverhampton and Coventry, has attended at Leeds as arbitrator in a dispute which had arisen between the master carpenters and joiners and their workmen respecting the rates of wages and the hours of labour. The views of both parties were placed before the arbitrator, and the result was that the men are to receive an advance of 3*d.* per hour in their wages, but that the demand for the reduction of the hours of labour was abandoned. It was agreed to appoint a court of arbitration to settle disputes that may arise during the next two years, and Mr. Jowitt was selected as the gentleman who is to be invited as umpire.

MONUMENT TO SIR JAMES BROOKE.—A committee, strengthened by the highest names, has been formed to promote the erection in Westminster Abbey of a monument in honour of the late Rajah of Sarawak, Sir James Brooke. Rajah Brooke sacrificed a considerable fortune to plant a society, governed by humane laws, on the shores of a barbarous island, whose centre has never even yet been explored. He gained solid advantages for England; he practically effected the cession of Labuan, which, as an outpost, an emporium, and a steamer station, is rising in importance every year; he swept the paths of commerce in that part of the world, so long untroubled by piracy; he, virtually, added a bishopric to the episcopate of Great Britain; and through his exertions trade in those waters has marvellously increased.

WATER SUPPLY.—The new waterworks for Carlisle have been completed. The reservoir had to be enlarged one-half, when it was found that the dimensions at first contemplated were insufficient; the embankments had to be extended and strengthened; rockwork required to be excavated, the existence of which had never been anticipated; and various other unforeseen expenses have been found necessary during the progress of the works; so that the contract has been exceeded to the extent of 2,000*l.* or 3,000*l.*, and altogether, instead of some 5,000*l.* or 6,000*l.*, a sum of 10,000*l.* has been added to the cost of the undertaking.—Owing to the present dry weather, the inhabitants of Keswick are to be put upon short allowance of water. The mountain rivulets are, in many cases dry; and the rivers Derwent and Greta are fast becoming mere brooks.

BLACKPOOL.—The new Assembly and Concert Rooms at Blackpool, erected by a limited liability company composed principally of Manchester gentlemen, have just been opened. The building occupies a site at the junction of Talbot-road and Clifton-street. It stands upon a raised terrace of triangular form, the apex of the triangle, fronting the sea, being crowned with an octagonal tower. At the base of the triangle is an opulent arcade, in which shops are situated, and from which visitors enter the Assembly Room by the principal staircase. The principal room (omitting the orchestra) is 74 ft. long by 38 ft. wide, and has galleries on two sides and at the lower end. The ceiling is lofty and panelled; and is furnished with three large domes, from which gas-lights are suspended. The stage (in the construction of which provision has been made for scenery, so as to afford facilities for theatrical performances) is commodious. From the terrace in Talbot-road is a staircase, to be used principally as a means of access to the reading-room, which is 36 ft. in diameter. In immediate contiguity are billiard-rooms, photographic-rooms, &c. From the last-mentioned staircase access is also gained to the galleries of the Assembly Room, and the body of the hall. The entire cost of the building is about 9,000*l.*

NEW CHURCH IN DINAN.—The foundation-stone of the English Church at Dinan, in Brittany, will be laid on the 28th instant. This will be the first Anglican church ever built in Brittany.

CHURCH BELLS DESTROYED BY FIRE.—Brydhill Church, Maidenhead, took fire the other day, and before the flames could be extinguished two bells were melted, and two others fell from their positions on to the lower arch of the tower. The damage done is estimated at 500l. or 600l.

THE OLD LOUVRE.—We mentioned some time ago the discovery of the foundations of the donjon tower of the ancient Louvre. To record the plan of the tower, it has been laid in black and white asphalt, except where the old building lies beneath the pavement of the present court, in which case granite has been used to reposit the foundation of the old building.

EXTENSIVE FIRES.—Park Wood, near Sheffield, has been fired wilfully by boys, and another plantation, near Hollow Meadows, in the same part of the country, has been accidentally fired, and many trees destroyed. At Retford there have been alarming fires in corn-fields; and near Wrexham, the surface of a whole mountain, called Yrondeg, has been burning for a week or more.

"MAREZZO MARELE."—M. Gnelton, concerned in the production of this material, is anxious it should be known that "the nature of the manufacture by which these marble imitations are produced, so far from being a simple result, represents the labour of many years' incessant study of the mineralogical formation of the finest marbles that have come under his observation."

STATUES FOR THE THAMES EMBANKMENT.—The new Thames Embankment being regarded as an excellent site for statues and drinking-fountains and similar architectural ornamentations, it is intended to remove several statues now inappropriately placed, and locate them along the range of the grand river esplanade. Noble's statue of Sir James Ostrum is to be placed, we hear, on the embankment, near the Houses of Parliament. It will probably be followed by a statue of Sir James Brooks. We hope our advice as to trees to shade the embankment walks will not be forgotten.

ROYAL ITALIAN OPERA.—"Il Domino Nero," the first Italian version of Anber's sparkling and well-known "Domino Noir," was produced on Tuesday evening last, Madame Lemmens-Sherrington sustaining the part of the heroine, M. Nardin that of Horace, and Signor Ciampi *Giù Ferris*. The latter sang the "Deo gratias" so well that a repetition was insisted on. Madame Sherrington was agreeable throughout, though towards the close of the opera the work of the season made itself obvious. Signors Neri-Baraldi and Tagliacico and Mlle. Locatelli contributed to a fairly effective ensemble.

RAILWAYS AND THE VALUE OF LAND.—The increased value given to land by railways is illustrated by Mr. Watkin, M.P., who, as chairman of the South-Eastern Company, states that at Hastings a piece of land for which, a few years ago, nobody would give 1,000l., is now worth 30,000l.; that, at Redhill, a piece of land which the company bought for 36l. the acre, has been sold at 1,867l. the acre; and that a park (Brickley) near another station, and containing 700 acres, which fetched no more than 50,000l. a few years ago, has since been sold for 120,000l., and could not now be had for less than 300,000l. In short, through these influences, land at first-class stations has risen in value from 200 to 1,000 per cent.

TEMPLAR'S SASH-FASTENER.—A large proportion of the sash-fasteners used are mere rubbish, soon breaking or otherwise getting out of order. Even when fairly made they have some inherent defects, to meet which Templar's Sash-fastener has been patented. The inventor claims for it, and with some justice, the following advantages:—It is self-fastening; a servant, in closing the window, involuntarily fastens it also; it allows the window to be a little open, if wished, and still fast,—a very valuable quality; it cannot be opened with a knife from the outside, like ordinary fasteners; the dropping of the top sash does not interfere with the action of this fastener as it does with others; and it effectually prevents rattling with the wind. We may add that it is simple, and that there is no spring to rust or to get out of order.

CO-OPERATIVE HOMES AND SANITARY PROGRESS IN ITALY.—At Genoa a large building is being erected on the co-operative principle, by working men, for the residence of fifty-four of their families. English co-operators are backward in this associated home movement, the object of which is to obtain comfort and economy in bed and board. At the laying of the first stone of the building for the Genoa community, Professor Cabella delivered an address on the dignity and virtue of labour, showing how, by prudence, even the poor man can build his own house, and expressing noble aspirations after perpetual improvement. Signor Cabella's address has been translated by Mr. Henry Roberts, F.S.A., whose pioneering efforts to improve the dwellings of the labouring classes, which commenced in England in 1844, have had a wide-spread influence in many foreign countries. When at Genoa, in 1856, Mr. Roberts was told by its chief magistrate that the municipality there had been put to an expense of 500,000l. sterling during the recent attack of cholera, mainly in relieving those of the population who live in narrow streets and filthy dwellings; and he added—"I can now, from experience, confirm what is stated in the publications you formerly gave me, as to the heavy expense which may be incurred in consequence of a defective sanitary state." The corporation, or municipality, has recently, at their own cost, converted a large pile of old buildings into convenient and healthy dwellings for working people.

TENDERS.

For Haddenham Gas Works, as per advertisement. Mr. David Oldfield, engineer to the Company:—

Table with 2 columns: Contractor Name and Amount. Includes Chandler & Son (£512 0 0), Porter & Co. (439 0 0), and others.

For the erection of a parsonage-house, Winstar, Derbyshire, for the Rev. H. Milnes. Mr. S. Rollinson, architect. Quantities supplied:—

Table with 2 columns: Contractor Name and Amount. Includes Gregory & Fryer (accepted) (£1,209 0 0).

For the erection of a house, &c., in connexion with the Roman Catholic Church, Chesterfield, Derbyshire, for the Rev. H. Birch. Mr. S. Rollinson, architect:—

Table with 2 columns: Contractor Name and Amount. Includes Heathcote & Son (accepted) (£200 0 0).

For the erection of a soda water manufactory, with stabling, at Camberwell, for Mr. T. A. Taylor. Mr. Joseph S. Moye, architect:—

Table with 2 columns: Contractor Name and Amount. Includes Walton (£4,900 0 0), Stoner (4,850 0 0), and others.

For additions to La Sainte Union Boarding House, Highgate-rose. Messrs. Goldie & Child, architects. Quantities supplied by Mr. James Schofield:—

Table with 2 columns: Contractor Name and Amount. Includes Simpson (£4,732 0 0), Jackson & Shaw (4,272 0 0), and others.

For residence for Mr. J. Cann, at Sutton, Surrey. Mr. Thomas, architect. Quantities supplied:—

Table with 2 columns: Contractor Name and Amount. Includes Best (£1,469 0 0), Cowland (1,390 0 0), and others.

For the erection of a girls' school, &c., at Sta. Derbyshire, for his Grace the Duke of Devonshire. Mr. S. Rollinson, architect:—

Table with 2 columns: Contractor Name and Amount. Includes Marlott & Sons (accepted) (£218 0 0).

For the erection of a new chapel, in Devon's, Bromley, for the United Free Methodists. Quantities supplied:—

Table with 2 columns: Contractor Name and Amount. Includes Aldons (£2,877 0 0), Stevens (2,758 0 0), and others.

For the erection of a warehouse, at Bankside, for L. Lazarus. Mr. N. S. Joseph, architect:—

Table with 2 columns: Contractor Name and Amount. Includes King & Sons (accepted) (£1,560 0 0).

For the erection of a store-house, Frogmore Bridge High Wycombe. Mr. Charles Carter, architect:—

Table with 2 columns: Contractor Name and Amount. Includes Spicer (£1,312 14 0), Corby (1,298 0 0), and others.

For Middle-Class Schools, Cowper-street, Finsbury. Mr. P. C. Clifton, architect:—

Table with 2 columns: Contractor Name and Amount. Includes Lucas (£19,067 0 0), Downes (18,000 0 0), and others.

For Wilson's Wharf, Tooley-street. Messrs. S. & Stock, architects. Quantities supplied by Mr. J. Hart:—

Table with 2 columns: Contractor Name and Amount. Includes Hart (£26,950 0 0), Wills (26,900 0 0), and others.

For bridge and roads, at Stratford, for the Carpenters Company. Messrs. Pucco, Corte, & Parker, architects. Quantities not supplied:—

Table with 2 columns: Contractor Name and Amount. Includes Moreland & Son (£1,578 0 0), Rivett (1,493 0 0), and others.

For Baptist Chapel, Charles-street, Goswell-street, Messrs. Finch Hill & Paraire, architects. Quantities furnished by Mr. Barnett:—

Table with 2 columns: Contractor Name and Amount. Includes Garrod (£4,367 0 0), Carter & Sons (4,370 0 0), and others.

For parsonage-house of St. Andrew's, Bethnal-green. Rev. Chas. Kirton. Mr. Benjamin White, architect. Quantities supplied by Mr. Longmore:—

Table with 2 columns: Contractor Name and Amount. Includes Brown & Robinson (£1,669 0 0), Perry & Co. (1,600 0 0), and others.

For villa residence, at Tulse-hill. Mr. J. D. Hoare, architect. Quantities supplied by Mr. C. H. Gough:—

Table with 2 columns: Contractor Name and Amount. Includes Myers (£2,655 0 0), Doves Brothers (2,355 0 0), and others.

For alterations and additions to house, 28, Museum-street, for Express Milk Company (Limited). Mr. Trehearne, architect. Quantities supplied:—

Table with 2 columns: Contractor Name and Amount. Includes West (£579 10 0), Walton (508 0 0), and others.

For the erection of villa residences. Mr. Joseph Moyer, architect:—

Table with 2 columns: Contractor Name and Amount. Includes Spawell (£8,700 0 0), Grover (accepted) (7,950 0 0).

WANTED, an experienced BUILDER'S CLERK and ACCOUNTANT. Age not to exceed Forty Applications and testimonials to be forwarded to B. M. Thomas, News Agent, 7, Eddis-street, Southampton, W.

TO BUILDERS AND OTHERS. WANTED, an energetic Young Man, with a small capital, to join the Advertiser in BUILDING OPERATIONS and WORKING a large BRICKYARD. First-class references required.—Apply by letter to Messrs. GARDNER, 22 Bedford-row, W.C.

TO PLUMBERS. WANTED, immediately, several good HANDS, Wages, 7d. per hour.—Apply to the FOREMAN, N. LOVATT, Contractor, Wolverhampton.

WANTED, a CEMENTSTONE BURNER. He must be thoroughly and practically acquainted with the burning of cement-stone.—Apply, stating qualifications and pay required, to the Admiral Superintendent of Portsmouth Dockyard.

WANTED, a thoroughly practical, energetic, GENERAL FOREMAN, to take CHARGE of a JOB in the South of England, in a WORKING FOREMAN of CARPENTERS. Must be a good fire.—Address, stating age, references, and wages required, to A. B. Z. care of DAVIES & CO. Advertising Agents, Finch-lane, Cornhill.

WANTED, a TIME and STORE-KEEPER, by a London Building Firm.—Address, stating full particulars as to qualifications, age, salary required, and where actually employed, to A. B. Z. care of DAVIES & CO.

TO PLUMBERS, AGENTS, &c. WANTED, by a steady, Handy Man, aged 37, a constant SITUATION, as a THREE BRANCH HAND, or to do the general work in a jobbing shop. Goodman's property not objected to. Trusting suitable references can be had.—Address, H. G. D., Water-street, St. Pancras, London.

TO STEVEDORES, BUILDERS, AND OTHERS. WANTED, a RE-ENGAGEMENT as GENERAL ASSISTANT. Is a fair Franktonian; can take charge of a job's worth of building generally.—Salary moderate.—Address, F. W. 11, Notting-ham-street, Margate.

TO BUILDERS, PLUMBERS, AND OTHERS. WANTED, a SITUATION, by a steady, sober Man, as a good practical PLUMBER, Glazier, and Decorator.—Address, W. W. No. 25, North-row, North Audley-street, Grosvenor-square, London.

TO BUILDERS AND CONTRACTORS. WANTED, by a steady, energetic Man, an ENGAGEMENT as FOREMAN of a Manager's Small Business. Has been accustomed to all branches. Carpenter and Joiner by trade. Well up in estimating work, keeping accounts, measuring up work, &c. Good references. Aged 25.—W. A. No. 37, Dullington-street, Avenue-road, Camberwell.

TO BUILDERS AND DECORATORS. WANTED, a permanent SITUATION, in or near London, as PAINTER, DECORATOR, GLAZIER, &c. Thoroughly understands the business in all its branches.—Address, No. 295, Office of "The Builder."

TO MONUMENTAL MASONS AND BUILDERS. WANTED, a RE-ENGAGEMENT as WORKING FOREMAN MASON. Has a good knowledge of ornamental and decorative church-work, in hard and soft stone. Thoroughly conversant with all drawings. Good references given.—Address, W. care of B. Robinson, Stamp Office, Stockport, Cheshire.

WANTED, by a Young Man, a SITUATION as PLUMBER and plain ZINC WORKER, or as a JOY in town or country. Good references, if required.—Address, P. S. Wakefield-mews, Regent-square.

TO ARCHITECTS, SURVEYORS, AND OTHERS. WANTED, by the Advertiser, a RE-ENGAGEMENT as CLERK of WORKS, General Foreman, or Manager on an Estate. Fifteen years' experience. Can measure up, estimate, and take out quotations.—Address, with terms, to B. T. C. 11, Clonmel-grove, Peckham, S.E.

TO BUILDERS, DECORATORS, &c. WANTED, by an ARTIST, Interior Decorator, and Designer, an ENGAGEMENT as FOREMAN, or otherwise. Will up at every branch of art & also Music Painting. Good references. Specimens and medals.—Apply by letter to J. A. S. Canterbury-terrace, Canterbury-road, N.

TO BUILDERS AND OTHERS. WANTED, by a thoroughly efficient and energetic Shop Foreman of Joiners, a RE-ENGAGEMENT either as HILY or GENERAL FOREMAN. Is a good workman, also accustomed to machinery. Aged 29.—Address, A. B. 125, Warwick-street, Finsbury, E.C.

TO BUILDERS AND CONTRACTORS. WANTED, by the Advertiser, a RE-ENGAGEMENT as BOOK KEEPER and GENERAL CLERK. Has held responsible situations in three of the largest London building firms, from whom he can have excellent references. Is willing to take the entire charge of the books and to assist in estimating.—Address, W. H. M. Standish's Library, Peckham, S.E.

TO BUILDERS, CONTRACTORS, &c. WANTED, by the Advertiser, a RE-ENGAGEMENT as BOOK KEEPER and GENERAL CLERK. Thoroughly conversant with the routine of a builder's office, and can assist in estimating. Has been with some of the most eminent London builders, from whom he can have excellent references.—Address, A. H. Post-office, Woodford-green, Essex.

TO ARCHITECTS. WANTED, by a competent DRAUGHTSMAN, who is good at designing, and who thoroughly understands the construction and details, an ENGAGEMENT. Salary satisfactory. References good.—Address, H. A. 3, Grove-place, Druggon, S.W.

WANTED, by a thoroughly competent ARCHITECT'S ASSISTANT, accustomed to competitions, prospective, detail and working drawings, an ENGAGEMENT in town or country.—Address, ALPHA, care of HAIN, Baker-street, 208, Gray's-inn-road, W.C.

WANTED, a SITUATION, as WORKING FOREMAN, or to take Charge of a Job, Town or country. Lettings by trade. Age 30.—Address, J. T. 29, Foundry-terrace, Finsbury, London.

WANTED, an ENGAGEMENT by a first-class BUILDERS SURVEYOR, DRAUGHTSMAN, ESTIMATOR, and MEASURE, or as SUPERINTENDENT of WORKS. References to London and elsewhere. A jobber by trade.—Address, 459, Office of "The Builder."

WANTED, by an ARCHITECT'S ASSISTANT, who has been with a London office, an ENGAGEMENT. Salary moderate. No objection to the country.—Address, 425, Office of "The Builder."

WANTED, a SITUATION, for a Youth who has just left school, in a Timber-merchandise Office in City.—Address, A. B. 101, Packerings-street, Ballington, N.

TO PLUMBERS AND BUILDERS. WANTED, by a respectable, steady Young Man, a SITUATION as PLUMBER. Good references.—Address, 474, Office of "The Builder."

TO ARCHITECTS. WANTED, a RE-ENGAGEMENT as CLERK of WORKS. Age 46. Carpenter by trade. Town or country.—Address, S. 64, Warwick-street, Finsbury, S.W.

TO BUILDERS. WANTED, by a Young Man, a SITUATION as Ladder, Barrow, Tread, and Step-maker. Can do plain carpentering and painting.—Address, A. G. 3, Smee-place, Camden-row, S.W.

WANTED, an ENGAGEMENT as FOREMAN of MASONRY or CLERK of WORKS, aged 36, over docks, saw-mills, and fertilizers; has had fifteen years' experience; can make working drawings.—Address, 451, Office of "The Builder."

WANTED, a SITUATION, in the Timber trade, by a Young Man of thorough experience. Aged 37. First-class references.—Address, X. 2, Cooks-office, Grimsby.

TO ARCHITECTS, &c. WANTED, by a Young Man, a SITUATION as JUNIOR ASSISTANT. Specimen drawings, references, &c.—Address, M. 134, Red Lion-square, Holborn.

TO BUILDERS AND SAW MILL MASTERS. WANTED, a SITUATION, by an experienced Circular Sawyer and Saw Sharpener. First-class references.—Address, J. A. 125, Wall-ditch-street, Wolverhampton.

WANTED, by a practical London CLERK of WORKS, a RE-ENGAGEMENT, or as Builder's General Foreman. Good references. Ten years with last employer. Well versed in drawing. Locality no object.—Address, C. H. Post-office, New Castle Emlyn, South Wales.

WANTED, a RE-ENGAGEMENT, by an experienced CLERK of WORKS, or a permanent engagement on a gentleman's estate.—Address, 451, Office of "The Builder."

TO BUILDERS AND PLUMBERS. WANTED, by a Young Man, a SITUATION as PLUMBER, or Three-branch Hand.—Address, H. K. 4, Goldenham-road, Grosvenor-square, London.

WANTED, by a steady, respectable PLUMBER, thoroughly acquainted with all the leading branches, a constant SITUATION, piecework, or charge of a large Job. Good references required. No objection to Town or country. Address, stating wages, to W. M. 65, Napier-street, Hoxton.

WANTED, by an experienced CLERK of WORKS, an ENGAGEMENT. References to eminent London architects. At present, Birmingham.—Address, A. B. 143, Stanhope-street, Regent's Park, London, N.W.

TO BUILDERS, ROAD MAKERS, AND CONTRACTORS. WANTED, by a first-class practical Man, a Carriage-way Pavior, Street, and Glass Dresser, wood, bricks, Dutch chimneys, or SLEDS, to TAKE WORK by the PIECE, Labour only. Good testimonials and references.—Address, JAMES GURDLEBY, 7, James-place, North-street, Poplar.

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TO BUILDERS AND OTHERS. WANTED, EMPLOYMENT, by a young Man, CABINETMAKER, and Joiner, in or out of the country. Constantly principal object.—Address, H. J. 3, Flin's-terrace, Church-road, Battersea.

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The Builder.

VOL. XXVI.—No. 1330.

Memorials of Old London and Old London Life.*



THE Corporation of London has just made a delightful gift to the public. It has placed the early archives of the City of London in the hands of Mr. H. T. Riley for selection, translation, and publication of all passages that give any presentment of London in the thirteenth, fourteenth, and fifteenth centuries, or any details of London life in those times; and in so doing this august body has made the public free, as it were, for ever, of some of its choicest possessions. The Corporation has opened the City gates, and invited the public into old London, the London of the Plantagenets; of Wat Tyler and Walworth; of Geoffrey Chaucer; the London of Queen Eleanor, of Queen Isabel, of Queen Philippa; of the Fair Maid of Kent; the London of Dick Whittington, paved with gold, in truth, if not literally.

Let us enter gratefully, observantly, correspondingly. It is the reign of Edward I. Each city gate is kept by two sergeants, "skilful men and fluent of speech," who carefully note, all day, who passes in and out, so that no harm shall befall the City. At the ringing of curfew every gate is shut and secured: all the taverns, too, for the sale of wine and ale are closed at this signal; and no one is allowed to go about the streets or ways after this hour. The skilful sergeants betake themselves to their lodgings, which are either within the gates or close by; and then into the silent and deserted streets turn six of the most "competent" men of every ward to watch and guard their district throughout the hours of the night. All the boats on the river are moored on the City side at night; the sergeants of Billingsgate and Queen Hythe take note of the name of every one of them; and each of these officers has a boat of his own, and provides four men to guard the river by night, on both sides of the bridge. You can hear the lapping of the water, as though the black shadows upon it are sighing to be free; for no one is allowed to cross the Thames by night.

But when we enter it is noon. There are little boxes, or stands, in the streets for the sale of wares, piles of timber lie here and there, and pigs stray about; but these inconveniences are not to be endured after "Monday next," so we will not dwell upon them. Here is a knot of men at work clearing the water-course of Wall-

brook; and close by them an alderman is passing, accompanied by two of the best men in his ward, on a house-to-house visitation and survey of the hostries, or hostels, in his ward, so that he may be informed of the exact number, quality, and calling of every person in his division of the City, of twelve years of age and upwards. In sight, at the same time, is a female wearing a hood and cape furred with minever, who regards, somewhat contemptuously, a woman of a lower grade, who has also draped herself in a similar garment; and she is evidently determining to move heaven and earth in her aldermanic circle to get an enactment made that regratresses, or women who sell wares by retail, and servants should be limited to the use of lamb-skin and rabbit-skin decorations for their hoods. There is a little crowd opposite the church of St. Martin. We peep between the elbows or over the heads of the throng, and see that "one Matilda, wife of Henry le Coffeur," coming from West Chepe, has fallen upon the pavement and broken her arm. The little crowd declares that she is drunk, hut, nevertheless, she is carried tenderly to her husband's house to languish and die. The men who carry her and the mixed group that accompany them talk of other accidents that have recently occurred as they go. They tell how, on the Eve of St. John, a man was found lying drowned in the Foss under the City wall, near the Tower, Portaoken, and his coat of russet picked up on the ground close by, and suggest that he went to bathe there without knowing how deep the water was, and sank never to rise. No one knows his name, or whence he came. Adam Schot's case is called to mind. He was the servant of Ponce de More, and climbing up a pear-tree in the garden of one Laurence, in the parish of St. Michael, Paternoster Chirche, for the purpose of gathering pears, a branch broke beneath his weight, and, falling to the ground, his body was almost hurst asunder. He died three days afterwards, and the pear-tree was appraised at five shillings; and Ponce de More and the next-door neighbours on both sides were attached by sureties. Then they tell how John de Haucroete was burnt to death a few nights before, through taking a lighted candle with him to his straw bed, and falling asleep before he extinguished it; how Henry de Flegge was drowned when he took his horse to water in the dock of the ward of Castle Baynard; how John Fretard was killed by John le Clerk when playing together at "tiles," by an accidental blow on the side of his head; and how other deaths had occurred by misadventure all within a few weeks. As the little sympathising procession turns into the ward of Anterkin de Auvergne, where Henry le Coffeur lives, we lose sight of it. There is another crowd before the doors of the Church of St. Paul. Let us see what is the matter here. One Walter Bacun has taken sanctuary within the church. The corner of our Lord the King, William le Mazelinor, accompanied by the warden of the city of London, John le Breton, John de Banquette, Baroncin, and other trustworthy persons, has come to demand the reason why he has done so. The refugee confronts the magistrates. He is a forlorn, repentant parish priest, who confesses that he has stolen sixteen silver dishes that belong to Sir Baroncin. Passing from the curiosity of this scene of humiliation into the streets, we note the stations, or stands, for stalls, clustering round the high cross of Chepe and the broken cross, all kept by women, the pent-houses, haut-paces, and signs. Some of the pent-houses are so low and project so much as to obstruct the roadway for people on horseback; the haut-paces, or roofs built on pillars, have their disadvantages too, for the spaces below them serve as harbourage for idle persons; and we feel that both inventions will have to be swept away. Here is the house of Roger Brewere. It is known as the "Maiden en la Hoop" (the Maiden in the

Hoop). Here is the tenement known as "Horseshed," and "Sarazineshed," that Peter Fanelore and two others bestowed upon the chantry in the chapel of St. Mary, near the Guildhall. Here is a hostel with the sign of a lion on a hoop. In Estchepe there is the "Belle on the Hoop" (made famous not long after this as the hostel where William Frenkyssabe passed himself off as the son of the Earl of Ormond upon John Tylneye, of the county of Norfolk, and induced him to part with "divers lands" and other good things upon the understanding that his little daughter Katherine, then seven years of age, should some day be his countess; for which magnificent lie the said William was put in the pillory for three hours, with a whetstone hanging from his neck, and then cast into Newgate until he could satisfy the deluded John). We observe among the signs less graceful combinations with the hoop than the maiden and the hells. Here is "Le-Walsheman sur le Hooppe;" and here are the "Kay sur le Hooppe" and the "Sterre on the Hooppe." In Chepe we recognise the seedlings of future high-storied piles in the selds, or silds, warehouses, or hazaars, which are used for the stowage of goods, and sometimes as centres for the sale of particular wares. They are let out in rooms furnished with ammiries and chests scoured with locks, as well as in shops, to different merchants. This large seld in Westcheape, in the Mercery, belongs to the Lady Roisia of Coventre. Ten melters, or chandlers, have selds in Chepe; and they are much disturbed because they have all received notice to remove the merchandize touching their trade from them, and provide themselves with premises elsewhere. This is the Spicery. In Fryday-strete stands the tanners' seld, where the tanners transact all their business. Foreign tanners coming to sell their hides pay one penny for every ten sold; and a pretty clamour the owner, Adam Lovelyn, is making, because he has heard one of his trade has been selling hides in secret at his hostel; and another has presumed to sell some in the street, instead of in the seld, whereby he is twopence short. In the ward of Brade-strete a knot of men are looking anxiously at an elm growing by London-wall, near Bishopesgate, and prophesying that it is too old and dry to last long, and that if it be not taken down it will be the worse for the shops of Roger Poyntel opposite.

Mr. Riley has not confined his pen to the extracts from the Edwardian archives that show us these things. In a careful and elaborate introduction, he draws attention to arrays of facts that could only have been made by one who has been over the whole field, and systematically groped his gleanings. The topography of old London he traces. He has gathered together mention of all the old gates, streets, lanes, and wards, so that we are able to see somewhat of the localities of the homes whence the citizens flocked to Westminster, to see the coronation of Edward I., and his brave and tender queen, Alianor. He has grouped the surnames in classes, adding to those derived from trades many that have escaped other collectors. Among names from trades are Henry the Wympler, wimple-maker; William the Oynter, melter of grease, or chandler; Andrew the Horsmonger; John the Marberer, sculptor perhaps; Simon the Fannere; Richard the Fruter; Geoffrey the Brochere, spit-maker. Then we read of oystermongers, knyfsmyths, malemongers, sellers of mails or travelling bags, chalicers, otemongers, bredmongesters, and other old names for trades we should scarcely recognise in their early guise but for the translator's identification. There were some people called "peters," who brought fish to the City, and were ordered to stand in Chepe with their fish, and nowhere else. Again Mr. Riley points out that Saxon Christian names had disappeared from the face of the City with

* Memorials of London and London Life in the Thirteenth, Fourteenth, and Fifteenth Centuries. Being a series of extracts, local, social, and political, from the early archives of the City of London, A.D. 1276-1419. Selected, translated, and edited by Henry Thomas Riley, M.A. of Corpus Christi College, Cambridge; and of the Inner Temple, Barrister-at-Law. Published by order of the Corporation of London, under the superintendence of the Library Committee. London: Longmans, Green, & Co. 1885.

but very few exceptions, although three centuries had not elapsed since the Conquest; the king upon the throne bore the almost solitary Saxon name that had survived through the interval. He says, "The name most in favour with the London population was undoubtedly that of John, and probably those of William and Thomas held the second and third places. In the list of the first common council chosen for the City, A.D. 1347, 133 in number, we find thirty-four members with that name, seventeen called 'William,' fifteen 'Thomas,' ten 'Richard,' eight 'Robert,' and eight 'Henry'; in the whole list not one Edward or Edmund, or other Saxon or Christian name, Radulf (or Ralph) excepted, is to be found." Among the women-folk Johanna, or Joan, was the favourite name, and Cristina the next in approval. Only the rich took upon themselves to call their daughters Mary. While this familiar appellation was thus esteemed, Isabel, Matilda, Juliana, Alison (Alice), Lucy, Petronilla, then rendered Pernel and Farnel, Agnes, Idonia, and Avice were common. In the nine treasured volumes consulted by our author only Godiyeva (Godiva) recalled to him that a race of fair Saxon women had ever lived on the soil. He has found several clues that lead to fresh information concerning the three names, either of which would have made any city famous, and all of which belong to London and these old times, Chaucer, Walworth, and Whittington.

Chaucer was the French term then in use for shoemaker. This name is mentioned nearly a score of times in the old City books, beginning with Stephen, a chancer, who was a surety for William de Clay, in 1281, including Richard le Chancer, vintner, identified as the father of our early poet, and ending with Thomas Chaucer, chief butler to Henry IV. and coroner *ex officio* in 1403, one of the two sons of Geoffery Chaucer. And besides these glimpses of the poet and his ancestors, there is the copy of a lease granted by the mayor, aldermen, and commonalty of London to the immortal Geoffrey, of "the whole of the dwelling-house above the gate of Algate, with the rooms built over, and a certain cellar beneath, the same gate, on the south side of that gate, and the appurtenances thereof," for life, in which the poet undertakes to occupy it himself, and keep it in repair "for the whole life of him." The mayor makes a reservation of right to enter the said rooms in time of defence of the city, and to order and dispose of them as may be deemed expedient at that time. This was in "the forty-eighth year of the reign of King Edward, after the Conquest the Third." The name of Walworth does not occur till an entry is made, in 1365, that the subsequently famous Sir William was elected alderman of Bridge Ward. "He had been," says our authority, "apprentice and probably manager of the business of John Lovekyn, stock fishmonger, and until then had to all appearance taken no part in City matters." In 1370 he was sheriff, at which time the City was in great excitement, expecting an attack from a multitude of armed men then in certain galleys lying off the Foreland of Tenet (the North Foreland), and forty men-at-arms and sixty archers kept watch at night between the Tower of London and Byllyngegate; which watch, by agreement, was kept by the Drapers and Tailors on Tuesdays, the Mercers and Apothecaries on Wednesdays, the Fishmongers and Butchers on Thursdays, the Pelterers and Vintners on Fridays, the Goldsmiths and Sadlers on Saturdays, the Ironmongers, Armourers, and Cutlers on Sundays, and the Sawyers, Spurrers, Bowyers, and Girdlers on Mondays, much to the homedamned discomfort, doubtless, of every tradesman's house in the City. There is an entry, dated 1374, of the fact that William Walworth was then elected Mayor. As a temporary enactment was made disallowing aldermen from serving two years in succession, he was superseded in 1377 and re-elected in 1378; again superseded in 1379 and re-elected in 1380. William Walworth does not seem to have spent his days in peace. In the month of June in the third year after the accession of the young king with whom his name was ever afterwards to be associated, one Alice, wife of Robert Godrich, came to his house, in the parish of St. Michael, Crooked-lane, and there "did horribly raise the hue and cry upon the said William," declaring he was a thief, and had unjustly disinherited her of 20*l.* value of land yearly and cast her husband into prison. He prosecuted her for this slander; but when he heard she was sentenced to the pillory, called the "tbeve," there to stand for an hour with a whetstone hung from her neck, as well as to pay him forty

pounds for the damage done by her slander, his indignation was succeeded by mercy, and mercy by pity. He presented himself before the Court, "begging and entreating the Mayor and Aldermen that the punishment of the pillory might be remitted to the same Alice; upon which, at his request, such punishment of the pillory was remitted. And as to the sum of money so adjudged to the said William, he asked that payment thereof might be put in respite, during the good behaviour of the same Alice, and that she might be released from prison, and accordingly at such request she was released." All the more sunny and pleasant did Crooked-lane look that June evening as the brave William wended his way homewards after his forgiveness and intercession, we may be sure; and mite was the tongue that had reviled him, we may be sure too. There is an account of the part he played in the insurrection of Wat Tyler in the June of the following year, which was written, says the City scribe, that this most wondrous and hitherto unheard-of prodigy that ever happened in the City of London might not be unknown to those to come. There are some facts in it that have not been given in other accounts. When the king rode out from the Tower to "Mileende," to meet the countless companies of Commons from Kent and Essex, the Princess Johanna, his mother, accompanied him in a chariot, besides the knights, squires, and citizens on horseback usually mentioned. And after "the most renowned man" had killed "Walter Tyler," in Smithfield, this account says that he so defended himself that "he departed from thence unhurt and rode on with our Lord the King and his people towards a field near to the spring that is called Whitewelleheche; in which place, while the whole of the infuriated multitude in warlike manner was making ready against our lord the king and his people, refusing to treat of peace except on condition that they should first have the head of the said mayor, the mayor himself, who had gone into the City at the instance of our lord the king, in the space of half an hour sent and led forth therefrom so great a force of citizen warriors in aid of his lord the king, that the whole multitude of madmen was surrounded and hemmed in, and not one of them would have escaped if our lord the king had not commanded them to be gone." The first mention of the mayor after he was knighted on the field, on this occasion, beneath the king's standard, occurs within a month in a grant of lease to build a hantpas, or halpase, to Sir Robert Knolles and Constance his wife. The mayor, aldermen, and commonalty of London gave the said Messire Robert and "Custance" his wife leave to make a hantpas, 14 ft. high, extending from the west side of their house to another one belonging to them on the east of it, for which privilege they were to give the chamberlain of the Guildhall a red rose, every year, at the feast of St. John, and in witness whereof the common seal of the City was set to the letters patent, Messire William Walworthe, knight, being then mayor. This Sir Robert was one of the brave knights who figure upon the pages of Froissart.

Dick Whittington was a London citizen when Walworth thus distinguished himself. The first mention of his name occurs in 1379, in a list of contributors to a City loan. His fortune was then, we presume, but in the course of being made, as he lent but five marks, as did about four-fifths of the subscribers; whereas the Mayor, John Phillipot, lent 10*l.*, and William Walworth 5*l.* We next catch sight of him in the City streets, as one of the eight common councilmen for Coleman-street Ward. Nine years after his loan of five marks he is named as surety to the chamberlain for the sum of 10*l.* towards the cost of defending the City. By this time he figures as one of the twenty-four most substantial commoners in the City. In 1393 he was chosen alderman of Broad-street Ward; and the mayor selected him for sheriff in the same year. When Adam Banne went the way of all flesh during his mayoralty, the king decreed, with the assent and advice of his council, that his well-beloved Richard Whityngtone should be mayor and escheator until the accustomed day of the next election; and when that day came, he was, by common consent, elected mayor for the following year, 1398. We may trace out some of the business that occupied his thoughts and filled his remembrance. In this year of office new ordinances were made for the leather-sellers full of restrictions; John Sewall was imprisoned in the goal of Newgate for saying to Richard Hawtin, in the church of St. Martin-le-Grand, that there had

been neither peace nor love in England since the king reigned; new ordinances were made for the hurers, who had then fallen into the habit of sending "their apprentices and journey-men, as well children of tender age as others, down to the water of Thames and other exposed places, and amid horrible tempests, frosts, and snows, to the very great scandal of the good folks of the said trade," to scour "capes" or "tunes," and were no longer to be permitted to do any "scouring" out of their own houses, nor to work on any feast-day or upon the "Eve of an Eve," nor on any Saturday after the last peal of vespers; and a mart was opened for the sale of broad-cloth on the site of the present Bankruptcy Court and Guildhall Buildings, for which ordinances were also made. A thrill of horror went through the City on the murder of one of its wealthy citizens, who was treacherously slain at Wimbchester, as set down in a valuation of the precious stones and plate found in his shop on Cornhill, appraised at 600*l.* 3*s.* 6*d.* In 1406 Richard was again elected mayor. The details of this election are given with great minuteness, the selection being attributed to divine inspiration, and a mass of the Holy Spirit for the guidance of elections in future years was ordered to be performed annually in the chapel of the Guildhall. In 1411, Richard Whityngtone, citizen and mercer of London, granted a piece of land for the rebuilding of the church of St. Michael, then "too small, frail, and ruinously," and his liberality did not save him from detractors. As in the case of William Walworth, the tongue that said the bitterest things against him most openly was that of a woman. His slanders were Johanna Hert, who came before the mayor, recorder, and sheriffs, and declared that she had often defamed Richard, saying he owed her very large sums of money, and detained goods and jewels of hers to the value of many thousand marks, all of which statements were false, the fact being that the accounts between them were strictly balanced, and if any difference remained she owed more to the same Richard than he owed to her. Whether she was sentenced to the pillory, like the mad-speeched Alice Godrich, does not appear, as the record abruptly ends with the declaration of her falsehood. There was another king upon the throne, when the famous voices of the bells came true, and Whittington was thirce Lord Mayor of London. Henry V. had captured Harfleur, and had fought the battle of Agincourt; the building of the new Guildhall had progressed; various improvements had been made in the City; the halpases at St. Martin-le-grand removed, the little postern in the City wall newly built up, the City moor laid out in gardens, the banks of the fosse at Walbroke piled, the watercourse at Oystergate diverted and put into better condition, and several other steps made in sanitary matters. By this time an order was in force which forbade the granting of the dwelling-houses above the City gates to any persons in consequence of the damage the gates, walls, and fosses sustained when they were occupied. The Plantagenet writings the Corporation has placed before us show us that these old days were busy times. The people were not always in holiday dress, hanging out gay draperies from their windows as demonstrations of joy, attending mass, feasting, or waiting about in great crowds to see triumphal returns of princes from foreign victories. The hutchers and fish-curers seem to have been always filling the kennels with blood and filth, the brewers always drawing water from the pipes of the public conduits for their brewing, the hurers always scouring in the streets, the strumpets industriously aping the dress and especially the furs of honest women, the cap-makers never proof against the temptation to make caps contrary to the mode stipulated and often doomed to see them burnt in Cheaps in consequence; the men in most other trades, too, prone to break the stringent rules and sure to be pilloried or otherwise punished for so doing; for enactments relating to these offences have been repeated over and over again at intervals. There seem, too, to have been a longing and determination to extend the hours of business which were always being jealously reduced to a minimum; frequent attempts to buy and sell in other places besides those arbitrarily appointed; a natural taste for giving bad measure and short lengths, and adulteration, that was always being weeded out, an inkling after Sunday trading, first indulged in by the barbers of London, but severely reproved by the Archbishop of Canterbury; an intention

to sell putrid fish, flesh, and fowl that was rigorously punished as often as detected; and an irrepressible craving to curse and slander the aldermen, which sometimes, in a fainter degree, extended to the mayor; a desire to strip and bathe in the fosses that was not allowed to be gratified; a habit of throwing dirty water from the windows instead of bringing it down to the ground below and putting it into the kennel; some drunkenness; a little child-stealing; but among the most substantial reputable people an abhorrence of all wrong-doing; for there are references to all these things. For the rest, the citizens seem to have come and gone, concentered and dispersed as incessantly then as they do now. This pervading presentment of active life, industry, swift passing to and fro, laying up of treasures and parting with them, is artistically and truthfully indicated in the following passage by Mr. Riley:—

"So far as the details of middle-class and low life, in those times, passed within the walls of a city, are concerned, hardly a feature perhaps can be suggested that in these pages is not, in some way or other, incidentally brought under notice. Among the more prominent may be mentioned,—the rules and usages of various trades and crafts, surgery being included in the latter, and the province mainly of the barbers; inventories of personal property of every description, from jewelry and plate down to pots and pans, kettles and old clothes; the stocks of the City shops; the tackle of shipping; the munitions of war; the roofings of houses; the supply of fuel; the regulations of the markets; the fees of the clergy; the times for curfew; setting the watch; the dangers of the night; the rates of wages; the tricks of trade; the devices for protection then as stark-nad, to all appearance, on the side of the master, as it is now on the side of the man; the importance of scotchmen and professions of the magicians; the arts and frands of the mendicants, swindlers, and sharpers, with as large a per-centage of whom the streets of London were probably then beset as they are at the present day."

Everywhere it is not so much the great ones of the land that we see before us as the mass of the people. When King Edward sends word of his victory over the Scots at Falkeld, it is not the most knightly monarch we see so plainly as the citizens who receive the intelligence, and give 20s. to the tired messenger. When Queen Isabel sends word of the birth of her first son at Windsor, it is not the proud young royal mother we see so well as the civic circle who rejoiced upon the occasion, carolling, and passing through the City with a great glare of torches and blare of trumpets, and who on the Wednesday following gave John du Phalaise, the queen's tailor, who brought the letter, ten pounds sterling, and a cup of silver, weighing 32 ounces, which present the same John sent back on the Thursday, deeming it too small. We do not see so much of the Black Prince, notwithstanding there is a somewhat specious letter from him shown us, as we do of the excited crowd that went out to greet him on his return from France. In the same way we are impressed more with the procession of the mayor and citizens to Westminster, on foot, to return thanks in the glorious abbey, after the battle of Agincourt, rather than with the fact that the queen was there too rejoicing. The "Memorials" are of the people and for the people. Often is the prince indebted to the people in these pages. Four times the royal jewels were sent to the City as security for large loans; and several times munificent presents were bought by the City magnates and presented to royalty. A present to the Black Prince consisted of hundredweights of silver plate, of which the inventory is given. Doubtless the princes were brave soldiers, mighty leaders, and magnificent representatives of authority. So were the citizens brave, mighty, and magnificent, too; and the corporation, especially, a grand, dignified, just-dealing, generous body.

He is a specification of one of the timber houses built in the reign of Edward II. 2 Edward II. A.D. 1308. Letter-book c., fol. xvi. (Latin):—

"Simon de Cantebury, carpenter, came before the Mayor and Aldermen on the Saturday next after the Feast of St. Martin, Bishop [11th November], in the second year of the reign of King Edward, son of King Edward, and acknowledged that he would make, at his own proper charges, down to the lord, for William de Hanl-tone, peltier, before the Feast of Easter then next ensuing, a hall and a room with a chimney, and one larder between the said hall and room; and one solar [parlour, or upper room] over the room and larder; also one oriole [probably bay-window] at the end of the hall, beyond the high bench, and one step with an oriole [porch?] from the ground to the door of the hall aforesaid; also one oriole at the end of the hall, beyond the high bench, and one step with an oriole [porch?] from the ground to the door of the hall aforesaid; also one stable [space left for dimensions which are not given], in length, between the said hall and the old kitchen, of 12 ft. in width, with a solar above such stable, and a garret above the solar aforesaid; and at one end of such stable there is to be a kitchen with a chimney, and there is to be an oriole between the said hall and the old

chamber, 8 ft. in width. And if he shall not do so then he admits, &c.

And the said William de Hanl-tone acknowledged that he was bound to pay to Simon before mentioned, for the work aforesaid, the sum of 8l. 6s. 4d. sterling, half a hundred of best-tempered markes shillings, fur for a woman's hood, valne five shillings, and fur for a robe of him, the said Simon, &c."

Did the honest Simon's true-love, or dame, look with favour upon the fur for her hood thus bargained for, and with kindness upon the donor, who gave his labour, skill, and timber for it? And was Dame Hanl-tone content with her summer-parlour, her new kitchen and cool larder? Was the view from the bay-windows that which charmed or vexed her? Could she see the processions of the mayor, aldermen, and commonalty from them? Did she see the messenger ride away with a present from the City of a thousand marks for the king, in aid of his war in Scotland? Did she hear the proclamation that the tailors should not scour furs in Chepe? Or see William de Croton in the pillory, for pretending to be one of the City sergeants, and stopping the carts of Richolda & Mabel, bakeresses, of Stratford, and exacting 10d. from them by this false pretence? Could she see the people bathing in the fosses of the Tower, or in the other fosses near the Tower, or in the Thames, and was she as vexed with them as the king was, and declare she would have them put to death, as he did?

Here is the agreement of Adam le Plasterer for plastering the hall of John de Bretagne, Earl of Richmond, grandson of Henry III., dated A.D. 1317:—

"Know all men that I, Adam le Plasterer, citizen of London, am held bound and obligated to Sir John de Bretagne, Earl of Richmond, to find plaster of Paris, at my own proper charges, good and sufficient, without default, proper for the hall of the said earl; and also that I will competently, at my own proper charges, plaster and complete the said hall, and will repair the walls of the same with the said plaster, well and befittingly within and without; as also the towels, to the summit, in such manner as befits the repair of the hall aforesaid; and this I will do for 24 pounds sterling, which our Lord the said Earl has paid to me beforehand. Faithfully to perform the which work within eight weeks from the day of the Holy Trinity next ensuing; I do bind myself and all my goods, moveable and immovable, nandy, my lands, houses, and tenements, within the city of London being, to distress on any of my bailiff of our Lord the King, &c., into whose handssoever the same may have come, for enforcing observance of all and singular the premises. In testimony whereof, &c. Given at London, on the Thursday next, before the feast of Pentecost, in the 10th year of the reign of King Edward, son of King Edward."

Did Adam get his prepaid task accomplished in time? Did the earl's mother, the Lady Beatrix, busy herself and maidens with tapestry to cover the newly plastered walls of the principal rooms? Or did the earl purchase for his renovated hall the piece of cloth eight ells long and six ells wide, which Aleyse Darcy embroidered, with divers works in gold and silk, after she had finished one of a similar description for the Earl of Lincoln, as described in the transcript of a quit claim about this time?

Reluctantly, we confine ourselves to one more extract. Mr. Riley has drawn attention to an acknowledgment which contains a distinct allusion to the materials used for varnish-painting upon canvas, more than a century before the time of John Van Eyck, who is often accredited with its invention.

"On Friday, the Eve of St. Botolph [17 June], in the 12th year of the reign of King Edward [the First], Nicholas Boun, painter, acknowledged that he was bound to Hugh Motun [the City chamberlain], in the sum of 20 shillings, for clothe [a green colour], vermilion and canvas, varnish and verdigis; the same to be paid to the same Hugh or his certain attorney, 10 shillings at the Feast of St. Bartholomew [24 August], and 10 shillings at the Feast of St. Michael [29 Sept.], without further delay."

Throughout the volume, Mr. Riley has translated *mestera* and *mestier* trade and craft, in preference to "mystery." He states that as these words are derived from the Latin *ministerium*, a serving to, and are not in any way connected with *mysterium*, a secret, this rendering is less likely to mislead the purely English reader than the use of the old-fashioned word "mystery" or "mistry."

We have referred to the new works at the Guildhall. There are three memoranda relating to them. From these we gather that the building now standing, which is situated a little to the west of the former structure, was commenced in the majority of Thomas Knolles, A.D. 1410, and that three years afterwards the funds were exhausted; upon which a council was held in the upper chamber of the Guildhall, and various fees and fines allotted for the support of the work for the next six years. Every apprentice, male and female, on entrance, was to pay 2s. 6d., and 3s. 4d. more at the close of the apprenticeship; for every deed that was enrolled an extra

fee was to be charged for the good of the work; every will, every letter patent, was to pay a fee over and above the usual charge; several fines and amercements were also appointed to be set apart for this purpose; and a 100 marks sterling out of the revenues of London Bridge were to be given for six years towards the prosecution of the works. This was in the year in which Henry IV. was succeeded by Henry V. The next entry was made in the first year of the reign of the last-mentioned monarch, setting forth that the two carts belonging to Henry Cook, carter, were not to be taken by the sheriffs for any other work, as they were engaged upon the service of the new work at the Guildhall. The last notice of this building is dated in the seventh year of the same king, when an enactment was made that the duty for scavage, or showing of goods, should be applied to the funds; and that Thomas Pike should contribute to the new work three years' arrears due from him. When Edward III. was re-building Westminster Palace so many workmen and labourers withdrew from his works that he issued a proclamation that no one was to employ them under penalty of being sent to the Tower; but no difficulty with the men is recorded to have taken place here. This smooth-sailing was, perhaps, due to the observance of certain articles drawn up by the trade, which we are about to notice.

About three years after the "strike" at Westminster the Corporation took the masons in hand. Solid, hard-headed, slow-thinking men they were, not particular about such trifles as the way their names were spelt, or whether they had any surnames at all; though not clumsy; very precise over the way they did their work, and determined that no one should do it in any other fashion. The mason hewers set themselves against the light masons and setters, and their disputes seem to have been very frequent and tiresome, when the mayor undertook to investigate their case. He attributed their discontents to the fact that their trade was not regulated "by the government of folks of their trade," and agreed to receive twelve of their representatives, who should draw up a code of articles by which, for the future, it should be ordered and ruled. Six masons on behalf of the hewers, and six on behalf of the light masons and setters attended this conference. The regulations, which were drawn up in Norman-French, were briefly these:—Every man might work in any branch of the trade if skillful at it; "good-folks" were to be chosen and sworn to see that no mason undertook work that he was not able to do, under penalty of fine and expulsion. No one was to take work in gross (wholesale or by contract) if he had not ability to complete it in a proper manner. He who did undertake such work in gross was to take with him to the employer six, or four, ancient men of the trade to testify that he was able to perform it, and take upon themselves the responsibility of finishing it if he should prove unable to do so. No one was to set an apprentice or journeyman to work, except in presence of his master, before he was perfectly instructed. No one was to take an apprentice for less than seven years. The masters that were chosen to superintend the trade were to oversee that those who worked by the day took for their hire what their work was worth, and asked no outrageous pay. If any objected to be ruled by these persons his name was to be reported to the mayor, who, with the consent of the aldermen and sheriffs, would imprison or otherwise punish him, "that so other rebels may take example by him, to be ruled by the good folks of their trade;" and, finally, no one was to take the apprentice or journeyman of another, to his prejudice or damage, until the expiration of their term, under penalty of half a mark for each conviction.

We close this recording volume in the same mood as that in which these Edwardian masons must have left the conference, much gratified with the wide courtesy and wise consideration of the corporation.

IMPROVEMENT OF PARK-LANE.—In reply to Mr. Labouchere, in the Commons, Colonel Hogg has intimated that the Metropolitan Board of Works have referred the subject of widening Park-lane to their surveyor, and they hope to be able, provided the expense is not too great, to carry out as far as possible the recommendations of the committee of the House on the subject.

RESERVOIRS AND WATER SUPPLY.

IN a former number of our journal* we proposed to revert to the subject of the collecting and storage of water on a large and comprehensive scale, in sound and well-constructed reservoirs, so that the future water supply of our largely increasing population might be placed on a sure and permanent basis, and that we should not continue on the present short-sighted system working just as it were from hand to month, as appears so self-evident to all those who have observed and investigated the subject; and the present moment seems to us the proper time for drawing public attention more particularly to this important question, so the shortness and inefficient character of the supply are being felt in many of our populous places and these difficulties will continue to arise unless we have the spirit, the enterprise, and determination to grapple with the subject, and to place it at once on a broader, more general, and permanent basis.

As we are just now investigating the subject matter of the water supply of towns and the pollution of rivers by means of royal commissions, the time is very opportune for pressing this momentous question home,—momentous as far as the wants and necessities of our towns and rural populations are concerned, as in the present day, with all our boasted advantages of superior culture and civilization, we lack many of the conveniences and sanitary provisions which ancient leading nations had placed for the advantage of their populations, and ours scarcely merit the appellations so freely bestowed in laudation of the enterprise, the pioneering principle, and the prestige of the Anglo-Saxon.

The necessity for a thorough investigation into the system of the general water supply of the country is now beginning to force itself upon public attention, as every year application is being made to Parliament to extend and amend Acts for the water supply of our large and populous towns, attended with the heavy expenses usual on such occasions, and the session now just ending has had many such applications, which an earlier comprehensive, preliminary, and exhaustive inquiry would have rendered unnecessary, and thus much of this further expenditure would have been saved.

In the absence of railway speculations, and the utter want of spirit or confidence in the money market, complete panic, chaos, and prostration have fallen on those enterprising individuals who usually profit so largely by the various schemes which the ease or gullibility of John Bull enabled them to float upon the capitalists of the country in the shape of "limited liability," and this collapse may turn their speculative theories into more actual channels, and water supply works and similar works may take the place of railways. The manner in which the information was obtained from the provinces by the Water Supply Commission relative to the present or future water supply of the respective localities does not appear to have been very good, and the information obtained will doubtless turn out to be one-sided and *ex parte*: the usual plan appears to be to summon the local surveyor or engineer, and two or three other officials, through which channels of information it is supposed will be elicited pure and unadulterated streams of knowledge bearing upon the sanitary state and conditions of the respective towns they represent, and the principle of calling opposing parties has not been entertained, so that the Commission could separate the wheat from the chaff, and thus from the happy medium draw their well-considered conclusions.

We dare say that when the report appears the town authorities will not have omitted the opportunity to paint everything *couleur de rose*, as was the wont to do provisionally in 1845, until the indefatigable Chadwick, followed up by the "Health of Towns Commission" and the *Builder*, rooted out and exposed the barbarous abominations of our towns, which so astonished and shocked the nation at large, and which educated and prepared them for that large measure of sanitary reform which culminated in the Public Health and other cleansing and purifying Acts. The necessity of an ample supply of water in all seasons to every place is now considered to be so generally necessary, that few will venture to dispute the point when argued publicly or on public grounds; and yet it frequently happens there are found water com-

panies, and even Boards of Health, who act precisely on the contrary principle, and who endeavour to reduce or stint the supply, and place difficulties in the way of the public obtaining it, even where that necessary life exists in comparative abundance. Their main object appears to be, to see how small a quantity of water will supply a population, or how great a pecuniary benefit may be derived from water eked and doled out as if the drops of water were veritable bits of money, to be applied upon the closest and most niggardly scale, and to the fewest possible individuals, forgetting that the leading, vital, and ruling principles of the present day are free trade, low fares on railways, low rates of water supply, and other sanitary arrangements compatible with the utmost efficiency of the works and the public benefit.

Having prefaced our remarks on reservoirs with these few general observations, we will now proceed to introduce the question of site and other subject matter incidental to the proper construction of such works.

The Site.—Great care and judgment are necessary in the selection of a site for a reservoir. The first point to be considered is the situation; that is, if the locality is convenient and suitable in all respects for the proposed works, and has a sufficient extent of area of gathering-ground draining towards it, to keep it at all times well and regularly supplied with water; and this capability of supply must be ascertained by a series of meteorological observations on the rainfall, by gauging from time to time the various streams that intersect the drainage area, and by careful measurements and calculations of the extent of the area and the average amount of the water produced by the rainfall, springs, &c., during a lengthened period of time, and particularly during dry seasons.

This very necessary information is not at all times sufficiently sought after and attended to. The sites frequently selected are in deep and narrow valleys, generally high above the summit level of the district to be supplied, so as to enable the water to flow by its own gravitation to the houses of the consumers; and reservoirs are generally formed by throwing an earthen dam or one of masonry across the narrowest part of the valley, so as to impound the water in the readiest, most secure, and efficient way.

The object to be obtained in this case is to collect the largest volume of water, and at the same time to present the smallest area of evaporating surface, and at the least amount of cost for the construction of the works.

The injurious action of the atmosphere on still and shallow water has induced the construction of reservoirs with great depths of water, and with necessarily deep embankments to hold it up. These afford the least possible space for the action of the atmosphere, either for evaporation or for impurities, and this has led to the making of many reservoirs of large capacity as regards depth, the embankments of which have been carried up, it appears, in many cases to the very verge of, if not beyond the limit of safety, and requiring the utmost skill, experience, and judgment of the engineer in their construction.

Another point to be considered is as to the desirability of the situation. The stratum over the area of the proposed reservoir should be a close, clayey, retentive earth, so as to require as little puddle lining as possible, and also a sound and impermeable foundation is required for the seat of the embankment, to carry the weight of the superincumbent earth forming it, and one that is free from any faults, springs, soaks, &c., not liable to slip from any peculiarity of the geological formation or dip of the strata, from compressibility, or any other cause.

And this, of course, leads us to the absolute necessity of a strict and thorough geological survey of the strata of earth over the whole area of the proposed reservoir, and more particularly of the seat of the embankment; and boring, therefore, must be resorted to, carefully made, and strictly examined, and the results thoroughly investigated and tested.

We have had so many reservoirs fail, as we presume, from a neglect of these very necessary preliminary inquiries, this essential elementary knowledge, that the wonder is that it should have escaped the critical investigation of those discerning men from whom the design of the works emanated. And it may not be considered invidious if we enumerate a few of those works where failures of more or less magnitude have taken place, in some places attended with most serious consequences, as critical allusions end

investigations of failures are often attended with advantages to future works. The places alluded to are Manchester, Bradford, Oldham, Sheffield, Dublin, and some other places of lesser note and importance.

The Design.—A suitable and efficient site having been secured, another important question is the design, as it is equally important as the selection of a sound and watertight stratum; the shaping of the structure, and apportioning the respective parts so that they shall be more than fully equal to the pressures and strains that may be brought to bear, are important elements to be considered, and to make ample allowances for.

The section of a dam-head should depend entirely upon the depth and weight of water it has to hold up and sustain; that is, supposing all other conditions of site, foundations, strata, &c., are perfect and unobjectionable; and to resist that weight of water resting against the banks there must be more than an equivalent weight of earth to resist or counterbalance it.

For instance, the vertical pressure of water on the bottom of a reservoir per square foot is equal to 62.5 lb. multiplied by the depth of water, and this for 100 ft. deep is equal to 62,500 lb. per square foot of the surface.

But the horizontal pressure against the dam-head is equal to 31.25 lb. multiplied by the square of the depth of water, and this for 100 ft. would be 322,500 lb., and this pressure continues to increase as the square of the depth.

And to sustain and resist this pressure a bank must consist of a weight of earth equal to at least double the weight of water, and the fore-bank, or the part in front of the puddle should be of sufficient strength alone to resist the fluid pressure. The water is supposed to be coincident with the top of the embankment, and this strength is necessary, as in case of the contraction of the clay of the puddle there would be a separation of the clay from the earth, and therefore the fore-bank alone would have to sustain the presence of the fluid.

Having cursorily examined this part of the question we will now proceed to view the principle as carried out in practice, and for this purpose will select one of the most successful works of the late Mr. Telford, viz., the Rotten Park Reservoir, belonging to the Birmingham Canal Navigation.

The dam-head is 50 ft. deep (depth of water 45 ft.); width of top bank, 20 ft.; base, 270 ft.; inner slope, 3 to 1; outer slope, 2 to 1; puddle, 15 ft. at base, 6 ft. at top. So, if we apply a rough rule, the width of the top of the embankment is two-fifths of the depth, and with the given slopes making the base about 5½ times more than the depth. If we apply the rule above mentioned to this embankment, multiply 31.25 by the square of the depth, and the horizontal pressure is 63,281 lb., while the weight of the embankment in front of the puddle would be 486,400 lb., and the weight of water resting upon it 196,840 lb., or considerably less than one-half of the weight of the bank.

Now, if we apply this rule to the Bradfield Reservoir by way of elucidation as we proceed, which was of the following dimensions: depth of bank, 95 ft.; width of top bank, 12 ft.; base, 500 ft.; slopes, 2½ to 1; the weight of the bank to resist pressure was 1,241,600 lb.; weight of water pressing against the fore slopes, calculated as before mentioned, 638,270 lb.; horizontal pressure of water, 282,031 lb.

So the weight of the Bradfield embankment was less than double the pressure of water resting upon it, while the Rotten Park Reservoir was considerably in excess of that quantity; and this, coupled with the loose, porous character of the earth composing the bank, which permitted the water to soak into and penetrate it, by which means the equilibrium was destroyed, and it absolutely failed from sheer inability to support and resist the hydraulic pressure to which it was subject; while, on the other hand, the Rotten Park Reservoir bank was firmly and solidly constructed of good terraced clay, which did not permit any infiltration or soaking of any kind.

The top width of the Bradfield bank should have been 40 ft. wide; base, 510 ft. The same fatality attended the Biherry Reservoir, which proved itself of insufficient strength. Its dimensions were as follows: bank, 96 ft. deep; width of top bank, 16 ft.; base, 496 ft.; and if we apply the same rule, it would be found that the top width of the bank should have been 38 ft.; the base, 518 ft., instead of the former dimensions. And if these dam-heads had been con-

* See p. 562, ante.

structed of the dimensions given, of proper material, and in a substantial and workmanlike manner, the melancholy catastrophe at those places would not have occurred; the public would have spared the heartrending shock, and the profession the obloquy that inevitably falls upon all, as well as those personally concerned.

It is always good policy in designing and laying out engineering works, particularly when water has to be dealt with, to err on the side of safety: one had better spend a little extra money, and place the strength of the works beyond the possibility of failure, than to calculate, theoretically and experimentally, upon so fine a principle of probabilities, that the slightest additional weight or accident will turn the scale against you. Hughes, in the "Treatise on Water-works," states that at the compensation reservoir at Longendale, the embankment is 27 ft. wide at top, and, as the water is 90 ft. deep, it is too narrow to support so vast a weight of water, and should have been at least 36 ft. wide. On the other hand, at the Round Wood reservoir, Dublin, laid out by another eminent engineer, the depth of the dam-head is 60 ft., width of top bank 30 ft., and this might have been safely reduced to 24 ft., and is as much in excess of proper width as the other is deficient. Nevertheless, at Round Wood there have been leakage and failures, and these probably arose from some oversight in not thoroughly examining the geological strata of the base of the dam, or the area which is covered by the water of the reservoir, but it has not been exposed to land slips, as was the case at Longendale, and which occasioned at one time much anxiety and expense, so much so as to require a conference of engineers to elucidate the mystery, and to point out a remedy. If we direct our attention to the various hydraulic works or tables that are published, they afford us very little trustworthy or correct data to govern us in the construction of such works. Moleworth, in his tables, gives the following formula for dam-heads:—

Width at top in high dams, 7 ft. to 29 ft.
 Width at top in low dams = the height.
 Breast slopes 3 to 1, and 2 to 1.
 Height above surface of water, 3 ft. 6 in.

For masonry dams the formula is as follows:—

Width at bottom = height \times 0.7
 Width at middle = do. \times 0.5
 Width at top = do. \times 0.3

And those arbitrary dimensions are given without reference to the height of the dam, the depth of water, or other trustworthy data.

The "Engineer and Contractor's Pocket-book" gives the vertical pressure of water on the bottom of the reservoir (62.5 by the depth), and the horizontal pressure against the dam (31.25 by square of the depth); and it is further stated that it is usual to make the embankments at top from 15 ft. to 30 ft. wide, the latter dimension would be about the width for a reservoir 60 ft. deep, the inside slopes to be 3 to 1, outside 2 to 1, and the top of the dam to be from 5 ft. to 10 ft. above top water. It further states, usually but not always, a puddle wall is made in the centre of the embankment to within 5 ft. or 3 ft. of the top, which should be from 5 ft. to 8 ft. wide at the top of the puddle, and slope down with a hatter of 2½ in. per foot vertical. For dams executed in masonry, the thickness at bottom should be 7.10ths of the height, 6.10ths at mean height, and 3.10ths at top; and although they are very particular in giving the exact proportions in dams of masonry, yet in dams of earthwork no defined theory appears to them applicable, otherwise than a general mathematical one. This information is derived from the "Aide-Mémoire," where it first appeared.

Cressy, in his "Encyclopædia of Engineering," touches very lightly and generally on the subject; and in "Telford's Memorandum-Book" a formula is given for calculating the pressure on the whole side or bank of a reservoir or tank say 18 ft. long and 6 ft. deep.

Thus 2.3rds of 6 (being the centre of pressure) is 4: then 4 \times 62.5 = 250 lb., being the mean pressure on each square foot of the plane, and the length 18 \times 6 = 108 square feet \times again by 250 = 27,000 lb., the pressure against the whole area.

But after giving us the pressure of water against the embankment, he gives us no formula for an earthen embankment to support and resist the pressure; and the divergence of practice, and different opinions of professional men, render the question difficult to comprehend and to thoroughly understand.

Hughes, on Water-works, who gives us some details of water-works construction and the dimensions of a few reservoir works, mentions two or three of this country, but affords but little information on that subject, and such that cannot be of much service to the practical man.

Dwyer, on Hydraulics, affords us no information as to the construction of earthen dams; but at page 177 he gives us a formula to calculate the pressure of water, which is follows: Multiply the sectional area by half the altitude, and by 62½, the product is the pressure in pounds. But without giving us any definite proportions for dams, he observes all gates, sluices, banks, &c., should be strengthened in proportion to their section. The centre of pressure being at one-third the altitude of the dam, to this point the additional support should be applied to enable them to withstand the hydrostatic pressure.

In Beadmore's very useful tables there are no allusions made to either earthen or masonry dams; and although much of what appears there is very good and trustworthy in other respects, still it appears to us incomplete without this necessary information.

Jamieson (or rather, say, Turnbull) in his "Mechanics of Fluids," p. 151, gives formulae for computing the strength of earthen embankments to reservoirs, in which he goes very much into detail, and it is very complicated and prolix, and would occupy too much of our space for us to transcribe it, and we must content ourselves by drawing attention and referring to it.

But although in the above works we find little information to assist the practical man, we find some good sound knowledge in a little work of West's Series, by Mr. Wiggins, F.G.S., on "Sea Embankments." He says, "The weight of embankments is of the utmost importance, first, to counterbalance the weight of the sea-water against it, that weight being augmented by the winds, &c., to a considerable extent."

This condition of weight is so important that, in some cases of light material, the safety of the banks depends on it, and a bank must be rendered weighty in proportion, either by enlarging its bulk or by more weighty material, or stone laid on the lighter material. The force of sea-water pressing against a bank will be in the compound ratio of its depth and its velocity. Every attempt to reduce these to calculation will be in some degree negatory, because one may at times greatly exceed the other; but they often act in combination, and the bank must therefore be superior to their greatest united force.

The weight of sea-water is 64½ lb. per cubic foot, and the weight of earth about 1½ ton per cubic yard, or 125 lb. to the cubic foot. We may, therefore, safely take the weight of the materials usually employed in sea banks to be nearly equal to double the actual weight of the quiescent water they have to sustain, because the resisting power of the dead weight of earth and stony matter is greatly augmented by its cohesion, and by the weight of water which rests upon the surface, which also tends to its support.

But this difference of weight in favour of earthy matter is not considered in practice sufficient for absolute security, and accordingly it is usual to increase the substance and weight of the bank by additions to its thickness at the apex, so as to raise it to nearly double the utmost weight that can be brought to bear upon it, and to place this additional substance in the strongest form. The same natural laws that govern a sea bank act also to a certain extent on reservoir banks, except that sea-water is slightly heavier than pure water, and the action of the wind much is greater.

In India, where they have carried out some very extensive reservoir works, they have a very simple practical formula which they use for heavy embankments, which is as follows:—Multiply the extreme depth of the dam-head by five, and that added to the width of the top bank gives the base. For instance, if an embankment were 55 ft. deep, that multiplied by 5 = 425 ft. + 30 ft., width of top bank, equal to 455 ft. base. The front slopes 1 to 1 or 1 to 1½, and 2 or 3 to 1 in the rear. The earth that usually composed it was clayey and generally adhesive earth. In this case there is an arbitrary width of top given, but that we have endeavoured to show should be regulated by the depth of the reservoir and the weight and pressure of water upon the bank, and the slopes we think should be reversed.

Workmanship.—But let a reservoir be ever so

skilfully and well designed and laid out, and the site however carefully selected, it amounts to very little, and is almost labour in vain, if the works are not properly executed and put together, of good and suitable materials and workmanship, and the whole substantially constructed and formed.

The seat of the dam-head is also an important subject for consideration. It should not be laid on sloping ground, but formed on level places or benchings, and connected with water-tight strata; in the same way up the sloping sides of a valley, it should be benched in and well connected with the strata after the whole of the soil has been stripped off. In forming and raising the banks it should be laid on in lifts or courses of not less than 1 ft., or exceeding 3 ft. in thickness, over the whole width of the base of the embankment, inclining a little from the outer side towards the puddle-wall or centre, and each layer should be properly spread and thoroughly consolidated either by means of rammage or by cutting over it with three-wheeled carts, or other means. Embankments either formed of barrows or tramways are always liable to be loose, porous, and unconsolidated, and require the utmost attention in laying the earth on, or mechanical means must be adopted to render it solid and compact, as also time allowed for the earthwork to find a solid basis from its own insistent weight and gravity. No large stones should be used in the structure of the banks, and large lumps of earth, clay, &c., should be broken up, so that every part may become firm and compact.

No deep or heavy embankment ought to be completed at once; it ought to be formed and raised in a series of stages, and he left a time exposed to the action of the weather, for a winter at least, as embankments hurriedly and loosely put together sink more or less for several years after construction, of which we have full evidence in the large number of railway and canal embankments that have sunk and required raising, during the canal and railway era, and from which cause many serious accidents have occurred.

As a case in point we may mention a serious accident that recently took place on a Cambrian railway, by which means a locomotive engine and train of carriages were precipitated into a river, attended with loss of life; and this was occasioned by a loose and unconsolidated embankment, one that had recently been constructed and put hurriedly and loosely together, as is too generally the case in such works. The streams where the accident occurred are in that district where the Severn takes its rise, and had been recently very much swollen from heavy rains, and this was improperly dammed up by a railway bridge of insufficient water-way to take the accumulated water; the consequence was, the mass of water rising against the embankment soaked into and penetrated it so much, that with its great body and weight it upset and made a breach in it to effect a passage, and by this means the flood was reduced.

As this district was well known to be subject to floods, care should have been taken to have put in a bridge of sufficient capacity in the waterway, and the embankment ought to have been constructed in such a manner as to resist the weight and pressure of the accumulated waters,—in fact, as carefully and substantially as a well-constructed reservoir embankment ought to be.

Where railway embankments are exposed to the action of water precisely the same system is required in construction, consolidation, and protection (except the puddle), as a reservoir embankment; and when the constructors fail to carry out that principle, then we shall be likely to hear of serious catastrophes similar to that which took place on the Cambrian Railway.

The puddle wall, composed of well-tempered clay and other ingredients, is also another indispensable adjunct to reservoir works; but upon the strength of this there is some difference of opinion. Telford, Walker, and other old, and most of our present hydraulic engineers, prefer using it in the centre of the embankment, but in many of the modern works they are not made of that thickness, strength, and consistency as were formerly adopted. Telford's puddle wall at the Rotten Park Reservoir for a 50-ft. bank was 15 ft. thick at the base, tapering up to 6 ft. at the top; while the Bradfield Reservoir puddle wall was 4 ft. thick at the top, increasing 1½ in. in thickness for every foot of depth, making the thickness

of the puddle 15 ft. 10 in. at the base for an embankment 93 ft. deep; this, like the bank itself, was considerably too thin and weak, which was proved to the satisfaction of every unprejudiced observer.

The puddle of the Bilberry Reservoir was also 16 ft. thick at the base only, tapering to 8 ft. at the top, with a depth of bank equal to 96 ft.; and this also proved its inherent weakness, and is another striking instance of defective work.

It is also of the first importance that the puddle wall should be thoroughly connected with a water-tight stratum under the seat of the bank: in the instance of Bradfield it is said the engineer sank to a depth of 60 ft. below the seat of the bank to secure that object, but they appeared to be so much troubled with springs, requiring a powerful steam-engine to keep down the water, that it is probable no good and efficient connection was formed with the water-tight strata.

There is also a difference of opinion amongst engineers as to the best and most proper method of constructing reservoir embankments. Some advocate the construction of them without the central wall of puddled clay, and their plan is to carry up the bank in lifts or layers of retentive clay or alluvial earth, carefully put together. On the other hand, and on the contrary, many still consider the puddle-wall an essential element in their perfect and water-tight construction.

Mr. Thom, of Glasgow, appears to have been one of the first to adopt the former practice; and this, we believe, is much adopted in the North, and may be termed, *par excellence*, the Scottish system.

The method of executing the works is as follows:—The embankments are constructed usually with slopes of 3 to 1, and the ground is excavated for the seat of the bank until they reach a firm and water-tight stratum, and upon this is formed the bank, spread in alternate layers of puddled peat or alluvial earth; and generally these layers are mixed and beaten well with wooden dumpers until they are thoroughly consolidated and firmly united together. The inner slopes are then covered with puddle, made of tempered clay mixed with small gravel or furnace cinders, so as to prevent the possibility of rats or other vermin from penetrating into the embankment, and thus causing it to leak.

In contradistinction, and by way of comparison, we may mention one made on the principle of the old canal engineers, and by a worthy lieutenant of Telford; and although it is of a somewhat lighter system of construction than previously laid down in this paper, yet the work was so carefully executed, and of such sound and durable materials, that it has stood remarkably well, and is an enduring monument of engineering skill.

The reservoir we allude to is situated at Harleston, Cheshire, and belongs to the Ellesmere and Chester system of canals. The embankment is of the following dimensions: 40 ft. deep, 10 ft. wide at top, and 210 ft. at the base; inner slope, 3 to 1; outer slope, 2 to 1. Puddle-wall, 10 ft. thick at base, tapering to 4 ft. at the top. The inner slope of this bank was lined 4 ft. thick of clay, laid on in courses 12 in. thick. The lumps of clay were carefully chopped small, and afterwards soundly panned, so as to form a compact and water-tight covering.

The embankment itself was chiefly composed of clay (the celebrated Cheshire clay—not the most trustworthy material), laid on in regular lifts or layers, of not more than 4 ft. 6 in. in thickness, and these lifts were continued all over the length and breadth of the embankment, and each lift was completed before another was commenced.

All large lumps of clay or other earth were carefully chopped and broken, and afterwards thoroughly panned and made as solid as possible, which was a work of considerable labour and expense; but it was attended with marked advantage, as it formed a perfectly solid bank, requiring little or no repair since its construction, which took place in the year 1830.

Although this embankment, like many more of the reservoir works attached to our canal system, has been attended with signal success, notwithstanding the thickness of the lifts, we think the lifts of greater thickness than desirable to form compact and solid banks, or for the deep embankments of the reservoirs of our modern waterworks; we consider lifts of 2 ft. or 3 ft. in thickness ample for the purpose, to ensure sound, water-tight, and durable work; indeed,

the lifts cannot be too thin, if we are to consider only the thorough consolidation of the bank; but as less than the depth above mentioned would be attended with inconvenience in conducting the work, and considerable additional expense, it would add materially and unnecessarily, we think, to the otherwise very costly character of modern water-works.

We dare say it will be remembered that on the occasion of the serious calamity that occurred at Bradfield, near Sheffield, exception was taken not only to the design of the new Sheffield Reservoir embankments, but also to the manner of constructing them. The lifts, or layers, were from 6 ft. to 9 ft. in thickness, and the whole earthwork was being constructed and put together as loosely and carelessly as it was possible to do it, tipped from tram wagons, and brought into the bank with tramways,—in fact, similar to the modern system of making railway embankments.

And that system even for railways is very faulty and open to grave objection, as is well known to railway engineers and contractors, and also to directors; for railway embankments hurriedly and carelessly put together continue settling and sinking some years after construction, and are often the cause of serious and calamitous accidents, with their attendant costly consequences to the shareholders. But in reservoir works, such loosely-constructed and hurried works are exceedingly risky, and doubly disastrous, as water in its action, contrary to the rolling stock of railways, presses every way, incidentally permeates, and will certainly find a vent or weak place, if any exist; and if a failure take place, its consequences are not confined to its immediate locality, as with a railway, but, like the Bradfield devastation, sweeps everything before it for miles, the inundations and overwhelming torrent topples over houses and bridges, roots up immense trees, and carries onward in its headlong career a becomhomb of precious lives, with all their imperfections on their heads, to eternity.

SURREY ARCHEOLOGICAL SOCIETY.

THE annual excursion of the members of this Archeological Society has taken place. Dorking was the rendezvous for starting. About 170 members and friends assembled to celebrate the society's popular "outing." The first place selected for a visit was Milton Court. The building is in the Elizabethan style of architecture, and the chief item of attraction is the grand staircase. Mr. Charles explained the points of interest connected with the building. On leaving Milton the company were next conducted to Wootton Church, where the duty of describing the various points of interest was undertaken by the Rev. E. Evelyn, the Rector, in the absence of Mr. Bailey, who was prevented from reading a paper on the subject. Upon leaving the church the Rev. Mr. Evelyn kindly invited the company to partake of luncheon at the rectory.

"Oakwood Chapel" was the next place mentioned in the programme, but to go there, owing to the distance, was found impracticable, and the excursionists next enjoyed a delightful drive through a magnificently wooded country to Anstiebury Camp, near Leith Hill. Mr. W. Pocock "did the descriptive." The company next took conveyance back to Dorking to visit the museum at Pippbrook House, the residence of Major Burt. Leaving Pippbrook House, the party visited the new church in Dorking Church, and wended their way to Soudes Place Farm, where they were entertained at the expense of Mr. George Cubitt, M.P. Unfortunately, a prior engagement in Ireland prevented Mr. Cubitt being present. About twenty new members were proposed and declared elected.

ANTIQUITIES OF ARYSSINIA.—The German traveller Rohlfis has arrived at Bremen on his return from Alysinnia, where he filled the office of interpreter to the English expeditionary corps. After the taking of Magdala he went alone to Lallibala, the holy city of the country, which has not been visited by any of the Europeans for more than three centuries (?). He found there nice Christian churches of the primitive Byzantine style of architecture, all monoliths, that is to say, each hollowed out of one enormous block of stone, and richly ornamented. In afterwards passing by Axum he discovered that the last of the obelisks still standing in that place is in a state of almost complete ruin.

ON FOREIGN ARTISTS EMPLOYED IN ENGLAND DURING THE SIXTEENTH CENTURY, AND THEIR INFLUENCE ON BRITISH ART.

THE paper on this subject, read by Mr. Digby Wyatt, at the Institute of Architects, and printed, for the most part in our columns,* gave rise to a discussion at another meeting of the Institute, which was carried on with ability and useful results. We confine ourselves in noticing it to the observations of three or four of the speakers who touched principles.

Mr. E. C. Robins read the following remarks on the paper:—It is with great diffidence that I venture to express very hastily the thoughts to which my perusal of Mr. Wyatt's paper has given rise. There is something especially refreshing and invigorating in the unhesitating adhesion of such a man as Mr. Wyatt to principles not now particularly popular. One is carried back to the days of one's pupillage, when the absolute divinity of Grecian architecture was a leading article of professional faith, and the Roman art of the Augustan age its only rival for supremacy. Mr. Wyatt boldly appears, not as the apologist, but as the champion of the much-abused Renaissance style of art, and the recorder of the histories of those men to whom he says we owe "the rapid formation of the great English School of Architects, to whom we are indebted for the creation of the so-called Elizabethan, and who kept alive the flame of that lamp of symmetry and comeliness of structure which ultimately, through Jones and Wren, shed its rays far and wide, not through England only, but to every land and clime in which such noble and right royal architecture as theirs will and must be cherished as long as arts may flourish and mankind endure." The foreign source of the stream of art thus overflowing this country is indicated in the title of the paper; still Mr. Wyatt is at some pains to show the national character of this new development of the arts here. He gives it as his opinion that English Gothic art was in its decrepitude, that Renaissance was in its prime, and that the result of their association was "the birth of an entirely new phase of art," culminating in the triumphant ascendancy of foreign ideas, and the revival and permanent establishment of classicality. The philosophical remarks at the opening of the paper and dispersed throughout it do not appear to be the logical consequence of reasoning upon the facts, but rather the statement of the premises of an argument attempted to be supported by facts, but which the facts collected fail to sustain, and in many cases seem to contradict. Thus, English Gothic art is stated to be in its decrepitude at a time when Beauchamp Chapel, Eton College Chapel, St. George's Chapel, Windsor, Bath Abbey, Henry VIII's Chapel, and King's College, Cambridge, were the embodiments of the "technical, æsthetic, and phonetic" condition of the arts of this country; buildings which Mr. Wyatt acknowledges "were of remarkable merit in technical execution, as well as in grace and beauty of design," and he does not point to any subsequent works of equal extent at all comparable with them. The Wars of the Roses sufficiently account for the decline in some of the industrial arts, in sculpture, painting, and jewelry; but they do not seem to have retarded the conception and execution of the great works before mentioned; and the decrepitude of English Gothic art would not seem to have existed until premature old age resulted from the neglect of it by Church and State. And who was accountable for this but Henry VIII. himself, who introduced foreign elements of design against the will of his people, which led to the popular rising described by Mr. Wyatt, which was put down by brute force only, but which still found vent in the ballads of the time? This prince, instead of nourishing native art, patronized foreigners of all descriptions, and the native art force, having reached such a culminating point of excellence as evidenced by the buildings referred to—which, admitting all their faults, have nothing like them in the world—was crushed out of it by disappointment and discredit, and want of encouragement from either churchmen or statesmen. And from that time to the present foreign fashions have been preferred to native work.

* With the development of the principles of the Reformation, men naturally refused to put

new wine into old bottles," says Mr. Wyatt; "and the country, beginning with Royalty, and proceeding through the chief nobles and successive Ministers of State, ripened for that inoculation of novelty from abroad which, as we shall have occasion to see, rapidly supplanted the old systems of progress by spontaneous internal national combustion."

What is it a thing for which we have any reason to be congratulated that the "inoculation of novelty from abroad should supplant the old systems of progress?" Does Mr. Wyatt doubt that those principles were sound and true? Was not the distinctive character of the arts as they existed in this country at the period, its national glory, as the exponent of its individuality and the outcome of the religious aspirations of its people? Did it not possess the charm of native beauty, in common with other distinct styles of art, the intrinsic worth of which are just in the same proportion that they were the expression of the necessities of the originators, their earnest craving to worthily represent their ideal of beauty or magnificence, their desire to exhibit their fear of the gods, honour to the king, and respect to themselves? Is it not illogical to assert that such inoculation by force from without was the result of "spontaneous internal national combustion?" Surely it was not the love of the profane arts introduced by foreigners that made them flourish; they never were popular till generations of apathy had passed; it was owing to the patronage of the influential few—the King and his Court. Was not the Elizabethan style provoked by the lingering love of the people for its own forms of art and its determination to engraft upon the foreign taste all of English feeling that it could?—a final protest against the imputation of decrepitude. *The life of art was not in the importations from abroad; what of life remained was indigenous to the soil.* The absurd incongruities of Non-such Palace found no popular sympathy, any more than the Brighton Pavilion. And once let loose by the wiser policy and purer taste of the Cardinal, the native arts revolved in the pleasures of Hampton Court, of which old Skelton sings:—

"The Kynge's Court
Should have the excellence;
But Hampton Court
Hath the pre-eminence."

English art died no natural death, was suffered to reach no decrepitude, but was tortured and finally strangled by that same egotistical prince whom Mr. Wyatt delights to honour—who sacrificed so many other "graces" to his lust. But Mr. Wyatt does not seem to see the caustic wit that suggested the plucking of the "hoole personage" of Henry VII. on the curling locks of the capital of an Ionic column. Again, is it fair to the spirit of the reformed religion to say that the new wine was put into new bottles because the old were not trustworthy, when in fact it was enshrined in those very forms of art dedicated to the special service of the still unreformed religion? Rather, was it not indicative of the incongruities of the age, whereby the suppression of bigotry was made the business of an impure prince? Yet Mr. Wyatt would rattle the spurious title of "Defender of the Faith," and add the equally well-deserved title of "Regenerator of the Arts." Whatever the genius of the foreign artists, however great their technical skill in the details of the arts of sculpture and painting and industries of the period, there was no heart, no love, no noble ideal. The old Church had corrupted itself and was despised; the new was made despicable by its supporters, was wounded in the house of its friends; and the result was that no religious aspirations inspired the age, either here or abroad, and forms of art naturally partook of the learning of the schools, "Renaissance" intellectualism, as Mr. Matthew Arnold writes it,—and heathen mythology was the accepted storehouse of symbolism; a state of things well reflected in the pages of Ruskin, who says in his fourth Edinburgh Lecture:—

"The world has had a trinity of ages,—the classical age, extending to the fall of the Roman empire; the mediæval age, extending to the close of the fifteenth century; the modern age, thenceforward to our own times; a change taking place about the time of Raffaele in the spirit of Roman Catholics and Protestants both, a change which consisted in the denial of their religious belief as heretofore expressed in the outward things of life. Thus, before the revival of classic art the very furniture of the king's house was made to confess his Christianity; it may be imperfect and impure Christianity, but,

such as it might be, it was all that men had then to live and die by; and there was not a pane of glass in their windows nor a pallet by their bedside that did not profess and proclaim it. Since that period the decoration has consisted of Cupids and Graces, Floras, Dianas, Jupiters, Junos, &c., as if we were horn heathens; so that the great broad fact which distinguishes modern art from mediæval is this,—that all ancient art was religious, and all modern art profane."

"Freedom and hope," says Fergusson, in his "True Principles of Beauty in Art," "are the first two principles of greatness in art as in everything else; and servility and despair of doing better than has been done before must cramp the noblest genius and hide the highest aim."

It has been well said that if there is one word by which an artist or critic may be tested—a single term in which all truth in art and all virtue in action might be summed up, in which we could find all the essence of a mind or the purpose of a life,—it should be the term Ideal. The reception of this term in all its consequences, or, on the other hand, its utter rejection, at once determines what an artist is in his ends and aims. To have no ideal is to have nothing to strive for or hope after. The ideal should be the end and aim of the fine arts, as distinct from engineering. It was Coleridge who said that a "picture was an intermediate something between a thought and a thing." The thought and the thing stand respectively for the outward world of matter and the inner world of mind. The thing or object is received and taken from visible nature into the inner mind of the artist, and there, being elaborated and combined with his individual idiosyncrasy of thought and feeling, comes forth a second time into actual existence under the new and created form of art. The primary, the raw material is nature; the forming, however, is mind; and the ultimate product, art. Nature enters into the mind a fact, a reality, and issues forth a picture, a poem, an idealty. To the nature around him the artist adds his own nature.

"And thus it is that native air
Mind informs with visions fair."

"Within the pale
We stand, and in that form and face
Behold
What mind can make where Nature's self
would fail."

In an estimate of the conditions under which the "creation of an entirely new phase of art" is possible, why does Mr. Wyatt ignore the effect of the absence of any noble ideal in the influence of foreign artists on British art? All true development is from within and thence without, inward enlightenment expressing itself in outward form; and all true and noble art is an outward and visible sign of an inward and spiritual gift or grace. Take the life of Torregiano, "the first great Italian master upon whom the king most fortunately alighted," says Mr. Wyatt, and consider for a moment what great development of art in its highest range may be expected from the mental laboratory of one who begins life by breaking the nose of Michelangelo (whom he always hated, says Vasari, because he was superior to himself), who was afterwards employed by Pope Alexander at the Vatican, but whom he speedily left for the army because the pay and spoil attracted him. Disappointed of the promotion he coveted, he returned to his art, which for itself he had no love, and worked in bronze and in marble such things as his sordid mind could conceive and his facile fingers embody. It needed little purity of soul to please the voluptuous Harry: so he was invited to England, lured by the better pay; but here this ill-conditioned man, the pioneer of the mercenary artists who followed him for the same good pay, was soon obliged to leave for Spain, where he got into trouble for smashing a figure of the Virgin, for whose purity he can have had no reverence, no heart to portray; and art can have consequently suffered little loss by the demolition. Yet it is to such a man and to such men that the students of the nineteenth century are hidden as to a festival of good things. But I believe it to be as true to-day as twenty years ago when Fergusson intoned it:—

"One of the most fundamental rules of art is that sordid minds cannot express elevation, the impure cannot express purity, or the vulgar mind elegance; if we want lofty, pure, and elegant art we must go to minds where those feelings exist; for all arts are the reflex of the individual of the nation practising them, and the improvement must come from within, either from more sedulous cultivation of purity and the higher emotions, or by a

more honest and straightforward mode of expression than has hitherto been adopted. On the other hand, we may feel perfectly certain that all that is bad in the individual or the nation will come out in their art, however much they may attempt to disguise it by foreign costumes or phrases borrowed from those who were artists not only in form but in spirit. Art must come from the heart, and can only come from there."

We do not want artists to give us a picture of what nature is only (*that* Torregiano and others like him may do), but what they *think* of nature (and who cares for the thoughts of such a man as he?). The mere copying of nature is not the ultimate end of art. Man has to infuse something of himself into the picture or building. It is the artist or me; acting on the Not me. We do not want a dwarfed and caricatured naturalism, but an inspired literalism. What seems most required to effect a revivification of the arts at any period of their decline is inspiration, besides that which may be learnt at schools; and this is often the fruit of honest labour and of pure thought.*

I hope I have made clear the points on which I am chiefly disappointed in Mr. Wyatt's otherwise remarkable paper, which opens a new page in the history of art. At the same time let me say that I greatly sympathise with Mr. Wyatt's cosmopolitanism, and would desire to steer clear, as he has done, of the error of those whose preconceived preference for some particular style or phase of art, blinds them to the beauty of others; but I should wish to avoid latinidarianism. To more accurately define my meaning, I cannot do better than quote, in conclusion, the following contrast between Grecian and Gothic art, sent to me in a letter from my friend the Rev. G. B. Porteous, who thus sums up their powers and limitations:—

"In sculpture one sees nothing so fine as the Greek resembler. It is a shame that the idolator should have stood nearer to nature and have wrestled more triumphantly with her veiled angel than the sculptors of any Christian age. The only Christian sculpture of profound merit is to be found in the general style and execution of the noble cathedral. Here, indeed, is something which, in uniting beauty and perfection, stands far above the graceful temple of the Greek or the more massive structure of the Egyptian, and is calculated by its general effect to lead the soul into states where the imprisoned loveliness within the soul itself can burst its fetters and execute the behest of the Divine Original. In classical civilization among the Greeks we had linear architecture than has ever been seen since. The sons of Hællas, a national incarnation of intellect, the grand avatars of genius, the light-bringers of the world, were real architects; as real as unreligious man could be. Let their archaic sculpture give the first response; and next, is not their architecture clear, finished, and faultless? Is not the symbolic character of Greek architecture a reflection of well-defined ideas, though of miserably dormant affections? Is not the very completeness of Grecian architecture symbolical of a mind habituated to ideas well formed, which it effectually grasps, while yet ignorant of those aspirations which ascend heavenward to the unlimited vastitude of the infinite and the eternal, of which a Gothic cathedral is so hefting and so magnificent an expression? The Parthenon is thought manifested in marble; York-Minster is faith reflected in stone. One is the product of intellect; the other is the offspring of the moral sentiments. The first is an idea; the last is a prayer. Artists designed the former, but saints must have conceived the latter."

Professor Donaldson.—If I understand Mr. Digby Wyatt's paper aright, and the intention with which he has written it, I should say that it was not to justify the introduction of a new style of art, nor to condemn the old one, which really seemed to have exhausted itself; but merely to follow out and to give us the history of the artistic training of the mind, which eventually produced the invention or adoption of a new style of art altogether. I think Mr. Wyatt was quite justified in saying that Gothic art at that time was in a state of decadence, because, if we only look at the exterior of Henry VII.'s Chapel, we must own that there was then great degradation of taste; and there is no one who has studied Gothic or Mediæval art but must acknowledge that, at that time, it was not worthy of continuing its career. There is a difference when we consider the vaulting of the chapel itself, because that was rather the scientific work of the mason than the artistic combination of the architect. The structural skill with which the vaulting is arranged is such as to surpass almost any previous combination of a like nature; and, in point of art, there is exquisite beauty. But the exterior of Henry VII.'s Chapel altogether certainly shows that art had arrived at a very low ebb in point of taste. We are much indebted to Mr. Wyatt for going through the analytical study of the development of the new style of art in this country, following it through all its phases, and pointing out to whom we may attribute the introduction of

* The recognition, appreciation, and interpenetration of the "true styles." Surely it is the union of strength and beauty, not the association of decrepitude and pedantry to which we should look for the "birth of an entirely new phase of art."

this new style, and the various steps by which we arrived at its transition in the sixteenth century. Now, we must recollect what had led to this. The whole of the Continent had been in commotion for a century previously, not merely politically, but in a certain artistic and literary sense, in consequence of the Greeks having been driven out of Constantinople and having taken refuge in Italy. The study of classic literature was revived through them, and began to resume its great dimensions and proportions, for it had been altogether lost. When it was reverted to again, it naturally induced the study of architecture and of sculpture of the Classic period, and of pictorial representations, few only, however, of which then remained, as in the Baths of Titus; and it was this that led the Italian mind into a new train of ideas, weary with the incongruous buildings of the pseudo-Gothic stamp in that country. These were most barbaric productions—mixtures of all kinds of sentiment borrowed from the North, and from Germany especially; the incongruous remnants of old buildings, put together as chance might direct, and without any rule of art; producing masses of buildings of a certain imposing size, with occasional graceful chance-combinations, but, as works of art, incomplete;—I say, dissatisfied with this state of things, the Italians wanted to have some fixed laws of art which should do away with these incongruities and these jarring principles of design, which should elevate art upon the same principles as classic literature, based on coherent forms and well-understood principles. Such was the case upon the Continent, the Italian mind being then very vigorous and powerful; in fact, I may say the Italians at that period were the first nation in the world,—in Europe certainly. They were brilliant in their imagination, eloquent with all the burning emphasis of a most impassioned language; they were enthusiastic in all they undertook, regardless of personal consequences; imbued with a deep love of the arts, pictorial and musical; they were inspired, for they had a natural rich store of invention and originality of ideas, not without deep and erudite investigation of the secrets of nature and the more obvious beauties of the animal and vegetable world; devoting their lives to the pursuits they followed. Such were the people who took the lead throughout all Europe, and, therefore, all Europe naturally followed them. The other European peoples were not endowed to the same extent with the same qualities; they were not possessed of the like rare faculties, and, therefore, feeling the influence of such superior minds, they instinctively yielded to their impulse. Now, England could not stand alone: she must be actuated by like feelings; and, naturally enough, she followed in the wake. We know the intimate relations which existed between Francis I. and Henry VIII. and the influence which the French king had in those days upon ours, and of which the interview on the Field of Cloth between the two monarchs at Calais is a proof. It appears to me, therefore, that it was impossible—altogether impossible—for England to remain behind the nations of the Continent, retaining its Medieval propensities and preferences; but it was obliged to adopt the new taste prevalent throughout Europe. Now it is the investigation of that, and of the process of the teaching of the English mind for the introduction of that new class of art which Mr. Digby Wyatt has sought to bring before us. We know that in our universities Erasmus, Bucer, and other intelligent foreigners were induced to come here to teach the classic languages and the philosophy of the Continent. In like manner, for the promotion of art Holbein was brought over with the able artists who have been mentioned by Mr. Wyatt in his paper, and whose various works have been described to us with so much discrimination as to their relative merits. I think, therefore, that it is extremely instructive to us that our friend should have pursued the subject so far, and should have investigated what was hitherto to a certain degree quite a mystery and an unknown subject, I believe, to nearly all of us—at least, I myself was not aware of the minute history of the art of that period. We knew that Holbein came over here and influenced the arts of this country; and in regard to architecture, we have an instance near us, at Hampton Court, of the graceful architecture he had introduced. We know he erected a gateway at Whitehall; but how these and other pictorial influences came to bear upon architecture we could hardly see or understand. Now, it was alluding to the power of the Italian mind; and our attention

has been drawn by Mr. Wyatt to the circumstance that Leonardo da Vinci, Holbein, and Albrecht Dürer had impressed upon the men of the period the necessity of the study of mathematics and of the mastery of drawing the human figure. These were the two grand elements upon which all art should be founded, and they were themselves very eminent in possessing these great acquirements. There was this misfortune, however, that painters did not satisfy themselves with being painters; sculptors were not content with being sculptors; nor were architects always satisfied with being architects alone; but they mixed up and practised other arts, as we know by the productions of the various artists alluded to by Mr. Wyatt in his paper. That was a misfortune. I think that architecture particularly has suffered by the innovations introduced by painters and sculptors; and in this respect it seems to me no greater injury was ever done to our art than by Michelangelo himself and by Bernini. They destroyed the purity of taste, introducing capricious varieties and all sorts of distortions and contortions in architecture, by which it was degraded materially. It is only men like Alberti, Vignola, Palladio, and others, purely architects, who have vindicated architecture as an art independently of all others. We can perceive, with respect to our buildings of the early period of the reformation of art, that they were very much influenced by not being undertaken by architects alone, but by painters. We see at Fontainebleau that the Italians, who came there not as architects but as painters, introduced every caprice they could think of, and produced a great medley; and although some good picturesque groupings were realized, to say that it is good architecture is not the fact.

Now, I hope Mr. Wyatt will pardon me if I attempt to follow out the architecture of that period, in illustration of our subject, by one particular instance, and that is in a building at Liveden, Northamptonshire, of which there is a plan and perspective view on the wall, taken by myself years ago. I will read an extract from a letter from Mr. Selby, a gentleman who lives in the neighbourhood,—that is, at Pilton, near Oundle, in Northamptonshire, and is well acquainted with the traditional history of that building.

"The building was erected, or perhaps I should say commenced, by Sir Thomas Fresham, who was knighted by Queen Elizabeth at Kenilworth Castle in his eighteenth year. This gentleman, who appears to have travelled in Italy, and to have been an architect of very great taste, built several other houses, &c., in the county of Northampton, viz., the Hall at Rushon, and a triangular entrance lodge, a beautiful work (both these are near to Rothwell). The house now belongs to Clarke Thornhill, esq. He also placed a rich screen in the church of Geddington. Another specimen of his skill, the market-house, the one then just spoken of (Rothwell), is still remaining but abjectly neglected. There is a print of this in Baker's 'County History.' It was commenced in 1577, and appears to have been taken down and rebuilt in an open space near the church. It is two stories high, and to each story there is an order, the lower one being Doric with an inscription in the frieze, and the upper one Ionic with panels containing coats of arms on shields. There are semicircular openings below, and above are the usual Elizabethan windows with mullions and transoms at mid height. It was preserved from total destruction by purchase from the surplus of a fund raised in 1827 by a few individuals." (Baker.) "Liveden itself," Mr. Selby continues to say, "was most likely never finished with a roof, although the naked floors were laid and continued in the building, then going to ruin, until the Parliamentary wars, when they were cut up by Major Butler, who had the command of some troops on that side, and conveyed to Oundle and re-used, as stated by Bridges in his history of the county."

Now this Liveden, gentlemen, as you see, is in the form of a Greek cross, and it has central pavilions at the end of the arms. There is a kind of podium base, and the sur-base is quite a Gothic moulding. The die of the podium consists of a range of panels with niches in them, and occasional apertures for windows; then above that rises a Doric order, not of columns but of plain walls, but there is a frieze and cornice with triglyphs constituting the first order; then above that is, I suppose, an Ionic cornice, the frieze of which bears an inscription, some of the letters of which still remain and may be seen upon the view exhibited on the wall. The detail of the podium is also shown in a small sketch which I took at the time I visited it. Now my informant goes on to say—

"Old Liveden was another fine mansion of the family of Fresham, and stood about one-third of a mile from what is called locally the 'new build.' There were two very handsome gateways to the old house. One was long since removed (destroyed) and the other was removed about ten years since and re-erected at Farmingwood's Hall (Lord Lytton's seat). There is a fair copper-plate engraving of the 'old build,' as it is called, in a work styled 'The Antiquarian Itinerary,' published from 1815 to 1818, in the seventh volume. It is there spoken of under the title of 'leaden old Beal,' which with the whole of the letter-press descriptions of it is a tissue of error. There

is no account of the Livedens in Baker's 'County History,' as all this side of the county unfortunately escaped his attention, whilst his power and means remained."

So far Mr. Selby.

I wish to call your attention to this as a beautiful instance of the Renaissance, quite equal to anything to be found in France and Italy. If we had some artists, or if the Government would take up the work, as is done in France, and send competent draughtsmen through the country, and instead of making a collection of higgledy-piggledy bric-a-brac things, like many authors put together in their hooks; if the pure only were to be chosen, then we should find that this country produced fine works of art, and that that period was one which might be imitated in its spirit with great success at the present time. It is very desirable for us that art should be vindicated from the great trash, which has been published as indicative of that period. My own idea is this, that as we had then but few competent architects and artists, the builders or masses who were employed made designs, which they had not the capacity properly to conceive; they made buildings of a certain size with particular feelings and sentiments of Renaissance, but they were carried out without true taste; and it is under the obloquy of these buildings that we now suffer as to the reputation of that style. I would also call attention in that period to the sepulchral monuments, such quantities of which exist even in the churches of the metropolis. There are some beautiful compositions of this kind in Westminster Abbey, and also in the church of St. Saviour, Southwark, and Ashbourne, in Staffordshire; but throughout the whole country you will find monuments in the churches of exquisite design, great simplicity of taste, and beauty of invention. Immense sums of money were expended upon them, both in regard to the materials of which they were composed, the alabaster and various marbles that were employed, and to the workmanship. Certainly they are very fine productions, and ought not to be allowed to pass away, nor to be so unknown generally as they are at present.

Professor Kerr.—I think we have scarcely recognised as we ought to do the remarks of Mr. Robins, which seem to me to afford a very good illustration of a bad kind of criticism, very common now-a-days. An accomplished gentleman, like Mr. Digby Wyatt, comes before us and reads a communication, which, like himself, is brimful of knowledge; and another gentleman takes leave to criticise it in what is, I hope I may say, without being at all offensive, the least elevated style of criticism that can be adopted in such circumstances. The first question submitted to us by Mr. Robins was whether Mr. Digby Wyatt had not said something disrespectful of Gothic architecture. This is the invariable opening cry raised by a certain sort of persons now-a-days whenever any subject of high-class critical bearing is mooted. Having thus begun, Mr. Robins next proceeded to deal with the critical question on its merits, and again he adopted the ordinary manner of the moment—that is to say, he took the fashionable sentimental view of the question. I may be permitted to say that I am certainly surprised to find a gentleman of Mr. Robins's practical and sensible position in the profession quoting such a writer as Mr. Ruskin against the arguments of Mr. Wyatt. What we have had so often laid before us we have had repeated once more to-night—that in the Middle Ages architecture flourished in consequence of the enthusiastic sentimentality in the people at large. I, for one, never could see anything but the greatest absurdity in such an idea. I believe that the merits of Gothic architecture, often great and often small, were in those old times altogether unconnected with such sentimentality in any shape. There may have been something of the kind amongst some of the clergy, and there may have been an enthusiastic religious feeling, more or less general, amongst some of the laity, according to occasional circumstances; but as for there being anything like a continuous romanticism in the heart of the people at large, of such a kind and of such intensity as to exhibit itself in the details of architectural design, I can only say that I think there cannot by any possibility be a greater fallacy prepropounded, or anything more subversive of the true principles of artistic criticism. I am anxious that Mr. Robins should not think that I am opposing him too severely, but it is seldom that we have this particular argument of his laid before us in a way so favourable for its refutation. Having, then, fallaciously appealed to our sense of re-

spect for Gothic architecture through our supposed veneration for the imaginary sentimentalism of the Middle Ages, Mr. Robins next proceeded to exhibit another kind of error, which is too prevalent at the present time. He introduced as the great cause of architectural change an individual ruler in the State. Now, no such individual ruler has ever in the history of architecture, as a matter of fact, exercised any such influence in a practical way. In the present instance he assumes that King Henry VIII. was the individual cause of a certain change of architectural style; and then, to prove the character of that change, he holds up to us the character of the king in his private capacity! King Henry VIII. married six wives; but if, instead of six, the number had been sixty, such a circumstance can have had no influence upon architecture. On the contrary, if this king exercised any influence at all upon art, it would be in the capacity of one who was a most accomplished and learned man. Indeed, in this view of the case he was a man who did a great deal for this country, a man whose true position in the intellectual progress of England, as apart from his errors of private life, is now beginning to be more rationally recognised. Certainly, as regards literature and the arts, he was one of the most accomplished men in Europe; and as such we may not doubt believe that he took a certain amount of interest in what was then the subject of accomplishment and learning—namely, the spread of the new school of intellect, which took its rise in Italy as the cradle of the modern world. Mr. Digby Wyatt and Professor Donaldson have taken much higher ground than Mr. Robins. They come before us to illustrate a very important period of architectural history in this country, and they do it by means of the resources of learning, by the elaborate collection of facts, and by the deduction of sensible conclusions.

Mr. Wyatt, in replying ultimately, said although Mr. Robins has been ably dealt with by Professor Kerr, I yet feel that a few words are requisite from me, as the author of the paper imputed. In the first place, it is to be clearly understood that because I may commend one style, and point out certain particular excellencies in it, I am not an advocate of one set of principles only, or that I recognize truth, justice, and excellence in one form only either of "faith" or "works." It is in the nature of the estimate of cosmopolitan principles that a true artist should be read. He must show himself as well as enthusiastic and poetical. It is perfectly true, on the one hand, that one of the highest forms of art is the ideal; but because that is so it is no reason why we are to insist upon the limitation of the types of forms of all art to those conventional types which transcend what is natural, can fully embody the ideal. When we look at the beautiful productions of Gothic architecture, painting, and sculpture, they frequently inspire that sort of sentiment which reflects very often pure devotional feelings. At the same time, because we admire that, are we to say that no country is to go on in the study of anatomical, geometrical, or mathematical laws, and their application to the establishment of other types of art? To do so would be to neglect adding all the graces that science may bring to art altogether. It is one of the strongest points in all successful art to observe the essentially practical and technical basis upon which the artist must build, and by means of his command over which he can alone clothe his conceptions with fitting form. It frequently occurs that a great artist sets up the type of a certain form of pure heauty. It is admired, repeated, and adopted as the vernacular production of his contemporaries, who, while aiming at perfection, involuntarily modify it. By this common spontaneous system of progress those who, to a blunted sense in the enjoyment of it; and the type gradually becomes effete. So it is that decrepitude often affects styles which, beginning in purity, are not, as it were, fed on or refreshed by change resulting from the association of fresh external elements with those upon which the great artist first created his ideal type. In my paper I took great care to distinguish between the falling-off in the fifteenth century in the art portion of architecture and its technical part. I stated that there was never a period in Gothic architecture when the technical branches of masonry, in vaulting and interpenetration especially, attained to greater excellence. There were first-rate masons in every part of the land. The concep-

tion of a building like King's College, Cambridge, was one of the grandest in all the country; but I doubt whether any good judge of art, comparing a bay of its length with a corresponding bay from Lincoln, Salisbury, or Westminster, would not at once realise how great a falling-off had taken place in the sense of proportion, and the just conception of a general harmony of parts. Who, examining carefully the sections of the mouldings, the forms of the different complements which make up the whole architecture of Henry VIII.'s chapel, would be found to say that they are one-half as good as corresponding features taken from good models even of Middle Pointed work? Hence I say, and I think with propriety, that had the fifteenth-century system gone on, by spontaneous combustion alone, its "decrepitude" would have merged into "senility." Change, with consequent novelty, by an unerring cycle of revolving wants and supplies, was absolutely demanded in this country to enable it to keep pace with contemporary revolutions abroad; and had that change and novelty been arbitrarily withheld, I believe it would have been certainly fatal to national art. In its earliest architecture, after the creation of the First Pointed style, we recognise the greatest ideal excellence in England. In the reigns of the first two Edwards you find the parts, though still graceful, beginning to assume a certain amount of rigidity, and departing from the excellence which characterised the Early English work. Then you go on to the greater mannerism of the Perpendicular styles; so that, instead of following a ratio of progress, the onward march is in a scale of regular and uninterrupted declension. I feel, therefore, that I am perfectly justified in saying that, under the "Wars of the Roses," architecture was in a fair state of decrepitude, because it had fallen, step by step, from earlier excellence to actual feebleness. That is clearly shown by the falling-off in the spiritual forms of old religions art, with little but mannerism to take its place—by the want of power to draw the human figure or to understand perspective, and the deficiency in knowledge of classical literature; in fact, the country had been declining in intelligence and intellectual activity—a certain advance in the forms of poetical expression being perhaps excepted—for at least a century. There had been a long series of wars, and the whole land was in a feeble and exhausted state; and unless we had had Henry VIII. with an active, full-blooded, strong constitution, young and with a fresh set of sympathies, I believe the country would have gone on dropping and dropping, and, as far as architecture was concerned, would have come almost to a state of annihilation. If we had remained in ignorance of such men as Michelangelo, Titian, Leonardo da Vinci, Raffaele, whose power no critic has been able to impugn satisfactorily, I think that we should in point of art have developed downwards till we had reached insignificance. I consider, therefore, that we are greatly indebted to Henry VIII. for what he did in this respect, and indeed in many others. There is one other point in which a little confusion of ideas seemed to prevail in Mr. Robins's mind. He appears to think that beautiful productions in art must necessarily be the productions of men of beautiful lives. That is entirely a mistake. Whoever is acquainted with the literature of the Greeks, or the Renaissance, or the Medieval literature, will find that at the very time the concretions, which we call embodiments of heauty, were given to the world, the men by whom they were produced were frequently given up to indulgence of vices and evil passions, and even refinements of sin and crime were rife. It cannot, therefore, be said that one period, whatever its art may have been, was much more virtuous than another. The great distinction I believe to be this, that generally speaking the individual may be what he likes; it is general voluptuousness in a country which is apt to produce degeneration in art. You may go as far as that, but to go further is, I think, unsound. In conclusion, allow me to thank you for the patience with which you have listened to me, and believe me that in collecting these materials my object has been solely to put certain facts together and to lay them before you, without claiming merits for reformers simply because they were modifiers of pre-existing conditions of art. It is for you to make such deductions from the facts I lay before you as you may see fit. Believe me I desire to do injustice to no style of art nor set of artists, be they Goths or be they Greeks.

NEW WORKS OF THE BOARD OF WORKS.

THE Thames Embankment footway, between Westminster Bridge and the Temple, was formally opened on Thursday morning, the 30th of July. The members of the Board and their visitors afterwards proceeded to Abbey Mill, and inspected the pumping-station which has been erected there. Sir John Thwaites (chairman of the Board), Earl Grosvenor, Lord John Manners, the Hon. W. Cowper, Mr. W. Tite, M.P., Mr. Alderman Lawrence, Mr. Ayrton, M.P., Mr. Bazalgette (the engineer), and many others were present. We confine ourselves for the moment to a few particulars officially furnished. The paved footway next the river, from Westminster Bridge to the Temple on the northern embankment, together with the Westminster Steam-boat Pier, opened on Thursday, is to be 20 ft. wide, with approaches to Villiers-street, Wellington-street, and Essex-street, Strand. The roadway will be 100 ft. wide, including both footpaths, but it is not to be formed until after the Metropolitan District Railway Company shall have completed their railway, which will for a considerable length pass under the new road. The embankment road will be formed by a new street which is about to be continued from Blackfriars Bridge to the Mansion House.

About 37 acres of land have been reclaimed from the mud-banks of the river by the embankment, and will be laid out in approaches, ornamental grounds and gardens, as soon as the railway works have sufficiently advanced to admit of the execution of such works. It is expected that the embankment and railway will be completed within a year from the present time.

As to the Abley Mills pumping station, all the sewage on the south side of the Thames, and the sewage of a portion of the north side have to be lifted, and for this purpose there are four pumping stations, two on each side of the river. Of those on the south side one is situated at Deptford Creek of 500 nominal horse-power, and the other at the Crossness outfall, also of 500 nominal horse-power; the latter was opened by the Prince of Wales in April, 1865.

Of those on the north side, the largest and most important is the Abbey Mills Station, near to Bow, in the north-east district of London. It is of 1,140 nominal horse-power.

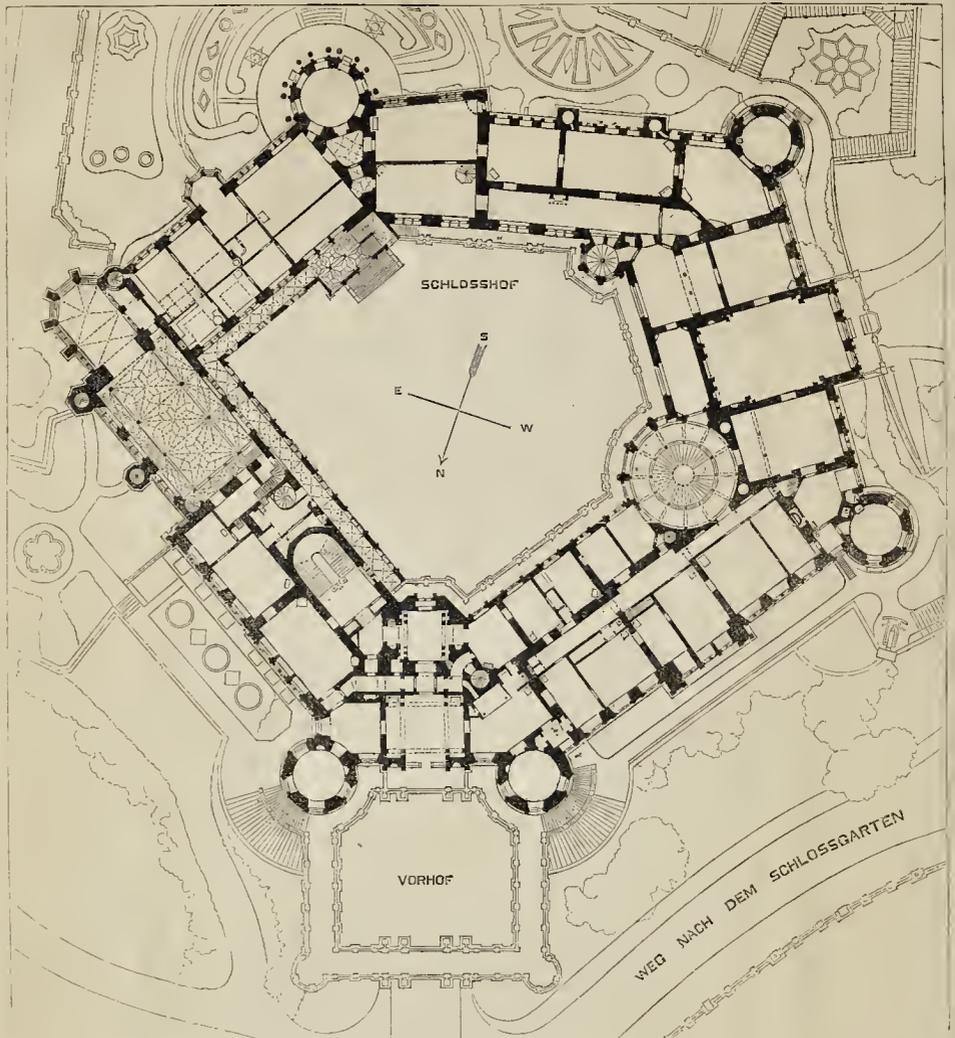
The Abley Mills pumps will lift the sewage of Acton, Hammersmith, Fulham, Shepherd's Bush, Kensington, Brompton, Pimlico, Westminster, the City, Whitechapel, Stepney, Mile-end, Wapping, Limehouse, Bow, and Poplar, representing an area of 25 square miles, a height of 30 ft. from the low-level to the high-level sewers, whence it will flow on by the side of the high-level gravitating sewers to the northern or Barking outfall, and thus it is there are no pumps at the northern as at the southern outfall.

This station covers an area of seven acres divided into two portions by the northern outfall sewer, which passes diagonally across it on an embankment raised about 17 ft. above the surface.

On the south-west side of the embankment stand the engine and boiler-houses and chimney-shafts, together with the coal stores and wharf for landing coals and other materials from Abbey Creek. On the north-east side of the embankment are the cottages for the workmen employed on the works, and a reservoir for storage of water to supply the boilers, and condensing water for the engines.

The engine and boiler-houses form one building, the engine-house being arranged on a plan in the shape of a cross, and the boiler-houses forming two wings extending north-west and south-east of the north-eastern arm of the cross. The extreme dimensions of the building taken across two of the arms is 142 ft. 6 in., the width of each arm being 47 ft. 6 in., the width of the two boiler-houses measures 100 ft. in length by 62 ft. in width; and there is a workshop situated between the two measuring 49 ft. 6 in. by 33 ft. The engine-house consists of four stories in height, two of which are below and two above the surface of the ground, the height of the two lower stories being 38 ft., and that of the two above ground measured from the engine-room floor to the apex of the roof being 62 ft.

At the intersection of the four arms of the cross the building is covered by a cupola of an ornamental character, rising to a height of 110 ft. from the engine-room floor, and at each of the internal angles of the cross rises a turret, in



THE CASTLE OF MECKLENBURG SCHWERIN.—Plan of Ground Floor.

which is formed a circular staircase giving access to the several floors of the building.

The boiler-houses are of one story above the finished ground level, the boilers and stoking-floor being below that level, the total height from stoke-hole floor to apex of roof being 33 ft. The workshop between the two boiler-houses is a few feet higher, the roof being a curb roof, and that of the boiler-houses a ridge-and-farrow roof.

The style of building adopted is mixed, and the decoration consists of coloured bricks, encaustic tiles, and stone dressings, carved work being introduced at the caps of piers and columns.

The drum of the dome, which is octagonal on plan, is supported by four wrought-iron ribs, springing from the walls of the cross at their intersection, the angles of the pyramidal roof below the drum running into and intersecting four of the eight sides of the drum. Immediately above the point of intersection the octagon is reduced by a splay, from which rises the lantern, also octagonal, each side being pierced with a large light, flanked by columns support-

ing arches over the lights. Above this story rises the slated roof, which is high-pitched, and is enriched at about mid-height by an ornamental cresting, and surmounted at its apex with a lofty vane.

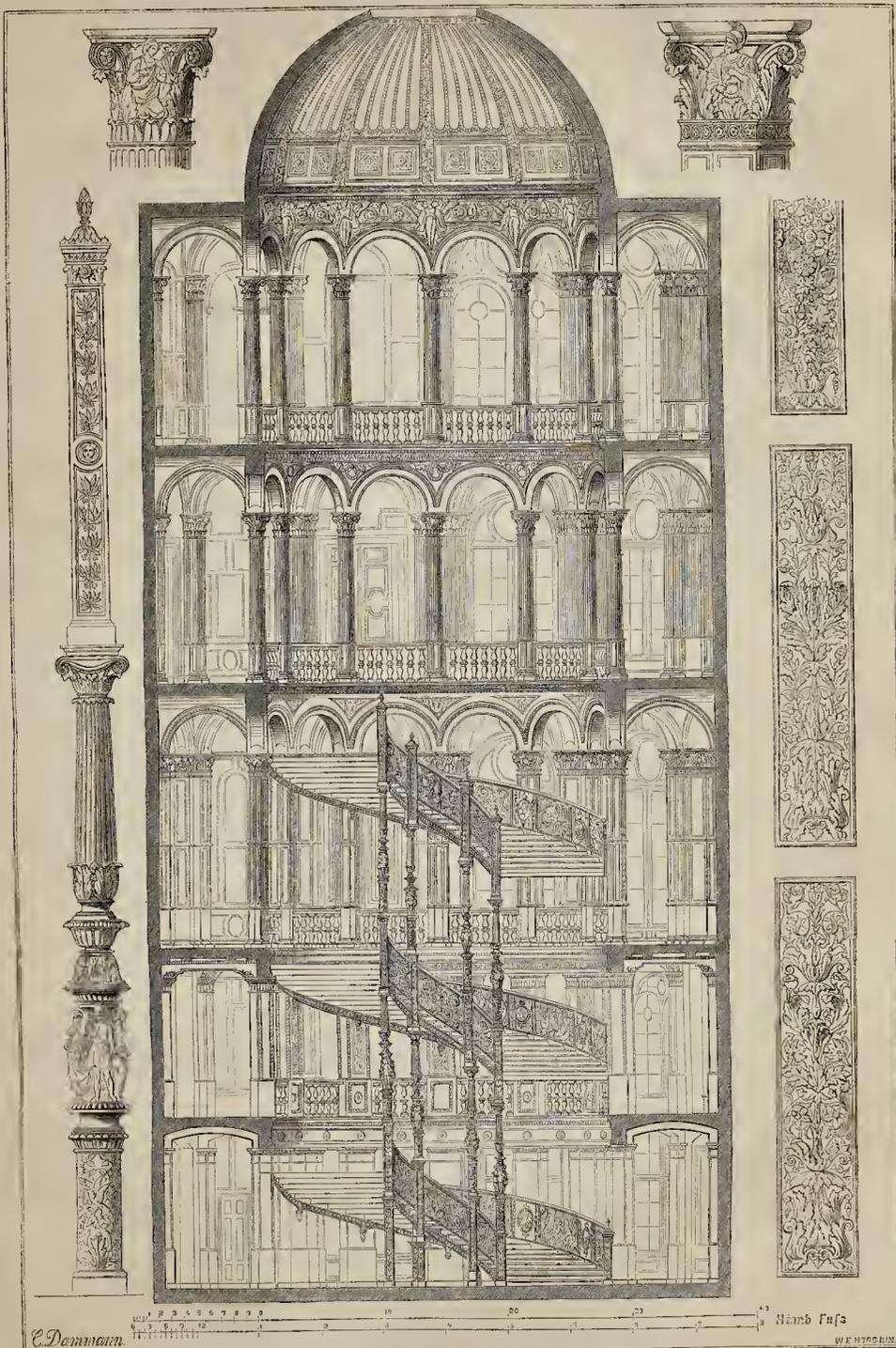
The chimney shafts, of which there are two, one on each side of the engine-house, are 209 ft. in height from the finished surface, and 8 ft. internal diameter throughout. They are externally octagonal on plan, rising from a square battered base. They correspond in style with the main building, and are similarly enriched with coloured bricks and stone dressings, and are capped at the top by an ornamental cast-iron roof, pierced with openings for the egress of the smoke. The foundations of brickwork and concrete extend to a depth of 35 ft. below the finished surface.

The engines are eight in number, each of 142-horse power, and are arranged in pairs, each arm of the building containing one pair, placed parallel to each other lengthwise of the arms, having the fly-wheels at the entrance end, and the cylinders at the inner end of the arm, so that the eight steam cylinders are arranged symmetrically

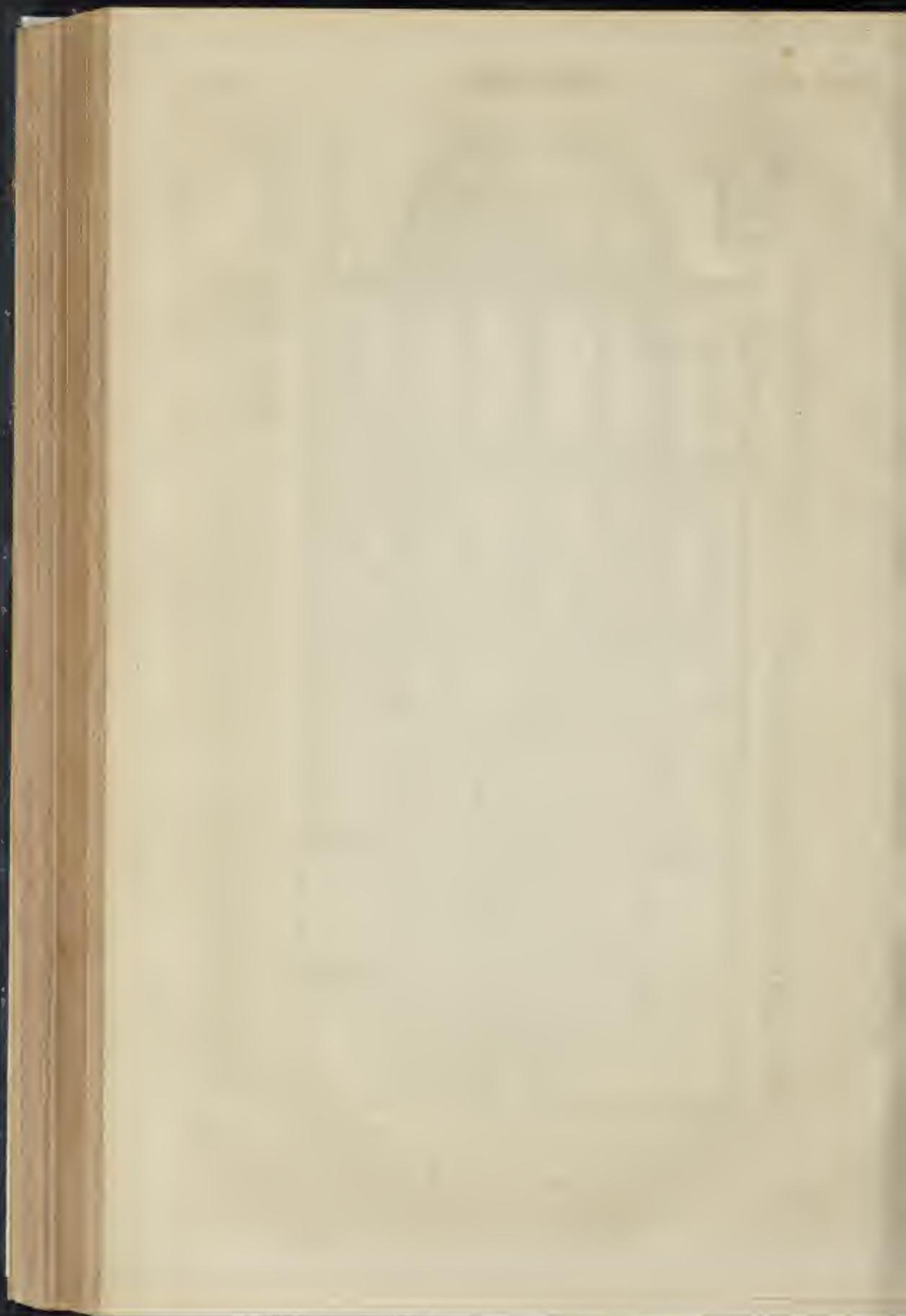
round the centre of the building under the dome.

The reservoir for the storage and purification of the water for the use of the boilers and for condensing purposes is situated on the opposite side of the embankment of the Northern Outfall Sewer. It is constructed mainly of concrete, is 18½ ft. in depth, and covers an area of about one acre, which is divided into three compartments, each compartment being used in turn as a settling pond, and containing about one million gallons; there are inlet pipes to bring water from the creek, and outlet pipes to convey the water to the supplementary reservoir under the engine-room and above the pump-well, from which it is taken direct to the boilers and to the cold-water cisterns around the condensers.

The cottages for the workmen are eight in number, arranged in pairs, each containing five rooms, and are fitted with every reasonable convenience; the house for the superintendent of the works, and which is situated on the other side of the Outfall Sewer, and near the entrance to the works, is more commodious, and fitted up in better style.



THE CASTLE OF MECKLENBURG SCHWERIN: THE GRAND STAIRCASE.—HERR WILLEBRAND, ARCHITECT.



THE CASTLE OF MECKLENBURG SCHWERIN, NORTH GERMANY.

In the account we gave with a view of the recently completed ducal residence of Mecklenburg Schwerin, at the commencement of our present volume,* we promised an illustration of the principal staircase which leads from the ground floor to the state floor. This we now publish, also a plan of the edifice, showing arrangement of the rooms. The steps are of polished black Belgian marble, each in one piece. They rest for about an inch one on the other, and at both ends on cast-iron pillars. These cast-iron pillars are supported in the centre of the stairs by six cast-iron candelabra columns with square pedestals, standing one above another. The outer ring of these pillars rests on cast-iron shelves, which are attached to the sandstone pillars of the gallery, rising one above another. The railings are of cast-iron, the filigree ornaments being of cast zinc. The pillars rising, in the design, through all the floors, are square in the ground-floor and entresol, octagonal in the main floor, and round in the state floor and fourth floor, and are worked in all parts with their ornaments, arches, and cornices of Saxon sandstone, the natural colour of the stone being visible. The balustrades between these pillars and columns of the gallery are of polished dark-red marble; the cornices on the same again of sandstone. The iron ribs of the staircase candelabra-pillars, railings, and filigree ornaments are gilt in all visible parts. The ceilings of the galleries are vaulted and tinted, the floors are laid out in variously-coloured marbles. The walls in the galleries are stuccoed, have the sandstone colour, and are divided into squares by coloured lines. The pillars with their capitals, in the galleries as well as the main cornice under the cupola, are executed in stucco; the cupola itself vaulted with white stone, is painted partly in grey and partly in various colours. The staircase receives light during the day partly from above, but mostly through the windows on each gallery looking towards the yard. At night it is lighted with gas in gilt chandeliers.

NEW SEWERAGE WORKS AT HASTINGS.

The completion of the main intercepting sewer of the new drainage works at Hastings, was celebrated by a dinner to the contractor, Mr. John Howell, given at the Queen's Hotel, on Monday last. Virtually this completion, so far as it goes, may be taken as that of the sewerage of the whole borough; as St. Leonard's proper, the western wing of the frontage, has had its similar system at work for some months past. The *modus operandi* adopted by both places may be described as the *tank system*, the whole of the sewage being conducted by a main intercepting drain to a deposit tank, whence it is discharged at such period of the tide as is favourable to carrying it clear away from the town.

At St. Leonard's this is at high water, when the set of the tide is *westward*. At Hastings, the discharge at low water leaves the flowing tide some four or five hours to carry the outpourings to the *eastward*, where it meets the outflow of the River Rother, and is dispersed to sea.

The intercepting sewer of the Hastings system extends from the Archway (the western extremity of the Local Board district) to Ecclesbourne, where the whole of the sewage of the district (with the exception of a very small portion which is drained into the St. Leonard's sewers) is discharged into the sea from the tank by gravitation, at low water. The point of discharge is about 800 ft. into the sea, and opposite Ecclesbourne Valley. The original sewer remains from the Archway to the centre of Warrior-square, and at the latter point, where there has hitherto been one of those obnoxious outlets into the sea, the new intercepting sewer commences. From that spot to the Albert Memorial the size of the sewer is 4 ft. by 2 ft. 9 in., egg shape, and has a fall of about 7 ft. per mile. From the Albert Memorial the sewer passes along Wellington-place, through Castle-street, along Pelham-place and East-parade, to the Bourne, the size up to that point being 5 ft. by 3 ft. 6 in., also egg shape. There are four branch sewers from George-street, &c., 2 ft. 6 in. by 1 ft. 8 in., egg

shape, with self-acting tide flaps complete. From the Bourne to the East Groyne the size of the sewer is 5 ft. 6 in. by 4 ft. egg shape. The fall from the Albert Memorial to the East Groyne is 4 ft. per mile, and the water of the natural streams running through Warrior-square and Priory is used for flushing power, so as to prevent any deposit in the sewer. The new tank which has been constructed near the East Groyne as a receptacle for the sewage, will contain about 1,500,000 gallons, and previously to the scheme being adopted it was ascertained that the greatest gurgings of sewage, in dry weather, taken at the three outlets, did not exceed 600,000 gallons in twelve hours, leaving 900,000 gallons for slight rains. The bottom of the tank is about 5 ft. 6 in. above low water at neap tides, and 2 ft. 6 in. below the invert of the sewer. From the tank a 4-ft. cast-iron pipe runs out to the point already mentioned, 800 ft. into the sea, with a fall of from 8 ft. to 10 ft. per mile. This will discharge 1,000,000 gallons per hour, and therefore the tank, when full, can be discharged in one hour and a half.

As a matter of fact, the whole contents of the tank, with thirty-six hours' sewage (in very dry weather), was discharged on Monday in the presence of several of the principal inhabitants and representatives of the press, in about an hour. As all the offensive outlets which have so long been allowed to pollute the bathing of this favourite watering-place and induce illness, are now stopped, its visitors may depend on clean bathing in a pure sea.

The works connected with the scheme have been carried out by Mr. John Howell, assisted by his attentive and judicious foreman, Mr. H. Butler, many years with Myers & Co. The amount of contract (which did not include the new groyne) was 25,640l. There were five other tenders for the work, the highest (from a London firm) being 49,850l., and the lowest (from Mr. A. H. Fernandez, of Tunbridge Wells), being 26,639l. The only part of the work which is not quite complete is the fixing of some few of the 4-ft. cast-iron pipes, by which the sewage is discharged from the tank. These pipes can only be fixed at the lowest tides, but the small portion of the work that remains in hand is now being completed with all possible speed, and its being unfinished has no injurious effect on the working of the scheme. Hastings has undoubtedly set an example which other towns would do well to follow. The importance of the undertaking cannot be over-estimated, and highly beneficial results may reasonably be expected to follow the large outlay which has been incurred. The proposal for celebrating the completion of the work by a public demonstration originated with Mr. Curling Hope, of Robertson-street, who, with a commendable degree of public spirit, brought the subject before some of his fellow-townsmen, and, with their co-operation, took judicious steps for carrying it out. The arrangements were made quite independently of any action on the part of the authorities of the town, and may be considered a compliment to the contractor and a testimony on the part of influential inhabitants that they fully approve of the mode in which the work has been carried out.

We need scarcely tell our readers that we view the works at Hastings as, after all, only preparatory, not final. The sewage must be utilised, not emptied into the sea.

MUSEUMS OF TRADE AND INDUSTRY.

The subject of Museums of Trade and Industry was discussed at a meeting convened by the Public Museums and Free Libraries Association, in the Assembly-room of the Metropolitan Club, 20, Piccadilly, on Thursday, July 23rd. Mr. John Holms, D.L., presided.

The proceedings commenced with the reading of a paper by Mr. W. H. Ablett, formerly of Coventry and Macclesfield. They all had heard, he said, a good deal of the subject of technical education lately, and while some even disagreed as to the precise meaning of the terms, they could not have failed to notice the absence of practical suggestions, and the want of unanimity that prevailed on the subject. He appeared before them to advocate a definite plan in aid of technical education, to form its supplement, and be the connecting link between theory and practical application in manufactures, in the founding of museums of trade patterns and industrial examples. This

was with him no new subject, born of the exigencies of the hour. For seven years past he had pointed out its necessity having seen many of our textile manufactures (which alone he progressed to understand) slowly but surely displaced by foreign productions, owing to the want of a little extra knowledge on the part of our workmen. Persons with only a superficial knowledge of manufactures were struck with the great lack of invention and power to stimulate improvements, combined with an awkward unwillingness to depart from old-fashioned methods, that characterised not alone the managers of factories, but also the masters in many branches of English manufactures. That Englishmen were inventive, no one could deny; and that much ingenuity and mechanical skill was often manifested by entirely uneducated workmen, was equally plain. In every manufacturing town throughout the kingdom there lay scattered about, amongst the working population, examples of attempts at something new in the shape of inventions or improvements, which were never brought under the observation of those who could practically apply them, from the simple fact that there was no system through which those attempts could come to the knowledge of the interested, excepting by chance or at rare intervals. Industrial Exhibitions amongst the workmen gave ample proof of the manufacturing ingenuity of the working population; but such exhibitions could exercise no beneficial influence upon manufacturing education, so to speak, and only served to show at times in a grotesque manner the singular misdirection the chances of life cast a man's lot in, as compared with the course whither his real bent or inclination would seem to lead him. He did not for a moment deny that in some branches of trade we still excelled foreign producers. An Englishman would ordinarily do far more work, and bring a more continuous and indomitable energy to a given task, than would a foreigner. But it was not there the weakness lay; it was to be found in defective knowledge of matters of taste and arrangement, and absence of that quickness of apprehension and that fertility of expedient, that were brought into active life only by education, and continuously sustained by daily observation. Who that recollected that we were the nation that produced such men as Shakspeare, Bacon, Milton, and Newton in the realms of thought and imagination, down to our modern school of practical engineers, could consider that we must be necessarily behind the rest of the world? What was now wanted was the wider diffusion of intelligence in the constantly recurring operations of every-day life, by which not only might the skill and talent of the workman be increased, but the mind of the workman become enlarged as to the object and application of his work, its comparative excellence or defects, &c. No means to this end existed other than those chance opportunities that failure sometimes developed; but if such museums as were advocated were established, the germ of a good thought might be perfected instead of dying away, and ideas would be suggested by other objects so as to form a complete whole of what otherwise would remain, perhaps, unutilized; not only would the eye be educated in matters of taste, but trade knowledge of almost every description could be gathered from this comparatively simple and inexpensive expedient, out of which further advantages would naturally spring. We had already to our hands all the outward machinery of a complete system. We had a science and art department, established for the art-education of the people, at South Kensington, in connexion with which the first collection of patterns and examples might well be formed to serve as a model for those provincial towns that would be disposed to adopt the plan. The standard of manufacturing skill and design would speedily be raised by such collections. They would have an influence upon taste, and positively assist a man in the commercial pursuit by which he gained a livelihood, enabling him to see what methods of production were pursued in this and other countries; how an article was started in a loom, or how an object of metal was cast,—placing him, in short, in a position to compete in the markets of the world. Of course, the details and minutiae of these museums must be left to local or municipal management, and one would, perhaps, differ very widely from another. He would suggest, however, the adoption of some arrangement, under which a working man who had produced an invention or a new pattern could exhibit it, with his name and address

* See pp. 9 to 11, ante.

attached, with a view to arousing the emulative spirit of the working classes, and to gather together in one focus the latent intelligence of a district. Masters could then often find ingenious workmen, and the workmen, too, find masters who would take up and successfully work their inventions. The general idea of a museum was that it enshrined the past; and, as time rolled on, the collection that would accumulate would show, in a very interesting manner, the yearly progress of manufacturing and inventive skill. But it was not in that light that it would become most valuable, but in teaching men the practical business of their every-day lives, giving to each workman an idea, and perhaps eliciting one from him, which another workman would amplify. Working men must be specially interested in such a plan. Most valuable inventions and improvements were made by them, but the advantages reaped from these were often enjoyed exclusively by others. Failing to get any one to take up an invention, a workman might exhibit it in the local museum; and the publicity thus given would furnish a positive title to remuneration, which few manufacturers would have the courage to refuse, did they adopt it without due acknowledgment. Hitherto, England had competed solely with the Continent, and America was at one time one of our largest customers for goods. Latterly, the high duties there imposed acted almost as a prohibition against British importations, and an immense impetus had been given to native manufactures. Let America get into full swing, and the active ingenuity of their skillful people become fully developed, backed farther by her boundless resources in minerals, cotton, agricultural produce, and coal—the latter alone exceeding by thirty times our own—and we would have another powerful competitor, whose exertions we yet scarcely felt, although the interesting statistical report sent by the Birmingham Chamber of Commerce to Lord Robert Montagu, exhibited our trans-Atlantic rivals as extensive manufacturers and exporters of such goods as wood-handled spades and shovels, hoes, axes, coopers' tools, nails, pumps, agricultural implements, sewing-machines, revolving pistols and breech-loading muskets, clocks, gas-fittings, weighing-machines, machines for domestic purposes, and a great number of what were termed "American notions." To meet these contingencies it was plain that we must call up all our own labour-power, and educate it purposely to the general advantage of the commonweal.

From the elements within us, the capital and energy of our merchants and traders, the indomitable perseverance and endurance of our artisans, who were naturally industrious and skilful, there was room to build up a grander and finer England in the future than ever existed in the past. There seemed to be something in the peculiar character of Englishmen that they never did their best until some strong opposition was brought to bear upon them; then the combative and persevering spirit of the nation was brought out, and great improvement often followed after a temporary collapse. Thus, upon first going to war with a foreign nation, we had often experienced a reverse, which, instead of acting as a discouragement, seemed to infuse new fire and spirit, with stern determination to conquer, into our management and councils; so that the check received in the first place ultimately proved to be a fortunate spur and incentive, leading to ultimate triumph. The plan of establishing Trade Museums would have a very wide application, for there was not a single branch of industry throughout the country that would not be considerably benefited by its adoption. Even in the mining districts, a museum would be desirable. The classification of the various ores, enveloped by the beautiful stalactites that abound, would form a very interesting collection, to which might be added models of machinery, and of all appliances used in mining. In the seaport towns, boats, anchors, cordage, sails, models of vessels, and marine engines, might be well represented; and these would become in time depositories of curiosities brought from abroad,—though this was the least useful aspect in which to regard the subject, unless they considered the great probability that useful fibres would be brought with other specimens, opening out new branches of industry.

While the mere workmen's Industrial Exhibitions, however worthy of encouragement on certain grounds, could have no abiding influence upon routine manufactures, and, on the other hand, the International Exhibitions were con-

sidered by many persons to have out-grown their just proportions, the proper determination and level of these expedients seemed to be indicated in the resolving of these efforts into final and permanent museums of trade and industry, to be established in all manufacturing centres, which would afford opportunities for the study and observation of the best examples of the kind of manufacture suitable to each district, and furnish an aid to technical education that could not by other means be obtained; as every clever manufacturing expedient in practical working would here be displayed, and could be readily utilized; in short, the museums would form the best descriptive supplement to technical instruction which it would be possible to devise, and if generally established throughout the kingdom would serve to mark an epoch in English manufacturing greatness.

THE PREVENTION OF DISEASES.

The tenth annual report of the medical officer of the Privy Council is, like its predecessors, a document of great interest. The volume is of considerable size, and includes a series of miscellaneous inquiries and reports, one being specially devoted to the geographical distribution and ethnological relations of consumption.

In regard to vaccination we learn that a new system of visitation, inspection of districts, and grants for successful operations, has been in force during the year.

The "occasional inquiries" of the Privy Council this year have extended to the outbreaks of fever at Winterton, Terling, and Guildford. All these were cases such as have again and again been reported on as "illustrations of excremental poisoning." "This filthiest chapter in the history of our pestilences," says Mr. Simon, "is one which I would gladly consider myself excused from re-opening on the present occasion." At Winterton there was disgraceful neglect, though the town four years previously had adopted the Local Government Act. At Guildford the water-supply was poisoned by sewage. At Terling the epidemic was due to conditions of local filth which existed under definite legal responsibility. The nuisance authority of the place (the Board of Guardians of the Witham Union) had grossly neglected its duty. In the space of two months a larger proportion of the population were killed by the filth-fever than ought to have died from all causes in two years. Mr. Simon suggests that if each person who suffered under these circumstances could recover his compensation from the rates, the local authorities would perhaps learn in a sharp practical way that sanitary neglect is a mistaken parsimony. So, too, he hints that, as regards commercial water-companies and the like, certain sorts of malfeasance should involve liability to pay pecuniary damages to injured persons. He thinks that in this point of view the sanitary rights of the public are but very imperfectly secured, and that explicit legislation in the matter is greatly to be desired.

NEW BUILDINGS IN KEIGHLEY, YORKSHIRE.

Mechanics' Institute and School of Art.

The erection of a large building, for the joint accommodation of the Mechanics' Institute and School of Art, has just been commenced at Keighley.

On the ground or principal floor the Institute will have its more important rooms; consisting of reading-room (at the south-west angle of the building), 33 ft. by 20 ft.; conversation-room, 28 ft. by 18 ft.; library, 33 ft. by 18 ft.; also patents room, pence bank, and secretary's office. The lecture-hall—a large apartment, 87 ft. by 44 ft., and with a wagon-headed and panelled and hoarded ceiling—will be common both to the Institute and School of Art, and will seat about 700 people.

On the upper floor the school of art will be located, and will have an exhibition-room, 46 ft. by 22 ft.; mechanical room, 28 ft. by 18 ft.; painting-room, 30 ft. by 18 ft.; modelling room, 33 ft. by 20 ft.; casting room, master's room, and retiring-rooms and lavatories for each sex. The lighting of the painting-room will be to the north, and of the exhibition-room from the top. From the landing of the principal staircase leading up to this flat or story a gallery opens out into the lecture-

hall before mentioned, giving accommodation for about 100 persons.

The whole of the basement story (which, from the nature of the site, will be clear of the ground on all sides) is occupied by a range of classrooms, ten in number, and some of them of very large size; also by a tea-room, 50 ft. by 18 ft., and a residence for the hall-keeper. Separate entrances to this story are provided on the plans.

The building is so arranged that the Mechanics' Institute, the school of art, and the lecture-hall may be in operation at the same time, and yet not interfere with each other.

Externally the building will be in the Gothic style, built of stone, and with ashlar quoins and dressings.

The principal entrance will be under a tower (rising to the height of nearly 100 ft.).

The contracts for the erection have been chiefly taken by Keighley contractors, and the estimated cost with the land is about 12,000l. The architects are Messrs. Lockwood & Mawson.

Baths and Washhouses.

The erection of baths and washhouses for the township has just been commenced by the Board of Health, under the same architects. The accommodation provided will consist of a central office, with separate entrances and waiting-rooms on either side of the baths; two men's tepid swimming-baths (first and second class), each 60 ft. by 30 ft., with open-framed timber roofs and top lights; four first and nine second class men's slipper baths. On the upper floor and approached from either entrance (so as to be used by either sex on different days), will be a suite of Turkish baths, with a first and second class tepidarium, frigidarium, and caldarium complete to each.

The washhouse will comprise thirty double wash-tubs, each supplied with steam and hot and cold water, and with drying closets, and all requisite appliances to correspond. An engine and chimney, and a suitable residence for the attendant in charge, will complete the arrangements.

The building is Gothic in style, and the large inside baths will be treated to correspond. The contractors are wholly Keighley men; and the cost, exclusive of the ground, will be about 7,000l.

THE GUILDHALL, LONDON.

We described some weeks ago the window, executed by Messrs. Clayton & Bell, which has been set up in the Guildhall by the operatives of Lancashire. We may repeat that the window is divided vertically by two main mullions into three sections, the central division being subdivided into five lights, the sides into two each. The copulet division on the north side contains figures of Lancastrian worthies, and in the similar division on the south side are introduced worthies of the City. The subject of the lower tier of the central portion of the window is illustrative of the rebuilding of the City by Alfred the Great, that of the upper tier being devoted to the subject of the grant of the charter to the City of London by William I. In both cases the figures of the kings occupy the central light, the figure of the Conqueror being shown in the act of presenting the charter, which has been reproduced in the glass from the original in possession of the corporation. The two figures in the side division on the north side are full-length portraits of Sir Richard Whittington and Sir Thomas Gresham; those on the south side being of John of Gaunt (Duke of Lancaster) and Sir Thomas Stanley. Whittington, by the way, holds a skull instead of his better known insignium, a cat. At the base of the window runs the following inscription:—

"The grateful memorial of the operatives of Lancashire and the cotton manufacturing districts to the Mansion House Relief Committee, who, as saviours of a world's benevolence, distributed to them more than 500,000l. during the cotton famine, 1862-5, namely, William Cabitt, Lord Mayor, William James Richmond Cotton, Charles Barber, William Morley, John Armitage, G. Howes, Francis Lyett, and Simeon Dillencroft; with Lord Mayors William Anderson Rose, William Lawrence, Warren Stormes Hale; and Joseph Gibbs, Secretary."

The window has a certain tameness. The figures of the worthies in the side divisions are larger than those of the kings in the central groups; and the feet of many of the figures are outrageously large. Nevertheless, it is a very handsome and interesting work. The ugly glass in the west window should be removed at once; its vulgarity is now more than ever apparent.

The costly work, upon which the Corporation of London have been engaged for nearly five years, in Guildhall, is now approaching completion. From first to last in that time the Court of Common Council will have expended upwards of 50,000l. upon the undertaking, the finishing stroke to which is being given by the erection of a carved oak screen, and a dais at the eastern end of the hall, at a cost, included in that sum, of 2,400l. The subject of the restoration was first mooted in the Common Council in July, 1862, on a recommendation, which was adopted, of the City Lands Committee that the then roof of the Guildhall, which was flat and unsightly, and to which we had often objected, should be replaced by an open roof, in accordance with the original architecture of the hall. In May, 1865, in addition to grants previously made, the Court voted 1,200l. for the erection of a lantern and spire to the roof, and authorised the additional expenditure of 4,800l. odd in rebuilding four of the turrets of the hall and two of the pinnacles, and 3,080l. in restoring and repairing the internal stonework of the tracery under the windows. The Minstrels' Gallery, constructed of oak at the western end of the building, has cost 1,200l.; and the construction of staircases in the turrets to afford access to it 250l. The necessary works for lighting and warming the building have cost upwards of 2,430l. The repairing of the hall and other incidental works have involved an outlay of 1,358l. odd, and the lowering the monuments of Nelson, Wellington, Beekford, Pitt, and Chatham, which had become necessary, about 470l. The contractors from the first have been Messrs. Myers, and the works have been executed from designs by Mr. Horaco Jones, the City architect.

THE PALMERSTON MEMORIALS AT ROMSEY.

THESE memorials have now been inaugurated. The day was kept as a holiday in the town. Earl Granville and other members of both Houses of Parliament were present, but neither Lord Russell nor Mr. Gladstone was there. The statue occupies the exact centre of the market-place. A solid bed of concrete forms the resting-place for the statue. In digging out for the concrete some of the brickwork was discovered which, nearly fifty years ago, formed part of the then town-hall and market-house. On the concrete a few rows of bricks are laid, and on these a large piece of granite rests, surmounted by another piece, somewhat smaller. Both these pieces are rough at the sides. Next comes a flat piece of polished marble, bevelled at the sides. On this is a shaft of the same material, equally highly polished. On the front of this shaft, facing the Hundred, is merely the word,—

"PALMERSTON."

And on the opposite side are the words,—

"Born, 1784;
Died, 1865."

This is all the inscription the statue bears. The shaft is surmounted by another piece of scolloped marble, which gives the pedestal a complete appearance. The figure is a bronze one, about 9 ft. high, and has been cast from the precast gun-metal that could be found, by Messrs. Prince & Co. of Southwark, from a mould prepared by Mr. Noble. The right hand is slightly extended and open to a considerable extent. The countenance or likeness is considered to be good.

The triplet of lancets, also erected as a memorial of the statesman, in the west end of the Abbey Church, is of great size, the centre light being 39 ft. by 5 ft. 7 in., and the two side lights 36 ft. 6 in. by 4 ft. 2 in. each. The window has been designed by Messrs. Clayton & Bell, to exemplify the idea of Government descending from heaven to earth. In the upper portion of the three windows is a representation of the highest idea of rule—the Lord Jesus Christ sitting on the throne of glory, surrounded by adoring saints and angels. Below are three subjects from the New Testament, showing acts of power and teaching; namely, our Lord feeding 5,000, the Sermon on the Mount, and the Tribute Money. Below these, again, are three subjects from the Old Testament, illustrative of power and government; namely, Joseph distributing Corn in Egypt, the Judgment of Solomon, and Daniel as ruler. In the lower tier are figures showing allegorically three modes of action in which an

earthly ruler may beneficially exercise his power:—1. In preserving peace and plenty; 2. In making war in defence of his country and of a right cause; 3. In breaking fetters and liberating captives; and at the bottom are the heraldic bearings of Lord Palmerston, and the following inscription:—"In memory of Viscount Palmerston: obit 1865." Beneath each of the Scripture subjects is a descriptive Latin text. In an arched dividing the subjects horizontally are demi-figures of patriarchs, prophets, kings, apostles, and saints.

HEALTH OF GUILDFORD, SURREY.

A RESIDENT in Guildford writes to us,—It is reported here that the fever has broken out very badly at Guildford again. It will be recollected that Mr. Buchanan was sent down from the Privy Council Office to investigate the probable cause of the last outbreak, and which was considered to be caused by the quality of the water supplied to the town, and remedial measures were supposed to have been taken.

I do not know what they will call the cause of the outbreak now. Can it be the great heat, evaporating the sewage which for ages has been saturating the soil and the underlying chalk.

Guildford is not drained. The sewage runs into cesspools, and probably filters through them to a considerable extent. There is a drain runs down some of the streets to take the rainfall from the street gullies, and I have heard some house-drains have been connected to it. There are a good many cellars in some parts of Guildford, and if they are not well ventilated and drained it does not improve the sanitary condition of the place, especially if the soil around the cellar be saturated with sewage.

I think it is likely there may be another official inquiry as to the cause of the outbreak. I do not think fever has ever been absent from the village of Compton, near Guildford, since June, 1867; and no doubt defective sanitary arrangements are the cause. At Dunstable, Beds, it is usual to turn the night-soil and sewage into the cesspools, and dig a fresh one every time the old one gets filled up,—consequently low fever is very prevalent in the town.

NEITHER LIGHT NOR SOUND EXCEPT TO EYES AND EARS.

HAVING read your review of Mr. Benson's "Principles of the Science of Colour," which I soon hope to have the pleasure of reading, I am still impressed with the belief that considerable misconception regarding the theory of colour arises from not pushing our present advanced physical and physiological theories of light and sound to their ultimate conclusions, or it would be perceived that all differences in musical notes and colours are fundamentally due to quantitative or proportional differences. The proximate cause of every colour, according to received theory, is, externally to the sentient being, an undulation of a certain length and velocity, nothing more,—just as the cause of a musical sound in the ear is proximately a certain mechanical vibration of the air. Notes and colours are the effects of these, on, and modified by, living organs; there is neither light nor sound independently of eyes and ears: if there be, we have yet to find the true theories of music and colour, for vibrations would clearly not then be the proximate causes they are now considered: the vulgar error lies in supposing colour to inhere in the vibrations themselves, and that it has the same objective existence that it appears to sense. No received physical theory does this. Vibrating force, then, is the real and sole primary of colour, and it is its variations which fundamentally produce all differences of colour: fundamentally these are differences of degree only, and not of kind. Primarys, secondarys, and tertiarys are verbal distinctions given to the phenomena produced by these mechanical vibrations in us. We do not say that these verbal distinctions are needless, so long as it is remembered that no colour is radically different from another, but that the difference is only a difference of measure.

On the subject of compensation, it appears to me that the largest generalization is the best, for fortunately every colour sensation can be tested, and its true compensation be found, by experimenting with the eye. But the old error creeps in here, and the compensating colours

are discoursed upon in treatises, as if they had objective existence.

The great law of compensation which pervades nature is this:—Let

$$0, 1, 2, 3, 4, 5, 6, 7-8-9, 10, 11, 12, 13, 14, 15, 16,$$

represent the limits of a scale of variation, then we have these compensating pairs, starting from the mean or central eight 9 : 7, 10 : 6, 11 : 5, 12 : 4, 13 : 3, 14 : 2, 15 : 1, 16 : 0; the sum and the mean of every pair being the same. The law may be expressed more intelligibly thus:—Any aberration from a mean state must be compensated by a corresponding one of an equal but opposite kind, which shall re-establish the mean or balanced state.

I believe that colour is the result of a disturbance of the mean state of solar vibration by the prism, or other means.

W. CAVE THOMAS.

THE GREAT PYRAMID AND LINCOLN'S-INN-FIELDS.

IT is commonly reported that the area of Lincoln's-inn-fields is the same as that of the base of the Great Pyramid of Giza; but until Colonel Vyse dug down to the base of that most ancient of structures and found the casing stones, no very accurate account of its dimensions could be given, and, consequently, no very accurate comparison could be made between its area and that of Lincoln's-inn-fields.

I enclose the dimensions of the exterior of the Great Pyramid as measured by the engineer Perring, for Colonel Vyse, with an outline in red ink of the figure of Lincoln's-inn-fields, and a scale of feet as given in the "Plan of the parishes Bloomsbury and St. Giles-in-the-fields, surveyed by J. G. Mair, esq., M.R.I.B.A." Drawn to the same scale, in black ink, is an outline of the base of the Great Pyramid of Giza, of which the superficial area is 583,696 ft., and of Lincoln's-inn-fields 511,116 ft., which leaves an excess in favour of the Pyramid of Giza of 72,580 ft.

If one side of the base of the Great Pyramid of Giza be placed against the wall of the houses on the north side of Lincoln's-inn-fields, the corner touching the garden wall of Lincoln's-inn on the east side of the area; the opposite line of the base of the pyramid will exceed the Fields by a parallelogram containing 72,580 superficial feet; no insignificant property when the new law courts are built.

Present base of Great Pyramid of Giza	736 ft.	Former base, &c.	764 ft.
Height	459 ft. 9 in.		480 ft. 9 in.
Diagonal	668 ft. 3 in.		611 ft.

You will perceive by these measures that about 10 ft. of the crust of the pyramid have been removed from each face, and this work of demolition is still going on; for a rude kind of vase, for pounding the indigo plant in, is made of blocks about 3 ft. high and 2 ft. wide by an Arab mason, whose shop used to be, at the time of the Prussian mission, on the south side of the monument.

JOSEPH BONOMI.

THE BELLS OF THE CHURCH OF ST. MARTIN-IN-THE-FIELDS.

THE steeple of St. Martin's Church is furnished with a fine peal of twelve bells in the key D, the weight of the tenor being 32 cwt. There is also a Priest's bell in the steeple.

The bells are severally inscribed as follows:—

1. Cast by A. R. 1753.
2. E. Hart and W. Chapman, churchwardens. T. R. 1770.
3. Cast by A. R. 1753.
4. [Glory to God in the highest], and on earth peace. 1725.
5. Peace on earth, and good will towards men. 1735.
6. Abraham Rudhall cast: all of us. 1725.
7. Prosperity to all England. 1725.
8. Peace and good neighbourhood. 1725.
9. Prosperity to the parish of St. Martin-in-the-Fields. 1725.
10. Fear God and honour the King. 1725.
11. John Walker and John Sawyer, churchwardens. 1725.
12. Rev. R. Pearson, D.D. vicar. Walter Turner and W. House, churchwardens. 1733. Priest's Bell. A. R. 1725.

The old church, which was taken down in 1720, had a peal of six bells. The present edifice, by Gibbs, was consecrated on the 24th of October, 1726, and according to an item in the account of Mr. Walter Turner, church-

avail themselves of in the town, such as the noble institute, the Fine Arts Gallery, & other admirable centres of education, which are the principal means of lifting men from the degrading position of serfs, and making them members of the highest and most respected members of society. And not only themselves would be benefited thereby, but it would be the means of keeping their children in that state of ignorance which the selfish and sordid-minded aristocracy would like to see. The builders do not let the public know that we do not object to the stone being scabbled out to skeleton moulds at the quarry. The wages are lower in those districts, and they get less done in the same time, so that it is a great loss to the employer. The old custom of our trade to work the stone at the building affords more time for it to become seasoned, and enables the architect or clerk of the works to better judge of the quality of the material, and to guard against all rents and abakes, which could not be so well detected after being worked at the quarries and exposed to the atmosphere and dirt in its transit to the building. In the end, our worked stone will prove the most economical and advantageous to the public."

The "Rattening" Case in London.—In reference to this case the *Forcaster Herald* says,—

"Mr. Potter took upon himself the responsibility of stating that trades societies do not object to piecework; that the societies name the minimum price of labour; and further, that the mere fact of a man being a member of a workman, Mr. Gladstone will not see that Mr. Potter and the delegates were deceiving him. The men themselves are now openly denouncing piecework, and threatening their employers with the horrors of the rattening system unless they accept a labour tariff dictated by only one party to a contract supposed to be entered into for the production of mutual advantages to all concerned. Mr. Potter informed the committee that payment by piece was impracticable in some trades and he may be right, but in most trades it is the fair system, we might almost say the only fair system. But it is not because payment by piece may be impracticable in some trades that the societies actually look; if not, why do they denounce the piecework system? Skilled workmen have a right to be consulted before such a system is adopted. How can mere men, who are not the masters for which an employer of labour has a right to look? Do candidates for admission to trade societies undergo an examination, or submit their names to a committee of experienced workmen, before they are admitted? We limited a number of his trade society without reference to his respect, upon his furnishing proof that he has served as an able worker under the system, or fulfilled certain requirements in which time and the payment of subscription were spread all over the workmanlike capacity."

Let us hope that these cases of "rattening" will be repudiated by the majority of the trade societies, and that philosophers and philanthropists will be left to carry out their good intentions, and so unite the interests of capital and labour that all remembrance of disputes between employers and employed may be lost in complete restoration of mutual goodwill and mutual confidence.

THE PROPOSED LAW COURTS.

A FORMAL protest against the injustice of the award as to the appointment of the architect of the proposed Law Courts has been forwarded by Mr. E. M. Barry to the Treasury, requesting our attention to it. Mr. Barry says,— "It seems to me that the question of a just or unjust termination of so important a competition possesses an interest and involves a warning to the profession at large, less than to myself." We think so too, as we have already said, and should feel surprised but for past experiences that the profession as a body have not uttered a strong protest against the decision that has been arrived at. If Mr. Street had been treated as Mr. Barry has been treated, we should say precisely the same thing. The strongest evidence was borne to the correctness of our views by the late Lord Haverwall, who signed the conditions as Lord Chancellor, under whose auspices they were used thus signed to the competitors, and whose authority respecting them cannot therefore be disputed. His Lordship stated—

"It was due from him to Mr. Barry to say that he was perfectly right in representing that the instructions given to him were to attend almost exclusively to matters of general accommodation, convenience, and arrangement, and was due to Mr. Barry to remind their lordships of the confidence given to all questions of internal arrangement. It was also due to Mr. Barry to say that Mr. Street should be the architect of the National Gallery, and that Mr. Barry ought to construct the Courts of Law."

Mr. Barry in his protest says,— "The conditions provide, (1), that the architect who all acquit himself the best shall be appointed; they point out, (2), that, in deciding who is the best, 'utility is to be the chief consideration; and that the arrangements shall be considered paramount, convenience, and arrangement, and they further provide, (3), that the decision on these points shall be left to the judges appointed by the Government to be a final."

With reference to any claims of other competitors, and the remarks on my prejudice, contained in Mr. Street's recent memorandum, I think it right to remark emphatically that such claims and remarks are based entirely on departmental reports by committees and others who were not the judges, but only some of their professional advisers, and that I rest my claims on the decision arrived at by the judges themselves, with the opinions of all their advisers before them, that "Mr. Barry's design is the best in regard to plans, and the distribution of the interior." This decision we were promised should be final, and it is not necessary for me to defend it. I may, however, quote, as illustrating it, the separate report of Messrs. Shaw and Ewbank assigning to me a preference under forty-one heads against three in favour of Mr. Street, and including in the former every one of those points which the competitors were told were of vital importance, such as light, air, quiet, access, staircases, general arrangement, &c. This report in no way supercedes, though it serves to explain, the decision of the judges, by showing in detail the views entertained by the two professional judges who may be supposed to have special qualifications.

Few non-professional persons can have a just idea of the amount of time, labour, and anxious study I have found it necessary to bestow on this work, so as to provide conveniently and satisfactorily for the vast extent of accommodation required, the printed details of which extend over eighty-three foolscap pages, and include sixty-six schedules, with twenty-four cuts, and more than 1,000 rooms.

I did not hesitate to incur the anxious labour of this competition to the detriment of my private engagements, because I relied implicitly on her Majesty's Government to carry out strictly and equitably the promise which they had made in order to obtain my designs, and because I felt sure that they would recognise the moral claims as well as the legal rights of the competitors. It did not occur to me as possible that the Government could allow me to so devote myself, and, after having received from me all I had to give (viz. my designs), and being thus in possession of all the advantages of the contract between us, would declare that they do not on their part consider themselves bound to keep their engagements, on the faith of which my designs were furnished, but hold themselves free to disregard the decision of the judges, who they promised should be final, and to make any appointment they may think proper as if the conditions had never been written and issued under the auspices of a Royal Commission, with the signature of the Lord Chancellor (Lord Cranworth), formally attached to them."

The course which has been taken is not only highly injurious and unfair to Mr. Barry, but is calculated to have a most prejudicial effect on the public interest; for it is difficult to see how, in the event of future competitions, it will be possible for architects again to repose confidence in the just and equitable adherence of the Government to the conditions prescribed by themselves, and agreed to by the competitors as a contract between the two parties. Is it yet too late to obtain justice?

HARBOURS AND DOCKYARDS.

MEMORANDA by Lieutenant-Colonel Clarke, R.E., director of works, have been issued among the Parliamentary papers, explanatory of vote 11 of the navy estimates. From these memoranda we make a few extracts, first remarking that the votes asked for Deptford, Woolwich, and Sheerness Dockyards are, looking to the proposed eventual suppression of those establishments, limited to such sums as are requisite for the maintenance of the existing structures, and for the effective and economic completion of the current work on the building, repair, and fitting of ships, until the new works at Chatham are sufficiently advanced to admit of those services being undertaken at that yard:—

Chatham Extension.

My estimate of January, 1868, for the execution of the works approved by Parliament in connection with the extension of Chatham Dockyard, amounted to 1,750,000*l.*, to be reduced in proportion as convicts are more or less employed. The further experience we have had in dealing (as we have been doing) with a treacherous and uncertain soil, leads me to hope that it is correct. Up to this date 540,000*l.* have been expended, of which 265,000*l.* have been paid for the supply of plant and material for the employment during the last year of from 700 to 1,100 convicts, whose labours are supplemented and led by from 250 to 350 free artificers and labourers.

Portsmouth Extension.

The Admiralty did not obtain final possession of the site for this work till 1856, and the first contract was let from April 1st, 1857, the necessary preliminary work of making a new boundary wall having been done in the interim. Arrangements for the yield of not less than 20,000,000 bricks a year by convict labour have also been made, and that number will this year be produced. Five hundred and seventy convicts are employed in brickmaking; the remainder, being artificers, are occupied in preparing plant, and in making and repairing tools, &c. Their labour has been supplemented by twenty steam-engines, applied to brick machines, pile-engines, mills, lifts, &c.

Devonport and Keyham.

At Devonport and Keyham the proposed expenditure this year is confined to what is required for additional machinery and the current charges for the efficient working and maintenance of the establishment.

Haulbovins.

The Irish Government, since November, 1867, having increased the number of boats from 275 to 460 men, with 100 free artificers and labourers, these works are now making better progress. Tenders have been invited, and are under consideration, for the construction by contract of the eastern wall and embankment. The expenditure so

far incurred amounts to 26,000*l.* (including 500*l.* for the purchase of Rat Island, which was private property), of which 7,000*l.* have been repaid, as usual travellers, steam pile engines, pumps, &c., and 13,000*l.* for timber and material, 5,000*l.* for the wages of free mechanics, and 1,000*l.* for superintendence. Workshops, stone-cutting sheds, and covered travellers have been erected, and the requisite rails laid down. By a timber viaduct, 3,500 ft. in length, I have connected Haubovine with Spike Island, to avoid the difficulties and danger of bringing the prisoners to the works in boats.

Portland.

For Portland harbour, which may now be regarded as the head-quarters of the Channel fleet, and which will probably become, in time of war, the point of departure and rendezvous for our fleet when taking the sea against an enemy, rapid and most efficient coaling arrangements are wanted, and a sum in the current year amounting to 2,000*l.* has been taken for commencing them.

Marine Barracks.

The extension of and sanitary improvement to the several marine barracks, which have of late years required large votes, are now approaching completion, and the sum asked for this year is limited to 15,000*l.*, the principal item being 3,000*l.* towards the erection of quarters for married marine soldiers, and 6,000*l.* towards the additional accommodation for officers and men at Plymouth.

Gibraltar.

At Gibraltar convicts only are employed, and the sum taken is limited to the amount sufficient to provide plant and a small number of free artificers for the further progress of the mole on the east side of the Naval Harbour. A mole has also been proposed on the north side, but the details have not yet been prepared.

CASES UNDER BUILDING ACT.

Clerkenwell Police Court.—On Friday, the 24th instant, Mr. Albert N. Bryett, builder, of 116, St. James-road, Holloway, attended at this court to answer a complaint preferred against him by Mr. John Turner, district surveyor of the eastern division of Islington, for erecting a building at the rear of No. 36, Grove-road, without first having given two days' notice to him, as required by the 38th section of the Metropolitan Building Act.

This case had been adjourned on two previous occasions, to enable the defendant to receive a reply from the Metropolitan Board of Works, to a complaint he had filed in reference to the proceedings taken by the district surveyor in respect to the said building.

Mr. Joseph E. Turner appeared for the district surveyor, and Mr. Hickette for the defendant. It appeared that on the 23rd of April, 1867, notice was given by Mr. Bryett, of his intention to erect six houses, shops, and additions in the Grove-road. The size of each of the proposed buildings given in the notice was equivalent to an area of 540 superficial feet. In November last the roof of the house, No. 36, Grove-road, was covered in, and the building as then carried out, was found to contain an area of 586 superficial feet. In the month of January last the district surveyor had occasion to visit the premises, when the house was occupied, and an oven had been erected by another builder; and on the 27th of April, 1868, he discovered the building in question began at the rear of the house, and for which he required notice, which had not been given. The sections relied upon by the solicitor for the district surveyor, were the 9th, 27th, 38th, 40th, 41st, &c.

On the part of the defendant, it was contended that works were going on from time to time on this and the other houses included in the original notice, and that even at the present time all the houses were more or less finished, and that the building in question was simply a coal cellar, of about 7 ft. high, and was included in the description of additions contained in the original notice of the houses. He also contended that although this house was "covered in" at the time stated, yet as the remaining houses, for which notice had been given, were not in such a forward state, this house could not be considered to be completely finished, and that according to one of the interpretation clauses of the Act, the term "area" of a building was not to include "attached buildings" the height of which did not exceed the height of the ground story.

The magistrate (Mr. Barker) decided that as the house was proved to have been covered in at the time stated, and taking into consideration that the area given in the notice for the houses was considerably exceeded, although the other houses might not have been completed at the same time as No. 36, Grove-road, yet to be in all respects and purposes each house, although included in one notice, must be considered as a separate building; the rules of the Act applied to each individually, and the work complained of having been commenced after the roof of the house No. 36, Grove-road, had been covered in, notice should have been given to the district surveyor. He should, therefore, impose a nominal penalty of 5*l.*, and award 2*l.* 2s. costs.

Mr. Ricketts stated he was instructed to ask for a case, which was granted.

The district surveyor's solicitor informed the magistrate that the decision of the Metropolitan Board of Works on the complaint made by Mr. Bryett was in accordance with his (the magistrate's) decision.

THE PROPOSED NEW MECHANICS' INSTITUTE AT BRADFORD.

The contract by which the Corporation of Bradford dispose of 1,000 yards of land at the corner of Bowling-green and Tyrell-street, at the price of 12*l.* 10s. per yard, for the erection of a new building in place of the present Mechanics' Institute, has been completed. Messrs. Andrews, Son, & Pepper, architects, Bradford, have been selected to prepare the designs.

MONUMENTAL.

In the House of Commons, Mr. Roebuck, after making some remarks very eulogistic of the late Lord Brougham, asked the Premier whether it was the intention of the Government to erect a monument in Westminster Abbey to the memory of that illustrious man. Sir G. Bowyer said he hoped that his lordship's remains would be brought from Canaan and deposited in the abbey. Other members spoke, including Mr. Gladstone, and Mr. Disraeli said that the Government were considering the best means of doing honour to the memory both of Lord Brougham and of Professor Faraday, and explained that the delay had been occasioned by the lamentable decline in this country of the sculptor's art.—It has been determined by the subscribers to the original fund for the memorial of the late Lord Holland in Westminster Abbey to devote the sum remaining, which amounts to about 2,600*l.*, to the erection of a statue of his lordship on a site offered by Lady Holland on the south side of Holland Park, adjoining the Kensington-road.

FROM SCOTLAND.

Edinburgh.—The foundation-stone of the first Established Church which has been built in Edinburgh since the Disruption in 1843, has just been laid. The edifice, named the West Coates Church, is intended to supply a want which the increase of population in the western part of the city has created, and its provision is the result of public subscriptions. There are already two Free Churches in the district—the Roseburn Church, built some time ago at a cost of 4,000*l.*; and Free St. George's in Stafford-street. The estimated cost of the structure is 7,500*l.* Of this sum rather less than 2,000*l.* only remain to be collected, the public subscriptions amounting already to 3,000*l.*, and a donation of 2,500*l.* being contributed by Donaldson's Hospital, for accommodation to be afforded in the church for the inmates of that institution. The site of the church is on a piece of ground belonging to Heriot's Hospital, adjoining the east corner of the Donaldson's Hospital ground, but separated from it by a road leading to the proposed fencing ground, and by a belt of plantation. The edifice is being built according to plans by Mr. Bryce, architect. It is of freestone, in the later style of Pointed Gothic, and to some extent will be cruciform in plan. The centre portion or nave is allotted to the general congregation; and the two aisles, with the galleries in the aisles, are to be appropriated by the inmates of Donaldson's Hospital. The church will be entered from the Coatbridge road, and exit doors from the galleries will be provided on either side for the general congregation. The entrances to the transepts are provided for by octagon turrets with staircases. Towards the front the structure is gabled; and there will be a spire and tower rising to the height of 130 ft. The tower is in three stories, the first story being lighted by a traceried window, and the upper stories by triplet lancet windows. The spire is pierced by two stories of spire-light windows, and is surmounted by an ornamented finial and vane. The roof is in a single span, framed with main complets. The seats are not to be enclosed with doors, but are to have open bench ends, and they will be wider than the seats usually are in Presbyterian churches. The pulpit is to be placed at the north gable, and behind it will be a vestry and other accommodation. The pulpit and platform in front of it will be panelled, as will also a portion of the wall behind. This north wall will be lighted by a rose window immediately above the pulpit, and by two side windows. The church will accommodate 900 persons; and the estimate of the total cost of the building already given includes all outside work.

Perth.—A grand Masonic demonstration has taken place at Perth, upon the occasion of laying the foundation-stone of Messrs. John Shields & Company's new power-loom weaving factory. The buildings, now in course of erection, are situated on the property of the Earl of Kinnoull, at Balhousie, a short distance to the north of the Perth Cavalry Barracks. When completed, the factory buildings will cover upwards of five acres of ground, and contain 400 looms, as also refreshment and reading rooms for the workers, and the usual necessary adjuncts to so large an establishment. The total cost of the erection of the factory will be about 20,000*l.*

Dumfries.—The foundation-stone of a new United Presbyterian Church has been laid at Waterbeck, near Keithbridge, Dumfries. The church, which will accommodate 331 sitters, will be in the Early English Gothic style, and will be formed of nave and transepts. The site is a short distance to the north-east of the present church. A manse is also in course of erection. The sites and the whole of the stone required for the buildings have been given free of charge. The cost besides is estimated at 1,868*l.*

CHURCH-BUILDING NEWS.

Hale, near Farnham.—Hale Church, built about twenty years ago, in the Norman style, and which had a north aisle added to it in 1861, has recently been again enlarged by the prolongation of the chancel, and by a chancel aisle. A western porch has likewise been built. Messrs. Goddard & Son, of Farnham, were the builders; and Mr. Ferrey, the architect.

Ashwell, Herts.—St. Mary's Church has been re-opened. The successive efforts at restoration made during the incumbency of the present rector have been directed towards beautifying the interior without destroying the original Gothic character of the building, and these are now completed; though a large expenditure is necessary to repair and arrest the ravages of time upon the work done by the Freemasons of the thirteenth century. Soon after the appointment of the present incumbent, the Rev. H. W. Hodgson, he set to work to restore the chancel, and this was effected for 330*l.* Subsequently the rector's father (Mr. C. Hodgson) restored the south porch at a cost of 120*l.*, hoping that this might lead to some more extensive improvements. The churchwarden (the late Mr. John Sale) about the same time paved the whole of the nave with York stone, and not long ago a painted window was placed at the east end of the south aisle by Mr. C. Tilling, to the memory of his wife. During the past year still further alterations have been made. Supported by his parishioners and other friends, the rector has been enabled to place an organ in the church, at a cost of about 400*l.* Under the advice of Mr. Shilcock, of Hitchin, architect, they removed all the old pews, substituting open seats, which have been made by Mr. Seymour, of Hitchin. The expenditure for this and some extras is estimated at 400*l.* In addition to this Mrs. Hodgson has presented the parish with a stone reredos, the centre panel of which contains a sculptured representation of the Lord's Supper, from the painting of Leonardo da Vinci; the design was furnished by Mr. A. Asplint, architect; and the stonework was executed by Mr. James Chapman, Lambeth-road. The cost was 80*l.*

Tunstall.—The new cemetery, which has been prepared for the town of Tunstall, or rather the Episcopal portion of it, has been consecrated by the Bishop of Gibraltar. It is on the slope of a hill on the west side of the town, and close to some large ironworks in the valley below. The cemetery is enclosed at present by a light iron fence, and has been laid out by Mr. Matthews, of Milton, from designs prepared by Mr. R. Dain, architect, Burslem, the walks and drainage being done by Messrs. Smith, Hanley and Newcastle. The extent of the cemetery is about seven acres, the land having been purchased from Messrs. Williamson and Mrs. Clive, at a cost of between 3,000*l.* and 4,000*l.* The chapels are not to be erected until time has been allowed for the subsidence of the ground from mining operations. About half the ground has been set apart for the burial of persons according to the rites of the Church of England.

Lichfield.—The foundation-stone of a memorial church to the Right Rev. John Lonsdale, D.D., late Bishop of Lichfield, is to be laid in the cathedral city, by the Right Hon. the Earl of Lichfield, the lord-lieutenant of the county of Stafford, assisted by the Right Worshipful G. S. Tindor, D.G.P.M., and the principal grand lodge of Freemasons of Staffordshire. After the ceremony there will be a public luncheon at the Guildhall, under the presidency of the Earl of Lichfield.

Iveggill.—The newly-erected church at Iveggill has been consecrated by the Bishop of Carlisle. The church is called Christ Church, and has been built at the sole expense of the Rev. A. E. Hutton, of Stockdalewath, the incumbent of the chapelry, from the designs of Mr. R. J. Withers, of London, who superintended the work. It is a

small edifice, and outwardly presents few attractive architectural features. It has, however, the advantage of being very pleasantly situated. The church, which is Geometric, and capable of holding 116 persons, consists of a nave, a chancel, south porch, vestry, and heating chambers underneath, and at the west end rises a bell spirelet of white shaw stone pierced by three louvres. The interior is decorated with windows in the nave and chancel are filled with stained glass, by Mr. A. O'Comer, of London. The east window has three lights, and is filled with a representation of the Last Supper, the small round lights above are delineated angels adoring, and the lamb and flag. The lower part of each panel is filled with traces. The two west windows, both of which have two lights, contain pictures of the Evangelists—the four major Prophets, Isaiah, Jeremiah, Ezekiel, and Daniel. The reredos is of oak, nine panelled compartments. Six contain zinc panels, illuminated, the Ten Commandments. These are the workmanship of Mr. Creighton and Mr. Scott, of Carlisle. The pulpit and font are of stone. These, as well as the general details of the church, have been executed from designs furnished by the architect. The contractors for the building of the church were Messrs. Robert Hope and George Little, of Dumfries. The church is faced with white shaw stone, but is chiefly built of Iveggill stone from the quarries of Mr. Thomas Nelson, of Penrith, who gave the stone not only for the church, but also for the parsonage-house now in course of erection near the edifice.

Montgomery.—The works in the parish church which have been in progress during the last four or five months, are now nearly complete. They include the restoration of the Perpendicular west window, which was in a very dilapidated and dangerous state. The whole of the stone work has been removed and replaced by new work, exact facsimile of the original, and filled with cathedral tinted glass. In addition to this, the roof timbers of the nave, which are of oak, had been cleansed of the coat of colour with which they were covered, and scraped and oiled. The roof is of open work, both in the west end of the nave, and in the chancel, with a wagon roof in the east end or intervening portion of the nave, the intersections of the woodwork of the latter having coloured bosses, which have been restored and recoloured. The red sandstone quoins of the windows of the nave, the north transept, and the Lymore Chapel, and the stonework of the west door, have been scraped, repointed, and restored. The Earl of Powis has alone borne the expense attendant on the works in the interior of the Lymore Chapel, including the removal and underbuilding, and restoration of the pillars and arches, which separate it from the nave. The exterior of the chapel has also recently been restored at the cost of his lordship. In cleansing the interior of the walls of this chapel, from the whitewash with which they were covered, curious old painting was discovered, representing the Resurrection; and it is still exposed. This chapel, which contains a piscina and sun-dial, has a gable window, the only existing remains of its former use as such are two very old runcumbent male figures in armour, but without record of either name or date, and a monument to Sir Richard Herbert, and his wife, the parents of Lord Herbert, of Chirbury, and George Herbert, the poet and divine. The whole of the works have been carried out by Mr. Morgan, of Llandinam, under the superintendence of Mr. Edward Haycock, junior, of Shrewsbury, who Lord Powis had previously employed in the restoration of the exterior of the Lymore Chapel.

Hungerford.—The foundation-stone of a chapel of ease to the parent church of Hungerford has been laid at Eddington. The site, an elevated one, on the east side of the turnpike road leading to Hungerford and Newtown, had been presented by Mr. W. Honeywood, of Chilton Lodge. Mr. Thomas Woolbridge was the contractor. The edifice is erected in the Gothic style of architecture from the design of Mr. A. W. Blomfield, of London, the material being coloured bricks with Bath stone dressing. The length of the building is 84 ft., and the width 37 ft., and it consists of chancel, nave, and south aisle, the latter being divided by stone pillars, with carved capitals and brick arches. There are open benches of stained deal, affording accommodation for 250 persons, but on an arrangement with chairs, the building would comfortably contain a congregation of nearly 350. The east window is painted the subject being "The Ascension;" it was inserted as a memorial of the late Mr. Mitchell

In the chancel are other windows of painted glass, whilst the body of the church is lighted by seven windows with mullions and tracery. The main roof is open-work, and plain; that of the chancel, however, is decorated with emblems of the Passion. In the chancel are stalls for the clergy and the choir, and the flooring consists of Minton's tiles.

Books Received.

On Aniline and its Derivatives. By M. RIEMANN, P.D., &c. With an appendix. Revised and edited by WILLIAM CROOKES, F.R.S., &c. London: Longmans, Green, & Co. 1868.

This is a practical treatise on the manufacture of aniline and aniline colours. It relates entirely to the actual state of the manufacture as adopted on a commercial scale, and to the apparatus in use in manufactories. Such being the case, and although the book is a valuable and interesting one to chemists and manufacturers, it scarcely admits of quotation here, curious and interesting to all though the subject of the beautiful colours and dyes got from coal tar be. The appendix contains the report on the colouring matters derived from coal tar, shown at the French Exhibition, 1867, by Dr. A. W. Hofmann, F.R.S. There is also a useful index to the volume.

Miscellaneous.

MONMOUTH WORKHOUSE COMPETITION.—Strong statements are made, even by one of the guardians, impugning the decision in this competition. Some of the competitors, we are told, have sent in a claim for compensation.

MOULDERS AND THEIR REGULATIONS.—At the Barnsley County Court, George Holden, a moulder at the Thorncliffe Iron Works, sought to recover the sum of 3*l.* 2*s.* 1*d.* from Messrs. Newton & Chambers. It appeared that the amount claimed had been stopped by the defendants on the plaintiff's wages, in consequence of his casting some 18-in. pipes over a given weight. The plaintiff contended that it was not usual to deduct anything from pipes of that size; whilst, on the other hand, the manager produced the books to show that it had been a rule at the works for forty years. The judge gave a verdict for 17*s.*, which was admitted.

THE SEWERAGE AND WATER SUPPLY OF GIBRALTAR.—The works of the main outfall are finished, and the house drainage is being begun. The works for conveying the water from the "Inundation" into the town are making rapid progress. During the operation of driving a tunnel from the Landport ditch towards the inundation, fresh water has been encountered in abundance soaking through from numerous springs. An estimate of the amount of these soakages, both in the tunnel and in another open cutting connected with the same works, has been made, and it is found to yield 1,436 gallons per hour. If it should prove that this stream is continuous, the great problem of the water supply of Gibraltar will be solved, and incalculable advantages must accrue to the whole community. All theories of the geological conditions of the Rock, according to the local *Chronicle*, seem to point to the existence of a large system of internal watersheds.

THE LATE MR. HASSALL, SCULPTOR.—Richard Hassall was born on his father's farm, near Leek. He inclined more to art than agriculture; and at the age of twenty-five entered the Macclesfield School of Art, where he made progress, gained medals and ultimately became an art pupil teacher. Leaving the school at thirty, for two years he devoted himself to wood-carving, stone-cutting, and sculpture. Macclesfield had a poor appreciation for such business, and insufficient patronage drove him nearly to the verge of despair. Two years and a half ago, the head designer and sculptor of the South Kensington Museum died—a man of great ability—and Mr. Hassall was sent for to strengthen the staff there; where he gained the esteem of all who knew him, and his productions were considered of great promise. Last week he died, just as he might have hoped to make this mark. Another designer and modeller (of South Kensington), Mr. Gibbons, was unfortunately drowned a few days ago.

A RECEIPT FOR YOUR LETTERS.—M. Replovsky, deacon of the Russian church at Stutgard, has presented to the Post-office of administration of St. Petersburg a letter-box, organized in such a way that the person who deposits a letter in it receives immediately a ticket showing the year, month, and day of the act. A commission appointed to examine the invention has found it perfectly practical and well suited for the object proposed.

MEMORIAL OF TALFOURD.—A memorial tablet, executed on British plate-glass of large dimensions, has been placed in the Philanthropic Lodge, No. 9, in the town of Reading, to the memory of the late Judge Noon Talfourd, who was a great supporter of the institution. The memorial consists of the arms, crest, and motto of the deceased judge, within an elaborate border. The work is the production of Mr. Thomas Mills, of London, who has just filled the east, west, and south chancel windows, for the church of Pitchcott, near Aylesbury, with stained glass. From the same factory were lately shipped fourteen stained-glass windows, for the church of the Holy Trinity, Port Elizabeth, Cape Town, consisting of figures, emblems, and geometrical patterns, in the style of the fourteenth century.

ARCHITECTS AND THE "ROYAL ENGINEERS."—A few young men are wanted to serve in H.M.'s Royal Engineers, and so bills are stuck about Devonport, showing to what trades they must have been brought up. The bill ends thus:—

- "Men of the following trades are required in limited numbers only, such as, —
 - Shoemakers, height, 5*ft.* 6*in.*
 - Filters ditto.
 - Surveyors ditto.
 - Clerks ditto.
 - Architects ditto.
 - Painters ditto.
- Rates of pay, from 5*s.* 6*d.* to 7*s.* 6*d.* per diem, according to grade and qualifications of trade."

This is rather good news for the rising generation of architects. They now know, and it is not the first time it has been announced in a similar way, that such of them as measure not less than 5*ft.* 6*in.* may get, in her Majesty's service, from 3*s.* 6*d.* to 7*s.* 6*d.* per day, according to qualifications; provided always that there are not too many of them striving for the post. This is certainly encouraging.

PRESERVATION OF BUTCHERS' MEAT.—It seems that Dr. Dewar's patented process for preserving fresh meat, by means of sulphurous acid, was successfully tried in Abyssinia. At a public meeting, not long since, in Sydney, resolutions were passed to raise 9,000*l.* or 10,000*l.* in order to aid a projector in his first experiment for the supply of the English market with Australian meat; and there is said to be every prospect of 300 tons of beef and mutton being soon despatched. We are told that a gentleman in Sydney has discovered a ready and harmless means of freezing the meat. Gases liquefied by pressure absorb an immense quantity of heat, or create an intense cold, when released from this condition. Such gases are introduced between the outer and inner cases of a double cylinder, and (by their release, we presume) the temperature of the inner cylinder can thus be reduced to 100° below zero. Within the inner cylinder the meat is packed, and therefore it never comes in contact with the gas at all. In twelve hours, it is said, 100 tons of meat may thus be completely frozen.

SANITARY REPORT ON MARYLEBONE.—The monthly report of Dr. J. Whitmore, the medical officer of health for the parish of Marylebone, has been issued. As compared with the death-rate of June last year, we find in the present return an increase of 2-3 per 1,000, and which is mainly attributed to the increased mortality from diarrhoea. The sickness returns also give 1,217 new cases of this disease, whilst in the same month last year they were only 645. The unusual prevalence of diarrhoea at the present time is attributed, first, to high temperature; secondly, to rapid decomposition of animal and vegetable matter consequent thereon; thirdly, to sleeping in overcrowded and ill-ventilated rooms under such a temperature; fourthly, to an unusual quantity of mutton fruit; and, lastly, to utter disregard of all care in diet and personal cleanliness among the poor population. To these causes the extraordinary dryness of the season ought especially to have been added, as rain is requisite to wash away the decomposing matter of a hot season. The shameful state of the dustbins of some of the better class of houses is adverted to.

WIMBLEDON LOCAL BOARD.—The Wimbledon Local Board have elected Mr. Chas. Bird, C.E., to the office of surveyor, vice Mr. Bryceson, who has resigned.

WATER.—Sir: During this hot weather pumps in and about London are besieged for the cool refreshing water in the wells. I would caution people not to drink this water, for I have no doubt that sewage percolates into the wells from adjoining sewers and drains. The gravel beds through which the sewage passes may remove the mechanical, but certainly not the chemical impurities. Some years ago people were seized with cholera from drinking water from wells and cisterns polluted with sewage. Housekeepers should also thoroughly wash out and clean the house-cisterns, which generally contain a muddily deposit from the water supply. People are often seized with diarrhoea from drinking water drawn from foul cisterns.—J. P.

CURIOS DISCOVERY OF A FIRE.—The inmates of Barlow Hall, near Selby, a large old-fashioned house, were recently aroused from their slumbers by the discharge of firearms, evidently inside the house. The master of the house, a Mr. Bailey, and his servants at once proceeded downstairs, when they found the kitchen in flames. An alarm was given, and the neighbours rendering every assistance, the fire was confined to that portion of the house. On an examination being made it was found that a hearth in the chimney had been ignited, probably the evening before, and the fire had communicated with other portions of the house, including a closet containing three loaded guns. These were discharged on becoming heated; hence the discovery of the fire.

IMPROVEMENT OF WORKINGTON HARBOUR.—In accordance with a plan prepared by Mr. Rendall, engineer, the trustees of the harbour of Workington, with the consent of Lord Lonsdale, have commenced a work which has long been greatly needed, namely, the improvement of the entrance channel to their harbour. For a great length of time, owing to the accumulation of gravel on the south side, the channel has been so narrow as to render its navigation dangerous, and during storms almost impossible. The old pier is to be extended 60*ft.* The extension of John's Pier is not at present contemplated, but in order to arrest the travelling heath, three groins are to be put up to the west ward of John's Pier. Workmen are also engaged at low water in deepening the entrance to the Lonsdale Dock.

THE NEW LAW COURTS.—In reply to Mr. Alderman Lawrence, the Chancellor of the Exchequer has stated that the plans of the New Law Courts will be settled by the Treasury, with the consent of the Commissioners. With regard to the funds, the Act of Parliament provides that 200,000*l.* he voted in consideration of the surrender by the Government of the buildings by the side of Westminster Hall now occupied by the Law Courts; 1,000,000*l.* were to be contributed from the surplus interest fund of the Suitors' Fee Fund; and the rest was to come out of a fund to be provided by fees paid by suitors, other than those in the Court of Chancery, extending over a period of fifty years. He could not say whether the contracts would be submitted to Parliament, as the final plans had not yet been decided on.

TWENTY-ONE HOUSES BURNT DOWN.—A couple of very destructive fires took place in Devonshire on Saturday and Sunday, part of two remote villages being razed to the ground. The disaster was in each case owing to the ignition of thatched roofs, which in the excessively dry weather are very inflammable. At Colyton ten houses were burnt down, most of the furniture being destroyed; none of it insured. At Collympton eleven houses fell a prey to the flames, which were increased by a large quantity of oils and spirits lodged in the house where the conflagration broke out. The tinder-like roofs of a whole row of houses were in a blaze at once, and the fire brigade had no chance of extinguishing the flames. Water was obtained from the town lake, but it proved inadequate to the occasion. There was no time to save the furniture, and in one or two instances the inmates barely escaped with their lives. There had not been so great a fire in Collympton since the disastrous calamity of twenty-five years ago, when, also in the month of July, 151 houses were destroyed, the fire originating in a flash of lightning. How the fire on Saturday and Sunday originated is a mystery. The total damage caused is estimated at 5,000*l.*

SOCIETY OF GRAY'S INN.—The whole of the property of the Honourable Society of Gray's Inn is now undergoing an external repair, under the new surveyor, Mr. Lewis H. Isaacs. The contractors for the works are Messrs. J. Simpson & Son.

LONGTON COTTAGE HOSPITAL.—This hospital has been inaugurated. It has been built at a cost of between 600L and 700L, about 130L of which have been contributed by the working classes. Numerous gifts of furniture and other necessaries for a hospital have been made, and the institution will now soon be in complete working order. The new building is erected near the mission schools at Mount Pleasant. It has a very neat exterior, whilst inside its appearance is cheerful and comfortable. Besides eleven bedrooms on the first-floor, there are, on the ground-floor, the sick wards, surgery, bathrooms, and outhouses, and other accommodation, which will be further developed according to the requirements of the town. At present accommodation is provided for four men, four women, and a number of children, and the patients will be attended by skilled nurses, and the best medical skill in Longton.

TENDERS.

For the erection of residence and warehouse, Belvedere-road, Lambeth, for Messrs. Bartram, Thomas, & Front. Mr. Lucy W. Hidge, architect:— Adams & Sons £1,758 0 0 Newman & Mann 1,696 0 0 King & Sons 1,530 0 0 Scrivener & White 1,511 0 0 Front 839 0 0 For the erection of a workhouse and outbuildings, &c., at Llanerchymedd, for the guardians of the Anglesey Union. Mr. R. G. Thomas, architect:— Griffiths £2,234 10 0 Chester (accepted) 1,925 0 0 For the erection of the County Court and offices, Cheltenham. Mr. T. C. Sorby, architect:— Billings & Sons (accepted) £3,340 0 0 For building a house in Newton-road, Paversham, for Mr. T. Gillett. Mr. B. Adkins, architect:— Creed £1,412 0 0 Brattle & Shoobridge 1,326 0 0 Epps 1,223 0 0 Austin 1,193 0 0 Solihull 1,139 0 0 Shrubsole (accepted) 1,039 0 0 For house at Caterham. Mr. P. Webb, architect:— Wells £3,095 0 0 Colls & Son 2,564 0 0 Ward 2,354 0 0 Foster 2,373 0 0 Turner 2,549 0 0 Sharpington & Cole 2,493 0 0 Regis 2,489 0 0 For villa residences at Walton-on-Thames. Messrs. Bacon & Bell, architects:— Jackson & Shaw £3,085 0 0 Patman & Fotheringham 2,998 0 0 Nicholson 2,850 0 0 Francis 2,943 0 0 Higgs 2,923 0 0 Sharpington & Cole 2,877 0 0 For the erection of warehouse, Vine-street, Minorities. Mr. B. Tress, architect:— Johnson £1,040 0 0 Shaw 1,018 0 0 Newman & Mann 996 0 0 Ramsay 973 0 0 Brewster 951 0 0 Sewall & Son 938 0 0 King & Sons 930 0 0 Cohen 910 0 0 For alterations and additions to 122, Pall Mall. Mr. H. H. Collins, architect:— Shaw £246 0 0 Sale 232 0 0 Ball & Russell 225 0 0 For rebuilding Nos. 52 & 53, Newgate-street. Mr. J. Coe, architect:— Turner & Sons £3,097 0 0 M'Crac 2,850 0 0 Morter 2,743 0 0 King & Sons 2,553 0 0 For a warehouse in Cloth-fair, Smithfield. Messrs. Haywood & Blashill, architects. Quantities supplied by Mr. D. Cubitt, N. Nichols:— Clemence £1,457 0 0 Fenor 1,369 0 0 Beeton 1,297 0 0 Scrivener & White 1,263 0 0 Tully 1,253 0 0 Newman & Mann 1,239 0 0 Hill, Keddell, & Waldram 1,149 0 0 King & Sons 1,143 0 0 For alterations and additions to premises, Hampstead-road, for Mr. John Oetzmann. Mr. C. Eales, architect:— Corman £3,700 0 0 Bywaters 3,553 0 0 Fish 3,513 0 0 Clark & Co. 3,490 0 0 Manley & Rogers 3,257 0 0 Mann 3,275 0 0 Scrivener & White 3,027 0 0 Kelly Brothers (accepted) 2,974 0 0

Accepted, for the erection of a villa residence at Chertford, Derbyshire, for Mr. G. Nash. Mr. S. Rollinson, architect. Quantities supplied:— Anstain, Mason's, &c., Work £239 0 0 Ellis, Joiner's, &c., Work 277 0 0 Marjerrison 37 7 6 Gothard 110 0 0 Roper 63 0 0 Gilver & Co. 22 0 0 Slack 19 10 0 Accepted, for the erection of school, &c., at Whalley, Derbyshire, for the Rev. T. C. Hills. Mr. S. Rollinson, architect:— Mason's, &c., Work £200 0 0 Wragg & Dearley 190 0 0 Langley 30 0 0 Marjerrison 30 0 0

For building two shops and stabling, High-street, Shadwell, for Mr. Wood. Mr. C. Dunch, architect:— Newman & Mann £1,793 0 0 Macey 1,789 0 0 Kilbey 1,771 0 0 Pritchard 1,717 0 0 Johnson 1,685 0 0 Rivett 1,692 0 0 Ennor 1,629 0 0 Hearle 1,487 0 0 For additions and alterations to the Horns and Chequers public-house, for Messrs. Taylor & Walker. Mr. C. Dunch, architect:— Rivett £293 0 0 Johnson 255 0 0 Morley 793 0 0 Kilbey 736 0 0 Hearle 739 0 0

For new infirmary and casual wards, &c., at Wandsworth and Clapham Union. Messrs. Beeton, Son, & Breton, architects. Quantities supplied by Mr. James Barnett:— Patman & Fotheringham £43,295 0 0 Mandfield, Price, & Co. 42,551 0 0 Perry & Co. 42,179 0 0 Higgs 40,718 0 0 Ashby & Sons 40,070 0 0 Macey 40,032 0 0 Browne & Robinson 40,000 0 0 Kirk & Parry 39,509 0 0 Dowson 39,198 0 0 Piper & Wheeler 39,949 0 0 Rider & Sons 39,790 0 0 Aviss & Sons 39,457 0 0 Easton Brothers 39,240 0 0 Nicholson 39,168 0 0 Adamson & Son 38,897 0 0 Myers & Son 38,857 0 0

For alterations and repairs to three houses, Nos. 139, 137, & 138, Sloane-street, Chelsea, and building three stables at rear, for Messrs. Roope. Messrs. H. Jarvis & Son, architects:— Hart £4,697 0 0 Higgs 4,529 0 0 Macey 4,302 0 0 Henshaw 4,193 0 0 Turrell Brothers 4,121 0 0 Tarrant 3,909 0 0 Thompson 3,920 0 0 Richardson 3,853 0 0

For draining an estate at East Greenwich, for Mr. Coles Child. Mr. Thomas Dinwiddie, architect:— Pearson £230 0 0 Disney 210 10 0 Nuon 157 15 0 Featherstone 67 0 0 Nowlan (accepted) 408 0 0 For new shop-front, for Mr. Hall, Swindon. Mr. T. S. Lansdown, architect:— Lovatt £252 10 4 Barrett (accepted) 215 8 8 For the erection of four houses in the Ladbroke-road, Notting-hill, for Mr. T. H. Scarborough. Messrs. E. Habershon, Ditch, & Webb, architects:— Manley & Rogers £4,290 0 0 Temple & Foster 3,900 0 0 Raskin 3,409 0 0 Miscars 3,514 0 0 Midwater 3,319 0 0 Johnson 3,220 0 0

For works at Fittlevorke Rectory, for the Rev. Mr. Catley. Messrs. Waring & Nicholson, architects:— King £112 0 0 Nightingale 359 0 0 Habbing 348 0 0

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VOL. XXVI.—No. 1331.



The Future Architectural Rank of London among European Cities.

MILITARY reasons avowedly and properly guide the conduct of the general. The physician acknowledges no rules for his prescriptions that are not derived from his knowledge of therapeutics. The lawyer, the financier, the man of any special science, is bound by technical rule. The architect must all to take his proper position as one of the directing influences of society so long as it is the habit of the day to settle architectural questions by any other than architectural reasons.

A very important instance of the truth of this view is now attracting public attention. The subject of the site of the new Law Courts has been twice brought before the House of Commons. In the discussions that have occurred, and in the more lengthened and detailed argument on the subject that is offered to the readers of the public journals, the prime question, the architectural one, has been treated as a matter of minor importance. Convenience, not of the public, but of certain owners of property; economy, which is not true but only apparent; and, above all, the dislike entertained by nine people out of ten to getting out of a groove, however casual may be the causes which placed them in it, have been allowed to exercise as much or more influence as the prime consideration of obtaining the best architectural site for a noble public building on which we are preparing to expend millions of money in the hope of its endurance for centuries.

In all architectural works worthy of the name, the choice of site is the primary consideration. For the most part the exigencies of civilization limit the architect in this respect. The position of military structures is generally indicated by Nature herself. The pass to be commanded, or the wide extent of champaign to be dominated, at once determined the feudal builder where to fix the tower of his *château*. Around these natural fortalices the humbler tenements of the peasant grouped themselves for protection. Paths originally selected by cattle, either from their easy slope or from some of those capricious causes that mock the subsequent inquirer, become crooked but well-worn roads. Subsequent fences add permanence to these vagaries of rustic stratigraphy. Cottages and houses rank themselves in the line of the hedge; until at length a purposeless and unintelligible maze, such as the ground-plan of the city of Norwich, confounds the engineer and drives the architect to despair.

Our great cathedral builders for the most part had a start in time over the casual tenements which slowly became consolidated into streets. A fair close surrounded the prin-

cipal structure. The future density of city habitations was unforeseen when such edifices as Gloucester Cathedral, Chester Cathedral, or York Minster, arose as the visible centres of the Christian worship of the surrounding country. The noble towers and happy position of York still enable that cathedral to impress the imagination, even of the traveller who flies by in the railway-train, with a sense of grandeur and of beauty. But if we compare the case where a collegiate or abbey church of imposing dimensions stands in a neighbourhood as yet free from the fury of building, with those in which the mass of population has circined the ecclesiastical globe with a dense array of crowding houses, we shall obtain a better idea of the care of the great church builders in selecting the locality for their work than we may be ordinarily apt to take. Sometimes, indeed, in the troublous times of civil war, the need of security led to the abandonment of the original site, as in the case of Sarum. St. Alban's Abbey, Ripon Minster, Ely Cathedral, Malvern and Tewkesbury Abbeys, may be pointed to as instances of the manner in which the grand form of the church, in the idea and purpose of the architect, stood out, dominant and impressive, towering as far above the humbler roofs of the subservient citizens as the inflexible dogma which it symbolized did above the feeble and uninformed groping of private judgment.

Sometimes the absolute magnitude of the building was such as to crush all competition. Such is the case with St. Peter's. Sometimes a happy chance has led to the selection of an unrivalled site, in an architectural point of view, in despite of economical or political considerations. Such was the case with some of the magnificent ecclesiastico-palatial structures on which the Portuguese kings lavished their enormous wealth. Such was the case with the unrivalled Superga, a church and conventual quadrangle on a lofty hill overlooking Turin, but from which, in certain states of the clear Italian atmosphere, the Duomo of Milan can be distinctly seen. The Duke of Savoy, reconnoitering from this elevated point the lines in which the French army lay round the gallant little ducal capital of Turin, made a vow to build a church on that identical spot, in honour of the Virgin, if victory attended the battle on which he then and there decided. The lover of architecture has reason to rejoice at the defeat of the French king. The somewhat coarse and rough masonry of the Superga is no drawback to the effect of the noble perspective.

The dense and squalid mass of the London of the Stuart kings,—that London in which the Oriental plague had established its power,—was happily swept from the soil by the Great Fire of 1666. To that destructive agent we owe the churches of Wren, the width and comparative convenience of the streets that we are now finding too narrow for our traffic, and that noble cathedral which has the defect of wanting space from which to be seen.

If to the genius of Wren, and to the happy fatality of conflagration, we owe the chief architectural beauty of seventeenth-century London, of a London that will soon be almost as much a thing of the past as ancient and historic Paris already is, we may attribute the stately magnificence which is promised, not indistinctly, for the future, in no small degree, to the impulse given to civilization by a rude Northumbrian labourer, who, at nineteen years of age, could neither write nor read. The patient, resolute, inspired toil of George Stephenson originated that practical union of the rail and the locomotive engine which first linked the suburbs of London with Liverpool, with Bristol, with Falmouth, with Newcastle, and with Edinburgh, and which then, spanning the Thames, burrowing under Islington, and finally marching boldly through the very "City" itself, has enforced

the adoption of a new style of metropolitan architecture.

It is true that in the nineteenth, as well as in the seventeenth century, London owes much to the destroyer. The fire that consumed the old House of Parliament not only made room for the Palace of Westminster, but rendered it necessary seriously to consider the subject. We cannot but feel, notwithstanding the argument that a loftier palace would have tended to dwarf the Abbey, that it is a subject of irremediable regret that Sir C. Barry's beautiful structure was not based at least 8 or 10 ft. above the present level. But this regret, even if ill founded, should be a powerful reason for a careful and adequate consideration of the all-important question of site for our future public edifices.

The great stimulus that was given to the art and practice of the builder by the construction of our railways has had an influence on our street architecture which has been as great indirectly as directly. Those who remember what were our public works forty years ago, our canal bridges, our wooden slip roofs, our hotel, or, rather, tavern accommodation for the stage-coach traveller, may well hold that the Thames Embankment would have been untouched but for the pioneering of the school of Stephenson and of Brunel. Pestilence again threatened the city from the insufferable manner in which we had polluted our noble stream. We were thus driven to lay out four or five millions on drainage works, which, incomplete and temporary as they must remain so long as the estuary is made the ultimate receptacle for the wasted chemical wealth which the land demands, have yet enabled a few straggling salmon to make their way above the bridges. As the Thames again becomes practicable as a water thoroughfare, and as we are devoting such large sums to the purification of the water, and to the removal of the fecular mud banks, the question of the elevations that are to rise within the embankment walls assumes primary importance. The architectural rank of London among European capitals will principally depend on the use we make of the building sites adjacent to the Thames Embankment.

We have now resolved on an architectural development of our public buildings of great magnitude. Four several works, each of primary importance, have been confided to as many distinguished architects. Having provided a palace for our Legislature, we are about to complete the palatial accommodation for our administration. Our disgraceful want of a gallery in which our great pictorial wealth may receive the first requisite for its due use, a place in which it can be seen, is about to be remedied. The aesthetic purposes to which South Kensington is devoted are to receive further pecuniary support. The formation of a national home for the archeological and architectural relics now committed to the cellars of Bloomsbury cannot be long delayed; and we have already expended more than three-quarters of a million sterling in clearing away a rookery that surrounded the ancient City boundary near the Temple, with the purpose of providing a site for worthy Courts of Justice.

To these five admitted requirements a sixth must be added, in the shape of a natural history museum. The state of our galleries of stuffed animals in the British Museum is humiliating to the naturalist, who is aware how far we are, in this important educational respect, in arrears of even secondary capitals on the Continent. It is, in our opinion, indubitable that the requirements of the library, or rather libraries proper of the British Museum, with the addition of the print-room, and, possibly, or perhaps temporarily, of the Geological Museum, a less expansive educational department than that demanded for organic forms, will require the whole available space in Bloomsbury. The localities of the Government

Offices, and of the educational show-rooms and museums, may be left without present question. It remains to consider, on the one hand, the use to make of the finest architectural site in London, and on the other the architectural requirements of the Courts of Law, the National Galleries for paintings, for sculpture, and for annual exhibitions, and the Archaeological Galleries.

Into the determination of a question of this magnitude extraneous arguments should not be allowed to enter. The convenience of site is one of the elements of architectural fitness; but this convenience is that of the general public, not that of any small section of the inhabitants of London. To allow the fact that the owners of the tumble-down pigeon-house that now let at such fabulous rents in the neighbourhood of Lincoln's Inn have a vested interest in keeping the Courts of Justice in an inferior locality, would be at once disgraceful and absurd. The chamber of counsel must be near to the Courts of Law, although the most eminent men have long contrived to appear, or at least to be paid for their appearance, at the same hour at Westminster and at Guildhall. The question of convenience to the bar is neither more nor less than the question which presents itself to every householder when he thinks of moving; not less, that is to say, in one sense, but actually less, inasmuch as the removal of the furniture of a single room is more easy than that of the furniture of a house. The barrister will have to remove his library to new chambers, as he does, perhaps, every five years, without any motive of greatly increased convenience, and his interest in the locality of the Law Courts is at an end.

As to the solicitors, they are, as it is, scattered all over London. A certain number of respectable firms colonise Lincoln's-inn-fields. These gentlemen consult counsel at their chambers. They may now diversify their walks from Stone-buildings to King's Bench-walk. To say that it would be any inconvenience to them to have the bar grouped in convenient chambers near the courts in which they practise is not for a moment to be urged. There remains, then, the sole fact, that if the Law Courts are fixed a quarter of a mile to the south of Carey-street, the rent of a few sets of ill-built chambers may be lowered.

We are by no means asserting that the obtained site for the Law Courts should be given up, and that a site should be obtained for them next the Thames Embankment. There are many and grave difficulties in the way: it must involve a large extra expenditure and considerable delay. It must not be supposed, as some writers on the subject appear to have done, that there is a site on the Thames Embankment ready to hand. This is an entire mistake. There is a frontage, and little more: the site must be bought, and would have to include all the houses between King's College and the Temple, one way, and between the Strand and the river the other. All we ask is, that the question should be fairly inquired into. Will the game be worth the candle? Are the advantages of the site sufficient to outweigh the objections? And in making this inquiry it must not be forgotten that to render the already obtained site sufficient, and to provide fitting frontages and proper accesses, more land to the west and to the north must be purchased.

Convenience of access on either side, by street, by river, by underground railway, will certainly be commended by the river site; and for architectural magnificence neither the Sainte Chapelle, the Institut, nor the completed Louvre of the Second Empire, would boast a nobler site, by the comparatively feeble tide of the Seine, than that which is obtainable by the banks of the Thames. To all persons interested in the dignity and in the prospects of architecture in this country the subject is one of primary interest.

It is to undervalue questions of this nature to consider them as of interest to the architect and to the man of taste alone; still more inappropriate is it to attempt to solve them without attributing due weight to aesthetic considerations. Persons are not, for the most part, more highly respected by their neighbours than they are by themselves. The stately magnificence of a capital city is one of the elements of national prestige, and therefore of national power and influence. The architectural beauty of Paris is not the least of the claims of the French nation to rank their capital as the metropolis of civilisation. An unusual combination of circumstances now allows us to do for London, if not

what Augustus did for Rome, yet at all events more than it often falls to the lot of any single sovereign to see effected in a populous capital. We have fresh and noble sites freely offered to the architect in the very centre of population. We have buildings of the first magnitude and importance to erect, and the erection of which has been resolved on. In a time of peace the nation is prepared to pay adequately for the construction of the courts of justice, of administration, of art, and of education. Commercial public works, of a magnitude unrivalled since the days of imperial Rome, if not since those of the proudest Egyptian dynasty, are educating our workmen, from the lowest to the highest, to a style of craftsmanship entirely unknown in this country at the commencement of the present century. Private wealth, under the stimulus already given to good taste, is replacing the dead walls and unmeaning windows of the Georgian style of street building, the poorest and least picturesque that was ever common in any civilised nation, by not altogether unsuccessful efforts to create a *Victorian* London. To what ever part of the metropolis we turn we find efforts, or designs, for improvement. If in the character and in the site of the buildings which must crown and characterise the whole structural renovation of the era we fail to be guided by true architectural reason, if we allow private interest, uneducated dabbling with artistic and scientific questions, or peddling crochets, to decide or to interfere with the decision, we shall do an injury to our children as well as to ourselves. It is to be hoped that the opportunity for making the architectural aspect of London worthy of the capital of the richest nation in the world, and worthy of the most populous city of Europe, will not be lost or misused. Such occasions as the present once last never recur.

THE ARCHEOLOGICAL INSTITUTE AT LANCASTER.

On the 28th ult., the annual meeting of the Royal Archaeological Institute of Great Britain and Ireland commenced at Lancaster. The Mayor (Mr. T. Storey) and Corporation of Lancaster presented an address to the president and members of the Institute, in which they expressed their congratulation on the meeting being held in the capital of the County Palatine.

Lord Talbot de Malahide, in responding, said it had always appeared to him that of all the public bodies of this country upon whom it was incumbent to show its regard for the preservation of ancient monuments, there was none upon whom that duty devolved more than on ancient corporations. Although there were glaring exceptions, yet the majority of these bodies seemed impressed with their responsibility in this matter. At one time, in the frenzy of the moment, several ancient corporations disposed of many of their most curious heirlooms, merely for the paltry sum which the molten metal would afford them. He believed many of them had been ashamed of what they had done, and in some instances they had done their best to restore, by imitation, the monuments of which they had lost the originals. He trusted that nothing of that sort had been done in Lancaster. His lordship then went on to say that it was essential to appoint a president for the year, and that he had much pleasure in resigning his office in favour of his friend Colonel the Right Hon. Wilson-Patten, M.P.

The newly-installed President then addressed the meeting, and some other speeches followed.

A pleasant week was spent; but Archeology played second fiddle to Pic-nic. The papers were few, and certainly not all of striking merit. Amongst those read on Wednesday was one by Dr. H. Barber on—

Pre-Historic Remains of Furness.

He commenced by remarking that the evidences of the ossific caverns were amongst those which carry man farthest back into the regions of time. The traces of man's existence in this country at very early periods, when Europe was passing through the "fluvial drift" period of the world's geological history, was shown in the reliquary caves, such as are met with at Capeshead and Kirkhead. He then proceeded to give a description of the Kirkhead cave, and the very interesting remains which had been discovered in it. The Capeshead cave is of larger dimensions in a limestone rock, which projects at the

point where the estuary of the Leven opens out upon the Ulverstone Sands. The cave was much disturbed during the formation of the "Over-sands" railway, several yards of the rock at the entrance having been blasted away. The Duke of Devonshire caused the cave to be cleared to a great extent, but nothing of importance was discovered, the work, unfortunately for the interests of archeological science, not having been conducted under the direction and immediate supervision of any one accustomed to such an undertaking. The floor of the cave consists of fine decomposed granite sand, about two or three feet deep, and sufficient evidences of human habitation had been discovered to lead us to hope that at no very distant time the cave will be systematically and thoroughly examined. Other caves are to be found in the neighbourhood of the village of Sculles, in Low Furness, one of which, at Sculles Hings, has been described by Mr. Cloze. Several hut circles, or camps, are to be seen in this district, the principal one being that known as the "Stone-wall," at Urswick, but of their original design and use we are unable to form more than an imaginative conjecture. Other encampments of a similar nature are to be seen at Foulda, on the Holme-bath estate; at Birkirigg; at Colensh, near Grizebeck; the Beacon, near Nettleslack, &c. The paper then treated upon the "sepulchral circles," which differ slightly from the hut circle in having the circle of stones, or walls of earth of which they are constructed, unbroken, while in the hut circle there is a sort of entrance to the circle, generally on the east side. One of these circles exists at Birlugs, and is known by the name of the "Druidical Temple," which, however, is evidently a misnomer. Other sepulchral circles are also to be met with at Knappath, on Kirby Moor, and a remarkable one at Swineshead.

The Chairman (Lord Talbot) gave an short account of some pre-historic remains found in Spain, which bore a close analogy to similar things found in this country.

On Wednesday evening a discussion was raised touching the

Value of the Form of the Arch.

in setting dates, on a paper read by the Rev. J. S. Petit, on "Carmel Priory Church," a building recently restored. The rev. gentleman exhibited some water-colour drawings of the church and its architectural details, and described the features of the building, which presented a singular mixture of the Norman and Early English style. Arches placed opposite to each other were found to be one Norman, with round heads, and the other Pointed; and yet, from their position, they must have been raised at or about the same time. The capricious employment of the round and pointed arch was, Mr. Petit observed, one of the remarkable features of the building. The tower also presented an unique feature in the church, there being a second tower within the first, surrounded by a wall, and supported by pillars so slender as to appear highly dangerous. The whole church was regarded by the rev. lecturer as a good but perplexing example of Gothic architecture. The priory was founded in 1188.

The Chairman (Mr. J. H. Parker) desired to call attention to the fact that they must not consider the form of the arch as a guide to the age of a building. That form was commonly a matter of convenience. People were too apt to think, if they found a round-headed arch, it must be one of the twelfth century, and that, if it was Pointed, it must be of the thirteenth century. Now, he could show them round-headed doorways of all periods, where it was convenient to make them. The form of the arch was, in fact, no guide to the date. They must look to the moulding and tracery.

Mr. E. Sharpe protested against the chairman's dictum as to the form of the arch being no guide to the date of the building. It was true, he said, that they might find exceptions: they knew that one swallow did not make a summer; but unquestionably for the first thousand years of the Christian era the round arch was used, and for the last thousand years the pointed arch was used. That was the general guide to go by; but there was a period intervening when the round arch had to give way to the pointed, and this transitional period was interesting as being the grave of the early form, the Romanesque, and the cradle of the later, the Gothic. This transitional period was one to which he had paid particular attention. He had visited more buildings of that period, per-

haps, than any other individual, with the object to determine, if possible, the question why the circular arch was abandoned, and the pointed arch introduced, and he had come to this conclusion—that the cause of the change was that the circular arch had a certain amount of weakness, which he explained as arising from the imperfect wedge-shape of the stones used in the round arch. The builders saw this tendency to weakness, and so they put a point to the top of the arch. They found in France, and indeed all over continental Europe, that the pointed arch was used invariably in the early buildings of the Transitional period on the main arches of a building—he would call these the arches of construction; but the arches of decoration—the doorways and arcades—were circular. For the first twenty-two years of the Transitional period—which lasted only about forty-five years—the arches of construction were pointed, and the arches of decoration were circular; he would guarantee this on his reputation as an archaeologist. It was not desirable that they should ignore that fact, but they should publish it for the benefit of all students. At the end of the Transitional period there was some confusion, and an apparent inclination to return to the old style; but up to the middle of the twelfth century the buildings were constructed according to the fashion of the Normans; after that period new ideas arose.

Thursday was the first great excursion-day, and included Furness Abbey and Piel Castle. At

Piel Castle,

Mr. Parker having collected his audience together within the walls of the inner bailey, offered a few remarks on the building, which he said was built in the reign of Edward III., about the middle of the fourteenth century, by the abbot of Furness. There were two baileys or courts, the outer one for the protection of the castle, and the inner for the use of the inhabitants. The Chapel was on the second floor of the keep. It was, however, merely a sacrum, a small space sufficient for the accommodation of a priest and an altar, the congregation being assembled in an adjoining apartment, which was used for secular purposes at other times, and which was separated by a screen capable of withdrawal. The main building was divided into two long chambers, which were again subdivided. In answer to Lord Talbot de Malahide, Mr. Parker said there were no doubt three stories to the building, and in many of these castles the upper chambers were the chief apartments. Porticulis grooves were found at the entrance. This, Mr. Parker maintained, was a very ancient system of fortification, for it had been found in use at Pompeii, in the walls of Rome, and in the Etruscan cities. He denied that this kind of fortification was Saracenic, but said it had been adopted by the Saracens with modifications, though existing much earlier than the time of the Saracens. Our mediæval castles were copies of castles of the third and fourth centuries, and they were copies of still earlier originals.

On

Furness Abbey

Mr. Sharpe discoursed. The first part of Mr. Sharpe's address was devoted to the progress of Gothic architecture generally, the steps of such progress being likened by him to the blended colours of the prismatic spectrum, the dark background of the celestial phenomena representing the gloomy period of heathen darkness, which, as the light of Christianity dawned, became illuminated with the various colours of the spectrum. Mr. Sharpe proceeded to apply his general principles to the history of the abbey amidst whose remains his hearers were assembled. He mentioned the historical fact of the early Cistercians having broken away from the parent institution in France, for the desirable purpose of amending the laxity that had crept into the practices of the old Benedictine foundations, which fact, Mr. Sharpe observed, was really the first act of that remedial course which terminated in the great Reformation of the time of Henry VIII. and his immediate successors. With the settled purpose of establishing a system of more practical piety, the Cistercians multiplied their foundations by hundreds, and this abbey at Furness was not the least magnificent of the wonderful fabrics whose devotion had from time to time erected. Mr. Sharpe said he had visited nearly all the abbays of the order on the Continent, and he found invariably that one common rule prevailed, and that rule was the adoption of

an improved style of architecture, from which all florid ornamentation likely to lead to superstitions or idolatrous practices was to be excluded. What gave the lecture the chief local interest was the fact mentioned by Mr. Sharpe of his attendance at that spot in 1850, when the Archeological Institute was last at Lancaster, and of his then having conceived the idea that the remains of important portions of the abbey lay buried beneath the soil of the adjacent field or orchard, and of his having suggested excavations, which the liberality of the Duke of Devonshire carried into effect through Mr. Ramsden, the result being the discovery of the vast hospitiu which constituted so important a portion of the abbey.

At the *déjeuner* which followed the visit, the Duke of Devonshire, replying to his "health," said if it was a privilege to be the owner of so venerable a ruin as that which they had just visited, he felt it was a privilege by no means exempt from duties and responsibilities. He considered it imperatively binding on him that he should hand down to those who followed him this memorial of the past unimpaired. He considered it to be his duty to take every precaution that he could against the ravages of time, and those dilapidations and decays to which such ruins were exposed, as well as against those injuries which might inadvertently be caused by visitors. He said "inadvertently" because he felt certain that no person would inflict wilful injury on such memorials of the past. Amongst the thousands who visited the abbey every year he felt proud that they were so well able to appreciate the architectural glories as well as the historical associations of the place as to refrain from injuring it.

On Friday Mr. Parker gave some brief particulars of his recent investigations in Rome, of which we have published a fuller account. Mr. Parker said that a great deal more had been done in the work lately than had ever been done before, and he proceeded to give a rapid sketch of the discoveries that had been made by the Government of Rome, by private individuals, and by archaeologists themselves. Among these was a discovery made by the Pontifical Government on the banks of the Tiber, namely, the original marble wharf in the lower part of the port of Rome, where the marble was landed. Excavations made here had been followed by great success. They found steps leading down to the water, which, instead of being level, were sloping, taking a zig-zag form up the cliff. They were paved with tiles of the Roman Empire. A little trick had been played, however, in reference to these tiles, of which he as an archaeologist complained. Some of the tiles had been broken or lost, and had been replaced with others from elsewhere. This was certainly managed very ingeniously; but he (Mr. Parker) would rather such tricks were not attempted. He had detected the attempt by discovering the real date of the substituted tiles. The whole was in excellent preservation, and tended to show that there must have been an inundation of the Tiber, perhaps twenty or thirty years after its construction, which hurried the landing-place, and that the marble wharf had been moved to the site of the then salt wharf, which had in its turn been moved higher up. He put the date at the first century of the Christian era. An enormous number—200 or 300—large marble slabs were found, so that the discovery was a profitable one in a pecuniary point of view. They had been carried to the Vatican for security. The Tiber was subject to great fluctuations. Notwithstanding the state of their polity, the Romans were still going on with their excavations, and were making fresh discoveries every day. In making a new street at the foot of the Quirinal, they came across a fine mosaic pavement, and made out a plan of a portion of a palace, but could not go far on account of gardens intervening. Then, in making another road on the banks of the Tiber, they hit on the line of an old subterranean road, of which the Romans were rather fond. Then, in making the new fortifications in the Aventine, they came on a house of the first century; but they would not allow him to examine it, although he saw enough to satisfy him of its date. Mr. Parker then proceeded in detail to describe the discoveries that had been made under the direction of the Archeological Association. These included the tracing out of the walls of the city of Rome, which was as distinct from Rome as the city of London was from London. They made the spaces inclosed smaller than it used to be considered. He had received every assist-

ance from the Romans themselves, and the only bit of Rome from which he had been excluded was under the care of the agent of the French Government.

The week was wound up with an excursion to objects of antiquarian interest north of Lancaster, viz., Borwick Hall, Levens Hall, Sizergh Hall, and Kendal. Leaving Lancaster by train, they proceeded to Borwick Hall, a fine old building in the Elizabethan style, about ten miles off. It is supposed to have been built in 1551, and, within three-quarters of a mile from it, there are the remains of a Roman dock, from which it is inferred that the sea, although now many miles distant, flowed within a mile of the hall during the occupation of this country by the Romans. It is now the property of the Martin family, of Capenrway, and is only partially occupied. It contains, in addition to a fine wainscoted hall and a guard-room, an oratory, and a confessional, of which the railings are still in existence. The principal bed-room is that in which Charles II. slept, in August, 1651, when on his way with his army to Worcester. The soldiers, to the number of 10,000, encamped in a meadow below the house. James II. also once rested here on his way to Scotland. Leaving Borwick, the excursionists proceeded to Milnthorpe by train, and from thence by carriage to Levens Hall, the seat of the Hon. Lady Howard. This interesting old building, with its gabled roofs and square-headed windows, is a picturesque mansion of Elizabeth's time, and in the fine hall there are some decided features characteristic of that period. There is abundant evidence that the hall once formed one of the towers with which the border country was so thickly studded. The next place visited was Sizergh Hall, about four miles from Kendal. It has for a long series of years been in the possession of the Strickland family, and Mrs. Strickland was present to receive the visitors. It contains a chamber which is said to have been for some time occupied by Catherine Parr. The general features of the architecture are Elizabethan. At Kendal a paper by Mr. Crowther on the church was read. The church is now and has been for the last twenty years under restoration. Mr. Crowther, in his paper, observed that it possessed the peculiarity of having four aisles co-extensive with the nave and chancel. The entire length, east and west, was 140 ft., and the width 103 ft., including an area exceeded by few parish churches in the kingdom. It was built in the fifteenth century, ranging from about 1440 to the close of the century. The foundation of an earlier structure on the same site had been found. This church appeared to have been of the Early English period. As far as the details could be ascertained, they had been copied in the restorations which commenced in 1850. In the eastern column of the south arcade of the chancel was an arched recess which had been supposed to be a piscina, but research had been made, and no outlet for water could be discovered, and no drain beneath. Mr. Crowther, therefore, came to the conclusion that it was not a piscina but a credence table. It had been restored.

Other excursions were made and meetings held on Monday and Tuesday following. We would not omit to mention that a clock was presented to the Rev. E. Hill as an acknowledgment of the service he had rendered to the members in arranging their excursions for a great number of years, a very poor testimonial, by the way, for the long given aid. Mr. Beresford Hope presented the gift with humour and feeling.

THE ARTISANS' DWELLINGS ACT.

Amongst the measures which received the Royal Assent on the last day of the session, was the Bill introduced by Mr. Torrens, one of the members for Finsbury, having for its object to provide better dwellings for artisans and labourers. The following correct analysis of its contents will, no doubt, be welcome to our readers.

The object of the Act, as set forth in the preamble, is "to make provision for taking down or improving dwellings occupied by working men and their families which are unfit for human habitation, and for the building and maintenance of better dwellings for such persons instead thereof." The Act states the places in which it is to be put in force, and provides that no place is to be included the population of which, according to the census for the time being

in force, is less than 10,000. The Act extends to Ireland and Scotland.

If in any place to which the Act applies there is no officer of health, the local authority, with the approval of the Secretary of State, is to appoint such an officer forthwith, and pay him a salary out of the local rate. The power of removal is, subject to the same approval, vested in the same authority. If this officer find any premises in a state dangerous to health, so as to be unfit for human habitation, he is to report the fact to the local authority. This report is to be in writing, and is to be referred to a surveyor or engineer, who shall examine and report the cause of the evil, and point out the remedy; stating whether the evil can be remedied by structural alterations, or whether the building or any part ought to be demolished. The local authority is to give copies of both reports to the owner of the property, with notice of a time and place for the consideration thereof. The owner may attend and state his objections, if any, to the reports, or either of them, including an objection that the works ought to be done at the expense of some other person, or at the public expense. The local authority shall make an order in writing, subject to appeal. If the order be one overruling the objections, the local authority, if deemed necessary, shall cause to be prepared a plan and specification of the works and an estimate of the cost. The clerk of the local authority is to give notice to the owner that the plan and estimate are ready, and the owner may inspect and transcribe same without charge. The owner may state objections to plan or estimate within three weeks, and is to attend at a time and place fixed by the local authority, to sustain such objections; and if he show that his objection is good, the plan or estimate shall be amended. An appeal from the local authority lies to Quarter Sessions, but the appellant must give notice in writing of appeal within one month after the making of the order appealed from. He must state in writing the grounds of the appeal, and enter into security to try the appeal and to abide by the order of the court appealed to, paying such costs as may be awarded. If there be not time for the notice mentioned above, the appeal is to be made to the following quarter sessions. At the hearing at quarter sessions the grounds of appeal are to be strictly confined to those set forth in the notice. The Court may, at the request of either party, state a case for the opinion of a superior court. No work is to be done under any order pending the prosecution of any appeal. If the point on which the owner relies be that he is not responsible for the state of the premises, he must give notice of his appeal, and of the grounds thereof, to the person or parish alleged by him to be liable, and such person or parish may appear and be heard against their alleged liability. If the local authority shall decide that such other person, or such parish, is liable, they shall send copies of the reports to such person or parish, and shall appoint a time for hearing such parties. When all the parties are before them they shall make such order as they deem just, and the order shall be subject to appeal, as in the case stated above.

Whenever four or more householders living in or near to any street shall, in writing, represent to the officer of health, that in or near that street any premises are in a state dangerous to health, so as to be unfit for human habitation, he is bound to inspect the premises and report thereon; but even if no such representation be made, he is not excused from inspecting the premises and reporting thereon. If the local authority shall refuse or shall neglect for three months to take any steps to put the Act in force, the householders who signed the representation may address the secretary of state, who may compel the local authority to proceed. When the order of the local authority is served on the owner, he must, within three months (or, in case of appeal, within one month after the appeal shall have been heard and decided upon) signify to the local authority whether he is willing to execute the required works, and where two or more shall so signify, then the right of effecting the works shall be given to the person whose ownership is earliest in title. Notice by the local authority shall be served on the owner or an inmate of his place of residence or of business, if such place of residence or of business be within the district of such local authority; otherwise notice may be sent in a registered letter, addressed to the owner, wherever he may reside or have his place of business. If the owner's residence or place of business cannot be found the

notice may be left, addressed to the owner, with some occupier, or, if there be not an occupier, the notice may be put up on some conspicuous part of the premises. The owner on whom the local authority shall have imposed, in the first instance, the duty of executing the work shall commence such work within two months from receiving the order, and shall proceed diligently to complete the same in conformity with the specification to the satisfaction of the surveyor or engineer appointed by the local authority. If he should fail to do so, then the owner next in order shall be required to execute the said works, and, in case of his default, the remaining owners in their order. If all make default, then the local authority may order the premises to be shut up or demolished, or may execute the work in conformity with the specification. In this last case the expenses, with 4 per cent. interest, are to be charged as a charge having priority over all other incumbrances, the local authority being invested with all the powers conferred by law upon mortgagees.

If the requirements of the order involve the total demolition of the premises, the owner shall within three months after service of the order proceed to take down and remove the premises, and if he fail to do so, the local authority shall take them down, sell the materials, and, after deducting the expense, pay over the balance, if any, to the owner. If the premises be at the time subject to any tenancy from year to year, or for a year or any less term, the local authority is to give notice to every tenant, stating the time at which such tenancy shall be terminated. Nothing in the Act is to prejudice the rights of any owner respecting the breach of any covenant made with him by a tenant; so that if an owner be obliged under this Act to take possession in order to comply with an order, his entry shall not affect his right to avail himself of any breach which may have occurred prior to his taking possession. If the order be that the premises only require improvement, the owner (including the owner of the first estate of inheritance), may take down the premises; but in such case (and also in the event of the owner desiring to retain the site), no house injurious to health shall be erected on any part of the site. If such a house be erected, the local authority may order the owner to abate or alter it, and in case of disobedience may do so at the owner's expense. If there be two or more owners, one of them may apply to two justices should the others neglect or refuse to join in obeying an order, and the justices may empower such one of the owners to take possession of the premises, and do all such works as may be necessary in conformity with the order which may have been made. When an owner has completed required works, he shall be entitled, on producing accounts and vouchers, to an order, charging the premises with an annuity at the rate of 6*l.* for every 100*l.* expended, payable for thirty years. Such a charging order is to have precedence over all incumbrances except quitrents, tithe-rent charges, and charges created by the advance of public money, and shall be recoverable as if it were a rent charge under deed. Clauses (in the details of which we need not enter, as they contain legal technicalities) are inserted, providing for the registration and assignment of such charges.

All expenses incurred by the local authority in carrying out the Act, shall be defrayed by them out of a special local rate, not exceeding 2*d.* in the pound, in any one year. The Public Works Loan Commissioners are empowered to lend, and the local authority may borrow from them, such sums as may be required for the purposes of the Act, but the amount of each loan must be sanctioned by the Lords of the Treasury. Notices to a local authority to be deemed lawfully served if delivered to the clerk of such local authority, or left at his office with some person employed there by him. Notices by any local authority are to be signed by the clerk of such local authority. If any person obstruct the officer of health, or other person acting under this statute, the offender shall forfeit a sum not exceeding twenty pounds. If the occupier prevent the owner, or if the owner or occupier prevent the officer of health, or his workmen, from carrying into effect the provisions of the Act after due notice given, a justice of the peace may make an order requiring such person so obstructing to permit the officer of health, or the local authority, or authorized workmen, to do all things requisite for carrying the Act into effect; and if, at the expiration of ten days after the service of such order, the occupier or owner shall

fail to comply with it, every person so offending shall, for every day during which the failure continues, forfeit a sum not exceeding twenty pounds. During non-compliance by the occupier the owner, unless assenting, is not to be liable to any fine. A local authority may appear before a judge by the clerk, and a company or body corporate by any member of their Board of management. The concluding portion of the Act points out the statutes under which the penalties may be recovered, the verbal alterations to be made for the purpose of adapting the Act to Scotland or to Ireland, and also regulates the jurisdiction of magistrates. Respecting this last point, it will be enough here to observe that powers vested in "two justices" may be exercised in the City of London by the Lord Mayor or any alderman; in the metropolis outside the city by a metropolitan police magistrate; and throughout England by a stipendiary magistrate sitting at a police-court or other duly appointed place.

Schedules are attached to the Act, pointing out the places to which it refers, the description of the local authority, and the source from which the local rate is to be levied. Forms are also added of the orders and notices to be adopted in carrying the Act into operation.

THE PUBLIC HEALTH AND THE WATER SUPPLIES.

"SWEET are the uses of adversity." So wrote the immortal bard, and so is it. If all were calm and sunshine, should we not sink into the lethargy of luxury and indolent ease? As storms purify and cool the heated, stifling air, so the trials of adversity brace up the energies and speed the currents of action in the truly noble. Difficulties, trials, and obstructions are the truest tests of heroism. Not less national than individual is the application of this principle. The Crimean war, for instance, found us unprepared, unnerved, unarmoured for the fight; and not until some sad reverses had roused the spirit of the brave, did the full force of his nationality show itself. The lion had slept, and had received some ugly blows ere he was fairly awakened and had put on his strength. Sweet were the uses of adversity in the Cotton Famine also. The bare fact was this:—300,000 persons were without work, without bread; for what were the few loaves and fishes of charity (freely provided as they were),—what were they "amongst so many?" There was a problem to be solved, and out of that difficulty there arose the most wonderful and practical organization of diversified yet unified labour which this country has ever seen; solving the problem for future time how the calamity of a labour panic may be turned into a blessing. Like the otherwise destructive mountain torrent, curbed and directed in its downward course, is held in restraint, and bid to work for man, so the dangerous force of an unemployed population was guided and controlled until it expended itself in public works, which are a monument of perseverance under difficulties, a triumph of perseverance under difficulties, a triumph of the force of discipline and wise direction, and are and will be a blessing to thousands who have not yet seen their first day. All honour to the gallant hero of Magdala and to his officers and men, who in a strange land made a way for themselves under unexampled natural impediments, and thundered at the door of the barbaric chief, bidding him, in the name of England, let his captives free. Honour also to that more peaceful general who arrayed an army of workers and directed their endeavours in besieging the citadels of dirt and the ramparts of disease, who every where aiding, encouraging, reviewing, and cheering up the drooping spirits of his troops, taught them to earn a solid victory over unexampled impediments. Sweet indeed were the uses of that adversity. Thousands of homes were saved from ruin, and blessed with the reward of honest labour, instead of the pauper's dole. Towns and villages, which filth and neglect had so overgrown that nothing in the way of ordinary effort could have coped with it, or ever have worked up the sad arrears of years of neglect; but the army of workers came down upon them, and a transformation so substantial, so satisfactory, ensued that none but those who shared in the campaign can really estimate the blessings of that calamity, the sweet uses of that adversity. What barriers of red tape and formalism were broken down; what inequalities were levelled; what fosses of exclusiveness were

filled up; what bridges of human sympathy were built; what channels of love and charity were opened up, none can ever tell. To the heroes who generalised the forces and fought the battle of our Lancashire adversity he honour: peaceful laurels will ever deck the brows of those true patriots, whether it be the general who organized the noble earl who presided, or the artisan who toiled. Again the sweet uses of adversity do not less appear when we are periodically awakened by the dread sound of "cholera." It is the trumpet-tongued messenger bidding us arise, set our house in order, and look up our weapons of defence.

The unprecedented heat and drought at present experienced are calculated to produce most disastrous ravages upon the public health. There are very few towns in Lancashire or Yorkshire where the water supply is not a source of anxious inquiry, affording in many cases good grounds for serious alarm. Already the drought has shut up many works, and thrown numbers of people out of employment; the farmers are at their wits' end for needful supplies, and cattle are suffering greatly and have died in numbers. In rural places especially, domestic supplies are most stinted in quantity and doubtful in quality; poor persons having to be up at daybreak to travel far distances and to wait sometimes for hours for the small dribble at the well or roadside trough. So King Cholera finds us wanting our best weapon of defence. The want of a proper supply of water is telling week by week upon the public health. Then, again, the condition of the rivers through and near the manufacturing towns is positively indescribable; there are no words in our present vocabulary which can convey, in many cases, the true idea of their pestilential state. In quantity a minimum, in filthiness a maximum; these streams (bath) heated by manufacturing processes, under a tropical sun, receiving as they do, for the most part, the filth, liquid and solid, of a million inhabitants, they are more like deadly, slimy, giant snakes wriggling their slow and tortuous courses through the towns they infest, or besmearing the landscape with their muddy trail, and emitting such odours as man cannot live in. Once fair and free, the banks of the "speckled trout," these streams gladdened the village and the town, and gave a freshness to the lawn of the mansion and a sunbeam of rainbow colour as they dashed over the mill-wheel. Now they bear in their courses the curse of man's disobedience in sinning against nature. We are learning in this our strait the value of pure water; we may have to feel this even more keenly yet. Nevertheless, the uses of this adversity will be "sweet" if it lead to an earnest searching into the whole question of our water supply and our rivers pollution. To increase the impoundage of the floods of wet seasons so as to provide more amply for every want, whether domestic, sanitary, or trade (and this last has now become of vast importance in the districts of Lancashire and Yorkshire), and to learn the true value of our servant water, who, after doing all the good he can for us, and receiving even our abuse and filth in return, will, if we let him, fertilize our fields and renew his own purity, brightness, and freshness in the very effort itself, coming out of his many labours and services for the benefit of man, like an angel of goodness again to flow on to bless and bless again, ever renewing his youth and freshness as the sun.

Practically our towns are too limited in their water supply to meet contingencies: we must have more, more. The supply has not increased in an equal ratio to the demand; the requirements of civilized life are very different from those of twenty years ago. For our personal comfort we must have our bath; he who cannot afford this luxury will have his "tub" and his sponge: the good housewife is more prodigal of water; she is more profuse in her washing and swilling, her rubbing and scrubbing. Our garden must be watered; we cannot do without the now accepted convenience of the W.C., and this last is a great drain upon our water supply, and a fertile source of abuse and waste. The appliances of modern times have altogether altered the state of things. The India-rubber hose and the high-pressure, for instance, enable the plentiful washing of windows, watering of gardens, washing of carriages, courts, and yards, &c., without labour, where formerly the bucket and the can had to be carried, and did duty much less easily, far less efficiently. Then, again, on sanitary and public grounds. We must have our parks and pleasure-grounds, with artificial lakes and fountains; our baths, washhouses, and

lavatories. We must have an ample supply for flushing sewers, street watering, drinking fountains, extinguishing fires, and what not. How needful now the flushing of sewers and the plentiful watering of streets, both which are impossible at the very time they are most needed. Last, not least, come the requirements of trade, vital necessity, to be kept moving. The streams which once sufficed to furnish the motive power, or to supply the needful wants of trade, are now, for the most part, inadequate or inappropriate,—inadequate from their small quantity, inappropriate by reason of their contamination. For most of the extensive manufacturing factories recently erected new and independent supplies have to be found, and not a few resort to the water companies and pay by meter. The quantities thus supplied for trade purposes alone in such places as Leeds, Manchester, Bradford, Halifax, Sheffield, and like places is astonishing, and in times of severe drought, as at present, the companies are in a strait, and have to resort to every expedient to maintain the trade supply; for when that fails, as it has done now in many places, the works must stand, workpeople are thrown out of employment, and the company's revenue is seriously impaired. There is, therefore, a temptation to continue the supply for trade purposes to such a point as to jeopardise the domestic and sanitary wants. In a vital necessity like water there ought not to be this hair-splitting,—this fine adjustment of wants and supplies,—this too frequent trying to see how little we can exist upon. It ought to be dealt out with no niggardly hand, even superfluous and waste itself (though all waste is to be condemned); yet in the case of water even the waste itself is not all loss, as the quantity expended goes to flush the sewers and to dilute the streams, overcharged, as they mostly are, with foul matter.

The reports from all parts of the country confirm the statements herein made. Hundreds of men and horses are employed in bringing water from all available sources. One town in Lancashire has had its only reservoir dry for a month past, and the inhabitants have to do as they can. At daybreak, in many places, there are thronging and pushing, and even contests of an unpleasant nature, for preference of access to the coveted drop; and a policeman at one point is stationed to secure fair-play amongst the struggling throng. At Bradford, Yorkshire, a large portion of the borough is without supply. Many of the Lancashire reservoirs present nearly a dry bed, and the little water yet remaining in them is shallow, exposed to intense heat, apt to wash up muddy deposits which are now exposed and dry. Cattle and sheep have suffered greatly, and even the salmon now are giving in. The River Ribble, justly famed for its salmon, is much polluted with sewage, and its volume is now so reduced that, I am informed, many salmon have died; others, exhausted and "weary of life," have committed suicide by lying in the shoals and allowing themselves to be captured at leisure. These are the victims of pollution and drought. Thus our food supply is reduced.

But the consideration of the subject in all its bearings, ever so briefly, would lead me beyond reasonable limits in your valuable space; I conclude, therefore, with a few general remarks, just as they rise uppermost to the mind.

In dealing with future water supplies there must be no narrow and limited view; more comprehensive areas must be embraced, and groups of towns must be included in one scheme. The watersheds of entire districts must be conserved, and more equal distribution secured for present and prospective wants. There are needed some equitable clauses to prevent the strong robbing the weak, so that when powerful companies or corporations pounce upon watersheds, distant, perhaps, twenty miles, they shall be compelled to make more ample and effectual provision for present and future wants of those whose district they invade; and should Conservancy Boards be formed (as, indeed, they ought to be), no Water Bill should pass until such Board has reported upon it in all its details.

But how can the companies increase their storage, expand their works, double the supply, and do all this, seeing that with their present works, conducted with the utmost economy, they cannot realize, on the average, more than say 6 per cent. upon their invested capital? The remedy is this: the charges for supply of water must be increased, and I do not think there would be found one dissentient out of every fifty consumers. The persons most likely to feel the pressure would be the operative class; but as

present prices for water supply of cottages are not more on the average than about 2d. per week, even if these charges were increased one-third, or 33 per cent., it would not be any perceptible burden even to the poorest, and yet in the aggregate it would amount to an immense sum.

Other classes of dwellings might be charged proportionately, and I should not doubt that that there would be, upon reflection, a ready acquiescence, and an acknowledgment that the water was well worth all that was charged. In the case of corporations, of course, any leakage in the water-rate would come out of the general pockets: so it is as broad as it is long. In either case the article consumed must be paid for, and no article is so well worth its value as water, particularly if it be good.

The charges for trade might remain as they are, on the graduated scales, as, if the quantity were forthcoming, the increased consumption which would result would amply repay the companies.

We must have more water, and we must pay for it a fair, nay, a remunerative price, so as to induce and encourage the investment of capital in its collection and storage. There is abundance of water in the country for every want: all we require is, reservoirs to put it into. We want more big bottles, out of which, in the droughty time of hay-making and harvest, we may draw abundance to satisfy every "thirsty soul."

As to our rivers pollution, it will take a long time to convince the public of the folly and waste of the present system. There is no panacea for it: every place has its peculiar circumstances and special conditions, but the time is not very far distant when there will be no more need to prohibit the throwing of sewage into rivers than there is now to renew the special clauses which not long ago were necessary to prevent gas companies from throwing, stealthily, their gas tar into adjacent streams; whereas this same tar is now in its crude state worth about 2l. per ton, and in its varied manipulations furnishes the daintiest tints for the robe of the most fashionable belle. The study of the utilization of waste products reveals wonders. How much longer shall the torrent flood destroy and the barren drought desolate? How much longer shall the hungry earth lie agape for the refuse of our cities, and our once bright rivers be turned into cesspools? How long this will continue we know not. But this we do believe that a future generation will, from very necessity, learn to store and utilize every scrap of waste, every gallon of fertilizing liquid, turning that which is our present adversity to sweet and beneficial uses,—our present difficulty into a triumph.

JOSEPH BRIELEY.

THE REAL AND THE IDEAL OF ARCHITECTURE.*

THOSE of us who have adopted architecture as a profession from a sense of its power on our imagination, can remember, as I can aver, the changed impressions on our minds produced by first acquaintance with the practical business of preparing designs for execution, a descent, as it were, from poetry to prose, the reaction from which is in many cases a slow process, but which must be attained ere freedom of design can be accomplished; and the counteraction to which should be constantly encouraged in the student by exercise in abstract design, apart from the mere practical work by which he acquires his technical education. The real in architecture must, to the architect, include, with their external forms, not only all that belongs to the special uses of his buildings, but their consequent necessary modes of construction, and the materials requisite or available for that end; and great is the difficulty of preserving amid these matters of practical and mechanical import, the due impression of his artistic aim, and of securing with full attention to the former all that truly bears on the last, which seems constantly in danger of being overborne and drowned among the varied details of mere physical requirements. I wish to be understood as in no degree holding that the ideal can be severed from the real in any works of true architecture, but I use the terms in their common, popularly received sense; and taken thus, the real of our art must of necessity present itself very differently to at least the three

* From a paper by Mr. H. P. Horner, read before the Manchester Architectural Association.

classes I have hinted at, more specifically—the architect, the proprietor, and the public.

To the architect the technical and constructive elements of practical design must be ever present as the tools or instruments by which he must accomplish what his imagination has conceived. There must be always a tendency in this constructive element of his work, to jar more or less with that exercise of the ideal powers of the mind, so essential to be kept in constant and living exercise if true architecture is to be the result of the artist's labour: and to prevent injury from this source to that province of mental exercise, on which I shall enlarge hereafter, the architect should, I think, aim from the first at the adoption of such a constructive system as shall, throughout his works, have a constant reference to the final effect which he desires them to produce. There are, of course, numerous obstacles meeting the imaginative designer in his endeavours to pursue such a system;—the kind of materials at his command; requirements of economy general or special; the restrictions of local or general enactments; and the habit of mind too often induced, either by early education or later practice (the latter fostered by the modern demands for rapid production), of pursuing a routine method both in the choice and use of the materials. Much care and self-management are needful to save the architect from getting into a species of "bathos" of design through these but too fully experienced causes; and the simple manner in which some constructive difficulties can be overcome by modern appliances of an engineering rather than architectural character, affords a too frequent temptation to adopt the easy and ready, as distinguished from the truly artistic, in architectural construction. I would not be thought of as opposed to the due application of such contrivances in metallic construction as modern engineering has brought into use, but there are valid objections to certain modes of applying them in connexion with architectural art which should not, and, by the true artist, cannot be ignored. It will not be denied that an essential characteristic of good architecture is that self-sustaining repose which results from the appreciation, by the designer, of the appearance as well as the reality of balanced gravitation. Arched construction, duly abuted, gives the highest combination, doubtless, of the actual and apparent in this respect; but where trabeate style or construction is adopted, short bearings, massive proportions, and an excess even in real and apparent overplus of material strength, are essential for producing this effect of architectural repose. Now, to this same effect, the use of extended bearings gained by the application of iron, is distinctly opposed, and the more so, the more studiously the actual means of support are masked or concealed. The mere knowledge that iron or other tenacious metal can alone render such bearings safe, leads even the least practised critic to the conclusion that in such cases it must be present, and the concealment causes in this, as in all other such cases, a feeling of dissatisfaction, and of a certain littleness, not to say meanness of treatment. Far better would it be boldly and openly to declare the presence of your sustaining metal, whether of strongly braced cast-iron, or lighter and simpler wrought; and so showing it, to make its necessary form conducive to your architectural effect, and its surfaces the recipients of suitable decoration.

Thus much for an example combining an illustration of my meaning in respect of material, economical, and habitual impediments to pure and true treatment of architectural design, to which, had I time and space, I might add instances of the manner in which personal tastes and preferences on the part of clients, oppose themselves to the free exercise of his art by the architect whose skill is called into exercise on their behalf. I must, however, myself economise my materials, and now briefly touch on the realistic aspect of architecture as it concerns those personally interested in it as owners or proprietors, whether in a public or private sense of those terms.

Unfortunately for both architecture and architects, a large proportion of those for whose comfort, enjoyment, or advantage the art is to be called into exercise, care little, and really understand less of what is meant by the term architecture, and confound it either with mere building of the commonest utilitarian kind, or with the mere surface decoration which stucco or paint can cheaply and rapidly add to the surface of such work. By clients such as these, though often requiring structures of a scale and

class which should demand full exercise of an architect's power of design, the merely useful is alone seen as their own aim, and in so far, and in so far only, as the works produced suit their needs in respect of accommodation in space and convenience in communication, do they believe that architectural art is present; and vainly bestowed, inasmuch as the inmates are contented, are all the nice studies of vista, effect, proportion, and succession of parts, which the anxious architect has lavished on the, perhaps, costly edifice which is to be coupled with his name and skill in art while its parts shall hold together. The merely everyday uses of common life are the real of architecture to such possessors of its examples, and their unappreciative acquiescence in its simple fitness falls cold on the senses of the lowly estimatèd, though perhaps, highly-paid artist.

I hold it vain to attempt the task of defining how much instinctive feeling, association, or education may have to do, individually or generally, with the acknowledged power of architecture on the human mind; and I proceed to express, weakly and imperfectly it must be, my own view of what through all these channels carries this force of ideal impression deep into thousands of differently disposed and variously cultivated minds.

This source of the power of architecture as an art of imagination rests I am convinced in its consonance with those laws of effect, infinite in the variety of their results, which the Creator has impressed on the material universe, and specifically for us on the surface of the globe which we inhabit.

Form, light (with its complement, shade), and colour are the material sources of all those enchanting landscapes with which this world can gladden the eye of him who seeks such pure enjoyment. Form, light, and colour give architecture, as I have said, place and power among the arts. Contrast, proportion, and gradation in form,—like in the mountain, the headland, the islet, and the cathedral,—arrest the eye and interest the mind. Why, we can scarcely tell, but so it is, and often with overwhelming force. Light, shadow, half light, reflexion, alike mark out, define, and enrich the broken cliff, the waving forest, the palace front, and the village spire; and colour no less, in its endless harmonies, gives life and vividness alike to natural and architectural objects.

The limits within which this strong and close analogy between nature and architecture can be said to prevail must vary as widely as can the objects of architectural production; and the actual ideal may range from rustic simplicity, comfort, elegance, through the whole scale of the beautiful, the grand, the magnificent, and the sublime.

In each class of the architect's works, under these many forms of the ideal, must the degree in which the elements of form, light, and colour contribute to his effects, vary, and interchange; and seldom as it falls to the lot of any of us to have the opportunity of achieving what can be placed in the category of the grand or the sublime, yet such opportunities do, at long intervals, occur for our profession; and happy may that man esteem himself in his generation who leaves behind him on the surface of this troubled globe something which is hailed by his fellow-beings as a gem in the midst of its monotony, and as calculated to call that least olivated, yet, perhaps most essentially characteristic element of his high place in creation,—his imagination,—into full and happy exercise, raising him for the moment above the common-place interests of speeding time, and leading him, even through a material source, to recognise his alliance with that which is surely superior to time in its essence, though doomed to perish with it in its substance.

I class architecture most nearly with music among the arts in respect of its directly elevating power upon the human mind; and it will be frequently found that the intellect most awake to the power of the one is sensitive also to the other; though I think observation will prove that insensibility to architectural impressions is a less common defect than indifference to those of music, the latter arising apparently from a not infrequent absolute deficiency in the organization, I mean of brain rather than of ear, concerned in conveying these impressions to the mind. Architecture is in its associations of wider interest to the greater portion of mankind than the art of music; but though many professing the latter art will be found skilled in its execution and even clever in its technical

arrangements, without any feeling, or very little, for its higher forms of imaginative power, I hardly think you could find indifference to grand effects in architecture in any one who could enter into, and lose himself for the time in the "disembodied" flow of a fugue of Bach's, the sublime transitions and cadences of a chorus by Handel, or the pathetic and heart-scorching strains of one of Beethoven's great symphonies.

I dare not permit myself to pursue this captivating theme of the analogies of the arts, but I feel sure that scope exists for the production of a work of immense interest to any one who would devote time to illustrate the connexion of the arts as Mrs. Somerville has forced of the sciences, and Mr. Grove of physical forces.

Briefly to notice some of the forms of the ideal I have enumerated, I should say that, in respect to that essential element of an Englishman's home,—that untranslatable word of his social vocabulary, *comfort*,—the architect, who must in many cases have this ideal most frequently of all proposed to him in his practice, will find that gentle play of light and shade, and a very restricted and chastened use of sober colour, with little dependence on the higher and stronger effects of architectural form will best assist him in securing its effect. The structures to which the epithet mostly applies are not large in scale, and all strong and forcible effects of form produced on a small scale an impression of movement and unrest which does by no means attach to the same when applied to buildings on a great scale.

Elegance or grace,—the characteristic which attaches strictly to structures connected with the lighter scenes of human life and its intellectual recreations,—would be in a measure wearisome, if markedly pervading the whole domestic range of a dwelling-house, however finished in style; but in the detached concert-room, the saloon, the theatre for the most part; yes, and the ball-room,—externally and internally,—this may be sought and secured. Greater play of form in small masses, less contrast by effect of light and shadow, and more and livelier employment of colour, will be found, I think, to conduce to this end; and, in contrast with the quieter effects of comfort and home feeling, the application of this style of effect may often prove most happy and artistically useful as applied to the parts of domestic or, as in the club-house, of less private buildings, which are to be devoted to such uses as I have alluded to.

Beauty, the next step below the grand, is surely not a result to be obtained in architecture without the expenditure of long and anxious study in design, and no less anxious experiment in respect of detail. Independence of scale is a characteristic of this high and captivating character of art, and, though applicable to a great extent even to large structures of certain classes, yet in those of moderate scale it seems best to commend itself to our love and admiration. Here, form, in some of its most reconcile relations,—chiaroscuro in its most subtle effects, and every variety of harmonious colouring,—may, according to the varying circumstances of the design, be called to his aid by the architect as means to secure his end.

Form,—effective rather by gradation and proportion than by contrast,—and effect of light, rather diffused than concentrated, seem appropriate to impressions of architectural beauty; while, in the use of colour, let the artist beware that only as applied to beautiful forms can this be otherwise than at least semi-barbarous; and let him look at and take warning by the alas! too many examples in modern English structures, where, in the desire to fall in with a prevalent but passing fashion, the architect has marred a perhaps otherwise meritorious design by the use of strongly-contrasted and even coarse colour, applied in hard and graceless forms, and sometimes with a force of crude opposition sufficient to overbear and destroy all that the really architectural features of his work had to offer of beauty or of grace.

Grandeur of effect, unlike beauty, must, as the term implies, enlist large scale among its constituent elements. Here, strong contrasts and hold gradations of form find place, forcible and concentrated effects of light and shade, while colour again falls into comparative abeyance, and where employed must be made strictly ancillary to the bolder effects dependant on form and chiaroscuro, as in deepening the effect of purposely-shadowed parts of a design by its retiring shades of purple or violet, or bringing into prominence what it is sought to press out

the eye by distinct but yet mellow tints of a warmer character, and pointedly by the studied use of gold in an unburnished form of etching. But here must be avoided, save in the smallest measure, the use of the primaries,—red, yellow, or blue,—or their negative and positive neutrals,—black and white.

Buildings of much grandeur of general effect, both of ancient and modern erection, might be cited, which, through injudicious application of a so-called hold—but really coarse—style of coloured decoration, applied sometimes under the misused term of “restoration,” have been robbed of their dignity; and if raised by their innate power of form and chiaroscuro above the danger of becoming vulgar, have been at least brought so near to the common-place that their admirers would be happy to see them thrown back almost into their former state of neglect, rather than made to flaunt in plumage foreign to their real character and true effect.

Feeble and trivial treatment of colour, however, in connexion with such structures, such as rather comes, in fact, within the range of the “elegant” in coloured decoration, is scarcely less out of place than the coarseness I would denounce; and hence arises the necessity of the most careful and repeated trials of parts, and not very small parts either, of such added decoration before it is decided to apply it in any fixed form to the whole. It is singular how slight a variation of tint will, when applied on a great scale, entirely alter (and perhaps mar) an interior effect. I have always admired the carefully chosen tint of thin dead wash which is used for the large surfaces of the interior of York Minster. It is such as to give a pearly grey hue to the further portions, while moderately and happily warm immediately under the eye. Pardon me for descending on the merits of white-wash for the nonce, but I am speaking of a building in which form is the pre-eminent element of effect. Once, when I was in the cathedral, I found the north transept alone completely re-coloured, but the work there beginning again *de novo*. On inquiry I found that, on the application of the colour in the transept, and its drying down to its normal tone, it was found that too large a proportion of yellow, though very little, had been used in mixing the huge quantity of colour required for the whole interior, and on the discovery of this, which was palpable when attention was directed to it, the whole was destroyed, and a new tint prepared which resembled the old aerial effect, while comparative vulgarity in a measure at least must have attended the use of the slightly warmer tint.

Our cathedrals and great churches come strictly within the range of this characteristic of grandeur in their good examples; and here I would say a word as to the effect of stained glass, either old or of modern application.

Little of the old, but far too much of the modern, is of a crudity in colour tending rather to lower than to enhance the architecture it is associated with, and this from three principal causes: one, ignorance or indifference to the character of stained glass in decoration, viz., its due fitness of treatment as distinguished from picture-making or relief by shadow, a treatment demanded for its true effect as for that of fresco, but even in greater measure; secondly, the neglect of the principle of dealing almost entirely with secondary and tertiary tints and hues, rather than with primary colours; and, lastly,—alas!—by the descent of this style of work from an art, as which it was treated but a few years back by Willement, Pugin, and a few more, to the level of a mere trade, in which dealing takes place by the square foot, and wearisome repetitions of gaudy medallions, and ill-drawn and ludicrously anatomized saints and prophets appear in all parts of the kingdom, garnished with glaring borders by the foot lineal, and solid masses of blue and red glass, one would think, by the cube.

NEW LAW COURTS.—In reply to Lord Denman, in the House of Lords, the Lord Chancellor stated that the Commissioners under the Courts of Justice Building Act had not as yet recommended any definite plan to the Government, and therefore the Lords of the Treasury had not as yet adopted or approved of any contract in relation to the building. The Commissioners, however, had agreed upon a draft-letter to the Treasury, which was to accompany sketches of certain floor plans that had been approved of.

THE MEYRICK COLLECTION.

We were in hopes that the remarkable educational museum of armour and other works made by the late Sir Samuel Meyrick, and left by him in Goodrich Court, Hereford, would be obtained for the nation, but this now seems doubtful. An offer was made to the present owner to purchase it for a foreign country, and there seemed a probability of its leaving the country. At the instance, we believe, of the Department of Art Mr. Planché reported on it, advising the purchase; and afterwards Mr. Vaux, of the British Museum, did the same thing. The Government, however, declined to move in the matter. We must express a strong hope that something may yet be done to render the collection available for public instruction and recreation.

IPSWICH FINE ARTS AND INDUSTRIAL EXHIBITION.

An Industrial and Fine Arts Exhibition has been opened at Ipswich, in the new Assembly Rooms. The upper room is occupied by pictures, sculpture, and other art-works, and curiosities; and the lower room is devoted to machinery and industrial works generally, including a great variety of models, a model organ, coffin conductor, aquaria, fine things in sewing machines, horizontal steam engine, &c., forming a varied and entertaining collection. The committee of the Working Men's College have been active organizers of this exhibition. That *souvenir* of the event might be preserved a private subscription has been entered into for the purpose of raising a small fund for the purchase of medals (both silver and bronze). The competition has been circumscribed, and we believe the rule pursued was that the author, artist, or manufacturer of any particular work intimating his intention of exhibiting for competition, was allowed to do so.

The judges in the art department were Mr. Cochrane, of the Norwich School of Art, and Mr. W. P. Ribbins, for woodwork, Mr. H. Brinsmead and Mr. H. Singleton; for iron goods, Mr. J. Hammond and Mr. J. Hawes; and miscellaneous, Mr. T. S. Gowing, Mr. B. Rix, and Mr. J. R. Ridley.

The exhibition was formally opened on Thursday in last week. At two o'clock, the mayor (Mr. J. P. Cobbold), the deputy-mayor (Mr. E. C. Ransome), the magistrates, aldermen, members of the town council, attended by the town servants, the principal (Dr. Christian) and members of the council of the Working Men's College, the exhibitors, and other inhabitants of the town assembled in the Sessions Court at the Town-hall, and thence walked in procession to the Assembly-rooms, and opened the exhibition.

THE WALWORTH-COMMON ESTATE COMPETITION PLANS.

We are requested to insert the following communication addressed to the guardians of the poor of the parish of St. Mary Newington, Surrey:—

“London, August 3, 1868.

Gentlemen,—With reference to the following advertisement, which appeared in the *Builder* of April 4, 1868, viz.:—

“To Surveyors and Architects.—Walworth Common Estates.—The Guardians of the Poor of the Parish of St. Mary Newington, Surrey, are desirous of receiving Plans for laying out the above estate, of about 45 acres, in new roads and streets, for the erection of private houses and shops. Premiums for the best plans will be given as follows:—For the first, 100 guineas; second, 75 guineas; third, 50 guineas.—Further particulars and copy of instructions may be seen at the clerk's office, as under, between ten and four. The plans must be sent in to me on or before the 1st day of June next.—By order,
JOSEPH BURGESS, Clerk.
Vestry Hall, Walworth, March 26, 1868;”

We the undersigned competitors beg to state, that having sent in plans and designs for laying out the above estate, in accordance with such advertisement, in the manner required by the printed instructions issued to us, we do hereby strongly protest against the decision lately arrived at by you, on the grounds of its being both inconsistent with the spirit of your advertisement and printed instructions, and most unjust to us. We complain that you have awarded premiums (especially the two first) for plans which are not in accordance with those

printed instructions, and also do not comprise the sanitary arrangements which are required by the Metropolitan Building Act, whilst many of the rejected plans have fully complied with the instructions, and are in accordance with the Act. We are also not satisfied with the third premium awarded.

We therefore respectfully call upon you to appoint a professional gentleman of high standing and character to act as arbitrator, and decide upon the merits of all the plans sent in; and we further suggest that we may be allowed separately to explain our plans and designs before such professional man, and we shall then be perfectly satisfied with his decision. Awaiting your reply,

- We are, gentlemen,
Your obedient servants,
H. M. BURTON, 14, Spring-gardens.
THOMAS EDWARD KNIGHTLEY, 106, Cannon-street, E.C.
BANISTER FLETCHER, 7, Guilford-street, Russell-square.
FREDERICK A. KLEIN, C.E., 110, Cannon-street, E.C.
LEE & WALTON, 6, Great College-street, Westminster.
ARTHUR C. PAIN, C.E., 7, Parliament-street, S.W.
A. A. FREEMAN, 25, St. Aubyn's-road, Upper Norwood.
THOMAS JEWELL, 2, Cottage-green, Camberwell.
RICHARD HOPTON, 2, Stanstead-road, Forest-hill.
WM. H. RAWLINGS, 1, Welton-terrace, Palace-road, Upper Norwood.
A. G. HENNELL, 22, Southampton-buildings, Chancery-lane.
WARD & USILL, 10, King-street, Soho.
W. B. MOFFATT, King-street, Whitehall.”

*** We have before us a large number of letters, many of them not from competitors, to the effect of the above protest. We trust the guardians may even yet find themselves able to do justice to those who trusted to their honour. The selections are manifestly not in accordance with the Instructions.*

HUMEWOOD, COUNTY WICKLOW, IRELAND.

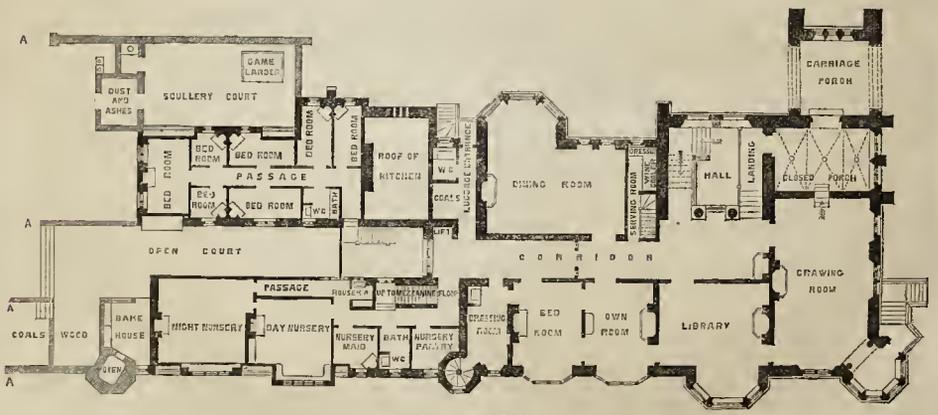
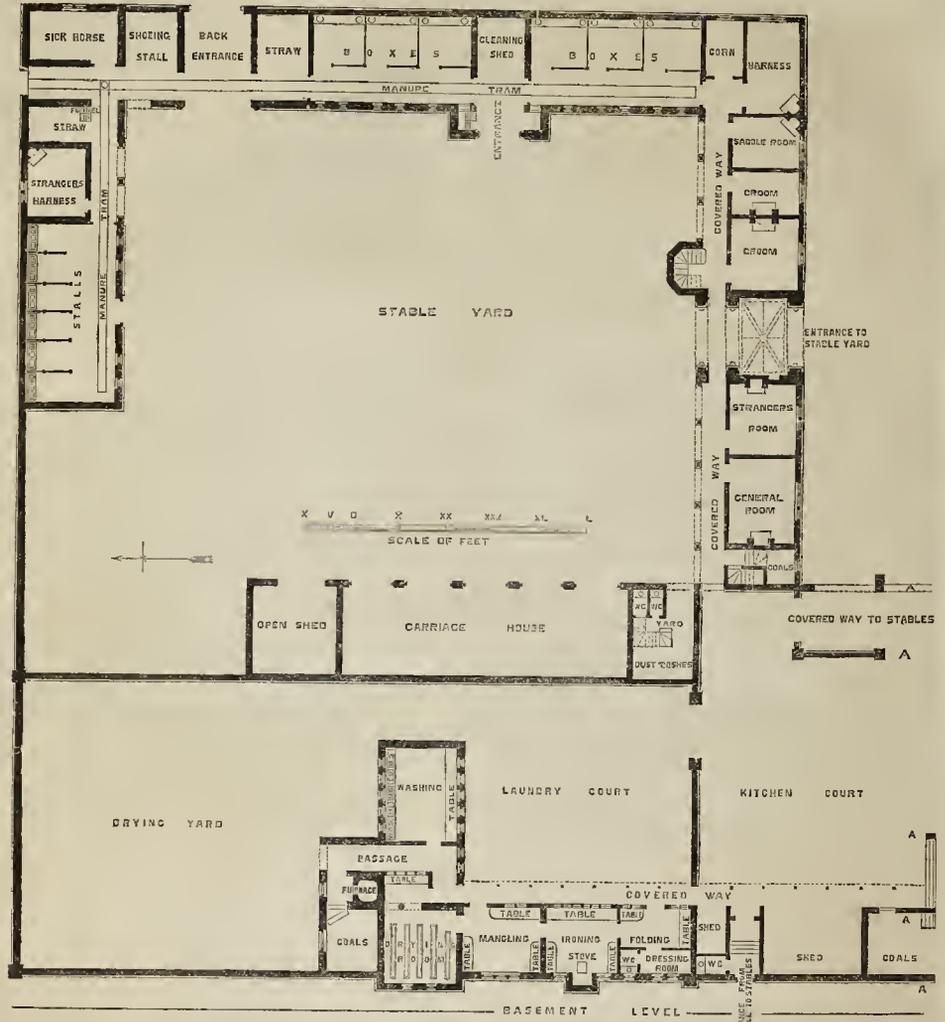
ILLUSTRATIONS are given in our present number of a mansion in the course of erection at Hume-wood, Ireland, for Mr. W. W. Fitzwilliam Dick, M.P. for the county of Wicklow. It stands in a commanding position, well surrounded with rich woods and mountain scenery.

The walls are entirely of granite, and the roofs are covered with tiles. The kitchen offices are in the basement, a few feet below the ground level, giving considerable elevation to the ground floor, which is approached by a stone staircase from a vaulted hall about 40 ft. in height. This hall forms the base of the tower.

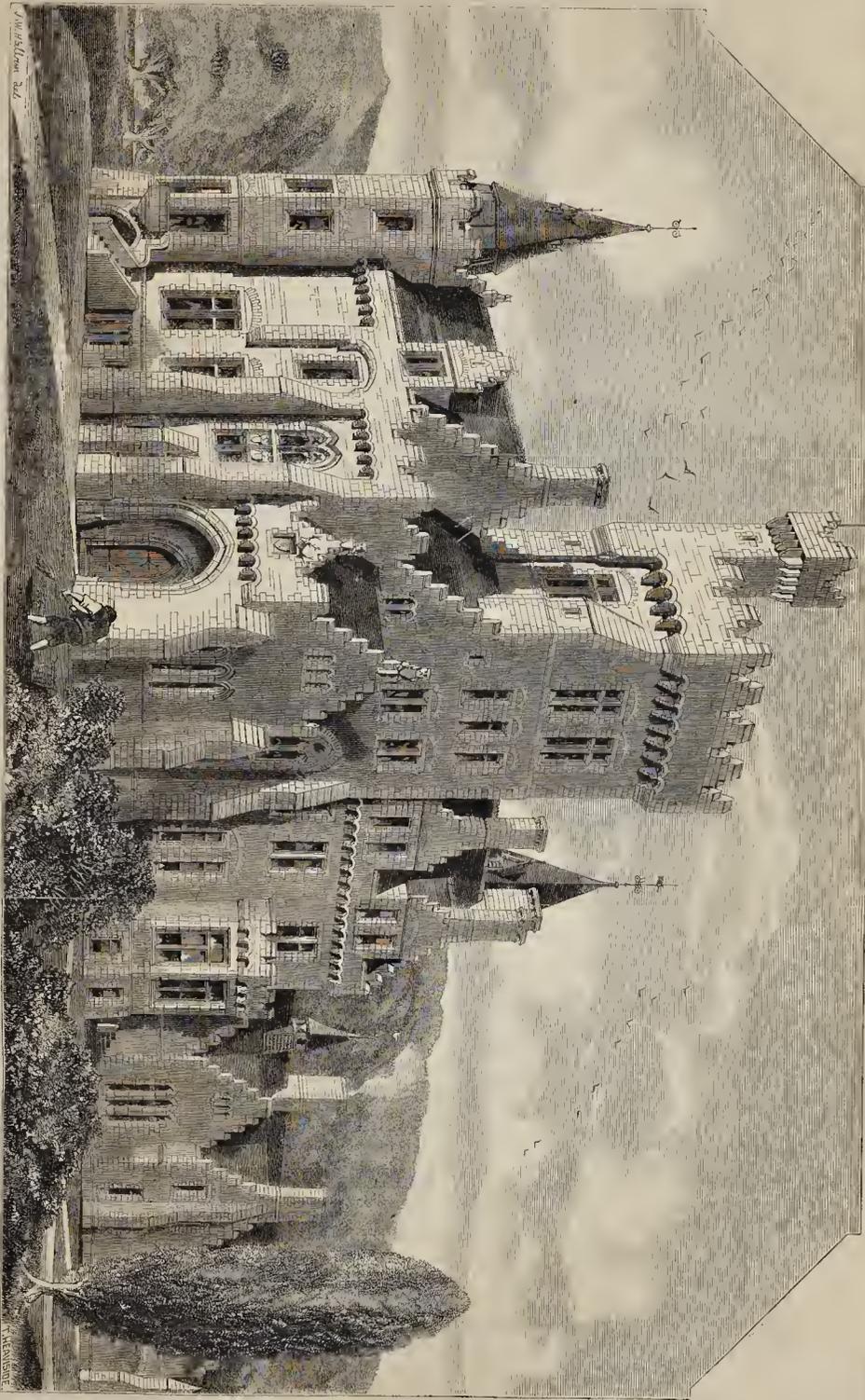
The fittings of the interior are being constructed of various coloured woods, the staircase being in oak. Provision is made in various ways for defensive purposes, if necessary. The house being intended chiefly for a short summer residence, provision has been made for a system of warming and ventilation throughout during the time that it will be unoccupied. The whole of the basement is vaulted in brick. The ceilings and floors over the dining-room, drawing-room, &c., are supported by massive oak beams, and finished with cornices of wood. The kitchen is open to the roof, and well separated from the habitable part of the house. There is a lift for coals and luggage from the bottom to the top of the house, and dinner is to be served by a traversing wagon, passing up the stairs to the serving-room. The windows of the hall and staircase and the upper portions of those of the living-rooms will be filled with stained glass, containing the armorial bearings, &c., of the family. Mr. Dick having a fine folio illustrating the heraldic history of the family from the earliest times.

The contract is being carried out by Mr. Kimberley, of Banbury, from designs by Mr. William White, F.S.A.

* We have received, but too late for present consideration, communications from the authors of the plans to which the first and the third premiums have been awarded.



GROUND PLAN
HUMEWOOD, WICKLOW.



HUMEWOOD COUNTY WICKLOW IRELAND.—MR. W. WHITE, ARCHITECT.

PRIZES AT THE "ECOLE CENTRALE D'ARCHITECTURE."

LAST November we published an account of the opening for the winter session of the Paris Ecole Centrale d'Architecture, which took place under the presidency of Mr. Henry Cole, C.B., who delivered an address to the students, and concluded by putting at their disposal a prize, to be awarded, upon the votes of the students themselves, to the student who could make the best drawing of the human figure. The first election was recently taken place, and it may be interesting to our readers to see the following account of the award made by the students, which we were enabled to give from the official announcement.

"Ecole Centrale d'Architecture.

Report of the Election for the 'Prix Cole.' The students of the first class assembled in the amphitheatre of the school on Thursday, the 14th of June, 1868, at five o'clock, and proceeded to the election of a holder of the 'Prix Cole.' There were twenty-four voters present. The scrutineers were composed of the commissioners, and M. H. Gautier was nominated the president. It declared that, in conformity with precedents, the elected candidate must at least poll half the total votes plus one.

Upon the first scrutiny the votes were recorded thus:—

M. Charbonnier	11 votes.
M. Rzetkowski	5 "
M. Hillard	3 "
M. Sauvestre	2 "
M. Vaudin	2 plus one.

No candidate having polled half the votes plus one, a fresh poll took place between MM. Charbonnier and Rzetkowski, each to poll as many votes as possible. A fresh roll showed that twenty-three voters were present.

The result of this last poll was as follows:—

M. Rzetkowski	12 votes.
M. Charbonnier	10 plus one.

The award of the 'Prix Cole' was accordingly made to M. Rzetkowski, born in 1845, at Julliac (Pyrénées). The director, M. Emile Trelat, expresses in a communication his gratification that, although the majority of the masters' votes were accorded to Mr. Charbonnier, the students, nevertheless, acted nobly and independently by electing Rzetkowski.

these there were 12 cwt. and 4 cwt. respectively, and with them are used common earth, charcoal, coke, blood, and other ingredients in small quantities. After being mixed with water they are pumped gradually into the sewage as it flows to a large tank in which the settling takes place. The sediment is afterwards taken up and poured into the flowing sewage five or six times over, and still proves effectual as a precipitator, and acts much more rapidly than the lime process at present in use. The result, we are assured, is, that over 80 per cent. of the ammonia in the sewage is extracted, and a manure produced which is worth fully 3l. 10s. a ton, while the water flowing off is clear and apparently thoroughly purified.

TRADES UNIONS AND STRIKES.

At the half-yearly meeting of the Birmingham Chamber of Commerce, a report was read, in which it was said, in relation to "Trades Unions and Strikes"—

"It is impossible to deny the right of working men to combine for their own just interest. The part of wisdom is to do all that can be done by persuasion and enlightenment to induce trades unions to keep their action within the limits of fairness and justice, as the only conduct that can be permanently successful. Your council considered that the stonemasons' strike in this town, which began in April last, and unfortunately still continues, was a proper occasion to try if any good could be done towards effecting a settlement between employers and their workmen by conciliation. In order to offer a Board of Conciliation that should be as unexceptionable as possible to the workmen as well as the masters, your council arranged with the trades council of this town, that three deputies from their body should join with three members of your council in offering themselves as a joint committee of conciliation between the parties in difference. The stonemasons on strike and the master builders were invited each to send three deputies to meet this joint committee in the council-room of your chamber. This offer was readily accepted. Some meetings were held, your council regret to say without success hitherto; but as these meetings may possibly be renewed, your council abstain from further statement. This attempt was the more readily made by your council from the hope that it might open up the way to some permanent council of conciliation, to which employers and their workmen might apply in their differences, before resorting to actual hostility."

The threatened "Rattening" in London.—We are written to by Mr. W. Allan, the general secretary of the Amalgamated Society of Engineers, disclaiming all connexion on the part of his society, with secret committees, or with the anonymous letter sent to Messrs. Bunnett, and others, threatening "consequences" if they allow piecework in their business.

ELECTRIC SAFETY LOCK.

MM. DUBÉ and LEMAIRE, Paris, two young mechanics, have invented a new system of safety-lock. The key of the proprietor can open the lock without ringing the bells (placed in the apartment, anywhere about the house, or at any distant locality); but if a false key be introduced, a "jimmy," or any piece of metal, the bells are set going as long as the piece is applied. This is effected by the disposal of the several tumblers with regard to a small lever which completes the battery circuit when elevated. When all the tumblers are lifted simultaneously, as by the master key, the lever is not raised and no alarm is given; but if one, or two, or three be lifted, the alarm lever is raised and the ringing takes place. If the burglar, knowing the mechanism of the lock, try to force the lock plate by any of the usual burglars' instruments, as soon as the metal is attempted to be wedged in the ringing commences.

The safety-lock can be applied to all doors or fastenings without distinction. The acting agent of alarm is a feeble current of electricity produced by a small battery of two elements. The pile used is that of Leclanché (small model), with peroxide of manganese and a single liquid, which does not require touching for several months, and then even a little water is all that is necessary to replace that lost by evaporation.

The master-key is protected by an insulating substance, so that when introduced it establishes no contact, nor does it raise the alarm lever when the tumblers are lifted. Now, supposing a burglar to have a dozen or so isolated keys, he could introduce any one of them silently, but on his attempting to turn it, the alarm would be continuously given and put an end to his experiments, so that he could not try one key after another.

THE SCIENCE OF COLOUR.

I HAVE read with much interest and very considerable surprise, your notice of the work of Mr. Benson on the science of colour.

I have endeavoured to procure the work, but Messrs. Chapman & Hall say they have it not, therefore I can only reason upon what is communicated in your article.

The author, as the reviewer remarks, roundly asserts that all our present theories on the laws of harmony of colour are entirely wrong; consequently that Newton, Brewster, Giète, Field, and Chovrenil are all quite mistaken, and that their old theories must be replaced by Mr. Benson's "Natural System of Colours."

I have read through this article very carefully, and more than once, but I fail to discover any reasons or arguments proving these assertions. I do not perceive why red, green, and blue should be considered the simple elementary or primary sensations of colour. I think a theory very defective which ignores yellow except when combined with blue as green. Does the author really mean that blue, red, and yellow are not the primaries? We are accustomed to call them so because they cannot be compounded of other colours. But he maintains that this system is a delusion, and is "unsupported by a single rational experiment," adding that "that theory is entirely subverted, not only by his researches on prismatic colours, but by all scientific experiments on the mixture of colours, which show that red and green, yellow and purple, and blue and orange, are not complementary to each other."

This is a subject so well known and so easily to be experimented on that I cannot understand how the author can venture to dispute it. It appears to me that he has been carried away by enthusiasm at the result of his experiments with the prism, to make assertions which a careful consideration of the facts cannot justify.

Most brilliant, interesting, and beautiful are combinations of colour brought into play by the use of a good prism; but they are swayed by a variety of subtle influences of shade, light, form, and colour.

I take a sheet of note-paper, and, looking at it through the prism, the top edge is fringed with scarlet red shading to pure yellow; then follows the pure white of the paper, and at the bottom edge is violet shading upwards to clear blue. Taking another piece of paper, and holding it near the first sheet, I bring the violet ray at the bottom edge against the scarlet ray on the first sheet, and the scarlet becomes soft rosy pink. On the centre of the white paper I place a black object; on this the violet and blue rays radiate at top, and the red and yellow at bottom, thus reversing the previous colours. Again, I turn the prism on a grass-plate (alas! it is very dry); the colouring is that of a brilliant opal, yellow predominating with light pencillings of blue, green, and red. Where the grass abuts on a pavement there is a well-defined fringe of deep yellow, then red, violet, blue, and blue-green, each a distinct ribbon of colour; then there is an interval of white, and again belts of yellow, pure rose-colour, and violet-blue. I instance these experiments to show how various are the combinations given by the prism, and that there is nothing in them upstating the theory that red, yellow, and blue are the primary colours, or that green, purple, and orange are their complementaries.

No definite proportion can be fixed for the due mixture of manufactured colours to form neutral grey, that must always be regulated by the tints of the actual colours, and also their chemical composition; but taking light chrome, carmine red, and good light ultramarine blue, I have found that the average proportion of three, five, and eight will form a good grey.

I have no doubt that the work of Mr. Benson will give very instructive suggestions on the various harmonies of colours; but when he declares that all our present received theories are decidedly wrong, he must bring stronger proof to convince us.

I quite agree with you that it is pleasant to meet with something original in which thought and labour have not been spared; but asserting that the truth of nature must be superior to groundless theory, is simply a phrase: it does not prove that theory to be groundless. I am not aware that sea-green and rosy-pink have been overlooked in combinations of colours, or that those colours should have a special influence on the theory. I offer these remarks for consideration.

JOHN G. CRACE.

UTILIZATION OF SEWAGE.

A SERIES of experiments with the contents of a Leicester sewage have been going on at the works in the Abbey Meadow, conducted by Mr. S. Sills and Mr. G. Wigner, of London. The process is that which has been already tried at Tottenham, and the results are those described in *Engineering* of the 3rd ult.—

"The experiments at Tottenham, which were conducted by Mr. Wigner, were commenced in a tank holding 5,000 gallons. The necessary quantity of chemicals, dissolved in about 6 gallons of water, having been put in, the tank was filled with sewage; the pump caused sufficient agitation to mix the ingredients thoroughly. The sewage (a dry black sample) was immediately decolorized, and in ten minutes a sample drawn from a tap nearly at the bottom of the tank was so clear that filtering seemed to be almost unnecessary. 4,700 gallons of this water were run off, and the tank filled again without removing the filament. This also was completely clarified in less than ten minutes. The tank having been filled and precipitated eight times, the trial was so far deemed satisfactory, and the water having been drained closely off, the residue amounted to about 200 gallons of thick black mud, with 100 gallons of water. This was dried in the open air, and the residue was about 8 cwt. of manure much resembling a sample of artificial manure in appearance, and containing 2-37 per cent. of ammonia. The analysis of the water shows it to be little more organic impurity than in the Tottenham water supply, and far less than in the river Lea at Tottenham. 86 lb. of the new compound, dissolved in 69 gallons of water, were used to precipitate this quantity (nearly 100 gallons) of sewage. The cost is estimated at 18s. 10d. per 100,000 gallons.

A larger tank, holding 36,000 gallons, was next prepared, and the sewage allowed to flow in by gravitation at the rate of about 1,600 gallons per minute, the sediment being in at the same time from two small tubs. Fifteen minutes after the tank was filled the mud had subsided, the water was clear, free from odour, and almost tasteless. The greater portion of the impurity remaining in this water was common salt."

At the Leicester works the process has been conducted on a much larger scale, and Mr. Wigner considers with even greater success. Monday 1,728,000 gallons of sewage were dealt with, the precipitating compound being added in the quantity of a little over a ton, the bulk of which was chiefly clay and alum. Of

THE ART AND SCIENCE DEPARTMENT.

As a means of stimulating a branch of industry especially available for the employment of educated females, the Lords of the Committee of Council on Education offer prizes for fans painted by female students in any school of art connected with the Science and Art Department, viz.—One prize of 5*l.*; two prizes of 3*l.* each, 6*l.*; three prizes of 2*l.* each, 6*l.*; five prizes of 1*l.* each, 5*l.* The decoration is limited to foliage, or flowers, or those conjoined with landscape vignettes.

With regard to the Whitworth Scholarships, it may be useful if we say that competitors in the schools and night-classes, for the Whitworth 100*l.* Scholarships will be required to produce a certificate of having passed in the ability to draw outlines like the annexed either enlarged or reduced in size from a copy. The examinations are held at any school of art or night-class in the United Kingdom during the month of May, 1868, or, if specially required, in a science school.

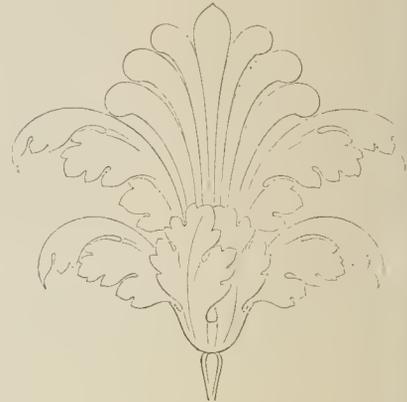
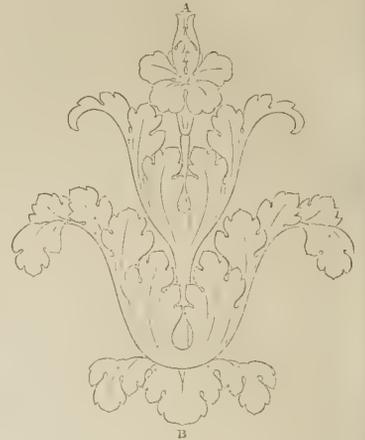
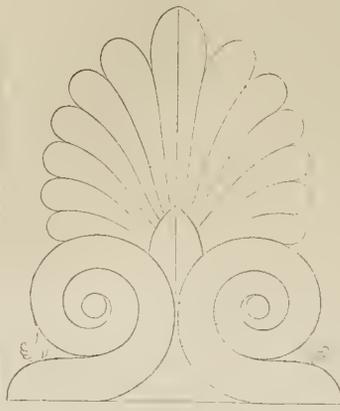
The fifteenth annual report of the Department states that the system of science and art instruction has reached 10,230 individuals in science, and 105,529 individuals in art. The students at the school of naval architecture numbered 41, at the school of mines 13 regular and 102 occasional, and at the college of chemistry 121. At the evening lectures there was a total attendance of 2,207. The total number of persons who have received direct instruction as students, or by means of lectures, in connexion with the Science and Art Department, is about 123,500, being an increase of over 10,000 in 1866. The attendance at the museums and collections under the superintendence of the department in London, Dublin, and Edinburgh has been 1,305,374, showing a total increase of 152,374, or 13.2 per cent. on the numbers of the preceding year, which were 1,153,091. The expenditure of the Department during the financial year 1866-7, exclusive of the cost of the geological survey, was 152,856*l.* 18*s.* 1*d.*, while in 1867-8 it was 179,950*l.* 6*s.* 1*d.*, showing an increase of 27,093*l.* 8*s.*

The committee say,—“We can confidently report that at no period since the establishment of the Department has its influence in promoting the knowledge of science and art, especially among the industrial classes, been so widely extended or its beneficial results so marked as during the past year.”

Our correspondents on the subject of the National Portrait Exhibition will doubtless have noticed that the collection may now be seen free on Mondays, Tuesdays, and Saturdays, and for 6*d.* each person on Wednesdays, Thursdays, and Fridays. The exhibition will close on the 22nd, before which such of our readers as have not seen it should make a point of visiting the gallery.

SHEFFIELD ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.

The fourth excursion of the members of this society has taken place. Starting from the School of Art, a large party of ladies and gentlemen drove by way of Dronfield and Chesterfield to Hardwick, arriving there about one o'clock. After partaking of luncheon, the party proceeded first to examine the Old Hall, now in ruins. Mr. Haslam, the under steward of his Grace the Duke of Devonshire, acting as guide, explained the different parts of the building, and pointed out objects particularly worthy of notice. From the Old Hall the party repaired to the present mansion, where, by permission of his grace, who is patron of the society, they visited more than is usually shown to



FREEHAND DRAWING EXERCISES.

visitors. After admiring the prospect from the roof, the party were entertained with refreshments before leaving the Hall. After being conducted by Mr. Haslam through the gardens and stable buildings, the party repaired to the inn, where an interesting account of the Old Hall was read on the lawn by Mr. W. White, jun. After tea, the party returned to Sheffield.

PROVINCIAL NEWS.

Ely.—A scheme is on foot to erect in Ely a public building which shall contain a museum, library, and large room for lectures, meetings, concerts, &c. A site has been obtained adjoining the Shire-hall; and a design of the intended building prepared by Mr. Freeman, of Ely. The expense is estimated at about 1,600*l.* Already 650*l.* of the required sum have been obtained.

Epworth.—A large public room has long been wanted at Epworth. The tectotals determined to erect a building to be made available for lectures and other public purposes, and have succeeded. The committee purchased a site in High-street, in the centre of the town, and only a short distance from the Market-place. The foundation stone, or rather the two corner stones, had just been laid.

Bradford.—A sum of 12,000*l.* is to be raised for a new mechanics' institute building, and to convert the institute into a people's college for Bradford.

Masham Hall.—This hall, the residence of

Mr. James Cookson, standing on a picturesque bend of the Tees, near Darlington, has been recently entirely remodelled and greatly enlarged. As altered it presents an Elizabethan group, the central portion being three stories in height, with bay windows carried the entire height, and crowned with a cornice and open parapet, griffins, &c. Attached are conservatories and stabling, dairy, &c. The principal feature in the interior is the main staircase, which is executed entirely in wainscot oak, and lighted from the ceiling. The ceiling is panelled, and the ribs are moulded and relieved with foliage, the intersections of the ribs being marked by carved pendants. The works have been carried out by Messrs. Shaftoe & Barry, contractors, of York, Mr. G. Crathorne acting as clerk of works; and the architect is Mr. John Ross, of Darlington.

SIDMOUTH.

THERE has been a marked difference in the temperature of London and that of South Devon during the last month. Thus, while the temperature of London was 93°, that of Sidmouth was only 76°, or 17° less. The highest and lowest minimum readings were 66° and 54° respectively.* There was generally sufficient wind through the day to prevent lassitude, and the mornings and evenings were delightfully cooled by the sea and

* The air along the south coast is kept cool in summer and warm in winter by the nearly equable temperature of the adjacent sea, which is continually receiving warmth from the gulf stream.

and frozes, and the heavy dews. Great as this advantage has been to Sidmouth, it is as nothing compared to the remarkable absence of sickness and disease, the town never having been more healthy. This may be partly attributable to the drainage works executed some time ago, and described in the *Builder* on the 4th of April last. A stained glass window, by Ward & Hughes, as recently been placed in the parish church to the memory of Miss Bacon, granddaughter of John Bacon, the sculptor, who carved the heads of the key stones in front of Somerset House, under Sir W. Chambers. He also executed other carved work about the same building, and good work of some of it is. The west window, by the same artists, was erected by her Majesty to the memory of her father, the late Duke of Kent, who died here January 23rd, 1820.

WORK IN THE HOT WEATHER.

It would be well were contractors, builders, and their great employers of labour, to be considerate to their men in so sultry and dry a season as the extraordinary one now in progress. They might obtain the same amount of labour, and indeed more, by allowing them to drop work during the hottest heat of the day, working early and late to make it up. The men would be thankful, and a masters would have more or better work done. Sunstroke has been unusually prevalent this season, both in this and in other countries, and working in the sun is dangerous. We have seen a very good practice adopted by gardeners and others to protect their heads,—namely, the wearing in their hats or caps of a large moist cloth, such as of flannel or calico. A moistened handkerchief, however, may do. The Indian practice of wrapping the hat over with a white cloth, we observe, is being adopted by bus drivers and conductors. While we are having something not far short of the dry and sultry of an Indian summer, it seems that in India they are making a trial of the moist and pleasant summer of England.

THE THAMES EMBANKMENT.

"A LONDONER" writes,—I have just had the pleasure of a walk along the northern Thames embankment. I observed that between Westminster and Hingerford Bridges a high wall of brick and stone is being erected, to divide the embankment roadway from the surplus land at the shore. I was under the impression that the formation of ornamental gardens was contemplated on this surplus land, and, if so, a high enclosure wall cannot be necessary. What pity that so much rubbish should have been brought on to the embankment, which will have to be taken away in the formation of the roadway.

FRIGHTFUL ACCIDENT AT A MANCHESTER MUSIC-HALL.

On Friday night in last week a large Society assembled in Lang's Music-hall, Manchester, and during the entertainment an alarm fire was raised. A fearful panic ensued, and the crush which followed twenty-four lives were lost, and thirteen other persons were more or less seriously injured. The building, whose proper title is the Trafford Arms, is in the occupation of Mr. D. R. Davies. The principal portion consists of a theatre, with pit, orchestra, and two galleries. At the time the tragedy named a performance was in progress to the benefit of a Mr. & Mrs. Clifford, dentists. The amusement of the moment was a sack race on the stage, to see which a number of men and boys in the pit stood upon the front benches. The benches creaked as if giving way; several men caught hold of a gas-pendant to save themselves from falling, and the pendant broke off their hands. The smell of the escaping gas was so strong that some one cried "Fire," and instantly the firemen in every part of the house rushed to extinguish the fire. The firemen were not only two staircases on either side of the stage, but in a mad effort to escape. Mr. Clifford was carried to them from the stage that there was a cause for alarm, but no one heeded him. A crush upon the staircases was such as to break the iron balustrades and the ironed stairs themselves, and the victims of the false alarm fell in heaps to the bottom,

while some jumped through the windows. As quickly as possible help was rendered in removing the dead and dying in cabs to the Royal Infirmary. There it was ascertained that the number of the killed was twenty-three, all men, most of them young, and that eleven men and two women were injured. The injuries were for the most part internal. There ought to be a general and stringent law passed to enforce the provision of sufficient means of exit from every place of public resort. On this we have often insisted, and the case which has now occurred only adds one more to scores of such cases which show the necessity for legislation on the subject. The widest possible means of egress, with doors opening outwards, ought to be compulsory.

BEHAVIOUR IN A PANIC.

SIR,—In a panic at a theatre, church, meeting hall, or in any place where numbers of people are assembled, what is the best course to pursue? Others have written to the newspapers making their suggestions, will you kindly allow me to make mine? When you find yourself in a crowd, on a staircase or elsewhere, the great thing is to do what very few would think of doing, namely, to *push back*. The space in front is full, gain a second or so by pushing back, and those in front will escape, then those behind can come on. In the Grand Stand at Goodwood, during the races are kept boards (about 3 ft. by 2 ft.), mounted on poles, on which boards are painted in large characters the words, "A Surgeon wanted." If an accident happens to a jockey, or if any person is taken ill, men are at once sent round in the crowd within the enclosure, with these boards held on high, and a surgeon is immediately found. Now, would it not be a good thing to have boards of a similar character in our theatres, &c., for use in emergencies, on which boards should be largely printed, "*Do not push forward, but push back!*" Those who could not see the boards might have the same words conveyed to them by means of a common sea speaking-trumpet.

W.

THE LAW COURT'S COMPETITION.

SIR,—I am no lawyer, or I should be able to answer the question which I wish to put. In this country it is our boast that all men are equal before the law,—that the rights of individuals are sacred as against the Government, as well as against any other assailants,—and that contracts, if not respected, can be enforced. The fair and temperate letter of Mr. Barry leads me therefore to inquire whether he cannot obtain either a *mandamus* for his own appointment as architect to the Courts of Law, under terms, or an injunction against the employment of any other architect.

The question of the departure by the Government from its own conditions is one of too much importance to professional men to be left to the decision of administrative caprice. Where there is a wrong, we are taught to believe, an Englishman has a remedy.

F. R. C.

DECORATIONS.

SIR,—Might it not prove a source of much improvement to young men in the several Schools of Art, to give them as a subject for prizes to form decorative designs for the ornamentation of the halls and the several parts of the rooms in which they are engaged, as the ceilings, &c., or even designs for rooms generally? Even as regards the walls of schools, those most proficient might be employed in decorating the several parts of the rooms. This would give them a facility and freedom in drawing, colours, &c., even to designing furniture, &c.

A SUBSCRIBER.

FELLING TREES.

SIR,—Will you or any of your correspondents inform me whether any machine has been invented for felling trees, which would obviate "Heart-shake," and where such is procurable? I shall feel much indebted to you for this information.

R. V. STONEY.

Calcutta.

THE LAST OF AN OLD MANSION.

SIR,—Some years ago you published some notices of mine on the antiquities of Beaumaris and its neighbourhood. One of them in a very short time will be lost, and before it disappears I would suggest that it would be worth while for some one to have detailed drawings and good photographs made of it. I refer to the old town mansion of the Bulkeley family, till lately divided into several small tenements, but now in the last stage of dilapidation, and about to be taken down. It is of the latest style of Gothic,—early timber, partly of stone,—and may have been built early in the sixteenth century. There are Elizabethan additions, and some of the ornamental plaster-work of this period is very good and elaborate in design. It contains a fine hall, with a cone over the door, an arched oak roof, beneath which, at the level of the collar-beam, a very elaborate ceiling with pendants has been added. A minstrel's gallery and screen remain at the lower end of the hall, but filled in with lath and plaster. At the upper end of the hall is a large drawing-room, with a good ceiling, with houses, &c. The hall and drawing-room are sixteenth century. In the roof is a gallery containing a fine fireplace, on which colour and gilding are still to be traced.

I have in vain tried to get the local photographers to take some views of the place; and it would be a matter of great regret if the remnant of this once fine building (which seems scarcely known to antiquaries) were allowed to be removed without some memorial of its details having been preserved. Even as a matter of profit, photographs ought to sell well among the visitors of the place and of the neighbouring watering-places; as Llandudno, &c.

E. W. COX.

A CAMBRIDGE THOUGHT.

Fair are the laws by Camus, reverend stream,
Whose waters quiver'd in the hindling ray
As o'er the cycloid arch we took our way
Where those tall lines invite the countess' dream;
Nor less it pleased in thoughtful mood to stray
Through cloister'd courts, or where the summer glow
Lit up the fading grace of Inigo,
Or own the Tudor fan's majestic array.
Yet seem these antique halls and quiet trees
Things of the Past, while Fancy on the breeze
Brings sounds that ill consort with learned ease—
Lead calls the Age, the trumpet sings to stride,
The leaders beckon, all the plain is ripe,
With hosts that onward press to brighter, stronger life.
H. H. S.

GREENOCK DOCKS.

SIR,—On the 31st of March last competition plans were to be sent in for the above docks. I duly sent in the plans under a motto, in accordance with the instructions, but have heard nothing of the result, although I have looked carefully through your weekly numbers. If the trustees are going to Parliament for further powers, it is time they selected some plans as the basis of their operations; and if they are not, it is full time that the competitors were informed of the result of their labours.

C. E.

LEAD PIPES AND AIR.

SIR,—The question of the flattening of lead pipes can be resolved as your last correspondent mentioned. A current of water, through even a horizontal pipe, with only 18 in. of head, is sufficient to draw in air to such an amount that, by a small pipe fixed at right angles to the flow-tube, and an india-rubber tube, M. Bourdon, known as an inventor of barometers and gauges, works the models of his new engine by vacuum so produced. I spent some hours with him a few days ago, and he assured me that, although he had patented the system in 1857, still it was always a wonder to him how it acted. The horizontal tube he uses is about a foot long, a little trumpet-mouthed, and playing into a waste trough, and the tube to which he attaches the elastic conductor of the vacuum is about 2 1/2 in. long at right angles, as I said above. However, I think the flattening of water-pipes, say of 4 in. diameter, must be gradual, as the pressure is not very great, even for an atmosphere of 34 ft.; but lead is soft, and the continual bearing of the burden will cause it to yield. If holes are bored with small air-pipes, at intervals near the bottom of the pipe, say 6 or 8 ft. from the ground, the exhaust will be prevented. If the air-holes are too near the top, the water will run over, unless the diameter of the pipe be so great as to make it a blowing-machine as used in many country districts.

DAN PARS.

REPUTIATION OF A CONTRACT.

In a case tried at the Lancaster Summer Assizes, Holden and Another v. Maguire, Mr. Holker, Q.C., and Mr. Edwards appeared for the plaintiff, and Mr. Quain, Q.C., and Mr. Gurn, M.P., for the defendant. The plaintiffs, Messrs. Holden & Clegg, were builders, carrying on business at Accrington, and the defendant, Mr. Maguire, a Roman Catholic priest, also residing at Accrington, and the action arose out of a contract entered into by him with the plaintiffs to build a Roman Catholic chapel. The plaintiffs tendered for the erection of the chapel, and sent in their tender, which amounted to £6,336. Some delay took place, the defendant then being desirous to build a presbytery, and was anxious to have the contract taken by the same party that obtained the contract to build the chapel, and the plaintiffs agreed to build the presbytery at the same schedule of prices they had tendered for the chapel. On the 26th January, 1867, the plaintiffs tendered to erect the presbytery for the sum of £1,000, the time for receiving the tenders having been enlarged. Their tender was accepted, and on the 5th of February, 1867, they wrote to Mr. Maguire to know if one of the architects was there, as they had kept Mr. Ellis (a workman well skilled in Gothic work, whom they had engaged upon the suggestion of Mr. Maguire) waiting to commence the work. The plaintiffs not only engaged Mr. Ellis, but they

built a workshop, erected a steam-engine and boiler, and had all in readiness to commence work, when another delay took place in consequence of the title to the land proving defective, and they were told that they must not proceed with the work till the question was settled and other land procured. Land was procured on the 12th of February. The plaintiffs wrote to Messrs. Wilson & Nichols, the architects, who, in reply, sent word that they must wait. They did wait, but to no effect. On the 20th May, Mr. Wilson came over, and the plaintiffs were introduced to him as the contractors for the work, and then for the first time Mr. Wilson said something about bondsmen. They at first objected, as nothing of the kind had been previously hinted at, but eventually they gave the names of persons willing to become bondsmen, and with those names Mr. Maguire expressed himself satisfied. On the 6th of June Mr. Wilson sent a letter to the plaintiffs, expressing his doubt as to their capability to perform the work, and the result was that he took away the contract from them and gave it to another person.

Upon the suggestion of Mr. Quain, it was agreed to limit the inquiry to the question whether there was a contract or not.

During the examination of the witnesses it transpired that after the tenders had been sent to Mr. Bell, an architect, they were opened by the defendant, who at once accepted that of the plaintiffs, and desired Mr. Bell to inform the plaintiffs, and to signify to the other parties, the fact that the contract had been disposed of, in order that he might not be troubled with any further inquiries.

The jury, without any hesitation, gave a verdict for the plaintiffs, the amount of damage to be settled by reference.

CHURCH-BUILDING NEWS.

York.—Until within about a year ago the Church of St. Michael, Spurrergate, in this city, contained high square pews, covered with green baize. The edifice was also damp and dirty, and was principally lighted by windows on the south-east side. These features were considered sufficiently objectionable to induce the parishioners, at a meeting held in the vestry, to pass a resolution substituting for the pews referred to stalls of a modern pattern, at an estimated cost of about 350*l*. The work has been carried out under the superintendence of Messrs. Atkinson, architects. The contractors were Mr. Dennison, for the pulpit, reading-desk, and reposing; Mr. Dodsworth, for wood-staining; and Mr. Keswick, for the masonry. After the improvements had been commenced an offer was made to rebuild the north-west wall, and to place in it two windows,—an offer which was of course readily accepted by the parishioners for the sake of the great improvement that would be effected. The whole of the old pews in the church were removed, and the floor relaid with concrete. The dampness has consequently been got rid of, and the whole of the interior of the building has undergone a thorough cleaning. The expense of rebuilding the north-west wall, and inserting the four-light windows therein, will be borne by the sheriff (Mr. J. Day, Junr.), Mr. Edward Day, Mr. Wood, of Spurrergate, and Mr. Sanderson, of Low Ousegate. These windows (which have been supplied by Messrs. Hodgson, of York) are filled in with cathedral quarries and ornamental stained lead borders. The two middle compartments in each contain subjects in stained glass. They are memorial windows. In the one is a representation of the offerings of the wise men after the birth of Christ, and in the other the descent from the cross. The two compartments in the other window, to the memory of Mr. Edward Day, are occupied with figures of Martha and Christ. The cost of the wall and windows has been 190*l*. The church will now accommodate about 400 persons.

Birmingham.—The new Church of St. Nicolae, to which has been appropriated a district taken from the parish of St. Stephen, has been consecrated by the Bishop of Worcester. The total cost of the building has been about 3,500*l*. Of this sum the Ryland Trustees gave 2,000*l*.; the representatives of the late Mr. H. Elkington, 1,000*l*.; Mr. F. Elkington, the site (700 square yards of very suitable land), besides 500*l*. for a parsonage; and the Church Building Society a grant of 150*l*. The total length of the edifice is 105 ft., and the total breadth 57 ft., measuring from the outside of the walls. The church consists of a nave, two aisles, chancel, organ-chapel, and vestry. As the church is closely surrounded on three sides by buildings, a lofty clerestory has been placed over the nave arches, by which means abundance of light is obtained in every part of the interior. The design of the church is studiously plain: very little which can be called "ornament" is to be seen in any part of it; but effect has been gained by the general proportion of the parts, and particularly by the unusual height of the whole building. The whole of the sittings in the church are free. There are no galleries. The number of sittings is 600. The architects were Messrs. Martin &

Chamberlain; and the contractors, Messrs. Wehl, of Hockley.

Banbury.—The Banbury people have just declined an offer of 1,000*l*. from the vicar's father, and 500*l*. from Mr. Hunt, a local brewer, towards rebuilding the chancel and improving the organ of the parish church, fearing, we suppose, that they should be called upon to find the remainder of the total sum required.

Bletchley (Bucks).—The old parish church of Bletchley, which has been restored under the direction of Mr. W. White, has been re-opened for divine service. Nearly the whole of the stonework had been repaired in brickwork and cement, involving the renewal of the greater portion of it. The chancel is chorally arranged with return stalls in carved oak, and there is a canopy reared behind the altar.

Brighouse.—The foundation-stone of a new church has been laid at Brighouse, by the Venerable Archdeacon Musgrave, of Halifax, who laid the foundation-stone of the existing church thirty-eight years ago. The new church is to be in the Gothic style of architecture, will accommodate 500 persons, and cost about 3,500*l*. Messrs. Mallinson & Berker, of Halifax, are the architects.

Liverpool.—The foundation-stone of a new church, to be called St. Nathaniel's Church, for the Windsor district, Toxteth Park, has been laid. The site of the church has been chosen in Oliver-street, occupying a central position in the midst of a dense population. The cost of the edifice complete will be about 3,600*l*., accommodation being provided for about 750. The contractor for the works, which will be completed by March next year, is Mr. William Murphy, the architect being Mr. David Walker, of Liverpool.

Lichfield.—The Lonsdale Memorial Church, the chief stone of which was recently laid, as already announced, is intended to take the place of the old body of St. Mary's, which was in a sadly dilapidated state, and which was far from being in unison with the tower and spire, built some dozen years ago to the memory of the Rev. H. G. Lonsdale, another member of the Lonsdale family, and which still remains, to form a part of the new structure. The style is to be Gothic, of the Geometrical Decorated variety, and the building will comprise a nave, north and south aisles, a chancel, an organ-loft on one side, and a vestry on the other, and a Diocesan chapel over a vault belonging to the family. The materials to be used in the erection, both inside and out, will be polished stone. An east window, with seven lights, is to be constructed, as a memorial of the late bishop, and there will be six windows in each aisle, the two at the east end being four-light and the others three. It will contain a polished stone circular pulpit, a reredos of Devonshire marble, and the chancel-stalls, altar-rails, reading-desk and lectern, pillar-caps, and other parts of the building will be carved. The roof will be of timber and open, and the building will be fitted up with Haden's warming apparatus. The architect is Mr. J. W. Fowler, of Louth, late of Lichfield; and the builders are Messrs. Crutchlow & Ward, Uttoxeter. The clerk of the works is Mr. Matthewson, Lichfield. The cost will be about 8,000*l*.

DISSENTING CHURCH-BUILDING NEWS.

Norwich.—The memorial end corner stones of a new Mission Chapel for the Wesleyan Methodists have been laid in Ber-street. The chapel, which is to accommodate about 400 people, is to be built of white brick, with schoolrooms under Mr. Adams, of St. Stephen's, is the contractor, Mr. Boardman the architect.

Normanton.—The chief stone of a new Wesleyan chapel has been laid here. The site of the projected chapel is in Woodhouse-lane, in the centre of the new town of Normanton. The building will be of red bricks, with white brick arches, strings, and cornices, also stone dressings. The inside dimensions are 42 ft. long by 33 ft. wide, and the edifice is capable of seating 200 persons. A vestry, 12 ft. by 12 ft., is attached at the rear. The roof inside will show the framing, which will be wrought, stained, and varnished, and externally it will be covered with blue slates. The interior, pews, benches, communion platform, reading-desk, and other fittings, will be of red deal, stained and varnished. The building, the front of which faces the high road, stands back from the line of road about 13 ft. A dwarf brick wall, stone coping, and ornamental iron railings

and gates will enclose the site. Mr. William Watson, of Wakefield, is the architect, and the contract has been taken for the whole of the works by Mr. Henry Gibson, of Normanton builder, for 473*l*. 10*s*.

Wickham.—The foundation stone of a Wesleyan chapel at Wickham has been laid. The site is a little to the west of the village. The chapel, including vestry, will be 45 ft. long by 28 ft. wide, and will have an open roof, the timbers being varnished. The style of architecture is plain Gothic. Seats will be provided for 200 and the total cost is estimated at 500*l*. The plan and specifications have been furnished gratuitously by Mr. Thomas Merch, of Blaydon Bank and were designed by Mr. J. E. S. Vardy, architect, Newcastle. The contractors are—For the mason, plaster, and slate work, Mr. William Nicholson, Leadgate; for the joiner work, Mr. R. Smith, Winton; and for the painting and glazier work, Mr. C. Robson, Winton.

Ormskirk.—The foundation stone of a chapel and schools in connexion with the Wesleyan Methodist hall, has been laid at Burscough Bridge, near Ormskirk. The building is to be cruciform, but the nave only will be used for the congregation, the transeps and chancel being appropriated as schools, and for the purposes of festivities until the congregation require the entire building for their use. The nave will measure 46 ft. by 36 ft., the transeps, 42 ft. 6 in. by 18 ft., and the chancel, 16 ft. by 8 ft. The entire cost of the building will be about 950*l*. The architect is Mr. Thomas Bridge, jun., and the builder Mr. Thomas Bridge, sen.

Tunstall.—The present Wesleyan chapel at Goldenhill, erected in 1822, and subsequently enlarged, being found inconvenient and too small for the rapidly-increasing population, the Wesleyans have for some time past been contemplating the erection of new and more commodious premises. This object is now being accomplished. A suitable plot of land centrally situated in High-street, the main thoroughfare, has been selected, and the premises will include school and chapel. The building will be erected from the plans and designs of Mr. Roberts, of Trentham, the contractor being Mr. John Grosvenor, of Bradley-green. The plans include a school underneath the chapel, which will be 5 ft. above the level of the road, and approached by steps. It will be a plain structure, the front being of red brick, with stone dressings. The interior of the chapel will be 63 ft. by 45 ft., and the height to the ceiling will be 30 ft. The schoolroom will be of the same length and width, the height from the ground-floor to the ceiling being 13 ft. The seats in the chapel will be open, and the woodwork stained and varnished. The singers' gallery will be at the back of the pulpit over the vestries. The cost is expected to be about 2,200*l*., including the price of the land.

Buttershaw (Bradford).—The foundation-stone of a new Congregational Church for this place has been laid, by the Mayor of Bradford. The site of the building is close to the Bradford and Halifax road, on the north side, on rising ground which is becoming thickly populated, and overlooking a vast tract of country. Buttershaw is a thriving hamlet adjoining Shelf. The architect of the new chapel is Mr. J. P. Pritchett, of Darlington. The building will consist of a Gothic nave and choir, with accommodation for 450 people on the ground-floor and in an end gallery, and there will be provision left for the erection of side galleries, so as to increase the accommodation to 600. There will be a tower and spire rising to a height of 90 ft., and a large central doorway with three-light window over; at the sides there will be single-light windows. Internally, the seats will be all open, with low, slanting backs, of wood stained oak colour. The roof will be open, with curved braces. The windows will be cathedral stained, of tinted glass in lead panes. The passages and vestibule will be laid with mosaic tiles. The chapel will be lighted with star-light, and heated with Haden's heating apparatus.

Bunbury.—The memorial stones of a new Wesleyan chapel have been laid. The plans of Mr. J. B. Bottle, of Great Yarmouth, architect, were adopted; and Mr. Livesley, of Tarpoley, builder, has undertaken the building, the contract for which is 825*l*., and the extras may increase that to 900*l*. or upwards. The new chapel will be 70 ft. long by 33 ft. wide, with a clear space of 6 ft. around it, and a good frontage to the Spurstow road at the end of Lower Bunbury. The materials used in the construction will be red and white brick, with stone facings,

the gabled front having buttresses with carved stone capitals, and a narthex, or porch, with window on either side. In the gable will be a circular window, improved by oblique arcade above, and the apex of the front will be surmounted by an iron finial. In the interior the open seats will be of Baltic timber, stained and varnished, and will afford accommodation for about 250 persons, while there will be a school and vestry, and out-office in the rear.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

Richmond (Yorkshire).—The new Church of Sainte Joseph and Francis Xavier, has been opened for divine service. It stands on the site of the old Catholic school, near the end of the town. It is Early Decorated. The plan shows nave, aisles, and chancel. There is one lateral porch, and to the front is a large porch or atrium, such as existed in certain well-known churches in Yorkshire,ountains, Ryland, &c. A bell-turret rises at the end of this atrium, giving access to an organ-gallery within the church. The capitals of the columns supporting the arches of the nave are all sculptured. The roofs are of framed timbers, that of the nave being arched. Three windows terminate the chancel or apse, one of which is filled with stained glass. Below these windows is the high altar, all carved in Caen stone, with marble columns. The chancel is paved with a mosaic pavement, and separated from the nave by a communion-rail of metal. At either termination of the aisles are chapels, which will be appropriately fitted up. Confessionals in one aisle, and the baptistery in the other, with a commodious sacristy, complete the plan. It is intended to erect convenient schools beyond the church, of simple character, but in keeping with the latter. The Priory of our Lady was begun some years ago, but is only now being completed by the erection of its most important feature—the chapel—and an extensive wing. All the works have been erected and carried out from the plans of Mr. George Goldie, architect, with local materials, and by local contractors. Mr. Naylor has executed the carpenter's and joiner's work of the church; Mr. Smith has done the stonework; and Mr. Garbutt has undertaken the whole of the convent work. For the sculpture, stained glass, tile, &c., the services of Messrs. East, of London; Wallace, of Newcastle; Law, of Broseley, &c., have been employed. We understand that about 3,000*l.* is its cost, inclusive of fittings. It will afford seated accommodation for 500 persons, exclusive of the organ-gallery and standing room.

Books Received.

Fraser's Magazine for August contains a paper "Trade Unionism in the City and Mayfair," in which trade unions are defended, though certain abuses are admitted. "Good or bad," however, says the writer, "they do only what is done by every mercantile firm, every joint stock company, every political club, every religious sect, every church, and every family. If they had not condemned, so does society too; and the choice lies between—not unionism and non-unionism, but—nonism and the most extreme form of socialism." If the non-nionist cannot compete with the unionist, he says, he must get out of the way. Inns of Court, the medical faculty, and such like bodies are addressed as unions of quite as exclusive and tyrannical a nature as trade unions, although they do not operate as broadheads or rattensers.—Broadway for August completes the first volume, and shows that this new international is getting on successfully. It contains a paper "The American Literati at Home," in which we have some particulars of Longfellow's home in Cambridge, Massachusetts. Broadway is about to appear in a new series, at a shilling monthly instead of sixpence.—Cassell's Popular Educator, new edition, revised, has reached its 10th part.—Part 3rd of Bourne's "Examples of Modern Steam, Air, and Gas Engines" of the most recent and approved Types" (Longmans), of which we lately spoke, has now been issued.—The Quarterly includes a paper on "Indian railways," which should have the effect of crossing the confidence in them already shown by the public as means of investment. A

Life of Garrick and a paper on Proverbs in the same part are very amusing reading.—*Hanover Square*, a magazine of copyright music, edited by Lindsey Sloper (Ashdown & Parry), is now in its tenth number, which contains two pieces for the piano-forte, a song by F. Stanfield (the words by Shakspere), and a charming ballad by Virginia Gabriel.—Several single pieces of music have reached us. We select for mention "The Rock-brook Galop," by E. Hill (Lamborn Cook, Addison & Co.). This is a capital dance-tune, original, spirited, and with time well marked. If this be the production of a very young composer, as we understand it is, we shall see more of the notes of E. Hill, and find them readily exchangeable for cash.

Miscellanea.

BRITISH MUSEUM.—A scandal in the coin department of the British Museum is being talked of, and one of the officers of that department, bearing a well-known name, has lost his appointment, we hear.

NEWSPAPER PRESS FUND.—The half-yearly meeting of this fund has been held at the office, 24, Cecil-street, Strand.—Mr. C. L. Grunneisen in the chair. The report, which was adopted, stated that the committee regarded the progress of the institution as highly assuring. In their last report they spoke with confidence of a large prospective increase in the number of members: this anticipation has been realized by an accession of 30 new members, showing in the aggregate an enrolment of 240; of whom 162 are resident in London, and the remaining 78 in the country. The grants during the past year amounted to 165*l.* The annual dinner, which took place at Willie's Rooms on the 6th of June, was in all respects a signal success. The donations amounted to 1,010*l.* 19*s.* The investments, balance at the bankers', and donations receivable, exclusive of the annual income from members' subscriptions, amounted to 4,744*l.* on the 30th of June.

LAYING THE FOUNDATION STONE OF THE NEW ISLINGTON WORKHOUSE.—On Saturday afternoon last, the ceremony of laying the foundation-stone of the new Islington Workhouse at Holloway took place. The proceedings were of a private character. The site selected is opposite the West London Union Workhouse, and commands a fine view of the surrounding country. The inmates will be classified, and the building is to be fitted throughout with every modern appliance to promote the comfort of the inmates. The edifice will present an extensive front, and although rather more useful than ornamental, it will be relieved by the employment of bands of variegated brick. A cupola will crown the structure. The wings of the building will be need— one as a Board-room, and the other as a casual ward. The whole will be erected from the designs of Mr. R. H. Burden, by Messrs. Nutt & Co. Mr. Alfred M. Lewis is the clerk of the works. It will be capable of accommodating 1,000 persons, and its cost will be about 76,000*l.*

BIRMINGHAM SCHOOL OF ART.—The following students of the Birmingham School of Art have been successful in the examinations held by the Science and Art Department in May last, in the following subjects; amongst others:—

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| Engineering Drawing: | |
| L. Avis, 1st class. | R. Holliday, 2nd class. |
| A. W. Brown, 1st class. | T. Phipps, 2nd class. |
| W. G. Causser, 1st class. | A. Reading, 2nd class. |
| T. Cox, 1st class. | J. P. Waldron, 2nd class. |
| J. Ellis, 1st class. | G. W. Whitehouse, 2nd class. |
| G. Glydon, 1st class. | W. Bushnell, 3rd class. |
| T. Gray, 1st class. | F. Evans, 3rd class. |
| H. Lewis, 1st class. | J. Fellowes, 3rd class. |
| C. E. Petford, 1st class. | J. Hill, 3rd class. |
| W. H. Robins, 1st class. | R. Morgan, 3rd class. |
| W. D. Sibleford, 1st class. | F. Shaw, 3rd class. |
| A. Betton, 2nd class. | W. Stocks, 3rd class. |
| H. C. Buckley, 2nd class. | W. H. Brookes, 4th class. |
| H. Butler, 2nd class. | E. Baker, 5th class. |
| G. E. Evans, 2nd class. | |
| D. Forbes, 2nd class. | |

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|---------------------------|---------------------------|
| Building Construction: | |
| W. G. Causser, 1st class. | W. Davis, 2nd class. |
| J. D. Dunn, 1st class. | T. Gray, 2nd class. |
| C. E. Petford, 1st class. | T. Phipps, 2nd class. |
| A. Reading, 1st class. | J. T. Waldron, 2nd class. |
| W. H. Robins, 1st class. | R. Baskin, 3rd class. |
| A. Betton, 2nd class. | J. Thorneloe, 3rd class. |
| H. C. Buckley, 2nd class. | W. J. Trigg, 3rd class. |
| T. Cox, 2nd class. | J. Dainty, 5th class. |

Prizes are awarded to all who pass in the 1st, 2nd, and 3rd Classes.

DISTRICT SURVEYORSHIPS.—At an examination held by the Institute of British Architects on Thursday and Friday last, the following gentlemen were nominated for certificates of competency:—Mr. Arthur Allom, Mr. R. C. James, and Mr. L. W. Ridge.

THE PUBLIC PARKS.—At the request of Mr. Alderman Lawrence, in the Commons, the First Commissioner of Works has promised that, for the convenience of foreigners and other visitors to London, he will cause at each of the park-gates the name of the gate to be written legibly and conspicuously.

WESTMINSTER ABBEY AND WORKING MEN.—The Dean of Westminster conducted a party of working men over the abbey, and afterwards entertained them at tea at the Deanery, on Friday. The visit was organized in accordance with a suggestion made by Dr. Stanley, on the part of the Working Men's Club and Institute Union, a society of which he is one of the vice-presidents.

THE FIRE IN FINSBURY.—Great damage to adjoining premises has been done by the fire in two timber-yards in Paul-street, Finsbury. It appears that no fewer than eighteen houses were more or less injured. There is something very absurd in the fact that so much care is taken by the Building Act that no pieces of timber in the building of any one of these or other houses shall come within 4 in. of the face of the wall; while, adjoining closely to their walls, there may be a whole timber-yard, with timber piled up against the walls themselves.

THE OXFORD CITY SURVEYOR.—On the appointment, from amongst seventy-one candidates, of Mr. T. C. Clarke, assistant engineer of the borough of Portsmouth, to the surveyorship of the city of Oxford, the Portsmouth town council passed a resolution to the effect "that a testimonial under the common seal be given to Mr. Clarke, expressing the high sense this Board entertains of his ability, zeal, and industry, as evinced by him in the performance of his duties, and particularly in respect of the main drainage works, which have been carried out during the three years and a half for which he held his appointment, and for some months of which he had sole charge."

HARRISON'S IMPROVED PARALLEL RULER.—The parallel ruler patented by Mr. Harrison will be found useful. The first idea of the inventor was merely to give a facility for ruling parallel lines at known distance apart, the width of the opening being regulated by lines drawn on the ruler, and this it does. There are different scales for this purpose at the four pivots of the cross-bars. The ruler is also marked so as to set out angle of any number of degrees by ruling along the ruler and along the cross-bar. The angle subtended at the eye by distant objects might by this also be roughly estimated. Cross-hatching or diaper would be readily drawn at any required angle, and probably in making perspective drawings the instrument would be found advantageous. In the business of a lithographic draughtsman it will be found useful, as well as by wood-engravers and brass-plate engravers. This ruler is to be obtained of Messrs. Reeves & Sons, Cheapside.

CHURCHYARDS AS RECREATION GROUNDS.—A crowded meeting has been held at St. John's Vestry-hall, Horselydown, to discuss the propriety of throwing open the parish churchyards as recreation-grounds. The rector (Rev. T. H. Tarlton) explained that he had been stupidly misrepresented when it had been reported in some local paper that he thought the churchyard a good place for old people to smoke their pipes in. What he desired to see was a place with pleasant walks, green turf, flower-beds, and flowering shrubs, to afford grateful retirement occasionally from the noise and bustle of daily toil to hardworking folk; a place where children might be sent to breathe fresh air exempt from the dangers of the street traffic. Mr. Fielding promised a cart-load of chrysanthemums and pompones; Mr. Hart proffered to keep and stock one flower-bed; Mr. Slee two ornamental garden-chairs, the churchwardens four more, and other gentlemen two more. It was resolved to open the churchyard as soon as possible, to gradually adorn it, without needless, or indeed any, desecration; to keep it for the express use an hour or so daily of the inmates of the workhouse at its side, and appoint two custodians to prevent histerious or needlessly behaviour.

DREAFFUL ACCIDENT ON A FRENCH RACE-COURSE.—A terrible accident occurred lately at Amiens races. One of the stands fell, roof and all. About fifty people came to the ground with the *debris*. Two persons were killed on the spot, and there were other casualties.

ESSEX ARCHEOLOGICAL SOCIETY.—The annual general meeting of this society has been held at Brentwood, an excursion in that neighbourhood having been arranged by the council, including the inspection of East Horndon Church, Little Warley Hall and Church, and the ancient Chapel of St. Thomas of Canterbury, Brentwood.

FALL OF A CORNICE.—Last week a serious accident occurred to five men who were engaged on a scaffold in forming a cornice round a new block of houses building in the fields between the Notting-hill station and the Harrow-road, Paddington. The weight of the material caused the work of the cornice to give way, which, in its fall, broke away the scaffold and precipitated the men from the height of 40 ft. to the ground. The sufferers, all of whom were seriously injured, were conveyed to St. Mary's Hospital.

PECKHAM-RYE.—The *South London Press* states that the manorial rights over Peckham-rye, Goose-green, and Nunehead-common, have this week been bought by the parish of Camberwell for 1,000*l*. Chairs for public accommodation will at once be placed on the grounds, and the inhabitants are now considering the propriety of asking for a few flowers; but seeing that the vestry contains members who advocate cutting down a fine grove of trees elsewhere, because in winter the drippings from their branches keep the road damp, they are by no means certain of getting them.

ATTACK ON A FOREMAN.—In the Clerkenwell Police-court, Richard Reilly, a labourer, was brought up on a warrant, and charged before Mr. Barker with committing a violent assault on Henry Skoins, a foreman of bricklayers at the Imperial Gas Works, York-road, King's-cross. Skoins complained to the defendant and the gang of labourers of which he formed part of their not doing work enough, and the defendant hit him twice with the hod. After that the defendant hit him on the breast, and followed this up by striking him on the face with his fist, and kicked him on the knee. The complainant said he had been ill, and spitting blood ever since. Mr. Barker ordered the defendant to pay a fine of 2*l*. 10*s*. or in default one month's imprisonment with hard labour in the House of Correction.

PANIC ON THE BRIGHTON WEST PIER.—There has been a fortunate escape here from a calamity equal to that at Manchester. The West Pier was crowded with about 5,000 people, and a large proportion of them were on the outer "head" listening to the band. A squall of wind caused the head to sway and vibrate a little, when a knot of women took the alarm, and raised the cry that the pier was falling. The great body of the promenaders at once rushed for the shore, and the stamping and running caused the structure to sway in a really alarming way. Fortunately, the pier-master at the first indication of alarm, threw all the gates open, and thus the immense crowd escaped with scant, if any, hurt, except to wearing apparel. The secretary to the pier company states that the pier is quite secure. It provides for deflection as itself a security.

STREET TRAMWAYS FOR LIVERPOOL.—The first Act of Parliament, authorising the construction of street tramways on a scale sufficient to test their adaptability for the omnibus traffic of large cities and towns, has received the royal assent. The Act empowers the company to lay down and work a line of tramway running from north to south of the borough of Liverpool, passing through crowded and in some instances narrow streets, with a loop line in the centre of the town, enabling carriages using the tramway to reach the Exchange. The Act now passed was the third introduced for the purpose in three successive sessions. The two previous bills were thrown out through the opposition of the omnibus proprietors, aided by the London and North-Western Railway, which for some occult reason employed the funds of the shareholders to prevent an improvement in the internal traffic of Liverpool. We hope the company will lose no time in getting their system at work, as improved omnibus accommodation and the relief of our crowded streets, especially in London, are now matters of great moment.

FEVER AT SYDENHAM.—We hear of a very prevalent fever in the older parts of Sydenham, where the drainage and water supply call for attention. This should be inquired into at once.

THE ATLANTIC CABLES.—The announcement that the Atlantic cable of 1866 has failed will be received with general regret. The fact has been notified to the Secretary of the Stock Exchange by Sir R. Glass, chairman of the Anglo-American Telegraph Company. The second cable still maintains the communication between the American continent and Europe.

ASH, AND MOUNTAIN ASH.—It has recently been remarked that the specimen blocks of ash and mountain ash exhibited in the collection of British woods at the Agricultural Show, Leicester, showed a marked distinction in character. The so-called "mountain" ash is no ash at all, nor in the remotest way allied to the ash tribe. As the "mountain-ash" or "rowan-tree" belongs to the rose family, it is a matter of small surprise that it differs in character from the ash.—W. G. S.

PROPOSED NEW INFIRMARY FOR KIDDERMINSTER. It has been resolved at a meeting of the subscribers to the Kidderminster Infirmary, to endeavour to procure funds for the erection of a new building for twenty to twenty-four beds for the Infirmary, which Mr. Baker, the borough architect, estimates will cost 3,500*l*. Mr. I. Brinton promised 500*l*.; the Bishop of Worcester, 100*l*.; and the Rev. G. D. Boyle, 50*l*. A resolution was agreed to empowering the committee to select a suitable site, to collect subscriptions, and to report to a future meeting.

COTTAGE HOSPITAL AT NEWMARKET.—Dr. Gray, of Newmarket, is calling the attention of the public of this town and neighbourhood to the advisability of establishing a cottage hospital, urging that Newmarket is a place peculiarly in need of such an establishment, the nearest hospitals being fourteen and thirteen miles distant, being at Bury St. Edmund's and Cambridge, whilst the town is surrounded by numerous populous villages, to which such an institution would prove an inestimable blessing. It is suggested that a public meeting be called to consider the matter.

TECHNICAL EDUCATION.—An evening class for working men, in connection with the Science and Art Department, for the study of practical, plain, and solid geometry, mechanical and machine drawing, and building construction, was established at the commencement of last winter, at St. John's Schools, Waterloo-road, the teachers being Mr. C. F. Dorrell, Mr. W. Busbridge, and Mr. S. Annis, all holding certificates from the Science and Art Department. About twenty-five students speedily joined the class, and of this number nineteen presented themselves as candidates at the examinations held under the direction of the Science and Art Department in the month of May last. The results of the examinations may be regarded as successful.

VENETIAN GLASS.—As the art of glass-making was introduced into modern Europe by the Venetians, Mr. Herries, her Majesty's Secretary of Embassy and Legation at Florence, in his report just issued, has furnished some statistics relating to the production of Venetian glass. He states that, besides discovering the art of rendering glass colourless by means of manganese, the Venetians also enjoyed the monopoly of mirrors, the silvering of which was a secret long kept from other countries. These mirrors, however, have now lost their reputation, as foreign competitors produce larger plates. Glass beads are still made in considerable quantities for exportation. Venetian enamels have always been famous, and among the peculiar productions of Venice may be reckoned the beautiful composition called aventurine, the secret of which is said to be in the possession of a single manufacturer. The great glass-works are at Murano, one of the islands of the Lagoon. The number of persons employed in glass-making at Murano and Venice is 5,000, of whom one-third are men and two-thirds women and children. The annual cost of the substances employed in the manufacture is estimated at 7,000,000*fr*. In the East there is a constant demand for beads and other articles known as "conterie." There are six glass-works in Turin, three in Genoa, five in Milan, thirteen in Florence, eleven in Naples, and twenty in Venice. These fifty-eight works produce articles of the annual value of 10,276,725*fr*.

ABYSSINIAN PHOTOGRAPHS.—Lord Napier, Magdala, favoured Mr. John Watkins, of Parliament-street, with sittings for a variety of photographs on Tuesday last. Consul Cameron, who is slowly recovering from his serious illness caused by his long imprisonment, has also sent Mr. Watkins; thus completing the artist's set of portraits of the whole of the rescued Abyssinian captives, with that of their gallé deliverer.

INSTITUTION OF MECHANICAL ENGINEERS. The annual meeting of the members of the society has been held at Leeds, in the Philosophical Hall. The chair was occupied by Mr. Joshua Whitworth. There was a numerous attendance of members. Mr. Thomas Greenwood (Messrs. Greenwood & Badley, machinists, Leeds) read the first paper, which was on "The Box Cartridge." A short discussion ensued on the paper. Mr. John Fernie, of Leeds, then read paper "On the Application of Machinery to Cutting." A discussion followed. Subsequently it was announced that the proprietors of the West Yorkshire Coal and Iron Company's works would be glad to see the members of the society and show them not only the coal-cutting machines at work, but also the shale oil works and brickmaking machinery on the same estate.

TENDERS.

For villa residence, coach-house, and stabling at Loughton Park, for Mr. Joseph Rooks. Mr. A. Bridgman, architect:—

Bennett	£2,330 0 0
Johnson	1,235 0 0
Kempson	1,250 0 0
Past	1,150 0 0
Pavitt (accepted)	1,050 0 0

For a pair of semi-detached villas at Croydon, Surrey, for Mr. J. C. Shackleton. Mr. George Low, architect. Quantities furnished by Mr. Fred. Johnson:—

Case	£2,515 0 0
Colls & Son	2,368 0 0
Palmer	2,345 0 0
Becton (accepted)	2,045 0 0

For new factory, Glengall Wharf, Old Kent-road. Mr. V. Buckland, architect:—

W. Lloyd	£5,340 0 0
Browne & Robinson	7,920 0 0
Colls	7,870 0 0
Myers & Sons	7,980 0 0
Lawrence & Sons	8,482 0 0
King & Son	6,456 0 0

For the erection of the Portmadoc British School boys', girls', and infant schools, two classrooms, teachers' residence. Grates not included. Mr. Owen M. Roberts, architect:—

W. Lloyd	£1,283 0 0
Jones & Co.	1,280 0 0
Griffith	1,252 0 0
Jones & Roberts	1,168 0 0
Robert Lloyd	1,115 0 0
Roberts & Williams (accepted)	1,100 0 0
Davies & Son	1,100 0 0

For alterations, repairs, &c., to the Hackney-road Wesleyan Chapel. Mr. John Tarring, architect:—

Diana & Sons	£593 0 0
Selman	591 0 0
Hill & Sons	545 0 0
Saunders	530 0 0
Hall	457 0 0
Blumcrin	444 0 0

For alterations to shop in Black Lion-street, Brighton, for Messrs. Holders. Quantities supplied by Messrs. H. Lansdown & Co. Messrs. Gaulty & Gibbins, architects:—

Parsons	£712 0 0
Chappell	681 0 0
Cheesman & Co. (accepted)	688 0 0

For the erection of seven houses, Fulham. Mr. D. Lake, architect:—

Pitts	£1,030 0 0
Henshaw	3,915 0 0
King & Sons	3,850 0 0
Mann	3,842 0 0
Thorn	3,620 0 0
White	3,454 0 0
Sharp	3,050 0 0
Wills	2,989 0 0

For fishing Nos. 2, 3, 4, and 5, Kidbrooke Park estate Blackheath. Mr. J. Waicheord, architect:—

Fletcher & Gay	£4,055 0 0
Boston	3,800 0 0
Sparrow	3,900 0 0
Emery & Co.	3,000 0 0
Wilsou	2,970 0 0
Gunn	2,820 0 0
Turner	2,179 0 0
Johnson	2,070 0 0
Pett	1,855 0 0
Merritt & Ashby	1,720 0 0
Wise	1,570 0 0
Reeve	1,610 0 0
Eastman & Cockerell	1,425 0 0

For repairing houses Nos. 9 to 16, Northampton-row and 7, Exmouth-street, Clerkenwell, for Mr. W. A. Higgin. Mr. W. Smith, architect:—

Crab & Vaughan	£289 0 0
Fletcher & Gaughy	430 0 0

The Builder.

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British Archaeological Association in Cirencester.

CIRENCESTER calls for archaeological investigation, and in it the British Archaeological Association have commenced their congress under very agreeable auspices, and with fair hopes that good may result from their meeting. The Association includes a number of staunch, hard-working antiquaries, who go out on these occasions, making no great pretence, but determined to do all in their power to get and give information. The President for the present congress is the Earl Bathurst,



who opened the week on Monday, the 10th, with an address, as he observed, to the unlearned, desiring to incite fresh minds to give attention to the subject. This Association, the President said, was formed in 1843 to investigate the customs and arts of our forefathers; and when the Association commenced its labours there were scarcely any local museums in the country, and the British Museum had then no particular place assigned for the custody of national relics. Speaking in the county of Gloucester, he could not, while on this subject, pass over the name of a distinguished local antiquary, Samuel Lysons, who was born at Rodmaston, not far from Cirencester. He was keeper of the archives of the Tower of London, and he wrote first on the antiquities of the county of Gloucester, and secondly on the Roman remains found at Kenchester: he was also one of the editors of *Magna Britannica*, and by his deep research and personal labours did much in the cause. He (Lord Bathurst) knew him personally in early life. The town of Cirencester, in which they were assembled, was the *Corinium* of the Romans. It was a very general thoroughfare, with roads branching out in different directions; and was no doubt a great military station. Four great Roman roads met at Cirencester,—1. the Fosse; 2. Akeman-street; 3. Apin-street; 4. Ermine-street. These roads would be described in detail in papers to be read on the subject of ancient *Corinium*; but, in addition to these roads, they had other antiquities of the Roman era. There was an elliptical area called the bull-ring, evidently the remains of an amphitheatre, and the Roman burial-place was situated in the suburbs of Cirencester—Watermoor. They had now in that town a museum built by the late Lord Bathurst, in which a variety of antiquities had been deposited. Quite lately a curious acrostic had been found, which had been placed in the museum. Amongst the most interesting relics which time had spared were the tessellated pavements. One of these was descriptive of Orpheus charming the birds and beasts. This was at the Barton Farm. Another was found in digging a drain in Dyer-street, and this was deposited in the museum. A vast number of coins, chiefly of the reign of Constantine, had also been dug up;

and, although a collection of coins might appear to be uninteresting to many, yet they had Addison for an authority that coins told a story much quicker than books, and Pope had adopted the same view. Proceeding to topics of more recent date, the President went on to say that, in the opinion of the townsmen, the abbey church of that town held as high a position in Cirencester as did St. Peter's in Rome. He would not anticipate the details which would be given in describing it by others, but, after a few passing words on the study of architecture, he noticed that one of the places to be visited was Malmesbury Abbey, a grand ruin. Another was Fairford Church, renowned for its painted glass. This glass was captured in a ship that was bound for Rome, by Captain Tame, who built the church purposely for it. The newly-discovered villa of Chedworth was a discovery particularly interesting, not only by reason of its romantic situation, but because it gave them an insight into the mode of country life of the ancient Roman nobleman. In conclusion, the President said that, although archaeology did not possess the all-absorbing interest of the turf and the chase, it had an interest of its own, and did not tend to ruin. And surely the student who pored over ancient remains of Greece and Rome, or visited the edifices which the piety of his ancestors had raised in honour of his Creator, could not be said to pass his time unprofitably.

It would be easy of course to show the speaker that archaeologists are never better pleased than when engaged on the turf, investigating earthworks, in full chase of a promising church seen across country, or thoroughly engaged in the examination of a ruin.

At the conclusion of the address Mr. Godwin, as the senior vice-president present, expressed the gratification which he and his brother members felt at visiting Cirencester. It was impossible to come to Cirencester, or "Cisester," as it was locally called, without receiving instruction: it was full of associations and full of remains. The Roman pavements there showed such a remarkable degree of excellence as to make us not only envious of the work, but ashamed of some of our own. The amount of art displayed in them was remarkable, and the endurance of the work was more so. Here were pavements which, after having done their work centuries ago, were as perfect as when they were first made, while many of the modern pavements in this country were already destroyed. They were making attempts to turn art into this and similar channels, and he hoped they would eventually succeed. The speaker referred to the valuable results which had been attained through the means of archaeological associations, and congratulated Cirencester on having long possessed individuals,—Mr. Buckman, Mr. Newmarch, Mr. Mullins, and others,—who kept alive an interest in the antiquities of the town.

Mr. Canon Powell (once perpetual curate, but now, by recent Act of Parliament, vicar of Cirencester) then invited the members to follow him to the well-known south porch of the parish church, and concerning which Leland writes,— "One Alice Aveling, aunt to Bishop Rathal by the mother side, gave an hundredth markes to the building of the right goodly porch of the paroch church, and Rathal's mother and others contributid to the performance of it."

In 1671 Bishop Nicholson sealed his grant of this "vice" (parvise?) for public uses. Mr. Powell gave some particulars, and a discussion ensued on the often opened question of its use, and as to what a parvise really is. There is no doubt that the term "parvise" (*paradisus*) belongs to an open space in front or near a church; at Chichester we have still the "paradise," and in France the open space near a church is constantly called the *parvis* still. Nevertheless, it is equally certain that the term

has been locally applied to the room often found over the church-porch. Indeed, the "paradise" chamber is not uncommon in old buildings.

Canon Powell then led his audience into the church, and gave a very full description of it; Mr. Niblett, M.A., supplementing it, and Mr. Planché directing attention to the brasses. The church, dedicated to St. John, is among the finest Perpendicular churches in the kingdom. The building extended over a long series of years, and is yet carried out consistently in one uniform style. Over the great window in the tower is a shield of the royal arms, in which the arms of France are borne in a way which has been disused since the reign of Henry IV., thus establishing that the tower is not of later date than 1416, while there is documentary evidence that the nave was not finished till the time of John Blake, the last abbot, and the south porch was the last portion of the fabric. The plan is a chancel with north aisle and north chapel, nave and aisles, with western tower and south porch. The nave is 75 ft. long, divided into six bays, and is 74 ft. wide across the aisles. Of the five chapels, that of St. Catherine is the most curious. It is on the north side, between the chancel and St. Mary's Chapel. The date, 1503, is to be seen on the roof. Over a niche in the south wall is a mural painting of the martyrdom of St. Catherine. The walls of St. Mary's Chapel were also once covered with wall-paintings, portions of which have come to light. One was a representation of Purgatory. In the Trinity Chapel are some fine brasses. Three represent William Prelate and his two wives, the former in plate-armour. The date is 1462.

A transition column on the south side of the church, partly built into the later work, stands on what seems to be the base of a Roman column (the mouldings very good), the front portion of which, being exposed, was cut into a fresh form by the twelfth-century men, to suit the column they were then erecting.

There was a dinner in the evening, at which Lord Bathurst presided genially. Mr. Newmarch, in proposing the health of "The Vice-Presidents," made some references to the signs of certain public-houses in Cirencester. One was "Bishop Blaize," who was the patron of the wool trade of the town, Cirencester being formerly the great mart of the district around. The derivation of this sign had been attributed to many causes. It had been supposed to be the "Bishop ablaze," perhaps a martyr; and, a hush being a Gloucestershire sign for a house of entertainment, it had been supposed to mean a "bush ablaze," or a "burning bush." There was another public-house which, when he was a boy, he remembered was called the "General Wolf," and which referred to the time when Wolf was quartered in the town onlisting recruits. It was not generally known that Hogarth once resided in Cirencester, and he (the speaker) had a painting by Hogarth, which was a panel in the Ram Inn there.

Mr. Thomas Wright, M.A., and another vice-president, invited.

Mr. Gordon Hills, in proposing "The Local Committee," acknowledged the kind co-operation and assistance that had been afforded by that body. With regard to the Abbey Church, which they had visited that afternoon, and where the exigences of time and dinner did not permit them to linger so long as they could have wished, it was a glorious church; but what a far more glorious abbey must once have stood on nearly the same site! William of Worcester had given them the dimensions of both edifices, and they could portray with considerable accuracy the size of the old abbey; and if they compared the dimensions of the old Abbey Church with the parish church they would see the superiority of the former church. It was only by looking back in that way, and thinking of what had been, and reproducing it in the mind, that they could

understand of what importance the town was in former days.

Sir S. Cary, Mr. Bowly, and other gentlemen spoke, Mr. G. R. Wright closing the proceedings with humorous thanks for the "health" of "The Ladies," his *syven-sisters*.

On Tuesday morning an early meeting was held in the Assembly-room, to hear

Mr. T. C. Brown, of Cirencester, read a paper on "The Ancient Plan of the Roman City Corinium," illustrated by a map showing the particular sites to be afterwards visited. Mr. Brown said he believed it to be the *Corinium Dobonorum*. As Roman history was silent respecting this ancient city, he suggested that it took its name from the camp on the river, *i.e.*, the river Churn, which runs by Cirencester, and "ceastre," easily rendered "Cirencester." They might believe it was a British town belonging to the Dobuni, and hence called *Corinium Dobonorum*. The city proper was surrounded by a wall of stone (the stonework had been found repeatedly, but was now covered with soil), having a ditch without. He was sorry to say that ancient and modern Vandals had destroyed many parts of the wall. The area within the wall, including the modern town, was about 400 acres. It was a perfect flat—an expanded portion of the valley of the Churn, which runs from the seven springs on the upper Cotswolds, and formed the head of the Thames. Some 3 ft. or 4 ft. under the soil was a deep gravel bed, in which constantly flowed an underground river. In this gravel bed the Romans dug wells, which they walled with cut stone, and which formed the hulk of the wells of the modern town. In deepening a well of his own, a portion of a Roman pitcher was found built into the wall. There was a good example of the Roman well at Mr. Brewin's Roman villa. No sooner did the Romans occupy this site than they began to fortify it by a wall, and then built common houses for the soldiers, better ones for the centurions, and villas for the officers. The streets of the modern town, they might presume, were the streets of the Roman city. They accorded with the Roman town in being narrow, in having those curious centres formed by three ways meeting, and in crooked arrangements that promoted defence. Without these streets, villas were built, as shown by the tessellated pavements discovered, and when first opened the warm-air baths were seen. The greatness of the Roman city might be judged of, not only by the largeness of the area within the walls, but also by its connexion with the great Roman roads—one to Gloucester, another to Bath, a third to Stow and the north, another to Newbury and the south coast. Throughout all this area, and without the walls, Roman remains were found whenever the ground was opened; coins in all parts, from Claudius, A.D. 42, to Valentinian, A.D. 424; millstones of black basalt from a town on the Rhine, others of conglomerate from the now red sandstone of the Forest of Dean; Samian and other pottery, bricks and concrete specimens of all of which they would find in the museum. Having pointed out the sites where these were found, Mr. Brown mentioned that the level of the present soil within the Roman walls was raised 4 ft. to 6 ft. Whence was this addition derived? In the suburbs of the city now called the Querns was the place of quarries. There the Romans dug stone, and of the rubbish formed an amphitheatre.

Mr. Godwin (in the chair), when inviting discussion, suggested that a systematic reconnoitring of researches, under the superintendence of a committee, should be undertaken. As to the raised level, it might be partly accounted for by the fall of roofs of the Roman houses and other *edifices*.

Mr. W. H. Black did not consider this to be the Corinium of Ptolemy. He believed it was of later date, and, after duly weighing the matter, he thought North Cerney, which was also on the Churn, was the locality of Corinium. Nothing was more likely than that after the first conquest certain situations became of more importance than others first settled. A number of military roads converged here; but these military roads were the youngest instead of the oldest roads in existence, except the modern roads made by Act of Parliament. The military roads sprung from the roads of Julius Cæsar, having a perfect beginning and ending. He thought there could be no doubt that this was a Roman city of respectable antiquity, but that it could not be identified with the Roman Corinium. The great roads converging here would necessitate the rise of a city which might have

become a Corinium of later times, but not the Corinium of Ptolemy. He had no desire to disparage the antiquity of the place, but, after all, truth was truth, and that was what they wished to arrive at.

Everything said by Mr. Black on a question of this kind is entitled to the fullest consideration, but to substantiate his position some stronger arguments will be necessary than those that were then brought forward.

The Rev. Prebendary Scarth and Mr. Thomas Wright, who spoke in the course of the discussion, were not prepared to accept Mr. Black's views. With reference to the raising of the soil, it was mentioned that at Uricinium (Wroster) there were 8 ft. or 10 ft. of earth; in the old city, at Bath, 16 ft.; and in another place, only 2 ft. This the speaker accounted for by supposing that in the more thinly populated places the accumulation would not be so great as in those more thickly populated. At Gloucester a horse-shoe had been found at a depth of 12 ft.

The party then proceeded to the pavement at the Barton, Oakley Park, under the guidance of Mr. John Bravender; and afterwards to St. John's Hospital in Gloucester-street, by the bridge across the fields to Hospital-gate, Abbey-grounds; then by Golden Farm-road, along the Roman wall to Watermoor; then to some remains in the nursery, and to Mr. Brewin's pavement in Queru's-lane. It was shown that the pavement at the Barton was suffering considerably from damp, and Mr. Gordon Hills, Mr. Godwin, and others having offered suggestions for its preservation, Lord Bathurst said he would not fail to avail himself of what had been said. The pavement at the Barton has Orpheus in the central circle, with a circle of birds around it, and then an outer circle of hearts. It is figured in Messrs. Buckman & Newnarch's "Illustrations of the Remains of Roman Art in Cirencester," but the engraving gives no idea of the harmony of colour and elegance of pose observable in the original.

The visitors were entertained by the president with luncheon, two or three hearty speeches being made; and then they went to examine the bull-ring, or so-called Roman amphitheatre, when a discussion ensued to which we shall recur. They also went to the Querns. The term Querns has been thought by some to owe its derivation to the fact that there were here quarries, locally called Quarns or Quarns; but others find it in the *quairns*, or burial places on the spot. Skeletons and ancient coffins have been found there. It is an interesting circumstance that the exceptionally dry weather has made evident here within the last few days, for the first time in the memory of man, that the foundations of a nearly square building, some 36 ft. square, are below the turf. The foundations are distinctly marked by the dryness of the turf above, and ought to be staked out on the surface, so that the knowledge might be preserved. Prebendary Scarth thought it not unlikely that the building here indicated was for the burning of bodies.

The two portions of composite capitals put together and standing in the abbey grounds have always been described as having formed part of one building. We can scarcely view the two pieces as of the same period. The lower part, acanthus leaves, is of purer design than the upper part, which includes a boldly-sculptured head on each of the four faces. The diameter of the top of the column to which the lower part belonged was 2 ft., indicating a structure of considerable importance. We should prefer to see the two pieces separately preserved, as together they form a disproportioned capital, and do injustice to the Roman. We may see from the upper part the licence the Romans allowed themselves in their capitals. Many of the best remains in Cirencester were discovered in the tract of ground known as the Leanea. A visit was paid to the museum, where Professor Church gave a description of the system of arrangement, and a general account of its contents, the greater part of which were local and mostly Roman. He described a process of his own for preserving iron antiquities and frescoes from decay. It consists of holding the iron articles in solid paraffin (paraffin candles), and painting the frescoes with the same material.

Mr. Roberts congratulated the town on the especial value of the museum by reason of its being purely of local antiquities. He also referred to the two Roman tiles which are impressed with the letters I. H. S., and about which there had been considerable discussion in London. Now that he had seen the tiles, he had no hesita-

tion in saying they had, in his opinion, no reference to Christianity, as had been believed by many. He also pointed to two bases of Roman columns which had mouldings, though on a smaller scale, nearly identical with that now in Cirencester Church, proving conclusively the Roman origin of the latter.

In the evening papers were read. Mr. Roberts decanted "On the places visited during the day," it being a customary proceeding to narrate the principal incidents, in order to give an opportunity for renewing, under more convenient circumstances, discussions of interest which the economy of time had caused to be cut short in the field. After this Mr. Dillon Croker read an account of the "Cotswold and its Popular Customs." The most interesting part of this paper was the history and reminiscences of the Dover sports. It appears from the "Annalia Dubrensis," a very rare collection of commendatory verses upon "the yearly celebration of Mr. Robert Dover's Olympic games upon Cotswold Hills (London, 1636)," that these sports, as common in the Middle Ages, consisted of wrestling, leaping, pitching the bar, handling the pike, dancing of women, hunting, and coursing. In this book there is a portrait of Dover on horseback, dressed in a suit of the fashion in vogue in the time of James I, and a dedication of the complimentary poems by his friend Matthew Wallhance, for whom they were printed by Robert Raworth. Amongst the contributors of these laudatory lays were Michael Drayton and Ben Jonson. The games continued until about three years ago, when the benches introduced into them by the railway labourers on the line then in construction caused an end to be put to them.

The chief contribution was a paper by Mr. W. P. Holt, on the remarkable Painted Glass in Fairford Church, and the connexion with it of Albert Durer. Mr. Niblett, M.A., followed with some supplementary remarks pointing out specialties in the Fairford windows. He said he had spent four weeks in examining the details, and had been unable to discover any monogram. The nearest approach to one was the letter A on the sword of an Amalekita.

The Rev. Mr. Joyce, as the representative of his father-in-law, the Vicar of Fairford, explained that the vicar had done everything he could to preserve the windows. As to Mr. Holt's theory of the authorship of the windows, he (Mr. Joyce) had taken a great deal of trouble in examining the works of Durer, and though he was aware there was a general likeness, he was unable to satisfy his mind that these windows were Durer's. If they were, they must have been executed at a very early age. If Mr. Holt could convince them that these were the work of Albert Durer, the Archaeological Association at Cirencester would have made a great conquest in art.

Mr. Holt's paper is so interesting, and the issue involved so important, that we print it in full, and with this must end for the present our account of what the British Archaeological Association are doing in Cirencester.

THE PAINTED GLASS IN FAIRFORD CHURCH, AND ALBERT DURER.*

In introducing to notice the painted glass windows in Fairford Church I do not purpose entering into any detail upon either the antiquity, progress, or decadence of that particular branch of art, but to occupy the time allotted me in closely keeping to the subject under consideration, and thereby endeavor to create, and maintain, throughout my observations, that interest which the importance of the subject unquestionably demands.

As an abstract fact, it is singularly disappointing that such wonderful productions should have hitherto remained without a historian, whereby their influence on art has necessarily been rendered nugatory, and they have been permitted to remain utterly unrecognized.

Whence can this apathy to such glorious works have arisen? How is the neglectful silence of 370 years to be accounted for? Whatever the reason, the fact remains that in the second half of the nineteenth century, when every talented work of art is discussed or criticised with the utmost minuteness, the treasures of Fairford Church still remain in obscurity, and, for any practical advantage hitherto derived from them, might almost as well have never existed.

* By Mr. Henry F. Holt.

With this preliminary reproach, which I feel too just to be either repressed or concealed, I will now attempt to deal with the subject.

Before, however, entering on any point connected with the authorship or merits of the windows of Fairford Church, which will be the subject of an excursion, at which I hope to have the honour of usurping, for the nonce, the functions of the highly respected and painstaking orator of the church, Mr. W. Beale, and playing showman for the day, it will be well, for the benefit of those present who may be unacquainted with the windows, to shortly describe them.

The windows are twenty-eight in number, the majority being divided into several compartments.

The subjects are taken from the Old and New Testaments and the Apocryphal Gospel, and are all, with two exceptions, to be found in the "Biblia Patrum," in the "Speculum Humane Salvationis," two of the best known early repertoires of popular Scripture historical records.

The subjects from the Old Testament are but four, comprising—

1. The Temptation of Eve.
2. The Lord appearing to Moses in a fiery bush whilst he was keeping the flock of Jethro.
3. The double sign vouchsafed to Gideon, and
4. The Queen of Sheba's visit to King Solomon.

The subjects from the Apocryphal Gospel and the New Testament include the principal events in the life of the Virgin and of her Divine Son, and represent—

1. The Meeting of Joachim and Anne at the Golden Gate.
2. The Birth of the Virgin.
3. The Presentation of the Virgin.
4. The Marriage of the Virgin.
5. The Annunciation.
6. The Nativity.
7. The Adoration of the Magi.
8. The Purification of the Virgin, and Presentation of the Infant Jesus in the Temple.
9. The Flight into Egypt, with the Massacre of the Innocents in the distance.
10. Christ disputing with the Doctors in the Temple.
11. The Assumption of the Virgin.

These are succeeded by—

12. Christ's Entry into Jerusalem.
13. Christ in the Garden of Olives.
14. Pilate washing his Hands.
15. The Scourging of Christ.
16. Christ bearing His Cross.
17. The Crucifixion—between two malefactors.
18. The Descent from the Cross.
19. The Entombment.
20. The Heavenly Host vanquishing the Evil Spirits.
21. The Descent of Christ into Limbo.
22. Christ appearing to the Virgin after His Resurrection.
23. The Transfiguration of our Lord.
24. Christ appearing to Mary Magdalen, Mary the Mother of James, and Salome, in the Garden—and in the background the three holy women, and the Angel at the Sepulchre.
25. Christ and His Disciples at Emmaus.
26. Christ appearing to His Disciples.
27. The Ascension of Thomas.
28. The Miraculous Draught of Fishes.
29. The Ascension.
30. The Descent of the Holy Ghost.

Then follow—

31. The Twelve Apostles, and
32. The Four Primitive Fathers of the Church.

Above them are—

33. The Twelve Protectors of the Church, surmounted by Angels.

Opposite them are—

34. The Four Evangelists, and
35. The Twelve Prophets.

Above whom are—

36. Twelve Persecutors of the Church, surmounted by twelve evils.
37. A large window in the west represents, in its architectural grandeur, the Last Judgment.

On either side of this is a window, both much damaged, and comprising (*inter alia*)—

38. David sitting in judgment on the Amalekite for slaying Saul, and ordering his servant to kill him.
39. Two figures of old men.
40. Sampson slaying the Lion.
41. The Judgment of Solomon.
42. Sampson slaying the Philistines, &c., &c.

In the higher lights are small figures en grisaille, comprising the Virgin and Child, Prophets, Saints, Angels (most of them bearing emblems of the Passion); and in two windows are ostrich feathers, with the "Ich Dien," from the cognizance of the Prince of Wales.

The subject of these windows is otherwise interesting, and for us in particular exceedingly important.

The artistic interest of the windows is twofold. There is first their intrinsic merit as pictures, for they belong to the period and style of glass-painting in which the mere decorative effect of coloured glass was, if not subordinated,

reconciled to its capability of conveying noble design. There is next their interest in connexion with the history of the great artist Albert Durer, of Nuremberg, to whom I believe they may safely be ascribed, and a most important record of whose artistic life and development, if I am correct in my ascription of them to him, they occupy and explain.

But the special importance of calling the attention of the British Archaeological Association to them at this moment arises from a mortal danger to which they are exposed, and from which I trust and believe we may hope to rescue them. I mean the imminent peril, the deadly risk, of restoration.

When those of you who do not know these windows come to see them, you will, I think, understand the grounds of artistic merit and art history on which I claim for them the most respectful attention. You will, I believe, find them, in spite of damage and decay, one of the most—if I trusted my own impression I should say the most—interesting series of painted windows in England of the later style, in which considerations of design as well as colour occupied the glass-painter's thoughts.

On the point of art history I think I shall be able to satisfy you that the early and quasi-traditional ascription of them to Albert Durer is borne out to demonstration by internal evidence, and if so, that they supply a gap in his late history, and explain some points of keen controversy and material interest in the earlier stage of his career.

Lastly—on the point of danger—of the imminent need that if these windows are to be preserved some steps should be taken to make their value known, with the view of preserving them from the sad fate of ignorant and incompetent restoration, I shall be able to satisfy you only too completely when, on our visit to Fairford Church, I show you a certain head of our Saviour, two particular prophets, and, alas! more grievous by far, the whole upper part of a west window, representing the heavenly section of the Last Judgment, the ruin of which may be measured by comparison with the lower half, still, happily safe from the tender mercies of the restorer; but, as the worthy parish clerk lately informed me with much satisfaction, likely very shortly to pass through that fiery ordeal, a worse condemnation, as I think ocular demonstration will satisfy you, than any of the condemned are represented as undergoing in the picture. The only place I should propose for such restorers would certainly be in the very hottest corners of the Fairford Inferno.

The earliest mention in print of these windows ascribes them to "Albert Durell, an eminent Italian master." At a later date better-informed describers jumped to the conclusion that Albert Durell must have been Albert Durer. But, strange to say, when this was first printed in 1778, and repeated more than once by compilers and copyists in the next ten years, the ascription was boob-pooled by Bigland in 1791, and since has not been re-advertised. Even Winston, the latest and highest authority on glass-painting, who gives considerable attention and high praise to the windows, nowhere so much as hints at the artist. I appear here, therefore, in the character of a new and independent claimant on behalf of Durer, and as the first who has subjected the windows to thorough examination and detailed comparison with Durer's works in justification of the claim. The study of Durer's life and labours has been the occupation of my leisure for ten years past, and I may, therefore, without vanity, claim to be specially qualified for such an inquiry, and able to give it a more exact importance in connexion with the painter's development than has been hitherto thought of. If I am right in my conclusions, these windows are a conspicuous and sole surviving record of a class of labours which occupied Durer in his transition from artistic youth to manhood, and must have been the preparation for that passage from his work as a wood designer and wood engraver, or *formschneider* to his later and greater labours as a painter, in the years between 1494—when he came back from his apprenticeship tour and married—and 1506, when we have his first grand picture, the "Fête de Rosaire," painted at Venice, and now at Pègne. In the interval his sole hitherto recorded works are the series of the Apocalypse on wood, the Adam and Eve, and a few other copper-plate engravings, and some half-dozen pictures, of which four were portraits. Before this time we know of him first as the goldsmith's clever and hard-working

son, next as apprentice to Michael Wohlgenmuth, whom I maintain to have been no painter, but a "formschneider," which business only Albert Durer practised under him, working principally for the great Nuremberg printer and publisher, his own godfather, Antony Koberger. Under Wohlgenmuth he wrought as a paid apprentice for three years. Then came his "wanderschaft," during which he never left the empire, but confined his peregrinations to a circle of towns and cities, of which Colmar was the furthest removed from Nuremberg, during which time he seems to have worked merely—as far as we know—as a "formschneider." At the conclusion of his "wanderschaft" he returned to Nuremberg, a youth of twenty-three, married Agnes Frey, a fair maiden of fifteen, with a decent dot of 900 gulden, and settled down to work for himself and family as a "formschneider" in the town where he had served his apprenticeship. From that time until he visited Venice in 1506, by the kindly help of Bilibald Pirckheimer, the celebrated patrician of Nuremberg, who lent him money for his journey and subsistence abroad, he was working at Nuremberg; but the list of his recognised works is altogether insufficient to account for his time during the interval at the end of which he bursts upon us as a great painter. My belief is that during this period he was training his mind, hand, and eye to large compositions in colour, mainly by the medium of glass-painting; and that in the Fairford windows we have the only extant remains of his mastery in that art. Not only had his authorship of these windows—once apparently a tradition—dropped into oblivion, but the place of this kind of work in the history of his art and life has never been ascertained or insisted upon, and in this respect I venture to claim originality as well as interest for my present statement.

Everybody who knows anything of art history knows that Nuremberg was one of the great seats of German glass-painting in the early part of the sixteenth century; but a preliminary question which will suggest itself to most minds is, Do we know from independent sources of Albert Durer as a glass-painter? I answer, "Yes." We have a series of twenty windows in the Church of the Temple at Paris, described by Lenoir in his well-known work on glass-painting, representing much the same subjects as those of Fairford, but unhappily destroyed during the Revolution. There are, in addition, windows described also by Lenoir at Passy, which probably have shared the same fate. There was a famous series occupying the windows of the monastery church at Hirschau, in Upper Bavaria, representing the principal events in the lives of the Virgin and the Saviour, which, from their description, must have been very much the same as the Fairford windows, but destroyed by the French in the wars of the Palatinate in 1655. This evidence is sufficient to support the attribution I now contend for. But it is remarkable that, either owing to the destruction of these continental examples, or to ignorance of Durer's biographers, the fact of his occupation in this way, which, from the dimensions of even the works I have mentioned, must have covered several years, has never been even referred to.

The fact that Albert Durer did paint glass being established by independent testimony, wholly irrespective of the Fairford windows, how do I connect those windows with him?

First, tradition associates his name with them.

Next, the history of the rehinding of the church is consistent with the fact.

Thirdly, the internal evidence deducible from comparison of the Fairford windows with Albert Durer's own youthful work is, as I maintain, and hope to satisfy you, absolutely conclusive,—if any such conclusiveness be obtainable from internal evidence.

First, the name of Albert Durell appears in the first printed account of the windows by Sir Robert Atkyns, in 1712.

It is said that an account of the pictures was engrossed on a vellum roll and deposited in the church chest. That roll had long been lost when Atkyns wrote, but a copy on paper was supposed to exist—a something probably drawn up by the then parish clerk for his own use. Any so-called imprint of or extract from this imaginary paper copy, however, is untrustworthy, from errors of description; and if it ever existed it had long before its disappearance become grossly corrupt.

But, secondly, the facts of the rebuilding of the church, and the legend associated with it, are eminently consistent with the ascription to Durer.

recognise the style of Durer from works admitted by all to be his, and bearing his familiar monogram.

To me, that monogram needs not to be inscribed anywhere on that noble range of windows in Fairford Church. The painter has left on them the still more conclusive mark of his great mind and master hand. Not a square inch of the original work still remaining in its significance and its earnestness, its beauty of sentiment or its brilliancy of colour, but I read written on it, as if in his own asymmetric characters, "ALBRECHT DURER."

RAILWAY FARES AND MANAGEMENT.

At present the newspapers are filled with letters complaining of the conduct of the railway companies south of the Thames, in raising the fares of the passenger traffic. A case of grievance is clearly made out, and it becomes a public question of no slight importance. If anything could show the desirability of Government interference it is a case like this. We are continually discussing the necessity for making better provision for the people in the shape of dwellings and lodgings, and certainly one means will be that of encouraging suburban residences; but these will depend almost entirely upon the facilities of access. What encouragement is there for persons to employ their capital in building, or for clerks and other classes of employes to move into residences upon our lines of railway, if at any time, without notice and for no apparent or sufficient reason, the fares are to be raised 50 per cent.? The fares are operating seriously upon building operations and upon the selling and letting of property.

The question is a very serious one, and ought to be taken up by the shareholders of the three companies, whose managers have brought upon them so much odium within the last three months. Upon them the loss will eventually fall. The whole case as affects these companies is a very simple one. There has been immense extravagance and waste arising from a senseless competition; there have been other sources of waste, and the consequences are that they are unable to pay a sufficient dividend, and maintain the working of the lines. They attempt by raising the fares to make good some of this loss, losing sight of the fact that they are breaking faith with those who have been induced to reside within reach of their lines. There is no good reason why they should not be at liberty to revise their fares at any time, but many reasons why they should not advance them upon mere caprice, and beyond the fair average charged by other lines. If they have lost money by foolish and profitless speculations they must bear the loss, and not expect the public to recoup, and in such a contest the public will in the long run have the best of it. In the meantime much angry feeling is elicited, and much inconvenience sustained by large numbers of persons of restricted means.

But the case is even worse than this. We know that there has been a rivalry between the Brighton and the South-Eastern, and one folly arising out of it was the construction of the line by the South-Eastern from New Beckenham to Addiscombe, a line that has never paid one half of its working expenses, and is less likely now to do so than ever. There has also been a rivalry between the South-Eastern and the London, Chatham, and Dover. The lines do not work in unison, and thus the passengers by the Mid Kent are subjected to great annoyance. This state of things has existed for some time, and at last the companies sought for parliamentary powers to amalgamate. Provisional arrangements were concluded, and they at once made an advance upon the fares, but the South-Eastern did not make any alteration so as to improve their service. The public, seeing this, took the question up, and made such representations to Lord Redesdale that the company, hopeless of carrying it, withdrew the bill. It is said that Mr. Watkin has expressed his determination to serve the public out. Such a determination is something worse than folly, for it perpetrates the injustice of punishing those who took no part in the opposition, for the faults of those who did. It is bad diplomacy, because it renders the feelings of the opposition more inveterate. The opposition arose from men who had no personal feeling towards Mr. Watkin, and who did not know him. It would have been easier for them to put up with the loss and the inconvenience, but they took it up on public grounds.

The question, then, occurs, whether it is right to place in the power of men capable of harbouring such petty resentments such immense interests as those involved in the management of our great railways. The interests of the shareholders may be left to themselves, but there are thousands of the public who are affected by it. The matter is much too grave a one to be trifled with, or dismissed by official haughtiness or contempt. It will be for the interests of all concerned that the question between the companies and the public be discussed in a calm and business-like spirit. It is to be hoped that at the next meeting of the shareholders of the South-Eastern, which takes place on the 27th, Mr. Watkin, with the concurrence of the Board of Directors, will offer such explanations as will carry with them the assurance that the case of the passengers will be looked into and redressed.

Having destroyed thousands of the dwellings of the poor within metropolitan bounds, and induced many builders to erect new ones on the skirts of their railways, and persons of restricted means to remove to these suburban dwellings, some of the more eager of the railway managers having thus entrapped their prey, think to benefit their interests by raising the fares. There never was a more foolish delusion. One would have thought that the history of the penny postage, the gas movement, and the more enlightened tactics of trade suggested by these movements, would have convinced these railway directors that it is by lowering prices within certain extensive limits, and not by raising them, that most money is made; but no general experience can make any impression on some boards until they specially try the experiment anew for themselves; and this some of the metropolitan railway directors are now doing. The mischief is, however, that they can only play this trick once and away, because they will thus check suburban building speculations so completely that a return to cheaper fares will be of no avail in restoring confidence so long as the railways continue under that sort of management which has already proved itself to be utterly incompetent. As we have said, however, perhaps it is all for the best, since it may hasten the revolution in railway affairs which is pending.

LETTERS BY SIR DAVID WILKIE.

IN connexion with some notes on Wilkie, by the late John Burnet, recently given in our pages, the following hitherto unpublished letters from Wilkie to the late Mr. Raimbach, the engraver, will be found interesting.

Raimbach lived at 10, Warren-street, Fitzroy-square.

Wilkie painted Raimbach's portrait unknown to him. On the 1st of January, 1819, he sent it to him as a new year's present.

" Kensington, December 2, 1819.
* * * * *
Haydon has been telling me, on the authority of a gentleman he met with at Mr. Hamilton's, who had just arrived from Florence, that Chantrey had really met with a most wonderful adventure. He was attacked between Rome and Naples by banditti, who carried him to the mountains (and they say blindfolded him). They offered him his ransom for a hundred guineas, which he paid by a cheque on his bankers at Rome; and on being assured that his bankers had paid it into their banker's hands in Rome, they set him at liberty. He told them he was a statuary; but it is supposed that was greatly in his favour, for a statuary in Italy is considered a very poor fellow. Haydon says nothing was mentioned about Jackson, and on my relating the story yesterday at the Royal Academy, I found this circumstance rather confirmed the truth of it, for one of the members told me that by the last accounts from Jackson, he was at Florence, and had parted from Chantrey. Haydon says I may depend upon the truth of it. * * * * *

DAVID WILKIE."

" Kensington, September 6th, 1820.
MY DEAR SIR,—The destination of my picture ('Reading a Will') is, I am happy to say, settled for the present. His Majesty (George IV.) has signified his pleasure that Mr. Brook Taylor should not urge the relinquishment of the picture unless the King of Bavaria should upon an inspection not find the work so good as the description of it led him to expect." This, of

course, sets me entirely at liberty to deliver it over to the Bavarian Minister.

As I wish to be prepared on the delivery of the picture with some definite request respecting the engraving of it, your advice will be of use, in order that some plan may be suggested to suit the circumstances of the case, and at the same time render the engraving of it practicable. The picture is still with me. * * * * *

DAVID WILKIE."

" Kensington, May 10th, 1822.

* * * * * My request to have a railing round my picture ('Reading the Gazette of the Battle of Waterloo') met with some shilly-shallying kind of opposition [from Royal Academy*] until the grievance should be more apparent. I went, however, to town yesterday, and from what I saw determined on writing to Sir Thomas Lawrence, and declared the picture to be in imminent danger; upon which a council is not only called, but Sir Thomas went himself to the Royal Academy this morning before eight o'clock and had the railing put up. The council will meet, I suppose, to approve to-morrow morning.

DAVID WILKIE."

" Rome, Posto Restante,

January 10th, 1826.

MY DEAR SIR,—After parting from you in Paris, we proceeded day by day with the Veturino, jogging on slowly towards the south-east frontier,—a journey monotonous, but not without adventures. A quarrel took place between two Frenchmen one night at supper with us, which next morning after we started cost one of them his life. On the eleventh day, we descended in the Canton de Vaud, in presence of the Alps, and entered Geneva. Here, meeting my friend Popffer, introduction and hospitality were not wanting, and we passed four days most agreeably in true native Geneva society: the good Audeoud alone I was not permitted to see; a violent fever had lately attacked his weak and mutilated frame, and, though better, could see no one, and those acquainted with him forbade even the leaving a card as too exciting for him.

We parted from Lawrence at Vevey, proceeded up the Valais, and crossed by that wonder of wonders the route of Mount Simplicon, whence in a short space we found ourselves in the gay and classical scenes of Italy, with all the associations of its former greatness and present interesting decay before us. Art being my object, as it would be yours, the "Last Supper," of Leonardo da Vinci, drew my attention at Milan. Time, however, with this has been even more unparing than is his work. A shadow only remains of this once great work, and that so faint that even the substance of the original paint has become a question,—whether fresco, tempera, or oil; but to show the immortality of mind, when such a thing is to be found in a picture, over the frail material with which it is embodied, this masterpiece in its very ruin has been revived in the admirable engraving of Morghen, and seems yet destined to enjoy a wide posthumous existence, long after the walls of the Dominican refectory have crumbled into dust.

From Milan, by Pavia, we passed to Genoa, a splendid city without, but loathsome within, where a few, and but a few, pictures rewarded the search; thence by the coast of the Mediterranean, along the tops of the Apennines, to Pisa, where the falling tower and the Campo Santo court attention, the latter presenting upon its walls a series of the early efforts before painting reached its maturity, evincing at once the lowness of its infancy with the high and spiritual aim which even from that it attained its growth. From thence we passed to Leghorn, to see my brother's partner, and on to Florence.

Here Phillips and Hilton soon joined me, from Venice, and our conjoined researches from gallery to palazzo, and from chiesa to convent, among the early, the matured, and the latter masters, found full occupation for a month. One object with me here, though defeated, was to see and converse with the venerable Raphael Morghen. His *bottega*, for such his studio partly is, is a resort of many travellers, who buy at first hand impressions of his works, which, numerous and exhausted as the plates must be, he still sells, in tolerable, though grey, condition; and, besides this continuing source of wealth, is said to be a man of considerable substance.

From Florence, our next resting-place was to be the Imperial City itself, and six days by Veturino was to bring us in sight. We chose the unfrequented road through Siena, celebrated for

* Mr. Raimbach's insertion.

the purest Tuscan, as Lochabar is for the purest Gaelic,—I suppose from its inaccessibility to strangers. Here, through wildness, desolation, and volcanic sterility, over barren hills and fetid valleys, the climate cold and wintry, reversing all that Claude has painted or that poets have described, we drove along; and at last, passing the extended and swelling, but pestiferous Campagna, we entered Rome, where, putting up, fatigued as we were, we hurried over intricate streets and muddy Tiber, and before twilight found ourselves in the expansive interior of St. Peter's, where even the most extravagant of our expectations were realised. I felt now, that after my fatigues, after all the sorrow and sickness with which I have been afflicted, a great event was now accomplished,—I was now in Rome, and one of the brightest dreams of my youth come to pass.

The labours of Michelangelo and Raffaele have since been the chief objects of my study. By far the most intellectual, they make other works appear limited; and though high in all that is great, are still an example, and a noble example, too, of bow the accessories of a work may be treated with most advantage. No style can be so pure as to be above learning from them, nor so low and humble as not to gain even in its own way by their contemplation. They have that without which the Venus and the Apollo would lose their value, and with which the mean forms of Ostade and Rembrandt become instructive and sublime,—namely, expression and sentiment. To some of the younger artists here, however, I find they are a stumbling-block,—things to be admired, but not to be imitated, and less to be copied than any flat, empty piece of Venetian colouring that comes in their way. The effect of these works upon the unlearned public at large deserves attention. Fresco, when old, gets dull and dry, and cannot be repaired or refreshed like oil; their impression, therefore, upon the common eye is not striking, and many people acknowledge this who, show them a new print from Raffaele or Michelangelo, would be delighted. Vividness is perhaps necessary to make any work generally impressive, and suppose these, fresh as they were at first, and as I have seen some recent frescoes, I believe they would be the most beautiful things imaginable,—popular, beyond a doubt, as it is upon record they were so.

In modern art, Rome is the school for all other countries, though opposite styles are here to be found suited to each. In painting, the Italians and French are alike followers of David. The English students, excepting Lane, whose picture has not yet been seen by human eye, are chiefly occupied with subjects of Roman costumes; but the Germans, for devotedness more like a sect than a school, have attracted much attention by their novel experiment of copying the masters and precursors of Raffaele—not Raffaele himself—in hopes that passing over the same course, they will arrive at his excellence. They have also revived the art of fresco, which, as they manage it better than they do oil, proves it at least as easy; and though their system scarcely admits of originality, it yet has so much of expression, and discards so much of what is meretricious, that I wish their feeling were infused a little into ourselves. Their names are Shnor, Feght, Schadow, and Overbeck. Shnor takes the lead, has married a Catholic, and changed his religion, to feel more devoutly the scriptural subjects of his art. But it is sculpture here that is the great object of attention and encouragement. The number of these artists multiply by every day's further knowledge of Rome: the chisel and mallet are heard in every corner. Amidst such competition great talents have, and are still, rising. True it is, that seeing at all hands statues and groups arising with almost flawless form and in pure Greek taste, one's notions of the difficulty of imitating the antique itself, is somewhat diminished; but knowledge of the figure and correct form will not of itself make high art. Canova had much more than this or he never would have impressed as he has done. He added grace and intelligence; and although his taste, adored as it was, is passing away, and Thorwaldsen, with more severity, more style, but with less expression, has risen in his place, a blank is still left: draperies prevail over flesh, and flesh over feature, and sculpture will, like painting, become mere decoration, if the expression of the inward man does not occupy some share of its attention. With objects passing around one, with all the

antique remains and local associations of this enduring place, you may believe that time does not hang heavily. The English society, too, are so numerous, and at such a distance from England lay so completely aside their national reserve, that as a stranger I never felt more at home, and having full leisure and no immediate care or anxiety, and with strength and even the appearance of health, and most excellent spirits, I may say the present is a time of most satisfactory enjoyment. Yet still I have not much to boast of: time is left to do everything with my complaint; I have given up medicine, and would almost give up the doctors too, for any good they can do; still I am not worse than I was when I left you in Paris.

My sister has informed me you had been to Kensington after your return from France, and she stated, much to my satisfaction, your having dined with the Baron Gerard at his villa at Auteuil, in company of our worthy president, &c. &c. I wished you should see the Baron, assured as I was you would be well received. I think such a party must have been gratifying to you. As we are now old friends, may I state a suggestion upon this?—namely, considering that it is not every artist that is so qualified for general society as you are, should you not in London go more into society than you do? Some people feel this as a duty to their profession: it would relieve and not hurt your studies, and might, as you could improve it, be of service to your family. This is taking a liberty with you, but it arises from my respect for qualities to which I look up, more than any other feeling, and rest in mental is as necessary as in bodily occupations.

And now, my dear sir, give my kindest regards to Mrs. Raimbach, and to all the young people, not forgetting little David: they will recollect, I doubt not, our meeting in the Louvre; and as at such a distance one likes to hear of our friends and what they are doing, may I ask you to favour me with a letter to tell me all the news;—how the published plate goes on, how you proceed with your more serious labours, and what you think can be done next to carry on the war. My own large plate of the will, from the little I have heard from Burnet, appears to have told. I only now subjoin the following little commission, referring somewhat to business, and subscribe myself, dear sir, yours very truly,

DAVID WILKIE."

"Kensington, April 6, 1822.

* * * * * The Duke of Wellington called a week ago, with some friends, to see my picture, 'Gazette of Waterloo.' He requested to see all my engravings; accordingly I brought him and his party into the parlour, and they all seemed much amused and pleased with them.

During the last week I have let in my neighbours to see my picture, of whom 362 have seen it; my house, in consequence, has been like a cryed fair.

DAVID WILKIE."

"Kensington, Nov. 28, 1823.

* * * * * The letter of M. Andeod, which you have been so kind as to transcribe for me, I have perused with great interest, and feel highly flattered, as you will no doubt feel also with me, at the announcement of the handsome compliment conferred upon us by the Society of Arts at Geneva. When the diplomas, of which M. Andeod says he had got charge, with the official letter from the secretary to you, shall arrive, it will then be proper for us to return our formal acknowledgments to the society. But, in the mean time, should you think it proper to write to M. Andeod, do oblige me by presenting my best regards to him, with my acknowledgments for the honour I have received, which, whatever may be the opinion the members of the society may be pleased to entertain of the works he submitted to them, could not have been conferred upon an entire stranger unless with the assistance of his very favourable recommendation. I hope to have the pleasure of seeing you before long, to confer about this very handsome testimony in favour of our joint labours, when we shall consider in what way our acknowledgments are to be made.

DAVID WILKIE."

ART-UNION OF LONDON.—The pictures selected by the prizeholders,—the names of the chief of them we have already given,—will now be found in the gallery of the Institute of Painters in Water Colour, Pall-mall. The exhibition will remain open until the 29th inst.

ST. MARY AND ST. NICOLAS COLLEGE, LANCING.

On the 28th of July the first stone of the new chapel, the ultimate cost of which will not be far short of 200,000*l.*, was laid by the bishop of the diocese, with great ceremonial, and the new dining-hall of the college was opened, after being many years in course of erection, under Mr. Slater and Mr. R. Herbert Carpenter.

The college, as already completed, comprises dormitory, school-rooms, library, and masters' houses, forming three sides of a quadrangle, about 150 ft. square, with cloisters all round it. The new hall joins the greater part of the fourth side, and the ante-hall and offices join the northern end of it. The chapel stands at right angles to the hall, forming the north side of a still larger quadrangle, of which the fellows' and provost's house will form the south side. The eastern side of this quadrangle is open, and the college being on the slope of the Downs, the view from this point extends over the sea from Beabey Head to the Isle of Wight. Besides these two quads, the southern wing of an upper or western quadrangle is now completed.

It is intended to build the chapel on a very large and magnificent scale, to serve as a place of worship for the three great Sussex schools on all grand gatherings of the college.

The plan consists of an apsidal choir, 170 ft. long (inside) and 30 ft. wide, with an ante-chapel of the same width, and 45 ft. long, north and south aisles, north-western and north-eastern towers, and a great campanile at the south-west angle, 350 ft. high. The whole length is divided into twelve bays (including the ante-chapel), with a five-sided apse. The arcades have clustered columns. Above this is a triforium stage, of richly-moulded lancet arches on clustered piers. This triforium is continued round the apse, and pierced as windows. The clerestory has large two-light windows, and the whole length is groined. The height from the choir floor to the underside of the groining will be 87 ft. The aisles have two-light windows, and are also groined. The flying buttresses on the south side are double, a cloister extending along the southern wall of the aisle. In the pinnacles of the lower rank are a series of niches. The upper pinnacles are more severe in type. The general composition of the buttresses is followed for those of the apse, which are of great projection, as the ground falls nearly 30 ft. from west to east. The total height of the apse to the ridge of the roof will be about 150 ft. On each side of the apse is a tower, of the same size as the width of the aisle. The clerestory composition is continued round the three sides, thus forming an open lantern. The upper part of the towers above the choir parapets has richly-carved niches and figures, and a short spire and pinnacles above. An apse is formed at the east end of each aisle, opening out of the east side of the tower. These will form the chapels of St. Mary and St. Nicolas.

The great entrance is at the west end, from a cloister communicating with the secular buildings. This cloister is of three stories, the upper one ranging in height with the triforium stage, the middle stage being used as mainment rooms, &c. A great rose-window will complete the west front.

The south-west tower will be about 350 ft. in height. The belfry stage has on each face two windows, of two lancet-lights in each, with richly-clustered monials. Octagonal turrets run up at each angle, and are terminated with rich pinnacles. The height to the top of the parapet of the square portion of the tower will be about 200 ft. Above this point it becomes octagonal, with large pedimented windows on each face, surmounted by a low spire of stone. The octagon is intended to serve as a chapel of St. Nicolas, and will have in it a powerful light, supplied by the Trinity House,—for the great height of this tower will cause it to be one of the most prominent objects on the south coast.

Beneath the chapel will be a crypt 20 ft. high, divided into three spans in the width of the choir, until the ascent to the altar begins, when the crypt below will rise to 30 ft., and be vaulted in one span to form a chapel. The foundation already put in exceeds 20 ft. in depth, the solid chalk being at that depth below the surface. The stone laid forms a portion of a jamb of one of the arches of the north aisle of the crypt.

The choir will have stalls for about 450 persons, the ante-chapel and aisles being intended to be used only at great gatherings. The

altar is raised from the choir floor by four flights of steps.

The whole will be faced inside and outside with stone, and groined with chalk, and the roofs covered with lead.

The ball is built of flint, with Caen stone dressings. There is a lower and an upper hall. It is divided into eleven bays by massive buttresses; the upper, or ball proper (the lower being used as a breakfast-room), is lighted by two traceried windows in each bay. A richly-moulded cornice extends the whole length of the outside and inside. On this are built great dormers of stone, of a Burgundian type. They are of two lights, with traceried heads, with rich buttresses, and pinnacles on each side, and surmounted by acute crocketed gables, and filled in with sunk tracery. There are five dormers on the east side, and four on the west, the other buildings abutting against the hall here. The dimensions of the hall are 101 ft. long (inside), 28 ft. wide, and 70 ft. high, or nearly 100 ft., including the lower hall. The roof has great arched and moulded ribs, with curved wind braces. The ante-hall has a gallery over it, opening into the ball by three arches, resting on polished red granite columns. The ante-hall and gallery are 40 ft. by 28 ft., and of nearly the same height as the hall. A lofty lantern of oak, partly covered with lead, with a shingle spire, is erected in the centre of the roof of the hall.

The dais is raised two steps above the general floor. The wall behind the high table is panelled with oak to a height of 18 ft. The panels are in three heights, with carved bands between, with a richly carved and bracketed cove and cornice above. In each of the square divisions of the cove between the brackets are traceried panels with shields. In front of the paneling are figures, 4 ft. high, of the patrons, SS. Mary and Nicolas. This portion of the work is executed by Mr. Forsyth.

The hall is approached by a fine staircase of stone, groined over, divided into three double bays, resting on clustered columns. These and the ribs are of stone, the filling-in of chalk. The northern end is lighted by two great traceried windows. The same staircase is continued down to form the grand approach to the chapel cloisters. A great oriel light is the ante-hall on the south side, richly panelled and carved. The fellows' common-room, serving-rooms, and stairs open out on the north side.

The whole of the windows are intended to be filled with glass by Messrs. Clayton & Bell, some of which are immediately to be inserted.

TRADE TROUBLES AND THE COURT OF CHANCERY.

A WEEK memorable in the annals of trades unions, by the attempt of some secret conspirators to overawe masters into the abandonment of piecework, has been made more remarkable by the judgment of Vice-Chancellor Malins, that the Courts of Equity are under the duty of considering whether, in any given case, they will stop trades unionists from intercepting the labour of their brother workmen. Considering the two operations as contemporary movements of opposite camps, the first thought does not suggest that they look much in the order of conciliation; but as the darkest hour of the night is the nearest to the morning, and the worst stage of the fever must be that which begins the cure, it is just possible that the extremes thus made for us may give that commencement of reconciliation which in so many trades seems almost the only alternative between us and the confiscation, on one side of our industry, and on the other of our capital.

A short time ago nothing was less foreseen on either side than that the formidable machinery of the Court of Chancery would be brought in to play a part in these trade troubles of ours. It was a resource that did not enter into the estimates of either party to the campaign. But the *fait* is now *accompli*, and we may be sure that the step, once taken, will not be retraced. The Court of Chancery is celebrated as having never let slip a good opportunity of extending its jurisdiction, or, having once extended it, of relinquishing its hold. It exists, indeed, less by law than by this tendency in its institution; and, having once assumed the province of protecting property in reference to whatever labour may be open to its competition, it is not likely

to fail of obtaining a predominating control over all the proceedings by which certain sections of workmen seek to limit the industrial operations of their neighbours. "If it shall be held," said the Vice-Chancellor, "that these proceedings are illegal, and if it be found that the court has jurisdiction to restrain them, I believe it will be found to be one of the most beneficial jurisdictions this court has ever exercised." In other words, the justification of the interference is measured by its beneficence. When the illegality is not statutory, or requires speedier treatment than the common law affords, the remedy becomes an affair of equity. This was the original basis of all the jurisdiction of the Court of Chancery, and under the changing circumstances of society it is held to have new causes of interference wherever there are equal grounds of injury to sustain an application.

The importance of the new resource lies exactly in that crushing potency which, in the interest of poverty, society has always tended to deprecate in these courts. We may reasonably enough complain that a machine of a thousand horse-power is set in motion to crush a butterfly or a wasp; but the fact remains that the butterfly or wasp is crushed. Once grant that the extent of injury suffered by an employer entitles him to the assistance of the court, it follows that there can be no means left of resisting the power. It is a maxim that the hardness of any individual case must not stop the operation of law, and the sure rule that would reach any workman visited by an injunction would be considered only the just punishment of the wrong which had provoked it.

But, as in Samson's "devonver" was found "food," and in his "strong" was found "sweetness," this new chapter, so full of unpleasant menace in the history of our trade organisations, has also its side of hopefulness and promise. In the proportion in which the new machinery will be crushing to workmen must it be expensive to employers; and the many arguments that already exist for conciliation may thus acquire the aid of another—the strongest—from the arsenal of the opposition. It may be found, as with nations, that the expense of the war will be the best security for peace. In proportion as the consequences are discovered to be growing every day more serious, all parties may be disposed to recoil from the causes which provoke them.

It is certain that all our other agencies have been singularly infelicitous in helping us to the required commutation. As when "chaos umpire sat," they have only "more embroiled the fray." Up to this time, as far as we have been able to reach a conclusion, even the influence of our remedy of remedies—the trades unions themselves—has been no better than the disease. It would be mere prejudice to say that they have not at times usefully interfered in the relations between men and employers; but the question is not whether they have done good, but how much, and at what expense? We want the estimate of the wrong side of their influence. We know where we are as to the amount of employment and the extent of our industrial resources. Can any one tell us how much work has not been done through them,—how much realized convenience and commodity have been lost through them,—how much individual comfort and public ornament have been missed through them,—how much additional groundwork new action and new enterprise has been sacrificed for ever through them? Can figures set out the unfavourable difference they have made in England alone in the aggregate of received wages during the last quarter of a century? Above all, is it possible to estimate in money, or, indeed, in any form that shall realize the truth, the extent of their influence on the progress of good workmanship,—the development of whatever is solid, original, enterprising, and artistic in the industrial genius of the trades?

We can only reach our best inference by using as our measure the difference between an industry working free and an industry working in fetters. It is easy to see that for our ingenuity and genius to work under less than the utmost freedom consistent with fair play and order is to confiscate a corresponding proportion of our resources and productiveness. The natural and irresistible tendency of all the men who form these private corporations is to subordinate the requirements of the trade to the convenience of a limited number of traders, and to insist on working other men's establishments for their own advantage under regulations that have little or nothing to do with public good, private

justice, or the development of art and industry. When a large manufactory is brought under their dictation, the true principle of management and the true principle of development are gone at the same instant. The laws of nature will, of course, still work; but, instead of being aided, they are weakened, crossed, circumscribed, checked, stunted, circumscribed, and crippled. Jealousy, apprehension, restraint, and limitation are of the essence of the mob empire that is forced over them; and there can be no harmony possible except on the basis of rules which, never more than questionably good and partially applicable, introduce a tyranny exactly where freedom is most required. The wages are kept up under certain inflexible conditions that confiscate progress in the future and shut out all equity and liberality of arrangements in the present; and it is twenty to one if the dictators permit any inequality of remuneration according to inequality of skill or industry, or tolerate any work or mode of payment suited to the emergencies of a changing business, or suffer any kind of employment varying with the requirements of an extended enterprise, or allow any expansion of industry that is not in keeping with their own individual interests or convenience.

The pretext of things is often one, the reason another; and we can only understand a *rationalis* in trades unions by looking upon them as the successors of those trade guilds of India and Egypt which formed part of the police system necessary to jealous and tyrannical governments. Workmen were made slaves to one another under drivers of their own choice. The chiefs checked the masters to please the men, and sacrificed the men to please the masters, and there was everywhere the subordination under responsible leaders dear to the heart of despotism. The check may be important still to those not vitally interested in the prosperity of the trades. It may give even some useful sacrifices for social order; but we must still object to sacrifice to it everything which guarantees that development of industrial enterprise and genius which ought to be making this the most brilliant in the epochs of human advancement.

NEW LAMP LATELY ERECTED IN HOLBORN.

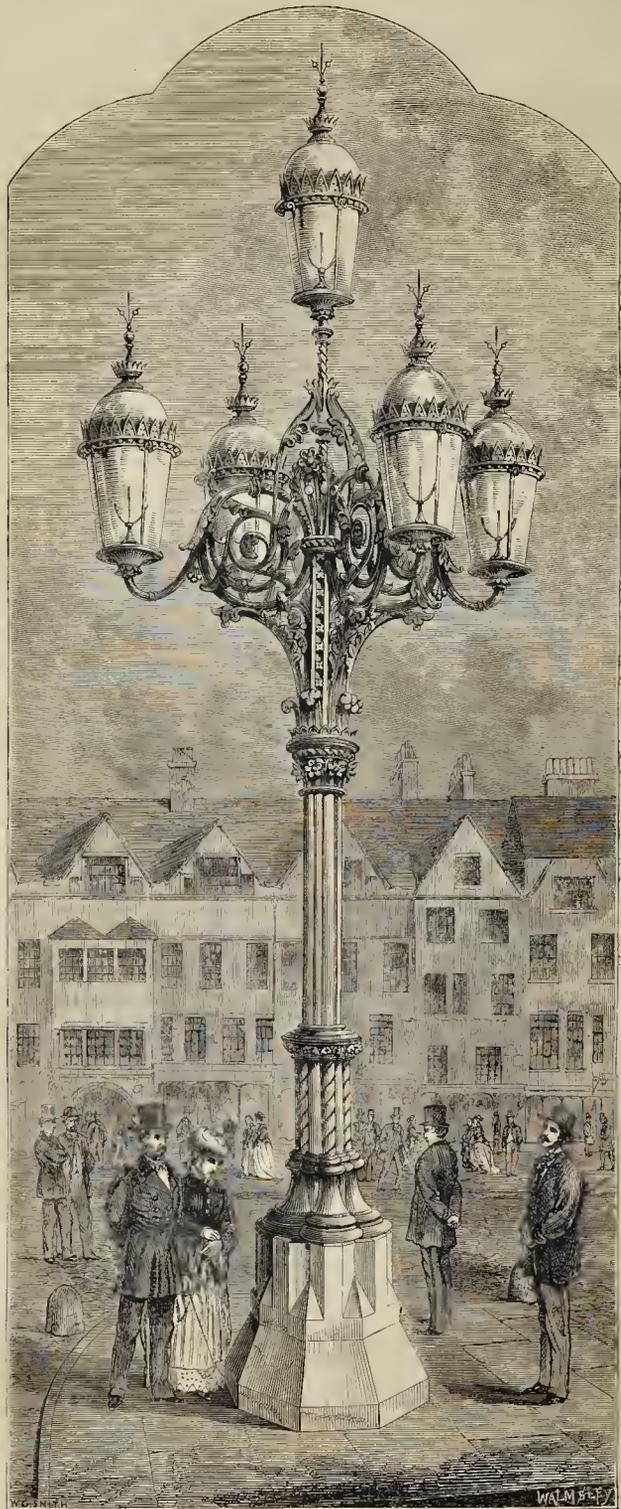
THE lamp which has just been erected by the Metropolitan Board of Works in Holborn, near Gray's-inn-lane, on the site of the old Middle-row (lately removed by the Metropolitan Board of Works), has an octagonal base, and four engaged shafts with moulded bases and moulded and foliated caps, forming a sarbaso, from which rises a central column of shafts banded together, with a foliated and crested cap, out of which spring enriched scroll arms or brackets for four lamps; a fifth and centre lamp rises from the junction of the brackets, by a continuation of the centre column. Flowers and leaves spring from the junctions of the brackets with the centre shaft. Each lamp has four burners, with reflectors, arranged in a novel manner, and has ornamental castings and finials.

The principal dimensions are as follows, viz.:—Height from pavement to top of finial of upper lamp, 24 ft.; to centre of lower lamps, 16 ft.; diameter of base, 3 ft. 2 in.; diameter, lower shaft, 10½ in.; diameter, central column, 7 in.; distance from centre to centre of lower lamps, 6 ft. 9 in.; diameter of lamps, 1 ft. 7 in.; height of lamps, 2 ft. 6 in.

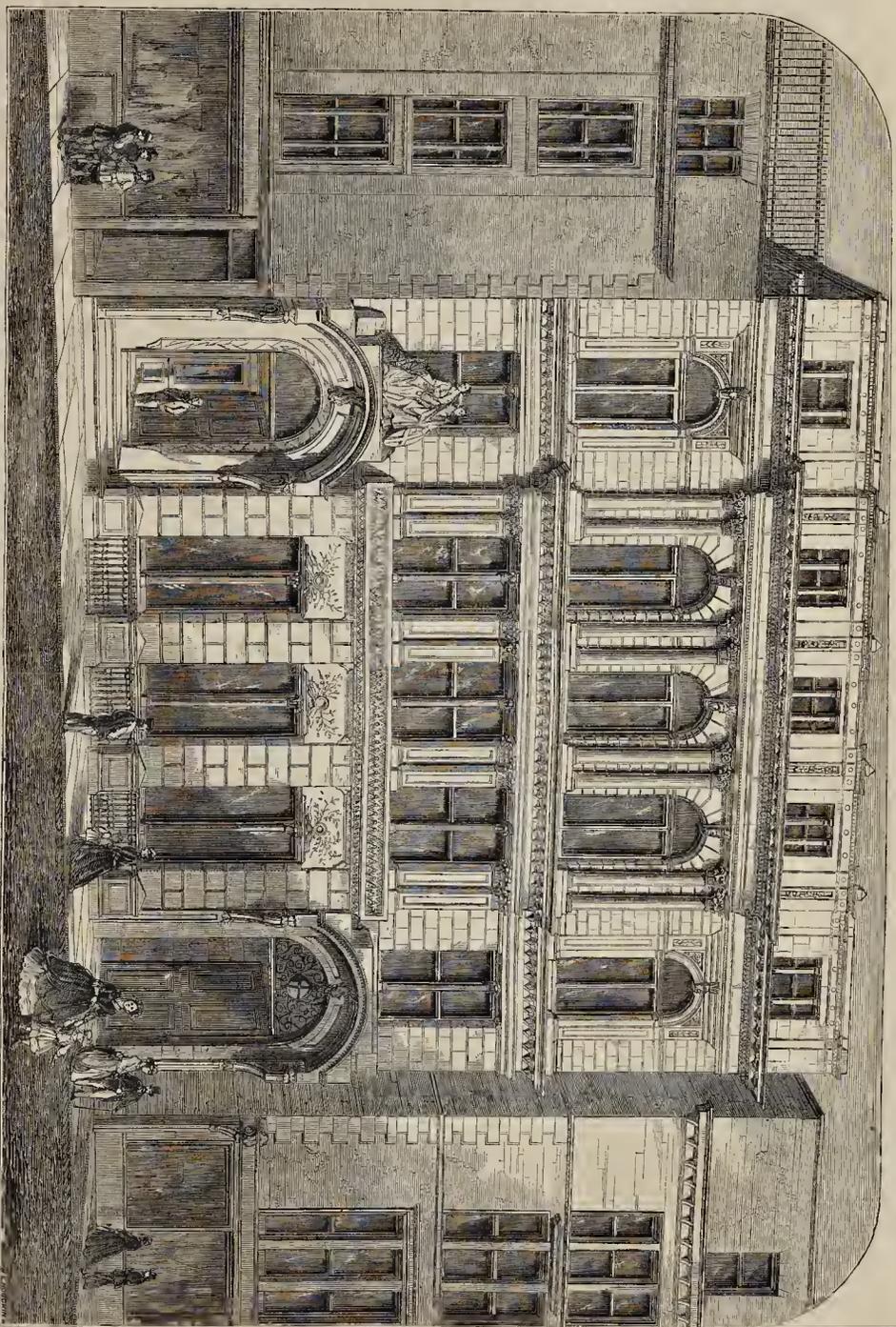
The lamp stands on a paved "sanctuary," oval in form, with guard-posts, with granite spurstones, &c.

The whole of the work, with the exception of the paving, has been executed in cast iron, by Messrs. Walter Macfarlane & Co., from the designs of Mr. Charles H. Driver, architect, at a cost (for the lamp alone) of 99l.

INTERNATIONAL WORKING MEN'S CONGRESS AT BRUSSELS.—There is to be a congress of the International Working Men's Association at Brussels on the 6th September. The subjects to be discussed include the following:—Reduction of the hours of labour; the influence of machinery in the hands of capitalists; landed property; education of the working classes; credit institutions; social emancipation by means of co-operation, &c.



IRON LAMP, RECENTLY SET UP IN HOLBORN.—DESIGNED BY MR. CHAS. H. DRIVER.



OFFICES OF THE LONDON DOCK COMPANY, LEADENHALL STREET, LONDON.—MR. E. N. CHILTON, ARCHITECT.

NEW OFFICES FOR THE LONDON DOCK COMPANY.

Our engraving shows the entrance front of the new offices which have been recently erected for the London Dock Company in Leadenhall-street: the material is stone. Mr. E. N. Clifton was the architect, and Messrs. Brass & Co. were the builders.

KENT ARCHÆOLOGICAL SOCIETY.

ONE of the most successful annual gatherings that the Kent Archæological Society has had since its formation ten years ago was lately inaugurated in Canterbury. Occasion was taken by the Dean to direct attention to an arrangement come to some years ago, whereby it was proposed to fill the niches outside the main entrance to the cathedral with statues of celebrities; and from a circular he has issued it seems that thirty-one out of fifty-six figures contemplated have been erected; and that, in addition to these, the Queen has lately signified her intention of presenting the figures of herself and the Prince Consort.

The preliminary meeting took place, by permission of the Dean and Chapter, in the new chapel and library. This apartment has only been just completed by the builders, Messrs. Besken & Godden, of Canterbury. Earl Amherst, president of the society, occupied the chair, and amongst the company were Lord Fitzwalter, Sir Walter James, Sir Walter Stirling, the Dean of Canterbury, Archdeacon Harrison, Canons Blakesley, Robertson, and Stone, &c., besides about 100 ladies.

The Rev. Canon Robertson read the report of the committee of management, which was adopted, and various new members were elected.

The President then called upon Professor Willis to give a lecture on the ancient masonry of Christ Church, which in olden times surrounded the cathedral. The professor commenced by saying that in 1845 he had made very extensive researches in connexion with the Cathedral of Canterbury, and had been allowed every liberty by the dean and chapter of those residing in the precincts, to investigate every portion of it, take measurements, prepare plans, &c., perhaps beyond that ever before extended to any other individual. He mentioned that the subject of his discourse would be published in the forthcoming volume of the society, and that several of the plans he now used for the purposes of explanation were lithographic proofs prepared for the work. Speaking directly upon the subject, Professor Willis said he had been enabled to satisfactorily decide on the uses of many buildings which hitherto, on less complete investigation, had been assigned to purposes for which they were not intended.

For instance, what was called the baptistry was in fact the great tower to which water was introduced from the north side, and from which the various lavatories of the monks were supplied. By reference to that remarkable and interesting work, "The Rites of Durham," which was written by one of the monks, and which contained a minute description of the whole routine of their daily lives, the whole plan was rendered plain and comprehensible. There were the carefully-contrived passages by which the holy fathers could pass to their diurnal and nocturnal services in the cathedral dryshod, carpets and wood-flooring being unknown in those times; there were "the studious cloisters" where the more educated pored over ancient manuscripts, or instructed the novices; or where the less instructed could think over their past faults and repent their "Ave Marias" and "Pater noster."

For these purposes the south alley of the cloisters was always inclosed, while the other three sides were generally left open. In his researches he had been able to make out quite distinctly the four hostels which were always provided for guests in large houses of this kind. The one for the ecclesiastics was at the east end of the cathedral, and near it, on the north side, that of the nobles, both being close to the more holy parts of the monastic pile. The question-hall for the middle classes, the merchants, and well-to-do was at a considerable distance; while that of the pauper class was close by the entrance, and as far off as possible, not only from the holier portions of the building, but from the other classes of society. The ecclesiastics and nobles were all under the care of the prior in this case, or the abbot at

other places; while the middle class and poor had each officers appointed respectively to take care of them. Professor Willis then, by means of drawings, laid before the audience, explained all the details of the ground-plan which he had prepared, and proposed to accompany the members over the cathedral close, and point out the particular localities of the building he had described.

Thanks were voted to Professor Willis, and the numerous party then accompanied him around the cathedral, and listened to a disquisition in elucidation of the lecture previously delivered.

In the afternoon the members of the society and their friends, to the number of about 200, dined in the Music-hall, St. Margaret-street.

The proceedings terminated shortly afterwards, and the archæologists reassembled at the Deanery, where they were regaled by the hospitality of the Dean and Mrs. Alford. A party was then formed, under the direction of Mr. G. Faussett, the hon. sec., who conducted them over the cathedral by moonlight. As the archæologists were grouped in the nave, and were admiring the effects of light and shade, the choir sang the anthem of Handel, "There were Shepherds," and the "Hallelujah."

On Friday morning, after divine service at the cathedral, a large party met at St. Augustine's College, over which they were conducted by the Rev. the Warden, who pointed out all the portions of the building that belonged to the ancient abbey before the present college was founded by Mr. Beresford Hope, M.P. The party then went to the ancient church of St. Martin, founded by Queen Bertha or Ethelburga, the wife of Ethelbert, King of Kent. Next they proceeded, under the direction of Alderman Brent, F.R.A.S., by way of the Dane John, along the city walls, and by the ancient mound, to the ruins of the Norman castle, near the gasworks; thence to the Hospital for Poor Priests, now the police-station, and thence across the river to the refectory of the Grey Friars, built over another branch of the Stour; and to Eastbridge Hospital, on King's Bridge. After evening service at the cathedral the party was conducted over the edifice by the Dean, the inspection having special reference to the visit of Erasmus.

TRUSTS FOR EDUCATIONAL PURPOSES IN LONDON.

THE Schools Inquiry Commission have published their tenth volume. This relates to the London division, which comprises the cities of London and Westminster, and parts of the counties of Middlesex, Surrey, and Kent, within the metropolitan district as defined by the Registrar-General. The population was computed in the Census of 1861 at 2,503,989. From the introductory summary we get the following facts:—

The total number of endowed grammar schools included in the metropolitan division, exclusive of the Charter House, Merchant Taylors', St. Paul's, and Westminster Schools, which were reported on by the Nine Schools Commissioners of 1861, is 24. To these may be added the foundation of St. Lawrence, Jewry, which is applied in the form of exhibitions only.

Among these twenty-five foundations are three which support schools having each an upper and lower department. These are Christ's Hospital, St. Olave's Southwark, and Dulwich College, on each of which specific recommendations by the commissioners will be found in the fifth chapter of their report.

The aggregate gross income of these foundations, some of which are applicable in part to other purposes besides the support of the schools, has been already computed in vol. i. at 97,708*l.* per annum.

The net annual income, after payment of all charges on account of repairs, rates, taxes, and insurance in connexion with the property and school-buildings, is estimated at 55,189*l.*, besides 1,089*l.* for exhibitions.

The greater part of the income is derived from the foundation of Christ's Hospital, whose net income from endowment is 42,000*l.* per annum, leaving 13,189*l.*, or, including exhibitions, 14,278*l.*, for the aggregate income of the remaining foundations.

In the case of one foundation at least (Dulwich) the prospective increase in the revenue is so great that no safe estimate can be formed of its future income.

Of these 25 schools, besides Christ's Hospital

and the foundation of St. Lawrence, Jewry, some are classical, with 1,417 scholars; nine are semi-classical, with 1,159 scholars; four are non-classical, with 577 scholars; two are elementary, with 88 scholars; one is in abeyance; and the other two are united with other primary schools.

The net annual income of the four schools already named, which were reported on by the Nine Schools Commissioners, is about 19,000*l.*, besides above 7,000*l.* for exhibitions.

The net annual income of endowments applied to the secondary instruction of girls (exclusive of Christ's Hospital) appears to be about 2,000*l.*

Hence the aggregate net income of the endowments for secondary education in the metropolis may be set down at 84,000*l.* per annum.

There is also a large number of endowments connected with the primary instruction of the poor. Ten of these foundations have gross incomes of 1,000*l.* a year each and upwards. They are the Royal Asylum of St. Anne's Society (1,377*l.*), Lady Holles' School (1,377*l.*), Reeve's School (1,164*l.*), the Grey Coat Hospital (2,736*l.*), Emmannel Hospital (3,118*l.*), Bancroft's Hospital (4,589*l.*), Raine's School (1,321*l.*), Aske's Hospital (4,800*l.*), Newcomen's School (1,656*l.*), Rean's Schools (1,000*l.*). Thirteen others have gross incomes between 500*l.* and 1,000*l.* each. Our information is not so complete as to enable us to form a very precise estimate of the net annual income of these charities; but their gross annual income amounts to about 45,000*l.* A large proportion of this is applied in the form of clothing and maintenance of boys and girls, and part also for other non-educational purposes, as almshouses.

After every allowance has been made, it may safely be affirmed that the net income of the trusts for educational purposes in London (including 42,000*l.* belonging to Christ's Hospital) exceeds 100,000*l.* per annum.

MIDDLESBROUGH PARK.

THE new park at Middlesbrough has been opened by Prince Arthur. It is to be called the Albert Park, in memory of the late Prince Consort, who was of same nationality as the donor. It comprises upwards of seventy-two acres of land, purchased about two years ago by Mr. Bolckow, with the view of presenting it to the inhabitants of his adopted town as a place of rational and healthful recreation. It is about half a mile from the southern extremity of the town, and has already been planted by its donor and other gentlemen residing in the neighbourhood. The walks are well planned and laid out, and there is an avenue of Wellingtonias in the park. There are two large pieces of ornamental water, one covering nearly four acres at the eastern extremity, the other covering an area of one acre near the western entrance. A cricket-ground has been laid out, and a bowling-green has also been constructed. There is a circular piece of ground in the centre of the park which is reserved for statuary, and on three sides of the park laid it is to be appropriated to the erection of villa residences.

FROM PARIS.

THE remains of the fire which took place in the eastern pavilion of the Halles Centrales on the 10th ult. have not yet been cleared away. The burned substances, such as meat, grease, hutter, eggs, cheese, &c., under No. 12 Pavilion, exhaled such a pestilential odour that the workmen employed in removing the *débris* had to stop work until some barrels of disinfecting substance, furnished by the Compagnie Richer (Vidanges), had been applied. On inquiring of the inhabitants living on the spot, most of whom have some dealings at the Halles, we ascertain that there is no building so well supplied with water as that portion of the Halles, especially in the pavilion neighbouring to that of the fire,—viz., the fish-market, where there is an enormous tank for live fish, which supplies three horse-fountains incessantly during working hours. Now, they inform us that, when the first alarm was given, the *pompiers* arrived; but they had not the key of the water, as the keeper had gone home. When the key was fetched it was too late. The heat must have been equal to that of a Bunsen's blow-pipe when the iron-work gave way.

Cast and wrought iron are very unsafe mate-

rials to depend upon for constructions in which extremely inflammable hydrocarbonaceous substances are stored. The only really fireproof building seems to be one constructed of thick walls and arched refractory bricks like a blast furnace. As to avoid storing highly inflammable materials, it is impossible; for the world must be supplied with butter, oils, bacon, spirits, &c.; but the evil can be much lessened, in case of fire, if these substances are kept in a number of separate fire-brick arched casements, so that they might burn out without injuring the contents of the neighbouring arches. Wrought-iron shows weakness and loses its tenacity at a common red heat: it does not melt, but it cracks and faints away; steel refiners melt readily, as also do cast supports at a white heat.

On the 22nd ult., at half-past three p.m., another fire, of a more destructive character, took place in an oil-cloth factory, situated in the Rue du Transit, between the Vaugirard Station and the Tonr Malakoff. Six houses were also destroyed. The burning oils and essence flowed in a stream, like lava, for 1,600 ft., setting fire to everything in its course, and causing, while it blazed as high as the first story, an immense cloud of smoke, which appeared to cover half Paris, and was perceived from the Boulevard des Capucines. The stream caught hold of a lamp-post, melted the gas-pipe (of lead), and set fire to the gas. It was turned into a quarry, and put out with sand just as it was about to leap into the main sewer, in which are placed the gas-mains! In the whole experience of the fire staff in Paris they never met with such a cataclysm.

Excavations are being made in front of the New Opera at the corners of the Rue de la Paix, the Rue de Réanmur and the Avenue Napoléon, the new street leading to the Théâtre Français at the Palais Royal, for the magnificent hotels to match those which border the Opera.

All the façades of the Place Vendôme are being scraped clean. Our readers are aware that this place was built after Mansard's designs. Completed in 1701, it was then called the Place des Conquêtes, and contained an equestrian statue of Louis XV. in the centre. When, in 1792, this latter was destroyed, the square was called La Place des Piques (rather symbolically). The present column, constructed with 1,200 bronze guns taken from enemies, was completed in 1810, under the directions of the architects Lepère and Gondin.

The scaffolding and hoarding which covered the new Vandeville Theatre, at the corner of the Boulevard des Capucines and the Rue de la Chaussée d'Antin, have been removed nearly completely; the new building is tastefully decorated with appropriate statues, garlands, medallions, and other ornaments, and bears the name of VAUDEVILLE, in large gold letters on a slab of marble. It is a rotunde building, and seems to be well suited to the site.

An experiment of great interest, in a topographical point of view, has just been made by M. Tournachon, the photographer, better known by the name of Nadar, with the captive balloon at the Hippodrome. At a height of 300 metres (984 ft.) he succeeded, in spite of the rotatory motion of the aërostat, in obtaining several photographic proofs, successively taken, representing most accurately the panorama of Paris. This is an important step in a strategic as well as in a geodesic point of view.

The western façade of the Palais de Justice has been completed; much remains to be done for the general group in the shape of demolitions of the old structures of the Préfecture and the formation of a well-planted esplanade on the site of the Place Dauphine, opposite Henry IV.'s statue. On the quay, the conciergerie towers, of trite memory, have been pointed and consolidated: how the new law courts will be dovetailed into these venerable relics we do not know, but we can only express a hope that the latter will be carefully preserved.

The new organ at Notre Dame, by Cavallé. Coll, with 6,000 pipes (Leeds has 6,150) is worked by six pairs of pumps, giving an enormous reserve of compressed air of 1,000 cubic feet. The filling of the church, upwards of 405 ft. long, with the majestic and sometimes awe-striking sound, making the whole mass tremble in the deep tones, requires the aid of a mechanical force which would, perhaps, be more in its place in an iron foundry. Still, the control, by electricity, is such that no unpleasant jarring meets the ear, especially with a good organist.

From the official reports we learn that the latter

expropriation juries gave the following awards for the value of land in Paris:—1st arrondissement (Palais Royal), 500f. the square metre; 2nd arr. (Bourse), 500f.; 3rd arr. (Temple), 260f.; 4th arr. (Hôtel de Ville), 295f.; 5th arr. (Panthéon), 183f. 33c.; 6th arr. (Luxembourg), 147f. 50c.; 7th arr. (Palais-Bourbon), 300f.; 8th arr. (Elysée), 224f.; 9th arr. (Opéra), 470f.; 10th arr. (Enclous St. Laurent), 387f. 50c.; 11th arr. (Popincourt), 124f. 30c.; 12th arr. (Neuilly), 35f.; 13th arr. (Gobelins), 52f. 55c.; 14th arr. (Observatoire), 88f. 37c.; 15th arr. (Vaugirard), 46f. 42c.; 16th arr. (Passy), 46f. 85c.; 17th arr. (Batignolles-Monceau), 87f. 50c.; 18th arr. (La Chapelle), 60f. 63c.; 19th arr. (Buttes-Chaumont), 39f. 60c.; 20th arr. (Mémilmontant), 28f. 40c.

ST. PAUL'S, OLD BRENTFORD.

THE new church of St. Paul, Old Brentford, the first stone of which was laid by the Princess Mary of Teck, was consecrated by the Bishop of London on the 30th ultimo. The church is a structure in the Decorated style, and consists of nave, north and south aisles, chancel, organ chamber, south porch, and vestry, and is fitted with everything requisite for the proper celebration of divine service. The tower and spire will occupy a position on the south-west angle of the nave; it is at present only carried up about 20 ft., but will ultimately have an elevation of about 140 ft. The church is faced externally with Kentish ragstone, with Bath stone dressings, the interior being of brick, worked in pattern. The piers and arches to nave, windows, strings, corbels, and other internal details are of Bath stone. The carving, of which there is a considerable quantity, is chiefly naturalistic. The east wall is decorated with a costly retables, the gift of two ladies, formed partly of Caen stone, various coloured marbles, and alabaster. The choir stalls, priest desks, sedilia, and lectern are of wainscot. The pulpit is partly of stone, the upper portion being of alabaster, with green serpentine polished shafts, and carved wainscot panels. The lighting is by Hart, being by cones suspended over nave arches, two handsome brass standards being placed within the altar rails. The chancel is paved with Minton's tiles, and the passages in nave and aisles with red and black Staffordshire tiles. A recessed arch on south side of chancel, fitted with white marble slab, will be used as a credence table. The altar rail is of brass on ornamental scroll standards, and is fitted with a telescopeslide. The carving throughout, and the various fittings, such as pulpit, desks, choir stalls, &c., have been executed from the architect's designs by Mr. Anstey, of St. John's-wood. Mr. Nye, of Ealing, was the contractor for the works; Mr. Farmer, the clerk of works. The church will accommodate about 700 persons on the ground floor; and the cost, exclusive of tower and spire and special gifts, will be about 6,000l. Messrs. Francis are the architects.

WHITCHURCH CHURCH, HANTS.

THIS church has recently been re-opened, the greater portion of it (the tower only excepted) having been rebuilt on an enlarged scale. The old church consisted of a nave, with north and south lean-to aisles, south porch, chancel, and a west tower. That part of the building pulled down was in a dilapidated and neglected condition, most hideously galled and, and damp, in consequence of the floor level being much lower than the external ground. The only objects of any architectural interest about it were the north nave arches (of the Perpendicular period); those also on the south side (of Early English date), and a massive tie-beam oak roof (which was, however, concealed by a flat whitewashed ceiling). Externally the tower possessed no feature whatever of beauty, being rough, stuccoed over, with quasi-Italian doorway and belfry windows. It has now been heightened, strengthened by buttresses, and surmounted by a lofty spire, covered with cleft oak shingles (characteristic of the district). The new church comprises a nave of same span as the old one, but one bay longer. The ancient columns and arches have been rebuilt in the same position as before, and the roof cleared of whitewash, and opened out. There are north and south span roof aisles, a well-proportioned chancel, and an open south porch constructed of oak. A vestry has been

built, which will contain an interesting library of theological works, left to the parish by a former benefactor. A remarkable feature, the tower is the internal ringers' stair, placed the north-west angle. It is of oak, octagonal in plan, excellently carved, and moulded with coupled lights and perforated tracery. It was appear to be early fifteenth-century work, remarkable sepulchral monument (somewhat like an Italian "cippus"), thought to be of Sixton date, was found imbedded in the wall of the north aisle. It slightly resembles headstone, having a semicircular top, is situated on both sides, and has a Latin inscription on it. Two recumbent monumental effigies (seventeenth century), elaborately coloured, belonging to the Brook family, stood in the former chancel, and have been preserved from injury. The walls of the new church are built of brick with Bath stone quoins and dressings. The roof is covered with local tiles. The church is present seated with chairs, but open benches, accommodate about 600 persons (when sufficient funds are forthcoming), are to be introduced. The chancel has a panelled roof, with mouldings and carvings, and carved paterae. The pulpits, carved of Bath stone, with foliated panels and cornice, is placed on a low base of the grey Bath stone from the old building. Among the principal contributors to the rebuilding have been Mr. Melville Portal, Dr. Hempstead, &c. The cost has been a little under 3,000l., and the works have been carried out by Messrs. Goddard & Son, of Farnham, builders, from the design of the architect, Mr. Ferrey, F.S.A.

RAILWAY MATTERS.

THE traffic receipts of railways in the United Kingdom amounted, for the week ending July 20, on 13,287 miles, to 820,696l., and for the corresponding week of last year, on 12,998 miles, to 809,533l., showing an increase of 289 million and of 11,163l.

It appears from a report of Mr. Juland Danvers lately published, that the length of railways open in India was increased during the last year by 3,943 miles by the completion of 319 miles. There are 1,665 miles now in course of construction, and various proposals for extending the railway system are under consideration. Materials to the amount of 333,239 tons have been sent out from this country, at a cost of 3,827,420l. The whole expenditure in this country during the year was about 4,000,000l. In India it was about 3,000,000l. Upwards of 9,000,000l. have been added to the capital of the railways, making the whole amount that has been raised up to the 31st of March last 76,579,000l., of which 75,071,600l. have been expended. The gross receipts for the year ending the 30th June, 1867, were 4,875,112l. as compared with 4,537,235l. of the previous year. The working expenses were 2,537,812l. and 2,225,495l. respectively. The net receipts in 1867 were 2,337,300l. and 2,304,534l. in 1866. In 1867 the number of passengers was 13,746,354, of whom 13,074,980 were third class. In 1866 the total number was 12,867,000.

THE NEW DOCK AT BOULOGNE.

THE floating dock at Boulogne has been opened to all descriptions of shipping, if towed by the steam-tug attached to it, since the last instance. It will take some months before the accessories of the dock are completely finished. At the inauguration the presence of the Emperor is expected. The floating dock at Boulogne was commenced in 1859, and has thus been ten years in course of completion. The total cost has been a little under 300,000l.

The basin now opened for shipping occupies a superficies of more than 17 acres, with a quay-wall frontage of 3,600 ft., and a superficial quay space of over 240,000 square feet for the stowage of goods. It is of irregular shape, and about 1,300 ft. in greatest length and 630 ft. in greatest breadth. It is excavated to a uniform depth of about 30 ft. below high-water spring tides, and is intended to contain a depth of from 20 ft. to 25 ft. of water. It is entered directly from the Channel between the piers of Boulogne Harbour, making ingress and egress easy at all times through a lock with two sets of gates, so constructed as to admit the largest vessels, but generally intended to act as a half-tide basin, and to accommodate several vessels of medium

tonnage at a time. The lock or half-tide basin is 325 ft. in length and 68 ft. in breadth, with a depth over the sill of the gates of 29 ft. at high-water spring tides, and 23 ft. at high-water neap tides.

The opening of this new dock marks an important improvement in the facilities presented to navigation by the harbours on the north coast of France. Rails in connexion with the station of the *Chemin de fer du Nord* run along the margin of the basin, enabling vessels to discharge direct into the railway wagons without transshipment; and it is intended before the close of the year to provide cranes and all the most improved appliances to facilitate the loading and unloading of vessels.

ST. PANCRAS NEW RELIEF OFFICES.

THE new relief office and dispensary, the first erected under the provisions of the new Act, and the first of a series of four intended to be erected in the parish of St. Pancras, are situated in the midst of a poor population in Compton-place, one of a series of courts enclosed by the houses in Compton-street, Hunter-street, and Leighton-street. The rooms are all on the ground-floor. The site is of the form of the letter L, the long arm of which has a double series of rooms, and the short arm a single series, chiefly occupied by the porter's apartments. Immediately opposite the principal entrance and hall is the general waiting-room, the superficial area of which is upwards of 600 square feet, lit by continuous lantern skylights in the open roof. The glazed side panels of the lanterns are hung on pivots, and are made to simultaneously open and close for ventilation. It is heated by a large open fire-stove surrounded by warm-air chambers, through which the fresh air is made to pass. At the north end of the room are exit doors leading to separate men's and women's latrines, &c., and to the fuel stores.

On the east side are a series of doors admitting to the committee-room and to the doctors' consulting-rooms. At the south end is the entrance to the dispensary and relieving officer's room, bread-room, &c. Adjoining the dispensary, and entered only from it, is a drug-room fitted with small range, sink, and shelves. Adjoining the relief office, and entered only from it, is a store-room, constructed so as to answer the purpose of a strong room also. Separate conveniences are provided for the officers and porters. The passage leading to the porters' rooms forms an exit from the relief-office without necessitating a return to the waiting-room or entrance-hall. All the rooms are very lofty, being open to the roof, and the underside of the rafters ceiled. The side walls are 12 ft. in height from the floor. All the fireplaces are fitted with Welch's patent ventilating stoves, which admit of fresh air from without being passed through the warm-air chamber at the back of each into the rooms through hit-or-miss ventilators over the chimney-pieces.

The contract was taken by Messrs. Scrivener & White, at the sum of 1,341l. Mr. E. C. Rohins was the architect.

THE SCIENCE OF COLOUR.

SIR,—I am glad that Mr. Crace's remarks were made without book. He will find that I by no means assert that "all our present theories on the laws of the harmony of colour are entirely wrong," and that I advance nothing contrary to Newton. It is the list usually given of primary and secondary colours which I maintain to be erroneous, as all trustworthy experiments prove it to be. Several of these I have mentioned in my treatise,—as, for instance, the following two:—

I. Lay a narrow stripe of paper, part white, and part covered with the brightest yellow pigment, in the sunshine, across a dark cavity: the prismatic spectrum of the yellow part will contain the same red and green as appear in the spectrum of the white part.

II. Lay a circular spot of the brightest cobalt blue on a neutral grey ground, at a little distance from a similar spot of the brightest king's yellow: hold a slip of clean polished glass vertically in the middle, so as to reflect the yellow spot from that part of the glass through which the blue is seen. Thus we obtain different mixtures of the coloured lights given out by the two spots, and

as the eye is moved higher and higher the resulting colour passes from blue to yellow through grey, but never shows the least tendency towards green.

These and many other experiments prove that if red and blue are primary colours, yellow is a secondary colour, and complementary to blue. The doctrine that there are three primary colours, and that those three are red, green, and blue, is supported by the accurate experiments of Professor Maxwell, detailed in the *Philosophical Transactions* for 1860. I have never heard of any experiments in support of the red, yellow, and blue theory, other than those of the mixture of pigments, or superposition of coloured glasses, the untrustworthiness of which is evident, because those substances are coloured only by virtue of their destroying light; and, being all more or less transparent, they must, in overlying, interfere with each other's proper colours.

I hope that when Mr. Crace has had the opportunity of trying some experiments calculated to give true results, he will see that the new doctrine is not without experimental support, and will do me the justice of saying so. I have not the least doubt that the correction of our principles will be of essential service in the use of all rules for beautiful and harmonious compositions of colour.

W. BENSON.

SIR,—According to Mr. Benson's work on the "Science of Colour," which you noticed a week or two since, yellow, if I understand rightly, is no longer to be classed as a primary colour, and green is to be considered as a primary in its stead. Now, as you say, "if the new doctrine be true, we cannot be too prompt in accepting it;" but before doing so we really must be told what yellow is. By the theory of Mr. Benson it appears to be literally "nowhere." We find it classed under "colours containing full red," but what if it contained no red, as it often does? for if it contained red it would be orange. What is that colour which will turn blue into green?—is it a primary or a secondary? If it is a secondary or compound colour, of what is it composed? We are told by Mr. Benson that "the strongest yellow is produced by combining the red and the green rays, and excluding the blue;" but without blue we could have no green, and the yellow ray would remain.

With Mr. Crace, I must say that I was considerably surprised with this new theory. I have tried the prism, as Mr. Crace mentions, upon a sheet of note-paper, and I find it precisely as he describes it. The yellow ray is distinctly visible at the top of the paper, and there is no green to be seen, which appears to be due to the white paper separating the yellow and blue rays, the red and yellow being at the top, and the blue and a tinge of red at the bottom, and when the black object is introduced in the centre the colours are reversed. But green is formed immediately upon allowing the yellow to approach the blue ray. Let us see how other greens are formed in nature. How is sky green formed? Sky green is to be seen on a fine evening, just before sunset, in the clear sky near the horizon, and it is one of the most lovely and delicate greens which can be conceived. It is formed by seeing the blue sky through the yellow rays of the setting sun. The sky itself is not more green than it has been all day; it is simply the medium through which it is seen making it, to our vision, appear green.

How is green formed in vegetation? It appears to me to be entirely due to the blue ray in the atmosphere, which apparently forms a blue colouring matter under the outer surface of the leaf, but which is altered by the yellow colour of the sap and the outside covering of the leaf into green. If we, for instance, take a fully-developed ivy-leaf, the upper side is of a dark bluish green, while the under side is of a light yellow green. Cut off a portion of the upper surface with a sharp penknife, and we shall find the colouring matter under is of a darker and still bluer green than the surface, showing that the colouring matter is modified and made yellower by the upper surface or covering, from which it is reasonable to assume that the blue is communicated to the yellow sap by the blue ray of the atmosphere; for the under side, which is less exposed to the light, is far less blue than the upper. The blue also is received by the plant gradually, as the young leaves are always of a yellow green, and they become bluer only by degrees. If the plant is excluded from the light altogether, it loses nearly all its blue and becomes yellow. When the sap ceases to flow

through the leaves, and they decay, as in autumn, the blue is abstracted from them, they become yellow, red, or reddish brown, according to the nature of the original colour or the further brownning influence of the sun. The great fact, however, is, that the blue is gone and the yellow remains. The rays of the summer sun have drawn away the colour imparted by the blue cold ray of spring, until at last, the sun's rays becoming redder and more powerful towards autumn, they will turn the cold blue green of the wheat into the yellow and golden grain of our harvest fields.

This appears to me to show clearly enough that green is a compound colour, and that yellow is a primary.

JAMES K. COLLING.

THE PRISMATIC COLOURS AND HOW TO SEE THEM.

As reference has recently been made in your columns by Mr. Crace and others to the colours produced by the prism, perhaps the following capital method (accidentally found out by me a few weeks ago) of seeing the prismatic colours to perfection may be considered worth a place in the *Builder*. I am not sure that it is entirely new, but it is quite new to me, and may be so to many others.

The usual method of observing prismatic colours is by looking at any object through a prism, or by observing the rays projected by a prism on to a surface; by each method all the prismatic colours are displayed at once in small patches, and it is not easy to observe the exact shades of the primitive colours, because they are interfered with by the secondaries; now, by the following method the rays may be, as it were, separated,—one colour only seen at a time, and that, too, in a large mass.

If, then, instead of looking at the colours through a prism, the prismatic colours be directed, one at a time, from a prism (by a second party) directly into the pupil of the spectator's eye, the effect to the party operated upon is, that he sees the whole apartment in one perfect haze of the colour directed into his eye; as the successive rays are thrown one after the other on to the eye, the effect is most magnificent. It is very dazzling from a small prism when the sunlight is not very strong. I have not tried it with a very large prism in full sunlight, but words are altogether inadequate to describe the splendour of the separate colours of the prism as seen by these means.

W. G. S.

À PROPOS DES BOTTES.

SINCE the railroad to Florence has been established, people of all grades and opinions have visited that famous city, and contemplated the treasures of art in its palaces and churches, while every Englishman returns to his country extolling the beauty of the celebrated statue of the Venus de Mediciis. Notwithstanding this tribute of praise,—this just acknowledgment of the perfection of its proportions, on which the excellence of this celebrated work mainly depends,—the shoemaker is still permitted to inflict on our wives and daughters the narrow misshapen shoe of the last century.

If, Mr. Editor, you regard the subject of sufficient importance in an artistic or sanitary point of view to publish the following dimensions, taken from a very excellent cast of the Venus de Mediciis in the Museum of Sir John Soane, it would enable any lady, in the possession of a foot-ruler and a modicum of arithmetic, to ascertain for herself what should be the exact length and width of the sole of her shoe, and at the same time convince her of the truth of the above statement respecting the narrow, misshapen shoe which the wily shoemaker has hitherto persuaded her to accept.

As the Venus de Mediciis stands, she measures exactly 4 ft. 11 in.; but, as she leans forward, and is poised more on one leg than on the other, 3 in. is calculated, must be added to the 4 ft. 11 in. in estimating her height in the perfectly erect position. This would make her 5 ft. 2 in. in height. Now, as her foot is exactly 9 in. long, it is rather more than one-seventh of her entire height.* The greatest width of her foot is 3 1/2 in., and this would be a mere fraction more than

* Vitruvius says the foot is one-sixth of the entire height of the man; but the finest statues of antiquity make the foot a little more than one-seventh.

one-eighteenth of her entire height. It may, therefore, be confidently asserted that anything less than these dimensions for the sole of the shoe of a woman of 5 ft. 2 in. in height will not only be out of proportion, but that it will occasion discomfort and inconvenience, and that anything much less will produce considerable pain, and ultimate irremediable deformity of the foot. It may also be observed that high heels to boots or shoes will greatly add to the misfortunes the foot is subjected to, by producing ankylosis of the tarsus,—in plain English, a growing together of the bones of the instep, of course not without its concomitant evils.

JOSEPH BONOMI.

KENSINGTON SICK ASYLUM.—PAYMENT TO ARCHITECTS.

SIR,—Has your attention been called to recent proceedings in Middlesex for the erection of sick asylums with respect to the remuneration of their architects? And, also, have you noted what was done in this respect at the last county meeting of Middlesex magistrates, as to a proposed scale for the payment of any architects employed by them on county buildings? With regard to the first, you published (25th July) a plan and description of two such asylums about to be carried out by Mr. Giles; but you do not say a word as to the terms of the competition. Six architects have been asked to send a design for the sick asylum at Kensington, but, feeling how improper the conditions were, and that they are such that no member of the Institute is at liberty (morally, of course, I mean) to accept in the face of the published scale of the Institute, out of the six applied to only two have accepted, Mr. Currey, Mr. Worthington, Mr. Wyatt, and Messrs. Banks & Barry have declined. The Middlesex magistrates propose a yet lower scale. I think something like this:—

5 per cent. first £1,000.
4 " up to £10,000.
2 " after.

No commission at all is to be given for any excess over original estimate: this is to be taken into consideration by the court in October. Meanwhile the matter is serious, and ought to receive attention.

F. R. I. B. A.

THE WALWORTH COMMON ESTATE.

SIR,—I am glad to see that the rebuilding of this estate, consisting of about forty-five acres, in the midst of our vast metropolis, is deservingly attracting some attention.

The plans, as laid out by the various competitors, provides for about three miles of new houses; and it is most important, not only to the rate-payers of St. Mary, Newington, and the inhabitants of the immediate neighbourhood, but also to the public at large, that suitable provision should be made for the health and comfort of those families who will have to occupy, at no distant date, these proposed new streets, which, if intended more especially for the poor, should then more especially be healthy.

The majority of the competing architects for laying out the estate affirm that this provision for health has been disregarded in the plans selected for execution and premiated by the guardians; and that a narrow view of E. S. A., arising from over-crowding the estate with the greatest possible number of miserable dwellings, has blinded a more liberal and broader view of getting a truer value from the land, by allowing a little more breathing-space, and so really securing in the end a greater prosperity.

The subject then suggests, I think, two questions:—

1st. Is it to the true interest of the ratepayers and the inhabitants that either of the three premiated plans, as shown to them, should be carried out in all its integrity?

If not, such plan should be at once rejected.

2nd. Do the premiated plans comply with the instructions issued by the guardians?

The competitors say no; and they ask (apparently with justice) that an arbitrator may be appointed to decide.

He would no doubt commence by rejecting all plans which have not complied with the instructions; and would probably include amongst them those showing a less holding depth than 50 ft.

He would then select the plans with the best

system of streets; and from these he would select such as gave the greatest amount of building frontage together with the greatest average depth; a minimum depth of 50 ft. being taken.

I think, sir, by some such method the best plans would be secured, and all the parties would be satisfied.

A LOOKER ON.

SILICATE PAINT.

SIR,—A short time ago my attention was directed to a letter which appeared in your columns recommending silicate of potash as the basis of a paint or dressing for stones. If your correspondent will kindly inform me how to make a black paint with the silicate, I should be greatly obliged.

PHILIP GRAYSON.

THE THAMES EMBANKMENT.

At the last meeting of the Metropolitan Board of Works the following report of Mr. Bazalgette, engineer of the Board, respecting the Thames Embankment, was read:—

"Engineer's Department, Spring Gardens, S.W., August 5, 1868.—The Thames Embankment, Contract No. 1, between Westminster and Waterloo Bridges, is nearly the whole of the works contained in this contract now completed, these remaining to be done being principally the finishing of the pilings at the top of the piers and the Charing-cross and Waterloo steamboat level of a part of the works, the removal of some piers and the completion of the wall facing the Crown Pier and the Priory Gardens. Approximately, the whole cost of the works executed, including 3,000 ft. of materials upon the ground, amounts in value to about 460,000, of which the sum of 6,000, represents the progress made in the past month. Contract No. 2, between Waterloo Bridge and eastern end of the Temple Gardens. With the exception of the finishing of some of the ornamental carvings, &c., the whole of the works contained in this contract are complete, at a cost approximately of 232,865. Contract No. 3, between Temple Gardens and Blackfriars Bridge. The dam for this work is fast progressing; about one-third of the number of piles are driven, and about 600 feet in length of the foreshore has been dredged down to the clay and properly puddled. The value of these preliminary works is 2,500. At the Westminster steamboat pier the pontoons and the waiting-rooms, and the offices thereon, and the two nearly girder bridges, or gangways for access thereto for the truss and completed ready for the use of the public. Similar works are being prepared at the Charing-cross, the Waterloo, and the Temple piers. With slight exceptions the whole of the main paved footway extending from Westminster Bridge to the Temple pier is completed and open to the public. The paved approaches thereto are being completed from Villiers-street, from the steps of Waterloo Bridge, and from Essex-street. An open deal fence is erected along the entire line of footway, but by a recent declaration of the Works, &c., Committee, this fence will shortly be close boarded, in order the more effectually to protect the several properties abutting upon the embankment."

A report was brought up from the Works and General Purposes Committee, submitting a plan of the proposed arrangements between the Board and the Metropolitan District Railway Company, for the construction of the railway along the line of the embankment, north, and new street to the Mansion House, and recommended that the sanction of the Board, be given to the same. The chairman regretted that they had not been able to open the approaches to the embankment from Villiers-street, from Waterloo Bridge, and from the steamboat pier at the bottom of Essex-street, Strand. This had arisen from the want of material, but the Board would accelerate the work as much as possible, and it was hoped that, in a very short time, the approaches would be open for the use of the public. The Board adjourned for holidays.

THE BUILDERS' BENEVOLENT INSTITUTION.

The twenty-first annual general meeting of the friends and subscribers to the above charity was held on Thursday (30th ult.) at Willis's Rooms, King-street, St. James's, for the purpose of receiving the directors' report for the past year, the election of officers, and other business connected with the institution. Mr. W. R. Rogers (president) officiated in the chair.

The chairman having briefly opened the proceedings, the secretary read the report, which stated that a satisfactory addition had been made to the fund, stock, 1,525l. 13s. 3d. having been purchased for the relief fund, and 107l. 8s. for the building fund. The amount now invested is 11,332l. 19s. 4d. for the relief fund, and 2,936l. 19s. 9d. for the building fund, being a total of 14,272l. 18s. 1d. stock, Three per Cent. Consols.

The directors again venture to solicit the friends and supporters of the charity to increase their kind efforts, and endeavour to obtain amongst their connections additional annual subscribers to enable them at the ensuing elections of pensioners to elect a large number of the unfortunate and deserving applicants.

Four directors, in conveying to the late president William R. Rogers, Esq., their unanimous thanks for his kind and energetic efforts to increase the prosperity of the institution, allude, with great thanks, more especially to his having obtained the large donation of 100l. each from ten firms; and the directors take this opportunity of thanking these gentlemen for their generous and liberal contributions.

The investment of these and all donations to the relief fund in Government securities constitutes a solid foundation for the future of the Builders' Benevolent Institution.

Mr. Joseph Bird expressed his gratification at the very satisfactory report which had been rendered, and moved that it be adopted and printed.

The motion, having been seconded, was unanimously carried.

Mr. George Plucknett proposed that the thanks of the meeting be given to the patrons of the institution, and that the names of the following gentlemen be added to their number, they being the ten firms who gave a donation of 100l. each at the annual dinner in October last:—A. Z. per Mr. Geo. Dines; Mr. William Webster; Mr. John Kell, M.P.; Mr. C. J. Peake; Messrs. Lucas Brothers; Messrs. Laurence Brothers; Messrs. Holland & Hannen; Messrs. Wm. Culbert & Co.; Messrs. George Myers & Sons; and Messrs. George Smith & Co.

Mr. T. Stirling having seconded the resolution, it was

unanimously carried.

Mr. T. Thorn next moved a resolution expressive of thanks to the president (Mr. W. R. Rogers) for his very beneficial services during the past year, and said that they had met together that day for the purpose of receiving the twenty-first annual report. The society had come of age, and he was happy to find that during the last year of his minority it had been presided over by so good a parent. While in his swaddling clothes difficulties occurred, but it was pleasing to know that from birth it gained in strength and beauty. It had been very useful, and had done very essential service, and would do so again.

Mr. Thomas Crooks was happy to second the resolution of a vote of thanks to the president, for never president had done greater good than he had done.

Mr. Bird put the resolution, which was passed with one accord.

Mr. Rogers, in returning thanks, said that, although it was the conclusion of his year of office, he still had the interest of the institution at heart, and he hoped that its benefits would be extended. He thought that there should be no relaxation in endeavours to obtain supporters for the society's interest and welfare.

The various officers were next elected, when complimentary votes were passed, particularly to Mr. Plucknett, the treasurer; and Mr. J. Bird, as hon. secretary to the annual hall, which was an effective source of revenue to the funds. Those gentlemen having replied, and expressed their continued adherence to the institution, Mr. George F. Trollope, on the motion of Mr. Plucknett, was unanimously received as president for the ensuing year.

We must ourselves offer Mr. Rogers a word of hearty praise for the good service he has done the Institution.

Miscellaneous.

TECHNICAL EDUCATION IN GATESHEAD.—In 1867 the artisans of Gateshead entered classes for scientific instruction, conducted at the National Schools, during the winter evenings. About fifty students enrolled their names. A committee was formed, and classes were commenced under the tuition of Mr. James Mac Callum, an engineer in the office of the River Tyne Commissioners. Mr. MacCallum had taken a distinguished degree in the University of Glasgow, and was, on the Rector's application, recognised by the Science and Art Department as a duly qualified instructor in any of the branches of science contemplated by the department. The classes were conducted on Tuesday and Thursday evenings from the beginning of November to the early part of May. At that date Captain Campbell, the Government inspector of science schools, held an examination of twenty-four of the students, who, having made twenty-five attendances and upwards, were willing to present themselves. The results of the examination have been just made public. The subjects of examination were practical, plane, and descriptive geometry; mechanical and machine drawing; building construction; and theoretical mechanics. In the first of these objects three students presented themselves: of whom one obtained a 1st class and two a 3rd class. In the second object twenty-two were examined: of whom four obtained a 2nd class, five a third class, seven a 4th class, two a 5th class, and four failed. In the third subject one obtained a 3rd class and one a 5th class; no failures. In the fourth subject, of the two examined both obtained a 4th class. The successful students are all artisans or apprentices. Of the twenty-five students nineteen were successful. One passed in four subjects, and one in three. Thirteen "Queen's prizes" were adjudged to the students, and six certificates of merit.

DIRECTING POSTS.—The *Chelmsford Chronicle* speaks of a directing post intended to be used where required in the Chelmsford Highway District. It was designed by Mr. Frank Whitmore, the surveyor to the Board. It is made of iron, with fluted column, the inscription being in relief on a green glazed ground, which seldom requires painting. The contractors are Messrs. Whitmore & Binyon, Wickham Market.

CAMBERWELL CHURCH.—The scaffolding fixed round ago to the steeple of St. Giles's, Camberwell, remains there through some parish squabble, and the work is not finished. The builder declines removing it until he is paid. I know that the ropes must be decayed, for it is two years since I first saw the wretched job; hundreds of poles will come rattling down some day, and the church will be poleaxed, and perhaps people also.—T.

MUSCULAR CHRISTIANS.—On Sunday, the 2nd instant, between twelve and one o'clock, the church service at Wiggington, in Bedfordshire, was suddenly interrupted by an old dame rushing into the church, and without ceremony crying out that the clergyman's hedge was on fire, and a neighbouring rick was in danger of being burnt. No sooner was the alarm given than the church was quickly emptied of the male portion of the congregation, who set to work at once to extinguish the fire. Foremost amongst the workers was the clergyman himself, the Rev. Mr. Mason, who wielded a heavy axe and cut a gap in the hedge, which helped to stop the fire. The rick remained uninjured; and after the fire was extinguished the clergyman returned with his flock to the church and finished the service: next day he regaled the whole of the workers.

COMPENSATION CASE.—On the 11th, the case of "The Emanuel Hospital v. the Metropolitan District Railway" was finally disposed of by Mr. H. Toogood, deputy high bailiff of Westminster, and a special jury. The claim was about 2,000l. for a piece of land in the rear of Emanuel Hospital, Victoria-street, which was required for the inner circle of the railway. The Corporation of the City of London were the promoters of the charity, which was founded by Lady Dacre in the reign of Queen Elizabeth, 1594. Besides the support of old men and women, a number of boys and girls were educated, and as "educational purposes" were prominent in the present time, the land was valuable, and could be utilised to a great extent. Mr. Lloyd and Mr. Thrupp were for the City of London; Mr. Hawkins, Q.C., and Mr. Streeten for the railway company. Several surveyors were called for the company, and said the value of the land required was about 8,000l. The evidence on the other side, by equally respectable men, was that the value was from 20,000l. to 22,000l. They differed as to the mode of utilising the property. The jury eventually assessed the value of the land at 10,475l., and they received three guineas each.

SOUTH-WEST LONDON SCIENCE CLASSES.—Amongst the results of the Science Examinations of the Science and Art Department of the Committee of Council on Education, South Kensington Museum, may be named:—*Building Construction.*—Queen's Prize, 1st class.—W. Bailey, J. Coles, W. P. P. Queen's Prize, 2nd class.—J. Bachelot, G. Jackson, W. Lawrence, J. Taylor, W. Wenham, H. White. Queen's Prize, 3rd class.—R. Bailey, F. W. Baller, H. J. Cadwell, C. Carter, J. Chivers, A. Everett, A. Grint, H. Humphreys, V. Jerams, E. Johnson, J. Line, V. Twissell, E. Walters, F. Wilford. Honourable mention.—T. Chivers. Passed.—G. Bird, J. Jordan, R. Young. *Mechanical Drawing.*—Queen's Prize, 2nd class.—W. Bailey, C. Humphrey, James Line, G. Thwaites, W. Wenham. Queen's Prize, 3rd class.—C. Carter, G. Jackson, V. Jerams, E. Johnson, W. Lawrence, W. P. P. Taylor, W. Walker, F. Wilford. Honourable mention.—R. Bailey, F. Baller, G. Bird, J. Watkins, T. Schofield, E. Walters, A. White, R. Young. Passed.—Alg. Chapman, A. Chapman, J. Chivers, J. Chivers, A. Everett, H. Jordan, T. Jones, W. Twissell, Theodore Winks. *Local Prizes (Chelsea).*—Sir C. Wentworth Dilke's Prizes.—1st class, value 5l.; 2nd prize, value 3l.; 3rd prize, value 2l.; 4th prize, value 1l.; 5th prize, value 10s. each. G. Jackson, W. Wenham, W. Evans, C. Carter and F. Wilford, W. Allee and T. Jones.

A MILLENNIUM IN HUNGARY.—The Hungarians propose to erect a colossal obelisk on one of their vast plains, in order to commemorate the thousandth anniversary of the foundation of the kingdom of Hungary. Some prefer a national pantheon on the mountain which overlooks their capital.

THE BROKEN ATLANTIC CABLE.—The tests seem to show that the fault lies at about eighty miles from Newfoundland, in water not exceeding, if it reaches, 100 fathoms in depth, and that the interruption of communication is so complete as to put it almost beyond doubt that the injury has been caused by the grinding of an iceberg. Communication will, it is expected, be restored in less than a month; but meanwhile the other cable is fully equal to the work required of it.

COMPETITION DESIGNS FOR WAREHOUSES AND OFFICES FOR THE LIVERPOOL FINANCIAL ASSOCIATION.—We understand the association have selected the design "Nota bene" for the first premium of 100l., and the design marked with the device of a triple tau within a circle for the second premium of 50l. The former is by a London architect, and the latter is a design sent in jointly by Mr. Brattan, architect, Birkenhead and Liverpool, and Mr. Shakeshaft, Liverpool. There were sixteen competitors.

CHURCH BELLS AND THEIR USES IN HAWAII.—The natives of Kona, Hawaii, have recently raised a new bell upon a tower, which they have erected, attached to one of their churches. The first use which they made of their new bell was to toll forty-eight funeral strokes in honour of the burial of some old conch-shells which had been blown for the past forty-eight years for the purpose of assembling the people to church, and which were buried with due solemnity. In a few years these conch-shells would have ranked among the choicest historical relics of the natives.

INFECTIOUS LODGINGS.—It ought to be generally known by sea-side and other lodging-house keepers that letting lodgings which have been occupied by lodgers afflicted with contagious diseases before the said lodgings have been effectually purified is now an offence punishable by law. The Sanitary Act of 1866 (Vict. 29 and 30, c. 90, secs. 33 and 39) provides that,—

"If any person knowingly lets any house, room, or part of a house, in which any person suffering from any dangerous infectious disorder has been, to any other person, without having such house, room, or part of a house, and all articles therein liable to retain infection, disinfected to the satisfaction of a qualified medical practitioner, as testified by a certificate given by him, such person shall be liable to a penalty not exceeding 20l. For the purposes of this provision the keeper of an inn shall be deemed to let any part of a house to any person admitted as a guest into such inn."

THE CATASTROPHE AT THE VICTORIA MUSIC HALL, MANCHESTER.—A resolution, adopted by the trustees of the Manchester Royal Infirmary, urging the city council to appoint a public officer to examine all places of public amusement, and especially to report in cases where the means of egress are defective, was read at the last meeting of the council by the town clerk. In moving that the matter be referred to the general purposes committee, it was observed that during the last season an alarm of fire was raised at one of Mr. Hall's concerts in the Free Trade Hall, and that in consequence of the alarm Mr. Tozer was directed to report as to the means of egress afforded by the hall in the event of any sudden panic occurring. He did so, and a copy of the report was sent to the directors of the hall; but they had not the courtesy even to acknowledge its receipt, and no other action was taken in consequence. The motion was adopted. The jury at the coroner's inquest in this case pronounced as follows:—

"The jury are unanimously of opinion that the staircase and handrails were quite insufficient for the egress of such large audiences usually assembled there, and that suitable alterations should be at once made for the safety of such as visit this place of amusement, and that the lighting should be so constructed as to prevent the gas being interfered with. The jury further recommended that power be given by Parliament for the appointment of a qualified officer by the corporation to inspect theatres, music-halls, and similar places of public resort, and that no licence be granted for public entertainments to the proprietors or public lessees of such buildings without the production of a certificate from such officer that the means of egress are sufficient for the number of people they profess to accommodate."

The foreman added that the jury wished that young people should only be admitted to such places with greater discretion than appeared to have been displayed in this instance. Verdict, "Accidental death."

TUAM CATHEDRAL.—The restoration of this cathedral is progressing. The Misses Cooper, of Mackree Castle, have presented the entire fittings and stalls for the choir. The carvings were brought by the late Mr. Cooper from abroad, and are considered among the most rare and remarkable specimens of art. Within the cathedral will also be preserved the arch, the celebrated remains of Early Irish architecture, which led into the little chancel of a church built in the twelfth century.

CONSECRATION OF ST. MARY'S, CHARTERHOUSE, GOLDEN-LANE.—On Saturday afternoon the new Church of St. Mary, Charterhouse, Playhouse-yard, Golden-lane, was consecrated by the Bishop of London. The edifice is one of those ordinary church structures which are being erected in the diocese of London in connexion with the Bishop's Fund, in which the very smallest possible space is made available for the very largest number of people who like to come. The church is a very large one, and is placed in the middle of a very dense and destitute part of London. It will accommodate nearly 1,000 people.

DRINKING FOUNTAINS.—It may show how useful such fountains are to state that the number of persons who drank at the fountain erected by the United Kingdom Temperance and General Provident Institution on London-bridge, from seven o'clock in the morning of August 5th to seven o'clock in the morning of August 6th, 1868, was 5,710. The fountain was built by and is now under the care of the Metropolitan Free Drinking Fountains Association.—The Duke of Sutherland has had fixed at the entrance to Trentham Park, Newcastle-under-Lyme, for the use of the public, a commodious drinking fountain, supplied with pure spring water, with three metal cups, so that three persons can be accommodated at the same time. The late Duke ordered the drinking fountain at the porter's lodge to be put up for the use of total abstinents twenty-seven years ago. There is an opinion that this is one of the earliest public drinking fountains for the use of the general public.

THE SOLAR ECLIPSE.—On the 13th instant the eclipse of the sun so much talked of by men of science will take place; and in various parts of the world, where it will be well seen, though not so in this country, parties of astronomers and others will be on the watch for its interesting phenomena. From the favourable position of the earth and moon, this will be a very complete eclipse, as the sun will be at about its greatest distance and its least apparent diameter, while the moon will be at nearly its least distance and its greatest apparent diameter. The red flaming appearances round the black lunar disc will be specially watched. These are believed to be really of the nature of flames, and connected with the sun; but we have an idea that they may be refractions of roseate clouds on the borders of the farther hemisphere of the moon, which may have both air and water—both atmosphere and clouds—on that side, although the centrifugal force of its movement may prevent either from remaining in the hemisphere presented towards us. If there be any depth of atmosphere, however shallow, at the edges of the disc, such a refraction as we have indicated would certainly be possible.

MARGATE.—At a recent general meeting of the corporation a discussion arose upon the state of the harbour, originating from an application to sewer some premises into the King-street drain. The application was strongly opposed by Alderman Price, and also by Mr. Kable, the mayor, and another member, on the ground that the drain deposited in the harbour all the sewage matter, and at low tide this quite poisoned the atmosphere, and had been the cause of visitors leaving the town. By granting the application the council would only increase the nuisance, and still further injure the town. In proof that there were real grounds for the complaint, a letter was subsequently read from Mr. Reers, of the York Hotel, complaining of the nuisance arising from decayed seaweed, &c., lying in the harbour, which, it was said, had made his family ill; and asking the council to take steps to remedy the evil. The council, however, adopted a curious mode of procedure. They determined by a majority of votes to grant the application to sewer into King-street drain, and afterwards instructed the sanitary inspector to take the necessary steps under the advice of the town clerk, against the Pier and Harbour Board to abate the nuisance.

THE RIVERS POLLUTION COMMISSION AND THE LIVERPOOL WATER SUPPLY.—The other day the Commission inquired at Chorley into the pollution of the river Yarrow. A calico print stained his opinion that the pollution of the river was mainly attributable to the impounding of the water of the district by the Liverpool Corporation. Sir William Denison said he was surprised that the Liverpool Corporation had been allowed to have the water; but that, with other matters, should have their attention.

TWICKENHAM ECONOMIC MUSEUM.—A party of workmen, members of the St. James's and Soho Working Men's Club, accompanied by Mr. Dexter, the secretary of the Public Museums and Free Libraries Association, paid a two hours' visit to the Museum of Domestic and Sanitary Economy, at Twickenham, on Saturday afternoon; Mr. Thomas Twining, to whose benevolence the public are indebted for this unique collection, paying the greater portion of the cost of the visit. The same club has just received a gift of more than 480 volumes of valuable books from Captain the Hon. R. W. Grosvenor, M.P.

SUBURBAN VILLAGE AND GENERAL DWELLINGS COMPANY (LIMITED).—An extraordinary general meeting of this company was held at the Cuildhall Tavern, on Monday evening, Mr. C. Palmer, a shareholder, in the chair. The report of the shareholders' committee was read, from which it appeared that the petition to wind up the company had been dismissed, and that through Mr. W. G. Habershon the estate at Longborough-park had been secured, with the addition of a road at the farther end, rendering it as desirable an estate as could be procured for the purposes of the company. Four new directors, viz., Messrs. W. G. Habershon, Basil Wood Smith, J. Faithful Fortescue, and C. J. Cooke were unanimously elected.

OPENING OF KING'S CROSS MARKET.—The new market adjoining to the Great Northern and Midland railways, at King's Cross, has been opened. It stands in the centre of a triangle of ground, at one corner of which is the station of the Great Northern Railway, with a siding to slant the produce of its line into the stores of the market's wholesale department. By this line thousands of tons of fish have hitherto been brought from Grimsby and Hull, and then carted to Billingsgate at an expense of extra carriage, loss, and delay by transit. But now the supplies of fish, meat, vegetables, garden produce, and general provisions will be at once sold wholesale, and offered fresh and undamaged in the adjoining retail department. The gates of the new Midland station are nearly opposite the market entrance, whilst at the other corner of the triangle is the Metropolitan station, with its incessant traffic to almost every part of the city and suburbs. The building has been erected under the direction of Mr. Jethro Robinson, the builder. The roof is so constructed as to admit only the north light, and thus shade and coolness are to be secured. There are to be daily auctions of produce. The entrance at present is from the Old St. Pancras-road, where a large iron foundry used to stand.

A GOOD TIME COMING.—At the close of the ceremony of "capping" the medical graduates of the University of Edinburgh, Sir James Young Simpson delivered an address, in the course of which he said:—"It may be, that the day will yet come when our hygienic condition and laws shall have been changed by State legislation, so as to forbid all communicable diseases from being communicated, and remove all causes of sickness that are removable; when the rapidly-increasing length of human life shall begin to fulfil that ancient prophecy, 'the child shall die an hundred years old;' when there shall have been achieved, too, advances in other walks of life far beyond our present state of progress; when houses shall be built and many other kinds of work performed by machinery, and not by human hands alone; when the crops in these islands shall be increased five or ten fold, and abundance of human food provided for our increased population by our fields being irrigated by that waste organic refuse of our towns which we now recklessly run off into our rivers and seas; when man shall have invented means of calling down rain at will; when he shall have gained cheaper and better motive powers than steam; and when he shall travel from continent to continent by submarine railways, or by flying and ballooning through the air."

TENDERS.

For the construction of sewage tank at Moss Hall, Finchley, N. Mr. Stephen Hoskon, surveyor:—
 Fitch & Caughley 2,417 0 0
 Evans 385 0 0
 Wills 375 0 0
 King & Sons 360 0 0
 Wills 354 0 0
 Faulkner & Cowley 326 0 0
 Goodair 315 0 0
 Bloomfield 298 0 0
 Eglinton & Paucei 268 0 0

For the erection of a public-house, St. Andrew's-road, Hastings. Messrs. Voysey, Jeffery, & Shiller, architects:—
 Vidler 909 0 0
 Longhurst 899 7 6
 Scire 865 0 0
 Parks 865 0 0
 Russell 813 0 0
 Howell 810 0 0
 Bourne (accepted) 783 0 0

For Hither Green-lane, Kent. Messrs. Tilbott & Chamberlain, architects:—
 Pritchard 4,312 10 0
 Pritchard 323 0 0
 Grady 228 10 0

Rebuilding 78, Chesapeake, for Mr. Bradshaw. Mr. F. Johnstone, architect. Quantities supplied:—
 Henshaw £1,428 0 0
 Axford 1,290 0 0
 Kilby 1,284 0 0

Alterations and additions to Frith House, Walton, for Mr. A. Holford. Mr. F. J. Dibble, architect. Quantities supplied by Messrs. Birdseye & Storer:—
 Terrace £3,090 0 0
 Axford & Whillier 2,852 0 0
 Godard & Son 2,727 0 0
 Kilby 2,730 0 0
 Hamblin 2,460 0 0

For additions and repairs to the rectory-house, buildings, and chance of church at Stow-Maries, Essex. Mr. Fredk. P. Walters, architect:—
 Kilby £1,176 0 0
 Gault 1,100 0 0

For the erection of three shops, Hereford-road, Kingsland, for Messrs. Mann, Crossman, & Paulin. Messrs. Hammack & Lambert, architects:—
 Webb (accepted) £1,495 0 0

For alterations to No. 50, Porchester-terrace, Baywater. Messrs. Hammack & Lambert, architects:—
 Rayment & Son (accepted) £3,116 0 0

For vicarage-house, Herthill, near Faversham, Kent. Messrs. Newman & Billing, architects. Quantities not supplied:—
 Whiting £1,445 0 0
 Judgs 1,413 15 0
 Epps 1,250 0 0
 Shrubsole 1,243 7 6

For house, Thatcham, Berks, for Rev. H. Martin. Messrs. Newman & Billing, architects. Quantities not supplied:—
 Elliott £2,645 0 0
 Wells 2,500 0 0
 Alloway (too late) 2,560 0 0
 Wheeler 2,361 0 0

For making roads at Homeward Lodge, for Mr. Wm. Tains:—
 Adams 4,750 0 0
 Drummond (accepted) 745 10 0

Sum offered for pulling down the British Institution, Blackheath:—
 Blount £100 0 0
 Ewins 105 0 0
 Drummond (accepted) 109 0 0

For making roads for Mr. R. Walker, King's Arms-yard:—
 Hales £1,695 10 0
 Drummond 1,995 5 0
 Eglinton 918 0 0
 Hawke 880 0 0
 Hubbard 891 8 6
 Brice 877 0 0
 Harris 775 0 0
 Tonge 642 0 0
 Strickland 620 0 0
 Hobbs 605 0 0
 Pibbey 570 0 0

For new church, Stamber Mill, near Stourbridge. Mr. Thomas Smith, architect:—
 G. & F. Higham £3,015 0 0
 Stockton & Co. 2,517 7 0
 Nelson 2,347 0 0
 Iie 2,315 0 0
 Chapman 1,850 0 0

For works to the Brighton Riding School, for the Brighton Corporation:—
 Goring £820 0 0
 Ascombe & Co. 675 0 0
 Loader 650 0 0
 Nightingale 615 0 0
 Oliver 624 0 0
 Lockyer 600 0 0
 Dean & Dickinson 575 0 0
 Chappell 566 0 0
 Cheeseman 550 0 0

For erecting a new school for boys and girls, master's-house, boundary walls, &c., for the parish of St. Helen, Abingdon, Berks. Mr. Edwin Dolby, architect. Quantities by Mr. J. Crawley:—
 Nightingale £2,585 0 0
 Claridge 2,185 0 0
 Thomas & Dicks 1,980 0 0
 Bowler 1,662 0 0

For alterations and additions to Prince's-street Chapel, Norwich. Mr. Edward Boardman, architect:—
 Stearnman & Spinks £2,225 0 0
 Lacey 2,107 0 0
 Bailey 2,098 0 0
 Murray 2,061 10 0
 Brown & Bailey 2,036 0 0
 Rice 1,896 10 0
 Harrison 1,886 0 0
 Downing 1,999 0 0

For lodge and receiving-wards at Leytonstone, Essex, for the Guardians of Bethnal Green. Mr. William Mundy, architect. Quantities supplied by architect:—
 Reed £2,397 0 0
 Cook 2,308 0 0
 Read & Son 2,267 0 0
 Forrest 2,215 0 0
 Dyer 2,169 0 0
 F. & F. J. Wood 2,155 0 0
 Arber 2,142 0 0
 Hill & Co. 2,105 0 0
 Emor 2,063 0 0
 Mundy & Hitchcock 2,050 0 0
 Perry & Co. 2,020 0 0
 Rivett 1,990 0 0
 Emor 1,863 0 0
 King & Sons (accepted) 1,960 0 0

For building laundry, &c., at the City London Union Workhouse, Bow-road. Mr. J. E. Saunders, architect:—
 Farbur £245 0 0
 Arnot & Golder 845 0 0
 Schofield 800 0 0
 Young & Son 791 0 0
 Adamson 757 0 0
 Peale 745 0 0
 Webb & Son 649 0 0
 Saly & Son 640 0 0
 Turner 637 0 0
 Peale 630 0 0
 Scholer 615 0 0
 Staines 598 0 0
 Crab & Co. 591 0 0
 Peale 582 0 0
 Watta 550 0 0
 Wicks & Co. 530 0 0
 Martin & Ashby 497 0 0
 Perry 493 0 0

For the erection of a warehouse and new crane, Stepney, Mr. D. L. White, after allowing for old materials, Mr. H. Ough, architect. Quantities by Messrs. Curtis & Son:—
 Vardell & Baker £2,775 0 0
 Staines & Son 2,638 0 0
 Dudley 2,600 0 0
 Crab & Vughtan 2,560 0 0
 Shumart, architects 2,556 0 0
 Emor 2,534 0 0
 Kirk 2,500 0 0
 Morter 2,493 0 0
 Peale 2,483 0 0
 Hedges 2,480 0 0
 Cubitt & Sons 2,439 0 0
 Martin & Ashby 2,418 0 0
 Nightingale 2,383 0 0
 Till 2,363 0 0
 Ancombe 2,340 0 0
 Peale 2,290 0 0
 Heale 2,287 0 0
 Wicks, Bangs, & Co. 2,216 0 0
 Johnstone, Brothers 2,190 0 0

For the erection of coach-house and stables, Hanbury Lodge, Brixton Hill, for Mr. John Dunn. Mr. Henry Luxton, architect:—
 Baxter (accepted) £205 0 0

For the erection of a detached residence at Dulwich. Mr. W. Sim, architect. Quantities supplied:—
 Ellis & Co. £2,970 0 0
 Dove, Brothers 2,040 0 0
 Fish 2,000 0 0
 Macey 1,825 0 0

For Levensden Asylum. Messrs. John Giles & Biven, architects. The quantities applied by Mr. D. W. Young:—

Tender.	Extra of Facing.
Thomas & Son	£9,150
Piper & Co.	8,696
Emor	86,790
Newman & Mann	86,478
Horsman	80,223
W. & J. Webb	88,200
Webster	95,000
Myers & Sons	87,650
Warburton, Brothers	87,368
Kilby	87,430
Nightingale	87,900
Chappell	81,385
Wagstaff & Son	88,623
Perry & Co.	83,400
Hill, Keddell, & Waldram	82,800
Kirk & Barry	78,787
Hart	84,350
Nixon & Sons	84,337
Kirk	81,600
Gannon & Sons	83,226
Eng & Sons	81,890
Henshaw	80,693
Nicholson (accepted)	79,850

For the erection of a new passenger station at Bow, for the North London Railway Company:—

Crockett	£24,500
Myers	22,463
Dann & Sons	22,350
Mansfield & Price	22,048
Abrams	20,375
Dickenson & Oliver	21,600
Perry & Co.	21,287
Hill, Keddell, & Waldram	20,695
Orford	20,375
Scrivener & White	20,650
Palmer	20,250
Watts	20,275
Wicks, Bangs, & Co.	19,445
Hedges (accepted)	19,400
Nightingale	14,657

The Builder.

VOL. XXVI.—No. 1333.

Railways Strangled and Railways Developed.



PEOPLE say that some kinds of grass spread and flourish all the more for ill-usage. Trampled beneath the hoof, nibbled and bitten to the stump, the hardy plant clings with yet more tenacious grasp to the soil, and sends down its countless rootlets in search of the moisture which may enable it to repair its losses. Even in a season like that of the remarkable July of 1868, when so much of our untrinitrated pasture has been unable to support the usual attacks of hungry cattle, from the effects of the yet fierce rage of the sun, we know that but a few days of steady rain are required in order to reclothe the landscape with verdure.

A vitality like that of the grass of the field attaches to the industrial growth of a great people. This vitality is not the only point in common between natural and political development. The analogy is so close that it can hardly be mere coincidence. A certain degree of freedom and hard usage seems to be as necessary to the sturdy growth of manufacturing and productive enterprise as to that of the vegetable pasture on which so much of our sustenance depends. The process of forcing is alike unsatisfactory in either case. Industry does not thrive under glass. On the contrary, there is ample evidence that the attempt to protect, to direct, and to foster the employment of labour by artificial means only results in unhealthy and unstable development. Remove legislative obstacles, remove prejudice, remove ignorance, and industry only asks to be let alone. Allow the sun to shine and the rain to fall, and the industrial harvest is sure.

In no description of industrial undertaking has the truth of this view become so strikingly evident as in railways. We have had ample illustration of the ill effects of an attempt to force prosperity. It is refreshing to be able to contrast with the long tale of mismanagement and misfortune even a single instance of more prudent conduct. The change that has come over the circumstances of one of the most notoriously unfortunate of English railways, under the care of one able and disinterested controller, is the strongest proof of the immense inherent vitality of the system of locomotive communication that has yet come to light.

Railway chairmen and managers, like financiers on a more imposing scale, are often apt to take to themselves credit for a prosperity with which they have in truth but little to do. The honour which they have, on memorable occasions, claimed or received, may remind us of the remark of Sheridan when the share of the Prince Regent, in the great events of 1814 and 1815, was being discussed: "What he most prides himself on is the late abundant harvest." But the plain straightforward account of the

result of six months of his stewardship which the Marquis of Salisbury has laid before the shareholders of the Great Eastern is not thus to be explained away. The stagnation of enterprise, and the disquiet produced in men's minds by the immense armaments of the military powers, have produced a natural effect on the general receipts of railways. In the week ending August 1st, 1868, the gross receipts of fourteen principal railways show a falling off of more than 1½ per cent. as compared with the corresponding week in the preceding year. And this diminished receipt has been earned by the working of a length of lines exceeding that of the former period by more than 2 per cent. The juxtaposition of these two statements tells heavily against the shareholders. In the face of this general depression, the present management of the Great Eastern has secured an increase of something like 15 per cent. in the net profits of the half-year. Of this large increase, the main part, in the opinion of the noble chairman, was due to a genuine increase of traffic. There had been no increase in the suburban fares to any considerable extent. In some particular instances, where the fares had been disproportionately low, they had been raised; but the wise general principle of the management had been, that residential traffic ought to be respected. Lord Salisbury carefully guarded himself against being thought to refer to any other lines; but the contrast between this prudent and honest conduct, and that which is rapidly emptying the houses on the Sydenham hills, is as marked in its principles as in its results. It is only to the impulse given by a competent head, who looked to the *bona-fide* improvement of an actual property rather than to the profits derivable on the Stock Exchange, that we can attribute the actual state of things. Fifty-two thousand pounds of increased revenue had been earned without a farthing of increased expenditure. Nor was this all. Such had been the care of the officers of the company that, in consequence of the diminution in the number of accidents, there had been an actual decrease in expenditure. No less than fifteen thousand pounds had been saved as compensation for accidents. There had been further a large diminution (5,679*l.* for the half-year) in the *bona-fide* working expenses; and in renewal of working stock, and substitution of new for old iron rails, an expenditure of 17,000*l.* had been incurred and paid out of revenue, which under the prevalent system of "making things pleasant" would have been hung, as an additional charge to "capital," around the neck of the helpless shareholder.

We call particular attention to the saving in the item of compensation. It is, as Lord Salisbury remarks, an unalloyed benefit, and one which relieves the public as completely as it does the shareholders. But why should the contingency of such a charge be left to weigh upon the company? Why should not each company become, as in other departments of commercial enterprise, their own insurers? It is true that vigilant care, good selection of officers, prompt and efficient discipline, and, above all, substantial encouragement for good conduct, form the most desirable elements of insurance against accidents, for which no money can adequately compensate the sufferers. But this is not all. We can conceive of no reason why a company, first taking every proper and possible precaution against accident, should not further secure themselves against any uncertainty of claim in the event of accidents taking place. This sum of 15,000*l.* is not given as the total amount of compensation paid in the preceding half-year, but as the saving effected in this one item in the course of six months. It represents the insurance of 1,800,000 passengers at twopence apiece. Why should not the company combine a definite system of insurance

with their fares? If it pays an independent company to insure passengers, for long and short journeys alike, at the respective charges of threepence, twopence, and a penny, for first, second, and third class passengers, how much better would it pay a company carrying on the traffic of a district to do so on their own behalf! If the additional pence were added to the fares it might be done by so proportioning the risk to the length of the journey as to make the increase almost insensible. But it would probably pay to grant a definite insured compensation without any increase of fares at all. If every passenger was informed, on the face of his ticket, that a certain sum was insured in case of his injury, from causes beyond his own control, while travelling by virtue of that ticket, and that the journey was undertaken on no other condition, the company being no further responsible unless the passenger chose to insure for a higher sum, the great element of legal squabble would be eliminated. On the one hand, the care and vigilance of all the servants of the company would be stimulated by the presence of a definite responsibility, which they ought to have a direct interest in avoiding. On the other hand, the social position, wealth, or public utility of any sufferer of actual injury could no longer be brought forward as an argument that the company should pay to him a heavier fine for personal damage than it could be called on to pay to the poorer or more unfriended individual who shared his misfortune.

We venture to suggest that the chairman, who has shown us so admirably what six months can effect, will take this question of insurance into consideration. If he introduce the system on the Great Eastern, not only will future dividends be swelled, but the shareholders of other lines, and the travellers on other districts, will not be slow to follow the example set by that which was, for so long a time, the most unfortunate of English railways.

We cannot but contrast the good news thus sent from the City Terminus Hotel with the chorus of discontent, anger, and deserved indignation which swells louder and louder from the South-Eastern district. It will, no doubt, be fresh in the memory of our readers that we permitted ourselves to make certain predictions on this subject: of these, we regret to say, every day announces some new accomplishment. It is nearly twelve months* since we pointed out what was required for the proper management of railway policy and railway traffic. To those remarks Lord Salisbury's speech on the 7th of August gives a clear and faithful echo. More recently† we called attention to the effect on the suburban growth of London which the shortsighted and unscrupulous policy of the directors of the South-Eastern system of lines was calculated to produce. The verification of our fears was almost immediate. A rise of fares, which may be called either vindictive or suicidal, was effected the moment that Parliament, against the consistent opposition of Lord Redesdale, had assented to an increase of the maximum rates. This increase has not been merely a return to fares established when there was not the urgent fear of competition which led to a reduction, possibly too great, but it has been a general augmentation to an extent ranging from 20 to 75 per cent., that can only be considered as a breach of faith with residential travellers. As against the public, the South-Eastern directors—we speak not of one line alone, but of the group of lines—have assumed an attitude of open and contemptuous hostility. We do not think that this is their chief blunder. In our opinion their policy cannot pay. Cost of transit to or from the metropolis has become an outlay which is so closely connected with rent that

* See vol. xiv., p. 653. † See p. 501, ante.

the two items of expenditure must be classed and considered together. So much per quarter for rent and taxes, so much for railway ticket, is the cost of a house at Sydenham as compared with one elsewhere. Stability of outlay is a matter of the last importance to persons of limited income. Landlords are prevented, partly by agreement, partly by a due sense of their own interest, from exorbitant and undue increase in the rent they demand. If that portion of the annual expenditure which goes into the coffers of the railway company is made the subject of rash experiment, landlords will be the ultimate, as tenants are the immediate, sufferers. We hear already from the house-agents that the empty houses in this healthy and agreeable suburb are numbered by hundreds. This means the arrest of the builder. Lodgers are making off in swarms, and a desolation which will be felt in the dividends of the ill-managed railway companies seems to be in course of active accomplishment in this ill-used district.

The improved state of affairs in the Eastern Counties, which the Marquis of Salisbury has made public, leads us to supplement the remarks we formerly made on the influence exerted by the management of the different great railway lines on the suburban development of London. There can be no doubt that, in the possession of stations at London Bridge, at Cannon-street, at Ludgate-hill, and at Charing-cross, the South-Eastern lines possess an enormous advantage over all other railways—an advantage which, by their arrangement of up and down lines, they have done their best to neutralise. The access to the Eastern Counties terminus is simply detestable. For residential traffic it is one of the worst of any metropolitan line. What may be the arrangements referred to by Lord Salisbury as pending with reference to metropolitan extension, time will show. But while the liability which has been incurred in this respect has hung like an incubus on the prospects of the Great Eastern, it cannot be doubted that any reasonable mode of bringing the Shoreditch terminus within readier reach of the Bank of England would be an enormous advantage to the traffic of the line. Suburban extension, driven from Surrey and from Kent, would freely take place along the highway into Essex, if the great disadvantage of the starting-point were removed. The Great Eastern is singular in this disadvantage; for although the Great Western has not yet pushed its terminus further than the spot selected by Brunel for his noble station, it is in connexion, though not in what may be called organic connexion, with the heart of London by means of the Metropolitan. Euston-square, not a very central station, was not the first terminus of the London and North-Western; and the residential traffic on this line is at a minimum as compared with that commanded by more accessible termini. Still the London and North-Western has its feeders independent of Euston-square, and from the neighbourhood of Camden Town to Willesden and Kensal-green the railway service is becoming more and more adapted. The terminus of the Eastern Counties line alone remains where it was fixed in 1835, without aid from intercalating lines. This has been, there can be no doubt, a serious injury to the shareholders. The stream of direct traffic is served not inadequately by the Shoreditch station. But the due development of the species of traffic which Mr. Watkin and his friends are doing their best to drive from the lines under their control will never take place on the Eastern line until some better arrangement is made for pouring it into the very heart of the City.

It may be thought that these remarks are of more immediate value to the shareholders on the lines, of which we have thus compared the management and the prospects, than to our general readers. We do not share that opinion. To all those who are interested in building, whether as constructors or architects, the matter is of primary importance. In all that description of building enterprise which is to any extent speculative, even within the most legitimate bounds, the investigation of the circumstances which control the future development of cities and towns is of the highest importance. In the paralysis which has fallen on our engineering enterprise, inquiry as to the proper method of developing the traffic of a district is of no less importance. Sooner or later the engineer will again be at work, to carry out the great necessity of the day, the supply of the readiest means of intercourse between district and district. When the public becomes convinced that, under the

guidance of the most ordinary prudence, it is remunerative to provide for the wants of the future, enterprise will reawaken. While the old spirit of vindictive strife, or of grasping speculation, presides over the councils of a railway system, the shareholders will suffer, the local interests will suffer, and the future development of the country will be, to that extent, checked. While a wise and energetic management develops the true sources of income the reverse will take place. To earn fifty-two thousand pounds more, by an expenditure of nearly six thousand less, is not discounting the future (the usual habit of railway directors), but making amends for the follies of the past by the best use of the present. It is an indication, and something more than an indication, that a prosperity equal to that which we so rashly tampered with in 1845 is yet in store for the railways of this country, if only we do not continue to repel it. The natural increase of the population alone will add ten per cent. to our traffic returns in ten years. But the increase of the travelling tendency of the population has been and will continue to be immensely greater than that of the population itself. There are no signs that this increase is likely to be checked. The falling off that has coincided with so much financial distress has been comparatively small. Every fresh facility that is offered to communication, whether it be a railway through the Alps, a canal through an isthmus, or a cable under the ocean, pours a fresh stream of traffic on the English lines. The ultimate development of the railway system is as yet unapproached. The light branch lines, which the ill-advised standing orders of Parliament as yet prohibit, will be demanded, sooner or later, by the necessity of the case, and by the good sense of the public. It can hardly be thought too sanguine an estimate of the future to anticipate that this natural completion of the railway system will add as much to the actual resources of the country as our 14,000 miles of trunk lines have already allowed us to do. On the one hand, we have the demands of common sense, the results of experience, and the fair prospects of the future; on the other, we have the resistance offered by the ruthless, selfish, gambling spirit which has thrown away so many millions that might have been remuneratively employed. It is important for all practical men to have clear, definite, and accurate ideas on this important subject.

THE THORNEY ISLAND CAMPO SANTO.

The facile pen of the very reverend historian of Westminster Abbey has made to the public, in the columns of the daily press, an appeal on a subject not unfamiliar to our readers. It is not because the project of a Campo Santo, to be constructed at Westminster, in the form of a cloistered enclosure connected with the old conventual buildings, has been indicated in our columns, that we shall be found silent when the official guardian of the Minster, and representative of the mixed abode of the spot, becomes the advocate of the scheme. The idea is not only one worthy of the associations and of the history of the locality, but is to a certain extent a necessary consequence of the architectural movement now actually in progress. With the entire area from the Church of St. Martin and the north side of Trafalgar-square to the Palace of the Legislature rebuilt or rebuilding, it is impossible that the mean and dingy tenements that now squat beneath the shadows of the Victoria Tower should be allowed long to remain as they are, or should be reconstructed under any supervision but such as shall bring the new structures into harmony with the Palace and the Abbey.

The Dean of Westminster speaks of a connexion between the proposed new cloister and Poets'-corner, and refers to the restoration of the chapter-house as affording facilities to the architect for this purpose. It would be interesting to observe how it is proposed to deal with the exigencies of this hallowed spot in a mode at once structurally and aesthetically satisfactory. A difficulty here presents itself to the casual observer. To say the least, the position of the pier which supports one of the new flying buttresses of the chapter-house comes into very inelegant juxtaposition with one of the battresses of the Abbey. A collection of nooks and corners is apparent, with which no small amount of architectural skill is required satisfactorily to deal. It is always easy in such

circumstances to criticise,—easier to do so perhaps, than to suggest improvements; but the present aspect of the buildings is not such as would have satisfied either the founders or the restorers of the Abbey, still less the founders that noble chapel which, if of an inferior style of architecture, is still the very central feature of the spot. Had a cloistered approach from Abingdon-street been designed in connection with the restoration of the chapter-house, means might have been devised for avoiding the inelegance which we can only consider as temporary. To work bit by bit was the plan adopted by the great builders of our cathedrals and minsters, and by this expedient alone we see the presses of the founders and enlargers of the religious edifices enabled to arrive at the imposing grandeur of their completed works. By the partial progress was that of execution rather than of design. In any modification or combination of original work the additions were planned on a well-digested scheme, however slowly the scheme may have been carried out. One high or abbot might build a nave, his successor might raise the transepts, or even, as at Exeter, pier bold arches through the walls of the twin towers when he lengthened the main axis of the building, and then raise a tower to a commanding height, for the adequate support of which the original foundations were laid; but an original design, or a development of the original design in harmony with its idea, has always presided over such serial work, when it has been developed and not patchwork.

In the present state of the restoration of the chapter-house this harmony is by no means visible. We speak with all reserve of the merits of a distinguished architect, when the conception of their *ensemble* is only arrived at from the otherwise unexplained forms that issue from the labours of the mason. Had the flying buttress to which we more particularly allude been situated in a similar position with regard to the chapels of a cathedral in Italy, or in any of the great stone-building countries, to that which it occupies in Westminster, we should have been sure that it was only one of those temporary piers which the masons of those regions rapidly erect, and that, the roof of the chapter-house completed, the thrust of that particular angle would have been met by the imposition of perpendicular weight, or by some other device known to the cunning of such builders as those of Gloucester Cathedral, and that the pier and awkwardly-situated pier would have been removed. As it is, we can only express hope that the plan of the architect is not yet revealed to the bystander, and that it is not intended that the worshipper or the visitor should reach the north-eastern entrance of Poets'-corner by threading a zigzag course between blocks of stonework and receding angles, that would unavoidably become receptacles of nuisances.

The very word of *Campo Santo* carries back the memory to the graceful cloisters at Pisa famous for the fine frescoes of the monks Orcagna. Cloisters are not foreign to Westminster. To the south of the abbey we have the ancient cloistered arcade of the former monks, well worthy of the most reverent and efficient restoration. Across the great line thoroughfare we have an example of a most successful treatment of the same architectural feature. In the cloistered arcade bounding the former Old Palace-yard we have, indeed, effect not contemplated by the architect. The weeping of moisture (probably from concrete above) through the stone voussours of the gutter in question has encrusted them with quaint patterns of the salts of lime or of magnes. The effect at the present time is that of cloud and variegated marble; and the observer who in a vain attempt to obtain some point of view from which the aspect of the Peel statue (recently erected with its back to all comers) would enter the railled courtyard of Westminster Hall may look anything but undesigned beauty that imparted to the otherwise beautiful perspective. Of any comprehensive and successful method of dealing with the requirements of the environment of Westminster Abbey, there can be no doubt that the element of cloistered arcades must form an important feature. We are not now offering a design, or suggesting a finished plan; that the duty of the architects to whom the treatment of the subject may be entrusted. To a cloister suggested by Dean Stanley is to the tower, not to the north, of the Abbey. But it becomes almost daily more evident that

whatever may be the work of the rebuilders, that of the demolisher must be unsparring. The site now in course of clearance and of re-arrangement extends from the Victoria Tower to Leicester-squares. Little by little, with more or less forethought, all mean, paltry, and incongruous building over that area is doomed to destruction.

The point which is, at the present stage of the affair, most important to consider, is that of a wise, comprehensive, provident plan. Details, even details of the first magnitude, may be fixed in year by year, decade after decade, or even century after century. But unless the foreshadowing of the magnificent ensemble which, if England does justice to her history and to her future, will hereafter group around the tombs of our kings, be grasped in time, it is possible that partial work may be so conducted as to stand in the way of the future whole. Such are the statues and drinking-fountains that spring up like mushrooms, each from its own independent stem, without any systematic arrangement or actual unity of idea. Such are the diagonal roads constructed across a spot where either a plain, unbroken area, or a turfed lawn, broken only by chapels, monuments, or other erections in harmony with the same, should stretch from the Abbey to the rear of Great George-street. The great point which we are anxious to urge is the cause of development against cobbling. It is the long-thoughted prevision of the founders of our cathedrals that we are anxious to see substituted for the results of a catch-party act.

This prevision is evinced by Dean Stanley, "The Abbey," he tells us, "is not yet filled." Yet "the space allotted in the Abbey to the graves and monuments of illustrious men is yearly becoming more and more narrow." "We must look forward to the future." The idea, therefore, of providing a spot, not for the entombment, but for the worthy memorial of great men, is one that may be almost called instinctive. Our climate demands vertical shelter for statues. Even the noble material of bronze is surely, if slowly, corroded by exposure in the streets of London. Marble, or stones of any kind, rapidly passes from the state of portraiture to that of scarecrow-ism. St. Paul's is invaded in a manner which we must be pardoned for questioning in more than one instance, and St. Paul's will never rank in the minds of Englishmen as the equivalent of Westminster. We cannot, therefore, regard the question of the Campo Santo of Thorney Island as either a fancy or a crocheted. We look at it as one of those things which, well or ill considered, the future will certainly bring forth. And if such be the case, the time for considering it is the present. We have our hand to the work. Demolition on one part, building on the other, is active and energetic. The nation is feeling after some certain guidance in the matter of taste. Recourse to the services of private members to compel from so inadequate a tribunal as the House of Commons the condemnation of an enormity erected by supplies is altogether unworthy of a civilised people. What would the architectural glories of Italy or of Germany have been if such judges had sat upon the questions of the safety of the Campanils of Pisa or the position of the Horses of the Sea before the palace of the Bourbon kings? Haste, and party feud, and rampant *dilettantism*, are all active in their opposition to the architectural embellishment of London. The present opportunity is unique. We do not urge that it should be hastily or rapidly exhausted. But it is impossible for us to be too careful that it should not be thrown away. With the land area from Trafalgar-square to Westminster so covered as to harmonise with the waterside elevation between the bridges, London will present a nucleus of architectural splendour not unworthy of the Victorian age.

THE FAIRFORD GLASS AND ALBERT DURER.

We ended our notice last week of the doings of the British Archaeological Association in Cirencester with the reading of the paper on the Painted Glass in Fairford Church, by Mr. Holt.* On the following day (the 12th) the places visited included Fairford Church, and we purposely kept separate this portion of the proceedings.

Mr. Holt, in face of the windows, repeated and strengthened his statement at great length. We can give but portions of his statement. He said he believed that Albert Durer received the order from John Tame to execute the windows according to certain dimensions furnished by the architect. He selected his subjects from the Old Testament, the Apocryphal Gospels, and the New Testament. The first window was a representation of the Temptation of Eves. The peculiarity of this picture was essentially that of Durer. Up to the time of Durer nobody,—at least of the German school,—had ever represented the serpent of the peculiar form given to it here. The foliage of overy leaf was finished in a marvellous manner, and the whole of the detail of the subject was worked out with wondrous precision, the greatest care being bestowed upon every portion. Nothing was passed over in a slovenly spirit, but everything appeared as if the artist had thrown his whole soul into the work. As he (Mr. Holt) had stated on the previous evening, he laid claim on behalf of Albert Durer to his being the person who produced the block-books then exhibited. That claim he knew would be most strenuously opposed. The error as to the authorship of that book arose thus. A certain print, known as "St. Christopher," bears date 1423, and the argument was that the state of art displayed in that "St. Christopher" under the date of 1423 showed a decided superiority of intellect and execution when compared with the engravings in the block-book, and hence the date of this block-book must have been 1380 or 1400. In fact, the literati could fix its date at any year from 1380 to 1420. Now, he had had the misfortune to dispute that date, and a great deal of obloquy had been cast upon him in consequence; but believing his objection to be valid, he had the courage to adhere to it, and still did so. He fearlessly declared the date of that "St. Christopher" to be a forgery, and that the print was, in fact, executed by Albert Durer himself, at Colmar, in 1493. The manner in which that forgery was committed was a starting-point which must be well understood. By a stroke of the pencil the clever dealer at Buxheim, where Heinken got the print, added seventy years to the date. By one movement of the hand he converted mcccxciii into mcccxciii. It must be borne in mind that no second copy of the "St. Christopher" was known to exist. He (Mr. Holt) contended that the print was executed by Durer himself at Colmar, at the time he was on a visit to the brothers of Martin Schön, who resided there. In the multitude of representations of St. Christopher there was only this and one other which had two doggerel lines in Latin underneath them; and this engraving was executed upon paper exactly similar to and bearing the same water-mark as that used by Albert Durer in 1493. The only other artist who ever produced a St. Christopher with the Latin lines was a friend of Durer, and copied from Durer's work. The block-books were executed by Albert Durer in 1494 or 1495 at the latest. In almost every instance the block-book was the foundation from which Albert Durer derived his design for these windows. The first subject in the windows was the Temptation of Eve; and the question would arise how far the slightest originality could be claimed for Durer if he executed the windows and not the block-book. Between the window and the block-book there was the smallest conceivable variation in treatment, but in spirit they were identical. One very distinctive ground on which he claimed Durer as the painter of the lights in the window just examined was, that they represented scenes which no other German ever painted until some years after 1500. He was bound to acknowledge that the subject was very differently treated by Durer himself in the year 1510. In the picture of the Birth of the Virgin were some very distinguishing marks of Durer's work. One was to be found in the shape of the bed, the arrangement of the canopy, and the tucking up of the

curtains into the form of chandeliers covered with baize. In that instance he borrowed from Martin Schön, who was the first artist who produced that species of bed with the curtains so looped up. He (Mr. Holt) had made a very careful search at the British Museum, and, through the kindness of Mr. Reed, had every facility offered to him; but nowhere until the time of Martin Schön could he find the same arrangement of the canopy and curtains. In the picture of the Birth of the Saviour, in the next window, the Virgin was a very fine type, marvellously left us, of Albert Durer's work. Those who knew the type which he had adopted for his Virgin would not disagree with him (Mr. Holt) in ascribing the present figure to Albert Durer. One of the attendants was handing to the Virgin the Babs, which was a bambino wrapped up in swaddling clothes, and the mother was in the act of receiving it with her right hand. The type of the dress was essentially that of Nuremberg, and the mode in which the details were treated was peculiar to Durer. He would ask the visitors to lament with him that small portions of the glass belonging to other pictures had been inserted at wrong places for the mere purpose of filling up. The very charming picture of the Presentation of the Virgin was the first known representation of that subject by Albert Durer. In this case the nimbus had been slightly damaged. In one window there was a figure which might represent St. Christopher, but he (Mr. Holt) could not speak positively on the point, because it occupied a different position from that in which St. Christopher was usually placed in Roman Catholic churches; but it was impossible not to identify the figure as one of Albert Durer's. It was in the frontispiece of the "Biblia Panperum," but, as Durer was not apprenticed to the wood-engraving, that book remained without date or place or printer's name, as the publication of engravings by a man who was not entitled by apprenticeship to produce them would, if known, have involved heavy penalties. It was erroneously believed that there were guilds of painters and other trades at Nuremberg at that time; but everything was regulated by the municipal council. The only thing that was free was art; but printing was then a trade. It had not then been emancipated from the provinces of trade, and dignified as a professional art. In the "Marriage of the Virgin" the persons represented were Mary, Joseph, the high priest, and an attendant. The hair of the Virgin was such as no hand but Durer's had ever attempted up to his time. There was scarcely any representation of the Virgin which he did not attempt. The head, in this instance, could belong to no earthly creature but Durer, but there was an instance in which it was made use of in 1510. In the marriage picture there were further touches of the apprenticed goldsmith, namely, in the bend and the finish of the chain. It was in the details that we must look for Albert Durer. It was in the marvellous minutia that this great artist was to be found. When the peculiar condition of the Virgin at the time of her marriage was remembered, those who had an artistic soul could not help being struck by the glorious style of the composition as displayed in the folds of the drapery, and the whole arrangement of the scene. The description of this picture given in the supposed manuscript of Sir Edmund Tams was as follows:—"Next to Joseph and Mary going to be contracted. There is [sic] the contractor and his witnesses to the contract." The Annunciation window was the finest of the series. Martin Schön was the source from which Albert Durer derived his inspiration for that particular window. Martin Schön was Durer's idol. He was a very celebrated painter at Colmar, and he might be said to be the greatest engraver on copper that had lived up to that period. Martin Schön and Albert Durer's father were very old friends; and it did not require a great stretch of the imagination to conceive that as Martin Schön produced his engravings they would somehow find their way to Nuremberg and come into the hands of young Durer. The studies of Albert Durer were founded on the works of Martin Schön, who had treated the Annunciation in a manner similar to that which characterised this window, with the exception that Schön had placed his Virgin in a standing posture. There were further traces of the goldsmith. None but a practised hand could have given due effect to the chain. The hair, again, was such as no hand but his had ever previously produced.

* See p. 598, ante.

NEW ACT ON THE REGULATION OF RAILWAYS.—The Act to amend the law relating to railways (30 and 31 Victoria, cap. 119) has just been printed. There are forty-six sections in the Act. Railway companies are to be liable during transit as carriers. They are when required to furnish particulars of charges for goods. After the 1st of April next communication between the passengers and the company's servants is to be provided under a penalty not exceeding 10*l.* for each case of default. Any passenger who makes use of the means of communication without reasonable and sufficient cause shall be liable for each offence to a penalty not exceeding 5*l.*

Mr. Nihlett called attention to an inscribed tablet at the back of the bed in the painting.

Mr. Holt said that no other artist but Durer used that tablet. He would show it in a dozen instances from the *Nuremberg Chronicle*. In the next painting (the Visit of the Wise Men to Christ) was another type of Durer. There was the first marked nimbus to the Babe. Nobody used that but Durer. He thoroughly believed all he had been stating. Every little detail in those windows could be identified with Durer. There was the Nuremberg treatment of the trees. It was not everybody who had adopted that style, common as it seemed. Some of the Flemish artists adopted it 150 years after Durer's days; but then they were all mad on copying him. He formed the model for imitation, and did to this hour. The next subject was the Adoration. There, again, the goldsmith's work was most elaborately done. All this work was entirely *sui generis*, and its marvellous detail compelled admiration. The costume was the Nuremberg costume of the period. Here, again, was the nimbus of Albert Durer. It was seen a little more pronounced in another picture. The horse's head was a remarkable type of Durer. He was not at that time celebrated for animal painting; but the head bore unmistakable traces of the hand of the master. The Star of Bethlehem was not to be found in the picture. In the Presentation of the Infant Saviour and Purification of the Virgin the characteristic nimbus occurred. It was used by nobody but Durer, and by him only for ten years—between 1490 and 1500. The woman with the doves could not be mistaken by anybody who had studied his works. Neither this nor the treatment of Joseph could be imputed to any one else. The architecture of the Temple and the form of the altar were essentially the composition of Durer, and formed a very fine production. This painting could not be sufficiently admired. It was, perhaps, one of the finest in the church; and here, again, the influence of Martin Schöen was shown. Martin Schöen was the first artist who depicted an angel in the tree pressing down the branches to enable Joseph to gather the fruit. He (Mr. Holt) did not at all object to his words being taken down by any one in the church. No one prior to Martin Schöen had so represented that subject. He was absolutely the first who introduced the angel into the branches of the tree. Albert Durer adopted that idea. The difference between Schöen's engraving of that subject and Durer's representation was that the former made the Virgin and the Child on the donkey, while Durer represented the donkey grazing. He (Mr. Holt) had never seen that mode of treatment by anybody either before or since Durer. The handling of the subject was very remarkable, and again marked the style of Durer. What could be more exquisitely pencilled than the foliage and grass? Every leaf would bear a careful examination through a magnifying glass. The whole production was perfection in painting. The next picture, which was the Assumption of the Virgin, was one of the finest in the church. The Virgin was standing on the moon, which was supported by an angel kneeling. Over her head was a crown borne by two angels, which were of the Durer type, beyond all doubt. The crown was one of those marvellous crowns painted by Durer, and by him alone. This was one of the finest types of the Virgin which he had ever seen, and it was truly unfortunate that the face should have been damaged. The treatment of this subject was Dureresque to the last degree. The figure of the Almighty was German. In the next window (the search for the child Jesus) was a very remarkable nimbus. All the nimbi here employed were of the pattern invented by Albert Durer. The picture contained a curious type of Nuremberg furniture. It was what was called a linen-fold. The composition of that painting he recommended particularly to notice. Every detail reminded one of Durer, and of no one else. This was true also of the figures above and around the painting. Nowhere could there be found any one who represented those figures in the same way, and to no one else could they be attributed. They represented emblems of the Passion. This window was the finest in the church. In the east window there were, as he (Mr. Holt) had stated last night, some distinctive characters, the pure invention of Albert Durer, and which none before him ever attempted, and which no one in painting had ever attempted since. The cross of the Saviour was

made of worked wood, which appeared to have been planed or sawn. The trees on which the malefactors were crucified were of wood in its natural rough state. From the head of the penitent thief there issued a small white body, emblematic of his soul, which was conveyed to the Paradise which the Saviour promised; and on the other side, from the head of the other malefactor, there was issuing a black body, emblematic of the blackness of his sin. These bodies would be scarcely seen or comprehended unless specially pointed out; but, fortunately, we had a drawing by Albert Durer himself, signed in 1514, in which the Saviour was represented as crucified on the worked wood, while the thieves were on the rough wood; and here were a white child, emblematic of purity, and a black child, emblematic of sin, issuing from the heads of the repentant and the unrepentant sinners. Now, considering, as he should strongly contend, that Albert Durer executed these windows somewhere about the year 1500, and that he did not make that drawing until 1514, and that he had never been in England at all, we must conclude one of two things—either that he was a vile plagiarist, or that he was the inventor of these devices. The treatment of the subject in the two cases was identical. The Virgin Mary was represented as being supported by John. The richness of the drapings was essentially Durer's; and one would swear that the horses being Durer's, and nobody else's. Nobody in painting ever indulged in the angles and points, in the folds of the dresses, as did Durer. The angels in this picture were the true type of Albert Durer's work. The whole composition of the picture was so essentially that which was set forth in the drawing which was indisputably Durer's that it would be almost a waste of time to contend against the authenticity of this picture as Durer's production fourteen years before he made the drawing. The nimbi corresponded, and the treatment was the same in both. The more these windows were studied—which he hoped they would be by everybody—the more certainly would the student be convinced that in these pictures Fairford possessed a treasure which all the world might envy; and that there did not exist in all England, except on a very small scale indeed, any other windows to be compared with these as specimens of German art. The moment the existence of these windows became known to the Continent, he would venture to say that Fairford would see in one week more foreign guests than she had ever seen since the time of William the Conqueror. The next window was a very fine one, and really merited all the attention which could be given to it, both for its composition and its execution and completeness. Everything in the picture was of the true Durer type. In the painting of the Transfiguration of our Lord the whole subject was properly treated. The hair exhibited a brilliant little bit of Durer's work. The detail was very nice, and the arrangement of the drapery and the angular folds were such as no other artist whom he (Mr. Holt) could recall had ever ventured upon. These were perfect types of what was met with at the period in the country about Nuremberg. Attention must be called to the representations of St. Dorothy and the Virgin and Child. What could be sweeter little statues than those? It was impossible to imagine anything better executed or more beautiful in taste. In the representation of our Saviour with the disciples on the way to Emmaus there was a head which he (Mr. Holt) need not say was *not* by Albert Durer. Scarcely could he point to a more melancholy instance of the improper interference of restorers than the presence of that head. Could anything be more successful as a type of vulgarity? The cup represented in the next picture was a Nuremberg cup, which anybody acquainted with Nuremberg customs could swear to without hesitation. The furniture here introduced was furniture of the latter part of the fifteenth or the beginning of the sixteenth century. The whole of the costume was as well marked as could be desired. This picture, again, exhibited several unmistakable characteristics of Albert Durer. The small figures at the top were charming. Nobody else ever represented upraised wings in the manner in which Durer depicted them. In the picture of the Draught of Fishes the alterations by other hands were very striking. In one of the new portions the light was represented as on both sides of the figure, while in the original portion by Durer the light fell on one side of the figures, and the other side was in shadow, as it ought to be. In the Descent of the Holy

Ghost the dove was represented with another kind of nimbus, or an aureole. Here again was the characteristic angularity of Albert Durer. This was the last of the pictorial subjects. The next windows contained the figures of the twelve Apostles. They were grand to the last degree—marvels of art and position, exhibiting in the mode in which they were detailed a knowledge of the fundamental principles of art which could not fail to very materially improve the science of painting if the modern school could have the benefit of these pictures. They were real treasures and were needlessly and even cruelly withheld from that admiration to which they were entitled, and the rising generation of artists were being deprived of treasures which they would find invaluable for their contemplation, study, and instruction. In one of the windows was a Prince of Wales's feather, which would dispose of the notion that the paintings were ever intended for the Pope. The upper portion of the large west window consisted of all new glass. In this restoration the church had received a parcel of what he might call the sheerest rubbish in exchange for the genuine article. It had been suggested that the artist who restored the window had simply cleansed the old glass and evident that it to its pristine beauty; but it was restored it all the glass in the upper part of the window was "Brammagen," while that in the lower part was glass of Nuremberg. From that, two opinions could not exist. The artist of Birmingham had, perhaps, done his best, and executed the task entrusted to him to the best of his ability. He (Mr. Holt) did not intend to cast the smallest blame on anybody breathing. On the contrary, he was willing to believe, and did most firmly believe, that those who entrusted the glass to the artist for the purpose of being cleaned really believed that it would be returned to them with increased beauty. Instead of that, they had simply been miserably duped, having had returned to them new glass of 4d. a yard in value; and the real Nuremberg was gone. He could only say that he hoped that not four-and-twenty hours would be allowed to elapse before a special messenger was sent off to Birmingham, to make sure of the recovery of all the old glass. Let them hope and trust that it was not actually destroyed, and that, with money, art and talent might be found to replace a great portion of it. He could hardly imagine that the persons who put in the new glass would break up the old. No doubt they had arranged it, and copied it to the best of their ability; but here was the result. He appealed to the British Archaeological Association to lose no time in announcing to Emper the treasure which existed here, and of which all the world had a right to be proud. They should invite co-operation in all quarters to secure the best talent to restore the pictures with the original glass.

In reply to the Rev. Mr. Joyce, Mr. Holt said that, with the exception of the top row, the upper portion of the west window was all new. The old glass was almost always in small pieces, while the new material was in large pieces. The blue circle was all new, except in small portions at the top. A portion of the window represented St. Michael weighing the good and bad, according to a curious old German legend. He might mention, though it was a bold declaration to make,—but he was sure he was right,—that Albert Durer was the first to treat the subject of the Last Judgment as it was here depicted. In the "Biblia Pauperum" he introduced two swords, one on each side of the Saviour; but in a subsequent representation he removed one of the swords, so as to introduce Mercy as well as Judgment. In the group on the left there was a perfect revelling of ideas. Many mistakes had been made in the explanation of that representation; but, to these, their own shaudry should be a sufficient answer. In the representations of the twelve Apostles there were further specimens of Birmingham work. No doubt the restorers had done their best; but was the result satisfactory? Would it be well to send any more pictures to Birmingham? He believed not. It must be perfectly absurd to expect Fairford to do what was needful in order to restore the original glass and to rearrange the misplaced portions. The task would place too heavy a burden upon the clergy and landed gentlemen of the parish, and hence the movement must be a national one. The question which he wished to bring fairly and broadly before the association was this,—Have we, or have we not, such a monument of art here that no words can be found to express adequately its real value? If we had, let us all be of one mind,

and animated by one spirit, to do honour to the immortal artist who produced it, and to take care that everything possible should be done, and done perfectly, that the whole force of influence of the Archaeological Association might be evinced by the vigour with which they undertook the work.

On examining the west window of the south aisle, the Rev. Mr. Joyce observed a character, having the appearance of an ornamental capital A, located on the blade and near the hilt of an executioner's sword, which formed a figure in the picture. The attention of Mr. Holt was called to this mark.

Mr. Holt said it appeared to be something more than an A. There was a cross stroke at the top, which would form it into the monogram A (A). This recalled to his mind that on the preceding evening Mr. Niblett mentioned that Albert Durer sometimes signed himself Albert Thürer, and hence he might write his initials as A. T.

Mr. Niblett said that it was not unusual to put a letter on the blade of an executioner's sword.

Mr. Holt, in reply, said that it had just been suggested to him by a friend that, in consequence of its being a usual practice to put a character on the sword-blade, Albert Durer might have taken advantage of the custom for the purpose of recording his own initials.

Mr. Roberts, in a brief description of Fairford Church, said that it consisted of a nave with aisles and a chancel with aisles. It was all late, and of a style which he was in the habit of calling "Debased Perpendicular." A great portion had been restored, and therefore it had become to some extent even more debased than it was at the date of its erection. It was said to have been erected in 1498. The Guildhall of the City of London, in the restoration of which he had been concerned, was built in 1499. It happened that this church was a little more debased in the upper part than the Guildhall, but in the lower part it was a little purer. Therefore it was exceedingly probable that 1498 was the date of most of the lower portion of the church. The upper part and outside seemed slightly more debased than the Guildhall. Probably the building was completed in 1500, as two or three years would have been a sufficient time for the holding of the edifice, with the amount of money which John Tame had at his command. The old wall-paintings in the upper part of the nave were of a more exalted character than the style of the edifice, and reminded him very much of paintings of an earlier date. They were of a similar character to those in the chapter-house at Westminster Abbey, which were attributed to foreign artists. That would bear out Mr. Holt's theory that these wall-paintings were produced by the workmen who came over with Albert Durer's glass.

Mr. Niblett said that the date of the founder's tomb, in the chapel at the north, was 1471.

Mr. Roberts, after further examination, stated that the date of 1471, which Mr. Niblett had ascribed to the death of John Tame, referred to the death of his wife. John Tame was described as having died in 1500.

Touching Mr. Holt's supposition that Albert Durer was the author of the woodcuts in the "Biblia Pauperum" and the "Speculum Humanae Salvationis," Mr. H. Noel Humphreys writes as follows:—

"Mr. Holt concentrates his remarks upon the 'Biblia Pauperum' and the 'Speculum Humanae Salvationis' in the following passage:—After stating that he has a final and conclusive argument to adduce, he says that argument is 'the belief that Albert Durer was largely concerned in the designing and engraving on wood of the cuts in the earliest set of German books containing Scriptural designs—viz., the 'hook-books,' comprising the 'Biblia Pauperum,' the 'Speculum Humanae Salvationis,' &c.' Now, it is utterly impossible that Albert Durer should have been engaged either in the designing or cutting of the earliest block-books, inasmuch as they were executed not only before his birth, but in all probability before his father was born. A well-known copy of the first edition of the 'Biblia Pauperum,' still in its original binding, contains a date which clearly proves that the work of the binder was performed between the years 1429 and 1430, and as Albert Durer's father came to settle in Nuremberg as a young adventurer in 1455, he was probably not born in 1425, nor even in 1430. It is to be observed also that the first editions of the famous 'Biblia Pauperum' were printed, on one side of the paper only, with a distemper ink, the impression being produced by rubbing at the back, which at once stamps them as the work of an epoch long anterior to that of Durer. The latest edition of the 'Biblia Pauperum' which I have seen was issued full half a century later. It is printed in printer's ink, after the invention of the printing-press, and bears a printed date—1470. Yet even this edition was printed one year before the birth of Albert Durer, which happened in 1471. The latest date that can possibly be assigned to the first edition of the 'Speculum Humanae

Salvationis' is about 1410, and it was probably produced full ten years earlier. Like the 'Biblia Pauperum,' it is printed on one side of the paper only, sufficiently proving that it belongs to a pretypographic period.

It is unnecessary to add that these works are without any colophon, date, or printer's name, and that the entire character of their illustrations is as distinct as possible from that exhibited in the cuts of the 'Nuremberg Chronicle,' with which they are grouped by Mr. Holt. That work did not appear till 1493, and it is possible that Albert Durer may actually have executed his pretences on some of its illustrations, as ingeniously suggested by Mr. Holt; his master, Wöhlgemuth, having been the chief designer or engraver of the cuts with which that work is so profusely embellished. But neither that circumstance nor the form of the nimbus employed by the artists who were engaged on the 'Nuremberg Chronicle' (which was, in fact, a form in common use) proves anything whatever as to whether or not Albert Durer was the designer or painter of the windows at Fairford."

STONE AND IRON MANUFACTURES ON THE THAMES.

On Friday, the 14th inst., a numerous party of members and associates of the Society of Engineers, under the direction and guidance of Mr. B. Latham, C.E., president of the society, Mr. Perry F. Nursey, auditor, and Mr. Harris, secretary, visited the shops and yards of the Thames Iron Works Company at Millwall, and the Patent Concrete Stone Company's factory at East Greenwich, on the opposite bank of the river.

A remarkable contrast was presented by the state of affairs at the two establishments, and the condition of some of the great works and yards on each side of the river was also suggestive of reflections far from cheerful. At the Thames Iron Works, although a large number of hands are employed—some 800 or upwards—it was sufficiently evident that only a fraction of the work of which the establishment is capable is in course of execution. Rolling of metal to various forms, and forging of various kinds, with divers other manipulative processes, were in active progress, and there is evidence that some little is still doing in shipbuilding on the Thames; but it was melancholy to note that the splendid engine workshops of the company, containing one of the finest assemblages of tools and tool machines in the world, was swept and garnished, toneless and silent. Cheerless, also, it was to note, on both sides of the river, the empty building slips and the smokeless chimneys. Apart from the question of the rate of wages paid to artificers on the Clyde, the Tees, and the Tyne, as compared with the Thames, it may be feared that the differential margin in the price of coal on the southern, as compared with the northern rivers, is fatal to a reasonable hope of a revival, to any great extent, of either iron shipbuilding on the Thames or any other branch of manufacturing industry involving a considerable consumption of the main power-producer—coal. During the last few years the average price of coal delivered in London has advanced fully 3s. per ton, including the best household qualities; and the relative price of

smithery, boiler, or furnace coal is, of course, considerably more. The railways already, it is admitted, carry more coal than is consistent with the safe conduct of their other traffic; and although additional railway-lines to London from the Northern and Midland coalfields may be constructed in the future, it is unlikely that any reduction of rate in the price from such a cause will be made for a good many years to come. To this reason—the comparatively high rate paid for freight or carriage of the heavy raw materials, coal and iron, which are staple articles of consumption in the shipbuilding yards—may be attributed, in a great degree, the languid condition of the Thames works. Hence it is, probably, that the recently-completed works of Messrs. Maudslay & Co., at East Greenwich, can scarcely be said to have commenced business; and hence also, probably, for a cogent reason, the fact that the fine new works of the Messrs. Bessemer Brothers, which have been erected in the same locality, have not commenced business at all, although they appear to have been almost, if not quite, complete for above twelve months. It is satisfactory to turn from these works—Messrs. Maudslay's and Messrs. Bessemer's—to others in their immediate vicinity, which exhibit a more healthy state of activity. On the one hand, the Telegraph Construction Company are shipping the Malia and Alexandria cable, of about 972 miles in length, and expect to get the whole on board by the first week in September. The *Scandera* is now in the river loading, and will take about 800 miles of the main cable. The *Chilton* will follow with the remainder of the cable and the shore ends. Both vessels are chartered and specially fitted by the company with the necessary iron tanks and other appliances.

The works of the Patent Concrete Stone Company are close by, and exhibit in their apparent activity and prosperity a contrast, not only as compared with some of the works in their neighbourhood, but as compared with their own state little more than twelve months ago. Then the works were very palpably new, barely finished, partially occupied, and evidently capable of turning out a much larger amount of work than appeared to be in progress. Now everything is shaken into its proper places, all is working smoothly, and the full resources of the works are in requisition in the execution of the orders in hand. A marvellous change has passed upon the appearance of the spacious yard. At its inner end a considerable space of what was but a short time since a pestilent marsh is converted into a fruitful vegetable and flower garden, containing numerous and varied samples of highly successful culture. Appropriately placed at the end of the buildings where the process of manufacture commences are great piles of sand of various qualities,—beautiful small, sharp shingle from Bristol, brought as ballast; a finer description of sand from Harwich; and a large heap of fine and dazzlingly white "silver sand" from Maidstone. In other parts of the yard are great stores of the other materials used in the manufacture,—piles of flints from Kent, and of a better sort from Dieppe; casks of caustic soda, and of chloride of calcium. At the outer end of the works towards the river, as sent out after passing the finishing process, are great piles of goods, all made to order, including some thousands of massive corbels for the principal cornices of St. Thomas's Hospital, and of balusters for the same buildings. Notably also among the finished work are great numbers of grindstones, of all sizes up to 6 ft. diameter by 14 in. thick, and of rice millstones. In these—the grindstones in particular—the company now do a large business, sending out occasionally 10 and 12 tons weight in a week. As many as 500 stones were recently despatched, in execution of a single order, to the Victorian railways.

The *raisonné* of Mr. Frederick Ransome's process of manufacturing stone has been described in previous numbers of the *Builder*, and need not be here repeated. The successive improvements he has introduced, as the result of much watchful observation, patient labour, and untiring perseverance, have been duly recorded. His earlier practice of hardening the stone by kiln-burning was admittedly defective, and it was not until he elaborated the chemical process of moulding his material with silicate of soda, or flint dissolved in caustic soda, and then saturating the moulded articles in chloride of calcium, that his theory could be accepted as sound. In theory he *did* attain

* In reply to this, Mr. Holt says, amongst other things, "I confess I am neither surprised nor touched by any of your remarks. When he mentions that which he calls 'a well-known copy of the first edition of the 'Biblia Pauperum,' still in its original binding, and which contains a date which clearly proves that the work of the binder was performed between 1429 and 1430,' I reply that one of two things must exist—either the date is false, or a copy of the 'Biblia Pauperum' has been purposely bound in the covers of an old manuscript, so as to give it the appearance of an antiquity which did not really belong to it."

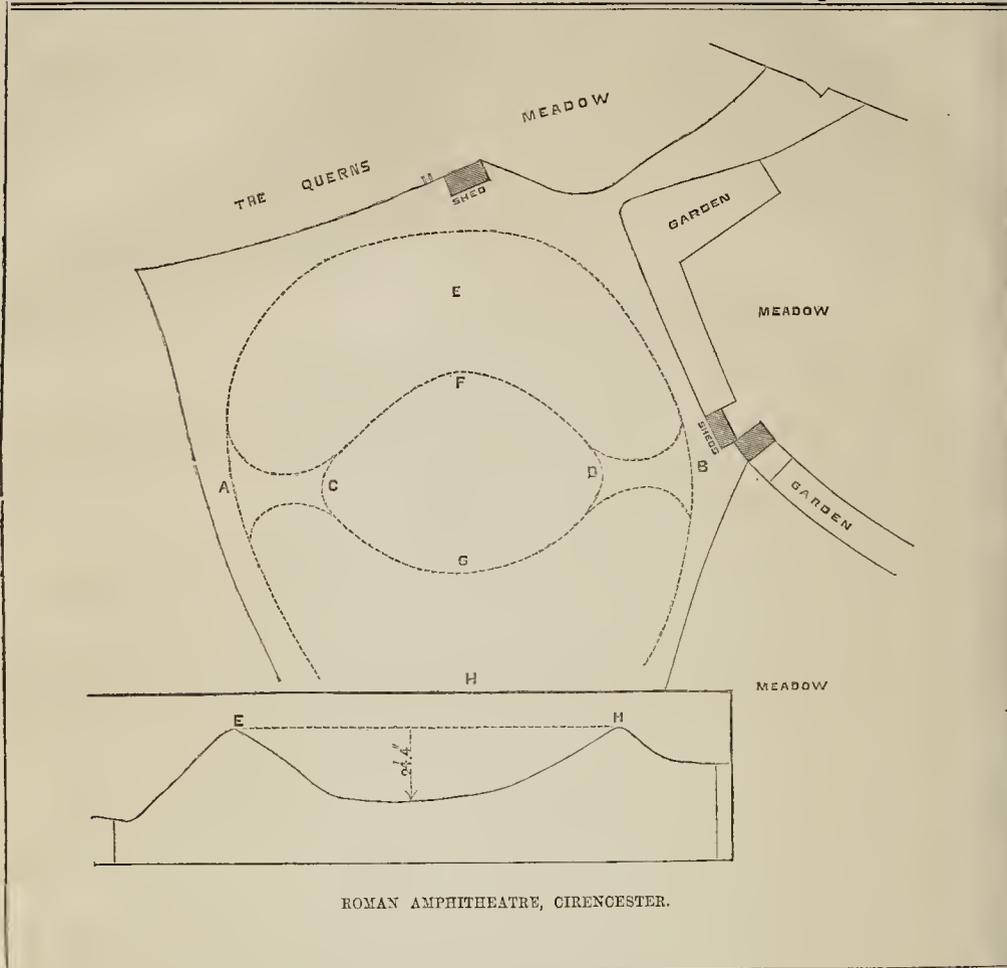
"H. N. H. must forgive me when I state that, as a general rule, I am an utter disbeliever in dates of 'literary or artistic rarities' prior to 1500, and that such incredulity is one of the results of my investigations, wherein the instances I have met with in the falsification of dates are both numerous and startling, satisfying me that however 'ingenious fraud' may be supposed to distinguish itself in the nineteenth century, it was equally remarkable in the fifteenth century, and practised whenever opportunity promised a reward."

Earnestly desiring to avoid unnecessarily occupying your valuable space, I will, instead of now combating in detail the views expressed by 'H. N. H.,' at once proceed to mention those which I believe to be some of the fundamental facts upon which my new theory is based, and upon a satisfactory solution of which must ultimately depend the value or the absurdity of my views.

First, I venture to insist that printing preceded engraving, and, consequently, that no engraving existed prior to 1440—no, not even the 'playing-cards.'

Secondly, as the most perfect justification of my disbelief in earlier dates, I disavow the date upon Lord Spencer's St. Christopher of 1423, so implicitly believed to this moment to be the earliest known woodcut with a date, to be a forgery, and that the true date is 1493. I further say that this forgery was effected by altering the word of the 'sc' into an 'x,' by which simple process seven years was forthwith added to its date; and I also declare that the St. Christopher in question was executed by Albert Durer at Colmar in 1493, on the occasion of his visit to the brothers of Martin Schöen.

Thirdly, I challenge all literature to mention a single instance in which the existence of a copy of the 'Biblia Pauperum' can be proved prior to 1489."



ROMAN AMPHITHEATRE, CIRENCESTER.

perfection at that stage, but it was found that important improvements in practice were still necessary, and these are in course of application. The remarkable novelty and special improvement in Mr. Ransome's process, to which the attention of the visiting engineers was directed, and which we have to record, is the mode adopted for accelerating the action of the chloride of calcium upon the silicate of soda in the interstices of the stone. By the method formerly adopted of external drenching of the pieces as cast, with the chloride, and their subsequent immersion for saturation in a bath filled with the same agent, much time was consumed, especially with the larger castings. The number of orders, and their magnitude, which came in upon the company speedily forced upon the managers the alternatives either to refuse orders, or to increase and quicken, if possible, their means of production. The pressure thus brought to bear has operated admirably in a further improvement of this process; and the latest expedient employed to carry it to the perfection desired is to clear the way for the binding agent—the chloride of calcium—by placing the piece to be acted on in an airtight receiver, immersing it in the bath, applying the air-pump for exhaustion of the air in the interstices of the block, and thus facilitating the rush of the chloride to fill the vacuum which nature allows. The saving of time by this exhaust process, as compared with the ordinary soaking, is as about 40 to 1; the chemical action by the rapid process is also much more complete and satisfactory than by the slower. The

only further improvements in the works that suggested themselves to visitors were their enlargement, and divers mechanical appliances, not essentially, although commercially, of importance, for the more rapid movement and manipulation of the materials employed in the manufacture.

In the elaboration of this invention, Frederick Ransome, like George Stephenson, groped long comparatively in the dark, and laboured hard and meritoriously to get into the light, which he has now done, even to the perfect day. Stephenson had important assistance in the latter part of his career from his well-educated and accomplished son Robert. Mr. Ransome also may be congratulated on having such an efficient co-labourer as his son Ernest, manager of the works, and between them it need not be doubted that all that yet may be necessary to make this invention a complete commercial success will be supplied by father and son, and their staff.

RETURNING WATER FOR THE REGENT'S CANAL.
In consequence of the drought, the Regent's Canal Company have been seriously threatened with a failure of their water supply. Mr. Sykes has been employed by them (in conjunction with Messrs. Easton & Amos) in pumping the water back over their nine lowest locks, employing for the purpose nine large centrifugal pumps, driven by portable steam engines. This is a somewhat novel application of pumping power.

THE ROMAN AMPHITHEATRE AT CIRENCESTER.

We spoke in our last of the discussion that ensued at Cirencester, amongst the members of the British Archaeological Association, touching the correctness of the opinion that what is popularly called the Bull-ring is in truth a Roman amphitheatre; and we have now gathered together the observations that were made on the subject both then and afterwards.

Mr. T. C. Brown, being requested to point out its features, said he would first call their attention to the city within the walls. They would find that the ancient city was buried several feet below the surface. He would ask them how the present level was raised. If they looked onward, they would see numerous quarries, extending far beyond where they stood. From these quarries the structures of the ancient town had been taken, and in course of ages by dilapidations had caused the rise. He suggested that it was the practice of the Romans to have games and other amusements in amphitheatres outside their cities; and he asked, What more likely place to be selected for such a purpose than the waste ground of a quarry? He repudiated the design which was before them being called an accident; it must be clear to everybody who knew what practical quarrying was that it could not happen that one should be left in the form which has presented. He pointed out a gap which he thought might have been an inlet for the beasts and gladiators who were to furnish sport for the assembled people. He had recently made a

section of one of the banks, but found no stones or steps, such as had been found in similar amphitheatres in foreign countries. This, however, did not alter his opinion as to its being an amphitheatre, as he reflected that in this cold climate it would not be comfortable to be sitting on stone seats. He thought, therefore, that the seating must have been of wood, which in the course of centuries had perished.

Mr. Black said he should like to ask two questions before expressing an opinion. First, in examining the structure of these hills, did it appear that the soil was solid or only detached? Secondly, had there ever been a section cut across the arena?

Mr. Brown answered the second question first, that the arena had never to his knowledge been opened, and as to the first question, that the soil consisted of oolitic rock, that there was little loose stuff, although occasionally banks of clay were found. Cuttings in other mounds by Mr. Lawrence had discovered several coins, lacrymæ, pottery, and some stone coffins.

Mr. E. Roberts said he believed it was no amphitheatre at all, but simply an uncalled-for, as it is now called,—throwing the rubbish of the quarry to the nearest convenient spot. There were several other mounds in close proximity, having nearly similar formation, and in this instance, so far as excavations had gone, no evidence of any structure had been discovered.

Mr. Turner said he believed it was a Roman encampment, and nothing more. There were many instances of Roman encampments precisely similar, and he believed that this was one.

The Rev. Prebendary Scarth thought no one who had seen the amphitheatre at Trèves could doubt that what they saw before them was of Roman origin. It was not fair, however, to judge of the amphitheatres in England at Roman stations by those on the Continent. He instanced several Roman stations in this country where there are similar amphitheatres to the present which are not doubted. At Dorchester there was one—the arena elliptical. Silchester the same. At Old Sarum, up hill to Charterhouse and Mendip, ancient Roman stations, perfect as the day when they were abandoned by the Romans, there were amphitheatres similar but smaller. Ilchester in the time of the Foss, amphitheatre smaller but similar. He multiplied instances, and denied that they were natural formations. We might as well say that the barrows on the Wiltshire downs were natural formations.

Mr. Godwin said his opinion should be determined by experiment. Further investigation should take place, and sections should be made. It was quite possible that, although originally a quarry, it might have been adapted to the purposes of an amphitheatre.

Earl Bathurst, being appealed to for permission to do the work, replied that if the congress were generally of opinion that it was desirable to make the excavation he would have no hesitation in allowing it.

The Rev. J. G. Joyce, of Stratfieldsaye, Hants, being asked to speak, said, having had three years' experience in excavating the interesting site at Silchester, he had no doubt in his own mind of this being an amphitheatre, and he felt sure that if they made the proposed excavations they would find some trace of the facing of the seats and the stonework, which would have been placed to prevent the earth falling in. No steps had been found at Silchester.

Mr. Richard Mullings, referring to the term "Bull-ring" said it might not be uninteresting to some persons to know how the amphitheatre came to be designated by its present name. Late in the seventeenth century, or early in the eighteenth century, a society was raised in Cirencester in favour of the Pretender, called the "Jacobite Club" of which club he had now the honour to be a member. Their meetings were held at an inn called the Bull, and there was upon record an entry stating that a sum of money was voted for the purchase of a "bull." That inn was doubtless named in the amphitheatre, which had since been called the "Bull-ring."

Professor Buckman, on another occasion, speaking of the antiquities of Cirencester generally, said there had been some little discussion about the amphitheatre, or "Bull-ring," as it was called. Now, he had made a minute examination some years ago, and had excavated a section. There he had found fragments of pottery and some coins, the date of which he could

not remember, but he had no difficulty in pronouncing it to be really what it was called, an amphitheatre. It was highly probable that it was originally a quarry, from which they obtained stone for the erection of Corinium, but they had doubtless without much difficulty converted it into an amphitheatre.

Since the examination, Messrs. Bravender & Son, surveyors, have kindly enabled us to engrave a plan and section of the amphitheatre, and have favoured us with the following dimensions with reference to it:—

- From A to B, 320 feet.
- From C to D, 200 feet.
- From A to C, 60 feet.
- From D to B, 60 feet.
- From the summit at E to F, 55 feet.
- From F to G, 120 feet.
- From C to the summit at H, 86 feet.

On first examining these remains we were not impressed with the correctness of the generally received opinion: the nature of the ground around, where almost similar mounds abound, the appearances at the two entrances, the asserted absence of any stonework whatever, and our recollections of Dorchester and Silchester rendered us unwilling to accept at once the assertion that we were looking on a Roman amphitheatre. Further examination and consideration have, however, entirely dispelled our doubts, and satisfied us of the correctness of this belief. That stonework has been found there would seem to be proved by a passage from Raddier's "History of Gloucestershire," published in the year 1779. Raddier, who was a native of Cirencester, says,—

"There are two avenues to this area (east and west), and on the north side, also, is another straight approach between two stone walls, lately discovered by people digging for stone."

This statement, however, does more: it shows a striking similarity between this amphitheatre and that discovered at Richborough, and described by Mr. C. Roach Smith in his volume on "The Antiquities of Richborough, Reculver, and Lympne, in Kent." Here, where an oval wall forming the enclosure of the arena was found, there is also, besides two other entrances, an avenue on the north side between two side walls remaining, 9 ft. apart, the intermediate space having been covered with a bard pavement. The dimensions of the arena also agree, the longer diameter measuring, like that at Cirencester, exactly 200 ft.* The shorter diameter at Richborough measures 166 ft. The long diameter at Dorchester is said to be 219 ft. (138 ft. the shorter), and that at Cæreleon 220 ft. The arena at Trèves is 219 ft. the longest way, 155 ft. the other; and that at Tintinnac, figured in Montfaucon's "Antiquité Explicite," tom. iii. p. 2, and quoted by Mr. C. R. Smith, 200 feet by 150 feet.

We must reiterate the desire expressed on the ground that the amphitheatre should be investigated under proper and careful direction.†

WIDE STREETS AND SHADE TREES.

THERE are sites in our city where the plantation of fine trees would not only prove a solace to inhabitants and passengers, but would contribute largely to the architectural aspect of neighboring buildings. In Trafalgar-square a few tubs have been lately placed, with cropped bay shrubs. These bits of formal verdure give universal satisfaction. It is after the old fashion of orange tubs in the Tuileries and in the court of the Palais Royal. How magical would be the effect if only a dozen planes of twenty years' growth were planted,—three at either end, and six ranging in front of the National Gallery! The fountains would look all the better, the buildings none the worse.

Many of the London streets are wider than than those in Paris, where trees are ranged so as to afford rest on seats, and shade to fatigued passengers. Except a few yards of Piccadilly and the Brompton-road (through the crescent), and also on the splendid thoroughfare of the Grand Junction-road (Oxford and Cambridge terraces), we have no timber trees to solace the

* This dimension at Cirencester has been called by Messrs. Buckman & Newmarch 148 ft., but we conclude Messrs. Bravender are correct.

† We have devoted so much space to two of the subjects treated of during the Cirencester congress that we must postpone the continuation of our outline of the whole proceedings until our next issue. We may mention that a good report of the doing of the week, with several of the papers in full, will be found in the *Wilt Standard*.

wayfarer. It may not be amiss to state that, before Piccadilly was widened by a strip from the Green Park, an article in the *Builder* led to the saving of the thirteen trees at present bordering the footway and cab-stand.

And now, as to the grand boulevards of Oxford and Cambridge terraces, which are 172 ft. wide from house to house, the writer would point out to the inhabitants the vast improvement that might be made by removing the iron railings of the inclosures on the sides next the terraces, and the widening of those drift-ways which have scarce room for two carriages to pass, and which have, in the centre of each terrace, an unsightly railed semicircle for teams to turn. All this might be obviated by gravelling a width of 6 ft. or 8 ft. up to the tree range, which might thus be thrown open and kept in decent order at little expense. Along the central route, which is 60 ft. wide and paved on either side, the railings and gates might stand as at present.

In the fine range of Westbourne-terrace, which is 100 ft. wide from area to area railing (the areas counting 20 ft. more from front to front), there are also strips of plantation, with double rows of heavy Portland cement balustrades. This canseway, about half a mile long, might advantageously be treated in the same manner, and planted with shady trees.

Along the Cromwell-road, which is 90 ft. wide, rows of poplars have been planted; but these want the grace of the wide-spreading lime, plane, or sycamore; and, if in continuation, along the Brompton-road (north side) trees were planted where they had been before growing, it would be a great boon to pedestrians, particularly in this portion of the line, which from opposite Brompton Church measures 90 ft. across.

Formerly in forming streets, no regard was shown to alinement: the longest, Oxford-street and Holborn, discovers great divergence of width, the mean of the former being 60 ft. from house to house; Holborn being in some parts 50 ft., in others 100 ft.: the intervals between Gray's and Furnival's Inns measure over 100 ft.

The Strand also discovers great inequalities, being, opposite Holywell range, under 40 ft., and at Somerset House over 100 ft. Again, in Whitehall and Parliament-street, there is a great diversity of width, which, opposite to the Treasury, and across to the railings of Montagu House, measures 134 ft. (exclusive of the grounds, railed in), but the proposed demolitions in Parliament-street will doubtless secure the continuation of suitable latitude to the terminal vista at the Cathedral.

Far from being a default, these varieties of width in great leading thoroughfares are an advantage; and where the style of architecture is varied, give effect and character. Somerset House ought not to form part of a range equally storied up to a continuous sky-line of cornice—that is the fault of Portland-place and numerous Russellian squares, and is no recommendation to the boulevards of new rectilinear Paris.

If the Strand goes on improving in equal ratio to the bye-lanes of the City, it will be, so soon as Holywell-row and the Temple Bar incus are removed, an incomparably fine boulevard; and St. Clement's Danes and the beautiful St. Mary's will lend grace and dignity to the range. It will then only remain to sweep away the unsightly and restrictive iron barrier around St. Paul's, throw open a noble piazza there, give a continuous street on the north side of the Cathedral, and thus make straight the way which the church ought to be the last to obstruct.

As to plantation on the way-side, it might be rash at the present juncture to prescribe planes, lindens, or poplars, although trees bring shade and a healthy atmosphere. Open the straits first, ornamentation will come after.

THE SEWAGE FOR THE SOIL.

THE long undecided question, what to do with our sewage, is gradually resolving itself into a satisfactory solution of the problem.

At Warwick, about two years ago, the corporation received complaints from several land-owners and residents in the district respecting the pollution of the Avon with the town sewage, and proceedings in Chancery were threatened. Instead of embarking in costly and needless litigation, the corporation frankly admitted the evil, asked for time to devise remedial measures, and forthwith vigorously commenced operations. It was decided to take the town sewage out of

the river and apply it to the land, and for this purpose a farm of 109 acres, situated on the Longbridge-road, was rented from Lord Dorner. At a total cost of about 8,000*l.*, the necessary buildings and machinery have been erected, and the flow of the town sewage has now been diverted from the river to the farm. The results of the new system far exceed the expectations of its most sanguine promoters. Although the land had only been irrigated for three weeks, there was already a good crop of rye-grass, 7 in. or 8 in. high; and, notwithstanding the very unfavourable condition of the weather, no inconvenience has been occasioned by any smells arising from the farm. The green and flourishing appearance of the fields contrasted most favourably with the parched condition of the adjoining pastures. It is stated that the governing body have received a very liberal offer from a resident in the town to take the farm for twelve months, at a good rent. The Warwick council, by their energy and prudence, have apparently avoided litigation, and created a new source of revenue, to the easement of the ratepayers at large.

At Rugby, the works connected with the thorough sewerage of the town are now completed, after six months' labour. The work has been carried out by the local board, under the immediate direction of the resident engineer, Mr. Bounney; and in place of the whole sewage of the town being discharged either into the brook or the canal, it is now carried to the Moor Farm, a distance of nearly half a mile from the town, by means of large iron tubes, laid 6 ft. under the surface of the canal (a sufficient depth to drain every cellar in the place), which take all the refuse matter from every street and court into the main culvert. All the drains have an inclination sufficient to clear themselves, but, to do away with the possibility of choking, there are nine or ten points at which the brook can be suddenly turned into them to flush and clean them out.

At Leicester the experiments already noticed by us are believed to prove that a compound has been invented which has only to be well stirred up in the abominable torrents which stream from every large town, in order to precipitate the organic and inorganic matter which the waters hold in solution, without any deterioration of their value as agricultural manure. Hitherto this has been the chief difficulty with inventors and chemists. The cost of solidifying the sewage without ruining it as a manure has rendered every application of it to the soil, except in the immediate neighbourhood of towns, practically impossible. The inventors of this new process, taking the first hint, as it is said, from certain regulations of the Levitical code, mix animal charcoal with blood, clay, and alum, and they have been pumping this "A B C compound," as they call it, into the streams discharged by the culverts of the well-drained town of Leicester. The result is reported as wonderful. The water, as discharged by the culverts, contains 189 grains of organic and inorganic matters in the imperial gallon. After being mixed with the new composition it contains only 57 grains per gallon, of which only 14 grains are organic, the London drinking-water containing as much as 8½ grains of the same. The residuum is then dried by simple evaporation, and on a chemical analysis of its elements, when thus dried, it is said to be worth about 4*l.* per ton. The cost of the composition and of its application for the production of one ton of this dry manure is less than 30*s.*, and the quantity which can thus be produced at Leicester alone would be worth about 17*l.* daily. We offer no opinion.

By the interposition of the Court of Chancery the Banbury authorities have been compelled to prevent their sewage from defiling the river Chorwell. Besides poisoning the river, it killed the fish, injured the cattle, and seriously affected the health and prosperity of the people who lived below the outfall. Perchloride of iron, carbolic acid, and other chemicals failed to prevent the nuisance. At last 135 acres of land were taken on lease, as a sort of disinfecting area, over which the sewage was to pass before entering the stream. The land was levelled and laid out like water meadows, with open trenches. By means of a steam-engine the sewage was pumped into an elevated tank, and thence flowed over the fields by gravitation. Already the results are remarkable. The sewage of a population exceeding 10,000 has been poured over these acres, and it would seem that if the land had not been underlaid in some parts with drain-pipes, very

little of the fluid would have reached the river at all. As it is, the effluent water has been perfectly pure, and during the last six weeks the thirsty soil has absorbed so much of the fluid that scarcely a drop has been left to go into the river. Of course all nuisance is at an end. The sewage, too, thus produces a substantial return. The local board of health pay 4*l.* 10*s.* an acre for the land. On eighteen acres they have grown a crop of oats realising 193*l.* by public auction. On thirty-five acres they have grown Italian rye-grass, producing up to the 12th of July, 379*l.*, being at the rate of 10*l.* 16*s.* 6*d.* per acre, with more crops to follow. The remainder of the farm is mowing grass, and hitherto the proceeds of the several sales (of all kinds) have been close upon 1,000*l.* It does not appear that all the mowing grass has been subject to irrigation, and the difference is very largely in favour of the sewage-grown crops. The Banbury ratepayers, we are told, "begin to feel easy in their minds."

By degrees we are finding out what sewage is capable of doing. In the present season excellent potatoes have been grown in sand transferred from the Maplin and irrigated with London sewage at Barking. While sea-sand may thus be made fruitful, sewage is found equally available for the stiffest clay. Town sewage, it is found, will grow anything from a bed of strawberries to a field of wheat. But it will not improve the fisheries; and, as a nation with a limited area, we cannot afford to take nutriment from the land and cast it into the sea.

PRINCESS'S THEATRE.

MR. GEORGE VINING and Mr. Boucicault together have achieved another great popular success, under the title of "After Dark." Mr. Boucicault writing the piece, and Mr. Vining producing it in the way by which alone it could succeed, and acting in it very finely indeed. Like the "Streets of London," it depends greatly for lengthened popularity on the excellent way in which known sites and buildings, such as the Victoria Station; Blackfriars Bridge, on crutches, with St. Paul's by night; a suburban villa and its lilac-filled garden; and the Underground Railway, are set forth; but the piece is of itself exceedingly interesting, with two or three very powerful situations, and is remarkably well acted throughout. Mr. Walter Lacy, Mr. Dominick Murray, Mr. Montague, and Miss Rose Leclercq are made for their respective parts. Incident succeeds incident with wonderful rapidity, all consecutive and all working to a climax, and the spectator has little time or desire to attempt to criticise till the curtain finally falls. To Mr. F. Lloyd and his assistant, Mr. W. Hann, great praise is due. The painting of "London by Night" is particularly charming, and the passage of a locomotive and train across the stage in the Underground Railway is a marvel of mechanical contrivance. "After Dark" is one of those pieces that all playgoers will feel themselves obliged to see.

FIRES.

This has been an unprecedented season for fires, most of them arising from the extraordinary dryness of the summer. Fields, woods, moors, and even hill and mountain surfaces have been burnt from the slightest causes, such as waste matches, locomotive sparks, &c. Houses, and even towns, have been destroyed by fire. From all parts of the Continent and from America comes the story of forests on fire. The ravages in Russia appear to be most extensive, and the flames were making progress in the direction of St. Petersburg. The trains on the Nicholas Railway ran through a district of 200 versts enveloped in smoke and flame. A fire, on the 28th July, destroyed nearly the entire of the town of Sestrook, in Russia; nearly 800 houses have fallen a prey to the flames. The town of Vytégra, in the government of Olonez, Central Russia, has just narrowly escaped destruction by a fire which broke out in a forest, in the centre of which it is situated. The disaster was caused by some haymakers, who had lighted a fire for cooking in a field, and the grass and timber, being unusually dry from the long drought, burnt with great rapidity. London has not escaped from fires of considerable magnitude. A great fire has occurred in the Borough, in the vicinity

of King-street. It originated in wooden premises occupied partly by a carpenter. After destroying various workshops and stables, it spread to adjoining book warehouses, and dwellings in various courts and alleys running into Chapman's-yard. At one time fifteen houses were on fire. Many poor families have lost everything belonging to them. At London Bridge station a fire has occurred, which at one time threatened disastrous consequences. It originated in the vaults under the platform, where there are oil stores and lamp rooms. Considerable damage was done. The cause is said to have been spontaneous ignition. The Huddersfield goods station of the Lancashire and Yorkshire and Great Northern Railway Companies, at Huddersfield, has been wholly destroyed by fire. The fire originated in a quantity of greasy material in the form of shoddy. The Friars' Goose Chemical Works, Gateshead, the property of the Jarro Chemical Company, have been destroyed. The loss of property is estimated at 100,000*l.*, and 500 persons will be thrown out of employment. Four men were injured by the fall of the roof, and were severely burned besides. Two policemen also were hurt. The fire is believed to have been spontaneous. Extensive fires have taken place at Uxbridge, origin unknown.

Since what we have said was in type other fires have occurred in London,—one in the workhouse of St. George's, Hanover-square, situated in the Fulham-road. The over-heating of a hot-air pipe in the laundry drying-room seems to have set that portion of the premises in flames, and the fire next communicated to the adjoining mangling and ironing rooms. The firemen and salvors were unable to get the fire extinguished until the drying-room was burnt out, and the mangling-room and ironing-rooms severely damaged by fire and water. The infirm ward overhead is also damaged, and the contents as well by fire, water, and removal. The damage was confined to the south wing.

Northumberland House, Strand.—On Wednesday night about one-third of this building was destroyed by fire. Fortunately the historical part of the edifice was not touched. The fire broke out in the hall-room, forming the wing of the mansion on the west side of the garden front, and which was erected about seventy or eighty years ago. A noble *Sèvres* vase, about 3 ft. high, and valued at 10,000*l.*, was broken to pieces; but we are glad to be able to say that the pictures are safe, except being damaged, chiefly by water, not, it is thought, irremediably. Even as to the vase, it may perhaps be restorable.

ACCIDENTS.

The King's-cross Accident.—An inquest has been held on the body of Benjamin Thresher, who was killed at the King's-cross works of the Great Northern Railway through the falling of an iron girder, weighing fourteen or fifteen tons. The accident was caused by the giving way of a crab which was being used to raise the girder. Mr. Cliff, the contractor, and his men, contended that the crab was of a size and calculated strength ample for the work required of it, and that, in fact, it had done heavier work before. The jury were of opinion that it was totally inadequate for the work put upon it, and an adjournment was therefore agreed to for the purpose of obtaining the opinion of Captain Tyler, the Government Inspector of Railways. At a subsequent sitting of the court Captain Tyler's report was read. It stated that one of the teeth of the intermediate wheel of the crab had evidently given way on a previous occasion, and the detached part had been fixed in its place again by an iron stud being put through it and the wheel. This had snapped off when the weight of the girder was put upon it, and the total destruction of the crab and the falling of the girder had followed as natural consequences. The accident would not have occurred but for the flaw. Mr. Cliff said the crab in question must have been part of a new plant he had bought. He never knew of the flaw till after the accident. Brown, the foreman, denied all previous knowledge of the flaw, although the iron stud was very large and very apparent. The jury returned a verdict of accidental death, but appended an opinion "that sufficient care and skill had not been displayed in the supervision and inspection of the machinery."

Fall of a Building at Warrington.—A man was killed and another seriously injured by an

accident which has taken place in Silver-street, Town's-end, Warrington. A number of workmen had been engaged in removing an old building, to clear the site for the erection of a Wesleyan chapel. During a shower the workmen, some five or six in number, sought shelter in the lower portion of the building. Suddenly a crash was heard, and on the neighbours repairing to the spot they found that the floors and roof had fallen in and hurried the workmen. They were extricated without loss of time; but one of them had been killed on the spot, while a second man had sustained very serious injuries.

Scaffold Accident at Wearmouth Bridge.—While the painting of Wearmouth Bridge was being carried on the men worked on scaffolding suspended from the bridge. Whilst at work at the west side, fortunately not over the river, they commenced "skylarking," and suddenly the frail scaffolding of two narrow planks "canted," and they were thrown off. They fell to the ground beneath, a depth of about 25 ft. They were severely shaken, but, fortunately, were not seriously injured.

ROYAL CONVENTION FOR THE EXCHANGE OF WORKS OF ART FOR THE PEOPLE.

DURING the Paris Exhibition a convention was entered into by several princes of the reigning families of Europe, whereby they agreed mutually to assist the museums of Europe in procuring casts and copies of national objects for the promotion of art.

Throughout the world every country possesses fine historical monuments of art of its own, which can easily be reproduced by casts, electrolytes, photographs, and other processes, without the slightest damage to the originals. This is the course of operations suggested:—

1. Each country to form its own commission according to its own views for obtaining such reproductions as it may desire for its own museums.
2. The commissions of each country to correspond with one another, and send information of what reproductions each causes to be made, so that every country, if disposed, may take advantage of the labours of other countries at a moderate cost.
3. Each country to arrange for making exchanges of objects which it desires.

The following princes have already signed the convention:—Albert Edward, Prince of Wales; Alfred, Duke of Edinburgh; Frederick William, Crown Prince of Prussia; Louis, Prince of Hesse; Albert, Prince Royal of Saxony; Prince Napoleon (Jerome); Philippe, Comte de Flandre; the Czarévitch; Nicolas, Duc de Leuchtenberg; Oscar, Prince of Sweden and Norway; Humbert, Prince Royal of Italy; Amadeus, Duke of Aosta; Charles-Louis, Archduke of Austria; Rainer, Archduke of Austria; Frederick, Crown Prince of Denmark.

We view this remarkable convention with the greatest satisfaction; it promises much more than is at first sight obvious; and we are truly glad to be able to regard his Royal Highness the Prince of Wales as the originator and main promoter of so admirable an undertaking.

THE NEW HOTEL AT LIME-STREET STATION, LIVERPOOL.

THE great hotel now in course of construction by Messrs. Haigh & Co., of Liverpool, for the London and North-Western Company, in connexion with their station in Lime-street, will, when completed, be one of the largest establishments of the kind in the country. The style of architecture adopted is of a mixed nature, partaking of the palatial character. The Lime-street façade, which forms the principal elevation, is 298 ft. in length, stretching the entire distance between Gloucester-street and Lord Nelson-street. The unusually high altitude of this, the main elevation, imparts to it a commanding appearance. The height to the top of the main cornice is 81 ft. 9 in., there being five stories from the ground floor to the cornice, above which again there are rooms formed in the roof, lighted by pediment-headed dormers. The elevation is rendered still more striking in its character and proportions by four towers, two being in the centre, immediately over the main entrance to the hotel, and flanked by two other towers at the

north and south sides respectively. The central towers, which are carried up to a considerable height above the main cornice, form the principal feature in the elevation. The height of these two towers from the main cornice to the top of the vane is 76 ft., making their entire height, from the ground floor to the apex, 157 ft., an altitude higher than that of most of the spires of the local churches. At each corner there are pinnacles corbelled out from the main body of the towers. The lower portion of these towers will be set apart as sleeping-rooms; and, there being three flights of this class of apartments, that portion of the building consisting of the central elevation will show eight stories. The two towers at the north and south ends respectively are 61 ft. above the main cornice, their entire altitude being thus 142 ft. above the ground floor of the hotel. They are formed by a high-pitched roof, surmounted by a square platform, the latter being surrounded by ornamental iron railing. The roof of the Lime-street elevation, which rises to a considerable height, is Gothic in character, the apex being surmounted by iron railings, harmonising with those at the top of the north and south towers. The central portion of the structure beneath the towers forms a special feature in the elevation, being much more prominent than those portions on the north and south sides. At each end, under the two outside flanking towers, there is an oriel window, two stories in height, supported on arch carved corbels. The ground-floor windows, facing Lime-street, which are sixteen in number, there being eight on each side of the main central entrance to the hotel, are circular headed, whilst those in the upper stories are divided into bays, with square pilasters and caps, from which spring circular-moulded arches. The main entrance to the hotel from Lime-street is in the centre, immediately under the towers. From this entrance a glass roof, supported by ornamental iron columns, will extend across the footpath of the street to the boundary of the carriage-way.

As regards the interior arrangements of the hotel, our authority, the *Albion*, states that, from the basement to the roof of the building, the architect in his plans appears steadily to have kept in view the utilisation of every yard of space at his disposal. The whole of the culinary and domestic arrangements of the hotel will be conducted in the basement, which has been so planned as amply to provide for the several departments of management. These plans include the kitchens, larders, store-rooms, wine and beer cellars, linen-rooms, luggage-rooms, cooking apparatus, with steam-boilers and other requisites, together with a large ice-house and a great variety of minor apartments. The servants' dormitories, both male and female, will also be in the basement, a portion of which has been specially set apart for this purpose. Passing through the vestibule on the ground-floor, a spacious hall is approached, from which corridors run north and south, communicating with a spacious coffee-room, reading-room, ladies' coffee-room, several dining-rooms, billiard-room, and a number of sitting-rooms. By ascending a grand staircase from the large hall on the ground floor, the private sitting-rooms and bed-rooms in the upper stories are approached. The upper stories consist of upwards of 200 bed-rooms, in addition to a large number of spacious sitting-rooms for private families and others, besides an endless number of bath-rooms, closets, and other conveniences. The upper portion of the hotel will be reached by a hydraulic "lift," the apparatus for working which will be in the basement of the building. The hotel communicates direct with the railway station.

In the construction of the Lime-street façade, as well as those facing Lord Nelson-street and Gloucester-street, a stone resembling that at the municipal offices in Dale-street will be used, whilst the frontage inside the railway station will consist of white brick. Messrs. Haigh & Co., the contractors for the erection of this immense structure, are proceeding with energy. It is only a few months since they commenced the undertaking; and, although the removal of the railway façade in Lime-street formed part of the contract, it has not only been cleared away, but the basement is already in a forward state, the stonework facing Lime-street being above the street-level. Messrs. Haigh have undertaken to complete the building and hand it over to the company in the course of two years. The architect of the hotel is Mr. Alfred Waterhouse.

We may here state that the enormous new roof, the largest in the world, now being constructed over the Lime-street station by Messrs.

George Thomson & Co., contractors (Lieut.-Col. Thomson), is being rapidly carried forward. It consists of a roof of one span, the principals stretching across the station to the extent of 214 ft. of a segmentary span each, is 75 ft. in height from the level of the rails to the apex, and when completed will be 385 ft. in length. It will be supported by eleven principals, 35 ft. apart, above which is the roof itself, which is ornamental and well ventilated. Two of the principals, with the iron framework securing them, have been completed. The roof will be covered with Welch blue slate.

SHOP ARCHITECTURE IN BRADFORD.

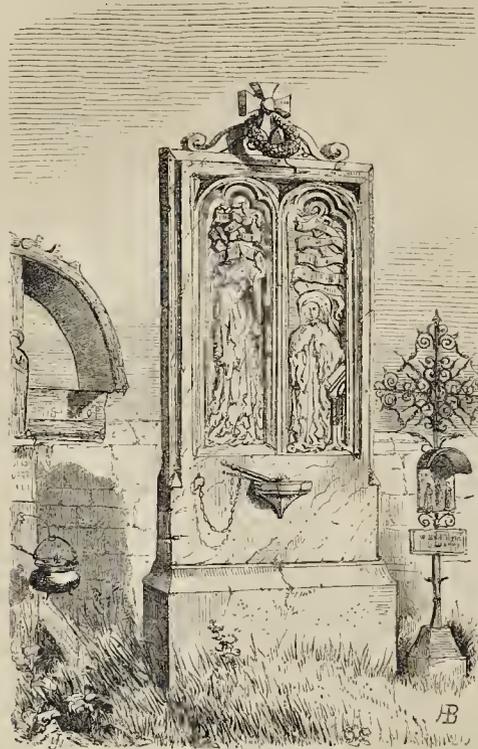
A FILE of buildings to be erected in that portion of Westgate, Bradford, recently widened, extending from Southgate to Godwin-street, has been just commenced. The buildings are intended to be used as a drapery establishment. The style selected is the French Renaissance, and the architects are Messrs. Andrews, Son, & Pepper. The area to be covered is 550 square yards, with a frontage to Westgate, including the angles at Godwin-street and Southgate, of 120 ft., and a frontage of 66 ft. to the latter street. The foundation has been hewn out of the rock. The building will be four stories in height, the top story lighted with dormer windows, and will measure 50 ft. from the ground to the parapet, towers rising at the angles 20 ft. above, and the outline being broken with angle chimney-stacks. The principal feature of the front of hasted work, and built of idle stone, with cleansed moldings) is a decorated window over the central entrance to the premises, crowned with a pediment. The windows of the shop, filled in with plate-glass, will be secured at night with iron revolving shutters. The shop, entered by a wide central doorway in Westgate, is 15 ft. in height. All complaint on the part of customers that they cannot properly see the goods is obviated by the light poured down on the back of the shop from a well-light, 45 ft. high and 13 ft. diameter. An office, placed on the mezzanine floor, will enable the principal to command at a glance a view of the entire ground floor. The building will cost several thousand pounds. Other premises are in course of erection in Godwin-street, but they are plain in design. Alterations are in progress at the corner of Well-street and Market-street, nearly opposite the Midland Station, where a frontage of 117 ft. will be secured to the best thoroughfare in the town, extending from Well-street round the corner into Market-street. The architects mentioned are superintending the work.

ANIMAL FOOD: ITS PRESERVATION AND ITS WASTE.

THE following mode of preserving meat in the hottest weather is given by a correspondent of the *Times*, who has tried it with success with the thermometer at 135°. The meat should be placed in a wooden box on a metal grating about 3 in. from the bottom. Under this grating should be burnt about an inch of sulphur stick as often as a joint is put in, the lid being immediately closed. It is convenient to have a sliding bottom to the box for facility of cleaning when necessary. The meat is perfectly good at the end of a week, and entirely free from unpleasantness of any kind.

This seems essentially to be the same as Dr. Dewar's sulphurous acid process, the fumes of burning sulphur being just that acid.

While saving processes are thus progressing, it is curious to note how waste for want of them proceeds in Australia. At the "boiling-down" establishment of the Messrs. Witter Brothers, at Colmahhah Station, Victoria, the sheep are collected in yards adjoining the wool-scouring shed, killed and taken into the shed attached to the dip, and then skinned and cleaned and hung up on hooks till the vat is ready to receive them. So soon as the vat is to be filled a number of hands are employed in chopping them into three or four pieces, and throwing them in. The vat is 11 ft. high, and holds 300 wethers or 400 ewes, and 1,000 of these are stewed by steam from a 40-horse power engine in forty-eight hours. When the fat has been all extracted it is drawn by taps in the side of the vat into large 500-gallon coolers. The gravy runs from a tap in the bottom of the vat into a reservoir



ANCIENT GRAVESTONE AT MOOSBURG, BAVARIA.

prepared for it, and is afterwards given as food to pigs, who luxuriate on what would be a great blessing for the poor in some of the large and populous cities in the old country. All the bones and shreds of meat that remain are drawn out and carted away to the same omnivorous herd. The bones are made so soft as to break in pieces in hand, the marrow being completely melted out of them. Casks are filled from the coolers, and sent by train to Melbourne.

ANCIENT GRAVESTONE IN CHURCH-YARD AT MOOSBURG, BAVARIA.

THE interesting little town of Moosburg, between Landsht and Munich, contains many objects worthy of notice. The minster is a noble Romanesque building of the very earliest kind. The interior bears a strong resemblance to the oldest portions of St. Alban's Abbey. The choir, which is not earlier than the fifteenth century, contains one of the most magnificent high altars in Germany. The reredos, carved in wood, is 60 ft. high, and adorned with statues varying from 2 ft. 6 in. to 8 ft. in height. The whole is richly painted and gilt, and contains pictures by the elder Holbein. The date of this magnificent work is 1426. There are a splendid set of stalls and several fine fifteenth and sixteenth century monuments. Near the minster is another church containing a singular western gallery, and just outside one of the gates is a small Romanesque church, surrounded by a very old cemetery. Two or three of the gravestones are ancient. The best is the one of which we give a sketch. It is carved out of a slab of red marble. On one side is a representation of the Annunciation,

and on the other an inscription, which is so defaced by time as to be nearly illegible.

The whole of the carving is in very low relief, but the drapery is well represented, though very angular in its folds, as is the case with all late German sculpture. Attached to this monument (and, in fact, to nearly every other in this cemetery) is a *bénitier* for holding holy water, and an *aspergès* brush chained to the gravestone. The upper portion of the monument has been modernised, and it is difficult to guess how it originally terminated. Very probably it had a "rood" and attendant figures.

Ancient churchyard monuments are very rarely to be met with, and we know of few other specimens.

Two or three monumental inscriptions, executed in brick, are let into the walls of the Cemetery of the Holy Blood at Landsht, and there are one or two old tombs in the cemeteries at Nuremberg and Saltzberg.

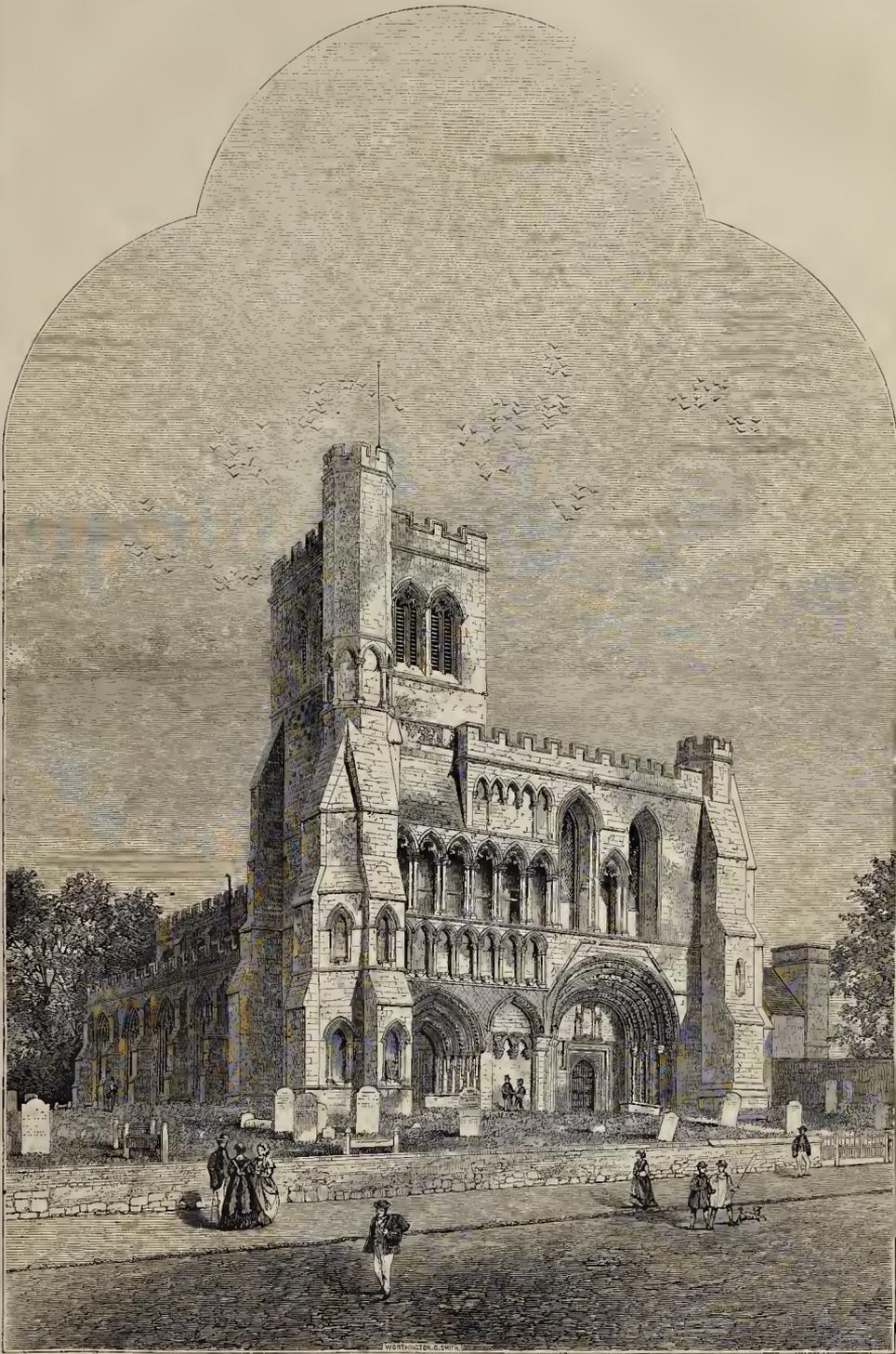
DUNSTABLE: ITS CHURCH AND NEIGHBOURHOOD.

Nor long ago, writing of Woburn and its neighborhood, we spoke of the ancient church at Dunstable and its interesting west front.* This we now illustrate, and would speak of it a little more at length.

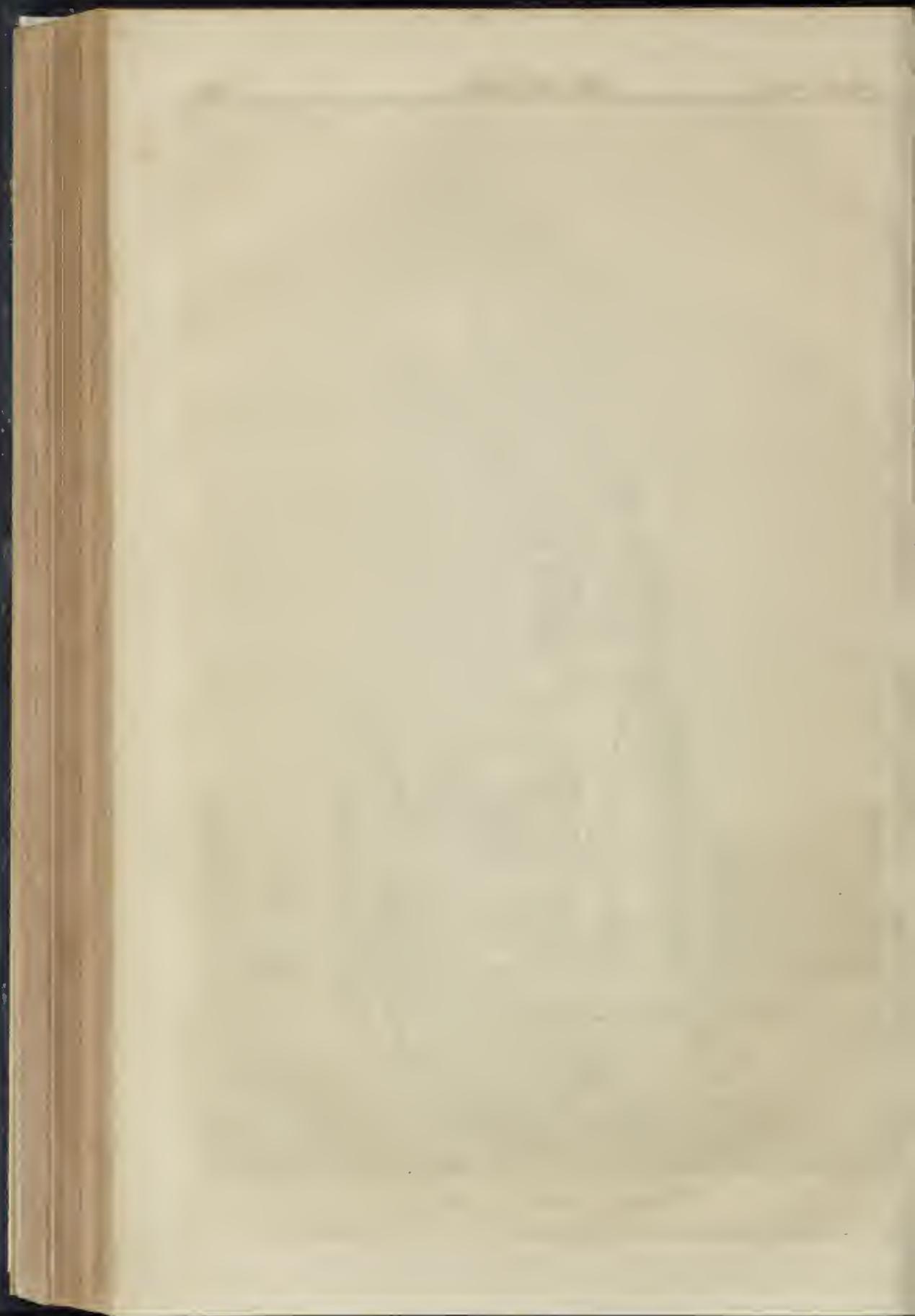
The "Dunstable Chartulary" (Harl. 1885) contains on one leaf the beginning of the celebrated "Annals of Dunstable" down to A.D. 552; it is written in a thirteenth-century

hand, probably the compiler's own. Preserved also among the Cotton MSS. in the British Museum is the continuation or single MS. folio on parchment of the Annals (Annales Prioratus de Dunstaplia), marked Tiberius A. 10: the handwriting is the same to the middle of the year 1210; then various hands are employed: after the year 1221 the entries in each year were probably made during the course of, or at the end of, the year itself. The Annals begin at A.D. 1, and the early entries are very curious, but, of course, are of no historical value: for instance, the first entry is, A.D. 1, "*Adam usque ad Nativitatem Christi*," &c.; and again (after a lapse), A.D. 33, "*Christus crucifixus est octavo Kalendas Aprilis*," &c. Coming to A.D. 606, we have (but always in Latin) "St. Paul's Church in London built;" and A.D. 1074, "Survey of England by William I.," and A.D. 1135, "Dunstable Priory founded." The MS. was very much injured by the fire in the Cotton Library in 1731, but it has been repaired with great care and skill. The earlier portion of the chronicle down to the year 1201, when it becomes original, is very brief. The author of this valuable historical work was Richard de Morins, prior of the monastery from 1202 to his death in 1242. Referring to the chronicle, we have "Richard de Morins made prior of Dunstable, and sent to Rome by the king on July 25, 1203." Under date 1203, we have "The lordship of Houghton given to this priory, and a three days' fair in May." (This fair in the month of May is held in the town to this day.) It is, however, very strange that Richard de Morins (beginning his chronicle in 1210) gives no account of the foundation of the priory, founded as it was in honour of St. Peter for Augustinian canons towards the end of the reign of Henry I. It was

* See p. 385, ante.



DUNSTABLE PRIORY CHURCH: WEST FRONT.



certainly not founded earlier than the middle of 1131, because Robert de Bethune, Bishop of Hereford, who is one of the witnesses to the foundation charter, was consecrated on June 28, 1131. Keeping still to the chronicle, we have, under date A.D. 1207, "Altars dedicated at Dunstable;" under A.D. 1208 mention is made of marriages and chrismings taking place at the church doors, and of a sermon being preached to the people outside the church, the "gans benedictus" and holy water being given to them there, and oil mixed with the chrism at baptism by the Pope's special licence. A.D. 1210, a vision of two Jews announcing the advent of Antichrist, seen by the prior; A.D. 1211, a red rainbow seen; A.D. 1212, miracles at Dunstable; A.D. 1213, the town burnt. During this same year (1213), and on the feast of St. Luke, the church was dedicated by Bishop Hugh II. of Lincoln. Altars in it were dedicated by Robert, Bishop of Lismore, in 1219, and by Hugh, Bishop of Ely, in 1231. In the great storm of June, 1222, which did so much mischief through the country, the roof of the presbytery and two towers of the west front of the church fell. In 1223 St. Mary's Chapel was pulled down in the Canons' Cemetery. It was pulled down in 1324, being then in ruins, and built up again from its foundations. In 1250 the inner gate within the court was built; a new dormitory in 1251, as the old one was in a dangerous state; and a new stable in 1257, on the fall of the old one. In 1273 the body of the church was restored at the cost of the parishioners; new bells were given in 1277; a new body to the bakehouse and brewhouse wall were built in 1282; a clock was placed over the "pulpitum" or choir-screen in 1283. In 1289 the parishioners finished two pinnacles on the north front of the church, and restored the stone roof, then in a ruinous condition, of the north porch. The great cross and many saints' effigies were repainted in 1293. During the plague of 1349 the parishioners gave a new bell, and the prior covered the belfry with lead. The reference to the two towers of the west front is very interesting, as at the present day there remains only the lower portion of the north-west tower. We believe, however, that the architect now engaged directed remains indicating the position of the south-west tower some years ago, an account of which was then published in the *Builder*. At the present day there are no traces whatever of the two pinnacles on the north front. The other references to the roof of presbytery, the Canons' Cemetery, the court, inner gate, dormitory, stables, bakehouse, brewhouse, and many other buildings and ornaments are of interest and value to the architect and antiquary.

Dunstable Church is a fine specimen of Norman and Early English architecture; but three centuries ago the building was cut down in all its parts, and only a portion of the nave was left, of which the triforium was made a clearstory, and it was covered with a florid Tudor roof. The structure, as it now stands, is in many respects perfectly unique, and is made up of Gothic work, ranging from the twelfth to the fifteenth century. It is the principal ecclesiastical building in the county of Bedford. The whole structure appears to have been built upon a very expensive and magnificent plan, and was originally in the form of a cross, with a bell-tower in the centre, supported by four lofty arches, parts of which, belonging to the eastern pillars, still remain. It is said that Henry VIII. intended to have made it a cathedral, and to erect it into a see, of which Dr. Day was to have been the first bishop. Upon the design being abandoned, a considerable part of the priory church was pulled down, and all that remains at present are the nave and two side aisles, a length of about 120 ft. The inside is chiefly Norman, and undoubtedly part of the original structure. Most of the windows are of a later date than the building itself. The east end is crossed by a flat wall, and the two nearest arches on each side form the present choir. A beautiful stone screen of four pointed arches, with clustered columns, ranges over the west door inside.

The west front, of which we give a view, is one of the most singular pieces of work in the country. The great Norman door, with its semi-circular arch and rich sculpture, was at one time a magnificent piece of work: now it is a mere wreck. The outer moldings are zig-zag work; the next, angels and foliage in alternate ovals; the third, beasts' heads and foliage; the fourth, the signs of the zodiac, &c., Pieces and Capricorn no long time ago being still there. The sill

is formed of an old coffin of Purbeck marble. The whole of this work is (or was) undercut in the most remarkable manner, and was in much better condition some fifty or sixty years ago than it now is, if we may believe one of the oldest inhabitants, who recently said to us,—"Ah! sir, you should have seen the door when I was a boy, and old Bob Eggleton was parish clerk. The carving was better then, but sparrows used to build their nests in the carving, and we boys used to go and throw large stones at the ornaments, and shuck the sparrows out." Then we often picked up a bit of a bird's wing or a beast's head carved in stone. As fast as we knocked one lot of sparrows out, they built again in the next ornaments; so we used to go and shuck them out again." This process of "whacking out" appears to have been carried on till there is now hardly a fragment of the original sculpture un mutilated to be seen. At this time the church was infested with jackdaws, starlings, owls, and harts; but their nesting-holes have since been filled up.

The lesser doorway, of Early English work, is in much better condition as regards the enrichments, but is nevertheless in a sad state of decay. The junction of the Norman and Early English work on the west front is very remarkable, and the character of the Norman ornament is almost unique in England. Above these doorways are seven niches for statues; the figures are all gone, but the pedestals remain. Above these is a second tier of open arcading leading to the bell-tower. Perhaps the primary use of this outer gallery was for the priest to ring the sanctus-bell when the Triagium was said, so that all persons, within and without the church, on hearing it might fall down on their knees in reverence of the elevated Host. The niches at the lower part of the north-west tower were formerly filled with statues, portions of which still remain. In the interior are a few tiles and memorial brasses. Of the latter many have been removed from their slabs and totally lost; and, as the original east end of the church has entirely vanished, the most costly and beautiful probably went with the building. In the north aisle is a slab which, though much worn, has undoubted traces of having been ornamented with a brass of great beauty, to the memory of an ecclesiastic. The size of the stone is about 10 ft. by 4 ft. Two other stones, which evidently were placed to commemorate departed priests, are to be seen: the largest is at the west entrance, just within the church; the smallest is placed without the church, near to the belfry-door. It was split some years since by the clapper of a bell, which flew out of the belfry as it was being rung, and fell on the stone. The brasses are both gone. Some years ago we copied the following inscription from a slab in the nave:—

"We now thor art not lost, but sent before
Thy friends all lette thy absence to deplore;
Nor can thy virtues ever be for gotten,
Thought in the grave thy corpse be did and rotten,
For yet t'onged crye to the ward must tell
That as they livest thou dyest, and that was well."

But the following is much more curious:—

"*He William Mulso, sibi quem sociavit Alice,
Mortuore sub dura cancellavit mora generalis.
Ter tres, bis quinos, hac natos fertur habere;
Per sponos binos Deus hi clemens miserere!*"

which may be rendered, "One general fate has enclosed here, under hard marble, William Mulso, and Alice his wife. She is reported to have had three times three and twice five children by two husbands, the Lord being merciful to commiserate." Many other inscriptions are of great interest, most of them dated.

The Priory Church is noted for its bells, and they bear the following inscriptions:—

- 1st Bell. "While thus we join in cheerful round,
May love and loyalty abound."
- 2nd Bell. "Peace and good neighbourhood."
- 3rd Bell. "Music is medicine to the mind."
- 4th Bell. "All ye who join with hands, your hearts unite;
So shall our tuneful tongues combine to
laud the nuptial rite."
- 5th Bell. "Wm. Coles & Wm. Exames, churchwardens,
1775."
- 6th Bell. "Although I am both light and small,
I will be heard above you all."
- 7th Bell. "If you have a judicious ear,
You'll own my voice is sweet and clear."
- 8th Bell. No inscription.
- Sanctus Bell. "*Ave Maria, gratia tibi!*"

Three bells especially deserve notice—1st, "The incumbent induction bell," rung the last time on June 1st, 1844, when the Rev. F. Hose, M.A., the present rector, entered upon the living; 2nd, "The pancake bell," formerly the confessional bell, always rung on Shrove Tuesday; and, 3rd, "The passing bell," which announces the death of townfolk.

A gorgeous ceremonial attended the consecration of the "sanctus bell." First of all, the bell was suspended from a scaffold, having a temporary arch erected near it, adorned with crucifix, candlestick, and pix. Around the bell were boys with white surplices, silver crosses, and elevated lanterns. After the curé had read a long declaration, various prayers were read, and an attendant priest laved the bell with a bunch of myrrh dipped in holy water; a ribbon was then tied round the clapper, the bell was anointed with oil by the curate, and under it various powders of powerful odours were burnt. Making use of the ribbon, the curé struck the bell three times with the clapper, and afterwards a lady, probably Matilda, daughter of Malcolm, King of Scotland, who was the godmother of the bell, if we may so speak, struck it in like manner. The clapper was then wrapped up in a napkin, the inside of the bell again fumigated and anointed, after which the whole party adjourned to celebrate Mass. In 1837 a man in a state of intoxication ascended to the helfry (when the bells were set perpendicularly for ringing), and went recklessly amongst them, the consequence being that one of the bells fell from its upright position, and crushed him to death against the wall.

A large number of interesting coins, in gold and silver, and other antiquities, have been found near the church and in the neighbourhood at different times. Amongst an immense number of Roman and other coins, we may mention one of Augustus Cæsar, B.C. 30; of Tiberius, of Trajan, Vespasian; a quantity of coins of Antoninus and Constantine; of Claudius Cæsar, Otho, Adrian, Commodus; ones of Probus, who reigned six years (rise of Manichean heresy); and many others unknown. Of the English series, a silver coin of Henry I., the founder, discovered between the stones of the old south wall of the church, near the vestry door; a coin of Henry III., three of Edward I., Edward III., Henry VII.; a shilling of Elizabeth; a coin of Charles I., one of the finest and most remarkable of the English series (it is the work of Rawlings, whose initials appear on the wall of the city of Oxford, on the obverse of the coin); a Charles I. shilling; and many others of various dates. An impression of the common seal of the priory, somewhat imperfect, is attached to the acknowledgment of apremacy in 1534, to be seen in the chapter-house at Westminster. It represents St. Peter with his keys, seated, and the legend round him is, "Sigil scolie sci Petri de Dunstaple."

Dunstable has always been noted for its old miracle plays, for its grand tournaments, and for its visits from kings and queens. Hallam, in his "Literature of Europe," says the earliest mention of miracle plays has reference to England. Geoffrey, afterwards Abbot of St. Alban's, finally teaching a school at Dunstable, inaugurated one of these shows on the story of St. Catherine. This was within the first twenty years of the twelfth century. Roscoe thinks there is reason to conjecture that the miracle play acted at Dunstable was in "dumbshoe." Warton, however, in vol. i., "Dessart," says Geoffrey was a Norman, his scholars were the actors, the performance took place in A.D. 1110, and he horrowed the copes from the sacrist of the neighbouring abbey of St. Alban's to dress the characters.

Leaving for the present the more modern history of the church and neighbourhood, we will glance at its most ancient remains. The original inhabitants of the locality upon which Dunstable now stands were a people called Cassii, who spread themselves sparingly over the counties of Beds, Bucks, and Herts, and proved to be no mean combatants with the powers of Rome. In the immediate neighbourhood of Dunstable are large ranges of steep chalky downs, and perhaps there is no part of our land where the relics of the earlier inhabitants can be better studied. Contiguous to the roads by these downs are the evidences of the aboriginal British stations, consisting of simple holes for residences formed in the chalk, with numerous tumuli. On the north-west of Dunstable, and about a mile and a half from the town, is an ancient Roman road, 25 ft. broad, in the most perfect condition. On one part of the downs, close to Dunstable, are five large tumuli, known as the "five knolls," with several circular and oblong excavations. This spot is one of the earliest British stations. Close to these knolls is Parscomb Pit, an immense hollow, whose sides still exhibit many remains of the ancient primeval dwellings. At the bottom is

an earthen platform, supposed to be a work of the Roman period, thrown up for the purpose of exhibiting gladiatorial feasts; the neighbouring hills would afford to thousands of spectators full views of the sports below. A group of primeval dwellings may be seen near the base of a hill on the road to Luton, averaging 8 ft. in diameter and 3 ft. deep. On the south-west side of Dunstable is an enormous earthwork, known as "Maiden-bower," 25,000 ft. in circumference. It consists of a single vallum thrown up from the external surface at an angle of 45°, from 8 ft. to 14 ft. high; and it is not improbable that originally a stockade was planted on its summit, composed of branches of trees intertwined. There are now no remains of a fosse. On the north-west side there is a gradual descent to the meadows below, where are the remains of mounds of earth, encircling the small streams which issue from the base of the chalk downs, and may possibly have been intended for fishponds, or as reservoirs or dams. It seems a natural inference that such small springs would be thus embanked to insure an abundant supply of water for the Cassii and their cattle. About two miles north-west from Dunstable, at Tottenhoe, is a lofty precipitous hill, with a summit of ramparted earthwork. It is in such a commanding position that, if defended by resolute men, it must have been impregnable. It consists of a lofty keep in the centre, with a vallum round its base, and a larger one of irregular form a short distance from it; on the summit of the hill are ridges of masonry placed in layers upon each other without mortar. Two Celtic coins and other antiquities have been found near. Close to Leagrave, three miles from Dunstable, is a fosse very deep and broad, describing a circle of 8,200 ft. This is probably the true site of Lygesburgh, one of the four British towns which fell into the hands of the Saxons A.D. 580. In the immediate neighbourhood traces of a hard-fought battle have been turned up in the shape of pieces of armour, spear-heads, and other weapons and armour, the entire valley, fields, and gravel-pits abounding with human skeletons.

King Henry I. kept the town of Dunstable in his own hands until 1131, when he granted it, with all its rights and privileges, to the Priory of Black Canons, or Augustine Friars, placed at Dunstable by permission of Pope Eugenius III. The king kept Christmas, 1123, with great splendour at his residence near the priory, receiving at that time an embassy from the Earl of Anjou. Henry I. kept Christmas here again in 1132; and his successor, King Stephen, in 1137. In the year 1215 (one year before his death) we find King John at Dunstable; in 1247 Henry III., his queen, Eleanor of Provence, and his family, visited the priory. In 1265 we find Henry III. and his queen, with Cardinal Attahon, again at Dunstable; and once more, in 1267, with Richard, King of Germany. In 1275, and again in 1276, Edward I. visited Dunstable. In the "Annales Prioratus de Dunstaplia" we now find accounts of grand tournaments held here, one in 1279, two in 1280, and another in 1289, all in the reign of Edward I. In 1290 the corpse of Queen Eleanor remained one night at the priory. At the spot where it rested in the market-place was erected one of the series of Eleanor crosses. It stood for 370 years, but there is not a fragment remaining now. The cross was erected the same year (1290) by John de Belle, a native of Battle. In 1293 there was another tournament, and a large bell was set up by the lepers.

In 1341 King Edward III. and his queen were at Dunstable, to be present at another tournament of great splendour, in commemoration of the victory over the French, in which two hundred vessels were taken, and thirty thousand men destroyed. In 1357 we find Henry VI. and Queen Margaret at Dunstable. On May 23, 1553, Archbishop Cranmer here publicly divorced Katherine, the unfortunate queen of Henry VIII., in the Virgin Chapel. Queen Katherine was then residing at Amphill Park, a few miles from Dunstable. In 1572 Queen Elizabeth visited Dunstable, and was entertained with pageants. Our present Queen has also visited the town.

We are indebted for a great deal of the information here produced, regarding the ancient church and neighbourhood of Dunstable, to the Latin reproduction of the "Annales Prioratus de Dunstaplia," by Henry Richard Luard, M.A., and to the "Dunstableologia" of Lamborn, added to our own knowledge of the whole neighbourhood.

Of late years we have visited the town and ad-

joining pastures and woodlands for its natural history and geological treasures, in which it is as rich as in historical antiquities. The butcher-hird or shrike we have often seen. Its curious work in the way of fixing cockchafers and beetles on the spines of hawthorn and other prickly bushes is observable. The kingfisher, too, one of the loveliest of British birds, is not uncommon near some watercourses by the town. Amongst other birds may be mentioned the great barn-owl, golden-crest, the wren, fieldfare, golden plover, bittern, curlew, red-shank, grosbeak, skua-gull, and many others. Of rare and curious plants there is an abundance; some of the neighbouring chalk hills produce the splendid pasque-anemone in profusion; the chalky plantations and hills give birth to a great variety of orchids. Here we have found the bee, the fly, the frog, gnat, butterfly, and birds'-nest orchids; the different species of epipactis, — *orchis mascula*, *maculata*, *ustulata*, *latifolia*, and many others. In Tottenhoe mead grow the grass of Parnassus, the butterwort, and adder's-tongue; at Kensworth, the green hellebore. The fungus tribe is represented by some of the greatest varieties; they may be found by the diligent searcher by the leafy roadsides in October, — one fine scarlet boletus, especially, has been found there, and described elsewhere by Mr. Worthington Smith (*B. rubinus*, W.G.S.), new to science, and which has never been found anywhere else. Of the abundant fossils from the chalk, one at least is quite unique.

The road between Dunstable and Leighton Buzzard is in one part remarkable. Originally the road (which diverges from the old Roman road) went right over the hill, and was so fearfully steep that it was next to impossible to get wagons and coaches over it. Then a road was made to the left of present cutting (less steep), but it is now grass-grown and disused. The road now used has a steep cutting through the solid chalk, perhaps 130 ft. deep, the *débris* being taken northward to fill up the valley and make the road good nearer Hockliffe. The cutting was, one severe winter, filled with drifted snow, and the road stopped for many days; it was at last carted away. Considering that this road was made some half-century ago, before railway times, it must be regarded as a brave undertaking.

From these few remarks it will be seen what historical and natural history riches are possessed by Dunstable. Returning for a moment to the church, the rector, the Rev. Frederick Rose, M.A., writes, — "There is danger of the present contract being suspended for the want of funds to cover the newly-restored internal stonework with the new roof." The external west front cannot be touched, from the same cause, although it is perfectly unique, and "a grammar of architecture in itself." What is now doing will be well done; but it is only a portion of much that ought to be undertaken at once. An appeal has been published to lovers of church architecture, and to those who take an especial interest in maintaining our ancient national edifices, for funds to aid in the restoration now being carried out under the superintendence of Mr. Geo. Somers Clarke. Large sums have been already subscribed by the rector and townsfolk, more than one person having given 200l. for that purpose. Let us hope that the good work will not be stopped for want of a little money to carry on the restoration of such an interesting national monument.

PARLIAMENTARY PAPERS FOR WORKING MEN.

The Working Men's Club and Institute Union have taken steps to obtain copies of important parliamentary papers, as they appear, in order to form a permanent "Parliamentary Library," and to place them at the service of the institutions which it is their object to aid and establish. They particularly desire that artisans who are members of clubs in London should have access to these papers. By the assistance of some members of both Houses of Parliament, they have already collected several documents of this kind, and on every Monday evening their offices will be open from eight to ten P.M., when the member of any London club who is not in arrears with his subscription, may, under certain conditions, borrow any paper, or refer to it at the office. The council of the above society rightly believe that the means of access to important

"Dine Books" will be of great service to all who take an intelligent and an active interest in public affairs. They believe that the discussion and treatment of all public questions would be far more satisfactory, because more accurate, if those taking part in them had the means of ascertaining the facts which can only be found in these reports. It is not creditable that the metropolis should not contain a single library of reference of this kind, and the "Union" have increased their claims to public support by this sensible step. Clubs in the country, subscribing five shillings a year to the circulating library of the society, will be entitled to borrow copies of these publications, as well as thirty volumes of general literature every three months. To form a library of such works as are not generally accessible to working men, and to circulate them to clubs throughout the country, at a mere nominal charge, is an undertaking which the council are very anxious to carry out. Persons may do good by supplying this library with copies of suitable books.

PARTNERSHIPS OF INDUSTRY.

At a recent meeting for discussion held at 150, Strand, under the auspices of the Working Men's Club and Institute Union, the value of industrial partnerships was considered, the question being whether there was evidence that a system of division of profits between master and workmen in a trading concern could be maintained, so as to conduce to the welfare alike of workmen and capitalists. The discussion was opened by Mr. E. Hall, F.S.A., a member of the council of the Union, who has given much attention to the subject in France. Mr. Hall's observations went to show that the question between the trade unionists and others in the previous discussion was left in a most unsatisfactory state, and had not resulted in showing how the great mass of the poor, or lower working class, were to be provided for; but that there were measures of palliation which might end in being remedial, and as to the value of the immediate introduction of which there was ample evidence, such as he had to offer. After a brief reference to arbitration and conciliation, which he distinguished from one another, saying that the value of measures aiming at the former was doubtful, whilst the feasibility of conciliation was completely proven (as by the fact that the majority of cases before the *Conseils des Prud'hommes* were settled not judicially), he spoke of the principle of co-operation between workmen, and contrasted it with that of competition, quoting from a *mémoire* by Blanqui, read in 1816 before the Academy of Moral and political Sciences of the French Institute, and from later expressions of opinion. Considering, however, that co-operative undertakings amongst workmen alone were impracticable in the large majority of cases, because some amount of accumulated saving or capital was necessary at first, he inferred that the chief means of promoting the interests of the working classes, and the consumer with the capitalist also, for some time to come, must be looked for in associations based on the principle of a division of profits between the master and the workmen. The question before them was, — Was there evidence that such associations could be maintained? He was provided with evidence, derived from the existence of one such partnership since the year 1842; and that association was now contributing to the solution, not only of the question that was then prominent, but to that of other questions among the most important of the time. In that trading concern, the house-painting establishment of M. Leclair in Paris, not one of the conditions predicted as operating to the destruction of partnership relations between a master and his workmen had ever troubled the harmony between M. Leclair and his subordinates.* As to management, the point on which it had been predicted that such partnerships must break down, there was no lack of it; whilst M. Leclair, in answer to Mr. Hall, with reference to the assertion that such concerns could not get through periods of commercial disaster, had said he could not imagine why they should do so less successfully than partnerships of the old kind. Whilst there was no lack of management in M. Leclair's case, there was no concealment of the state of the common business and property; and Mr. Hall

* A full account of this establishment, and of the system pursued, was given in the *Builder* some years ago, at a time when the possible value of such partnerships was less generally admitted than it is now.

mentioned another partnership, similar to that of the Maison Leclaire, wherein there was a provision for examination of the books by representatives elected by the workmen. The results in M. Leclaire's establishment were briefly these, as the chief:—1. Entire freedom since 1842 from strikes; 2. A partition of the profits, in two equal parts, between M. Leclaire and an associate of his on the one hand, and the workmen on the other hand; 3. The maintenance of a provident society for cases of sickness and accident, old age, widowhood, and orphanhood; 4. Diminished sickness, from the nature of the house-painter's occupation, by the use of methods that had been tried in this country, following M. Leclaire, but had been here abandoned; 5. Superior execution of the work, and opportunity given to the public to test the execution; 6. Improved demeanour of the workmen, of which there was the highest testimony; and 7. Education of apprentices and others in the craft, with courses of lectures and social réceptions, tending to render permanent the relations, and to secure the advantage of all. There were, however, the speaker urged, more extended results possible from co-operation than were immediately deducible from what had been said of the success of a single trading establishment. In France M. Leclaire looked to one of the most important spheres of co-operation as in connexion with agriculture; and he was already actively engaged in the promotion of one such undertaking in the commune of Herblay, near Paris, of which he was maire.

The meeting was subsequently addressed by Mr. Lloyd Jones, Mr. Charles Hole, Mr. Lilwall, and several workmen, most of the speakers looking forward to a change of the relations between the labourer and the capitalist as inevitable. The discussion will be resumed on the last Thursday in this month.

TREAT TO THE WORKMEN AT THE ABBEY MILLS PUMPING STATION.

FROM Monday to Thursday of the previous week the members of the several vestries and district Boards of the metropolis had visited the Abbey Mills Sewage Pumping Station, on the invitation of the Metropolitan Board of Works. On Friday in last week another class of visitors inspected the works, Mr. Webster, the contractor for them, having invited a number of friends, and also the various classes of his workpeople engaged in rearing the works, their wives and families, to inspect them. The premises having been thrown open to those invited, and the steam-engines and other parts of the works inspected, the company then proceeded to a large tent provided for the purpose, where Mr. Newton, the chairman of the Main Drainage Committee of the Metropolitan Board of Works, and other members of the Board sat down at a cross table at the side of Mr. Webster, the visitors being in front, and the several classes of labourers, excavators, carpenters, bricklayers, masons, painters, &c., being ranged at tables at each side, and provided with a substantial meal. At the conclusion of the repast Mr. Newton remarked that the object of their meeting was to give the workmen engaged on that great work a treat, and also do honour to Mr. Cooper, who was the resident engineer, and the representative of Mr. Bazalgette, who had taken such an important part in carrying out the works. Mr. Webster said it was a proud day for him to see a thousand happy faces around him, some of which he had known for twenty years. He acknowledged the valuable services rendered to him by Messrs. Jennings and Powell, and also Mr. Halkin, the artist. Afterwards the tables were removed, and dancing and singing were enjoyed.

TAYLOR'S BRIDGE COMPETITION, CAMBERWELL.

THERE were forty-two sets of designs sent in, in response to the advertisements offering premiums of 21l. and 10l. 10s. The vestry selected as the four best "Audentes fortuna juvat," estimated cost 2,100l.; "Pontifex" (No. 2), 2,412l.; "Datnr Dignoi," 2,450l.; and "Vox Vectis," 1,496l. After the selection had been thus made, but previous to the motto envelopes being opened, a competitor ("Pontifex") addressed a letter to the chairman of the Purposes Committee on the subject of his estimate, and, not content with signing himself "Pontifex," he

added his official address. On the occasion of the final decision by the vestry it was moved "That 'Pontifex' should be excluded from the competition," or "that he should be placed third in merit." This occasioned a sharp discussion, but on its being shown that there were two "Pontifexes" in competition the motion was withdrawn. The vestry then decided that the designs of "Audentes fortuna juvat" and "Pontifex No. 2" should be the premiated sets, and on the envelopes being opened it was found that the authors were Mr. J. Dredge, 10, Buckingham-street, Strand, and Mr. J. W. Smith, 7, Westminster-chambers, Victoria-street. It was also then seen that Mr. Smith was the "Pontifex" who so narrowly escaped exclusion.

PRIZES TO ART-MASTERS.

THE Lords of the Committee of Council on Education having, by a minute dated the 3rd of January, 1868, offered prizes—viz., one sum of 50l., three sums of 40l., five sums of 30l., ten sums of 20l., and twenty sums of 10l.—to the head-masters of the schools of art in the United Kingdom in which the general amount of work, considered with reference to the number of students under instruction, should be found, after the examinations, to be most satisfactory; and having had the results of the recent examinations laid before them, have awarded the above prizes as follows:—

Chas. D. Hodder, Edinburgh	£50
J. S. Rawle, Nottingham	40
J. P. Bacon, Stoke-on-Trent	40
Edwin Lyne, Dublin	40
D. W. Reimach, Birmingham	30
Edw. R. Taylor, Lincoln	30
W. G. Muckley, Manchester	30
C. M. Clarke, West London	30
Luella Gunn, Bournemouth	30
W. L. Casey, St. Martin's	20
Susan A. Ashworth, Edinburgh	20
Joseph Kennedy, Kidderminster	20
John Sparkes, Lambeth	20
Robert Greenless, Glasgow	20
John Anderson, Coventry	20
Herbert Gilbert, Lancaster	20
Walter Smith, Leeds	20
George Ryles, Westminster	20
S. F. Mills, Spitalfields	20
James Ford, Macclesfield	10
J. S. Groppel, France	10
John N. Smith, Bristol	10
F. M. Black, Kilmarnock	10
W. H. Boucens, Sheffield	10
Samuel Elton, Darlington	10
James Carter, Hanley	10
F. F. Hosford, Llanely	10
William Stewart, Paisley	10
Alexr. Macdonald, Oxford	10
W. H. Stopford, Halifax	10
W. C. Way, Newcastle-on-Tyne	10
John Parler, St. Thomas, Charleston	10
W. J. Baker, Southampton	10
J. B. Birkenmyer, Exeter	10
Robert Cochrane, Norwich	10
Peter Chaudler, Hull	10
W. T. Griffiths, Ipswich	10
John Finnie, Liverpool (South District)	10
R. C. Puckett, Bath	10

ANOTHER "CAMBRIDGE THOUGHT"

Alas! that feet by "seedy Cam" that stray
Should gladly turn to strife's unallotted way!
Alas! that eyes which scan these classic meads
Hail Discord's promise in her scatter'd seeds!
That ears which "neath the lofty Tudor vault"
Drink in high music, still are so at fault!
To deem the trumpet "sings" which shrieks to scorn
Old Wisdom's utterances—vain to warn!
Not such the lore on Cam's still margin taught.
Hear some few truths with long experience fraught,
Old Time old Error for new Truth shall see;
Hard reasoning makes the black seem white—not be;
The man's gray hair is still the worst;
Who feed the bubble, Change—shall feel it burst.

SENIOR BOX SARKEN.

MONUMENTAL.

The Clyde Statue.—A statue of Lord Clyde, erected by public subscription of the citizens of Glasgow, has been publicly unveiled in George-square, in that city, in presence of a large concourse of spectators. Sir James Campbell, on behalf of the statue committee, formally handed over the monument to the city corporation, and the Lord Provost, in a few suitable remarks, accepted the trust. The statue, which has been executed by Foley, occupies a site close by that of Flaxman's Sir John Moore. It represents Lord Clyde in a military nodding, standing erect with left foot advanced. The left hand, grasping a telescope, rests on the stump of a palm-tree, while the right, hanging by the side, holds a sort of velvet cap, encircled with an Indian veil.

Statue of the late King of the Belgians, at Antwerp.—This statue has been inaugurated with great rejoicings. Leopold I. is on horseback, and in the act of saluting. The monument is of bronze, and is the work of Joseph Geefs. The pedestal is of blue stone, the stone of Belgium. Four inscriptions are engraved on it; the first reads thus: "The commerce and population of Antwerp to Leopold, the First King of Independent Belgium. Voted, 1856; erected, 1868."

Monument to Archdeacon Phelps at Reading.—A mural tablet in memory of the late Archdeacon Phelps has just been erected in Grey Friars Church, Reading. The tablet is fixed to the south wall of the nave, and is supported on stone corbels. The general feature is a foliated arch, resting on two dark marble columns, and enclosing a panel of white marble bearing the inscription. The monument is executed in red Mansfield stone, and is designed to harmonise in style and character with the architecture of the church. The tablet was designed by Mr. Woodman, architect, and the work has been executed by Messrs. Wheeler, all of Reading.

THE ELEVATIONS ON THE HOLBORN VIADUCT.

It has been stated in the Times that the utmost freedom and variety are to be allowed in the architecture of the buildings about to be erected on the line of the Holborn Viaduct; there appears to be an impression that this will scarcely turn out to be so practically. A "Lover of Variety," writing to us, says,—"I have felt bound to inquire particularly as to the facts. The conditions (printed) bind the lessee to submit an elevation within two months for the approval of the committee. He is to make any modification that the City architect may direct; and if no elevation is submitted the City architect is to make one, to which the lessee must bind. If one party take a portion only of a block, he is to agree with his neighbours as to the elevation, and the City architect is to approve or direct an elevation of his own to be adopted by all the workmen, so as to secure uniformity. The blocks are very long indeed, as a rule. I am perfectly satisfied that the intention is not to permit variety, as pleasingly depicted in the Times article, but to hedge the matter round with such restrictions as will produce uniformity, and that of the design prepared already. The conditions may be seen by any one at the architect's office, Guildhall. As to their practical operation, there are more than one architect already who could tell you a story."—We shall hope to find that uniformity will be avoided.

THE HOLBORN VIADUCT AND ITS PROGRESS.

SIR,—In July, 1865, tenders were sent in for the City architect, Mr. Horace Jones's, plan for the Holborn Viaduct. The lowest was that of Messrs. Myers, and the work was, under very heavy penalties, to be completed in nine months from the order to commence. Amount of Messrs. Myers's tender, 239,537l.

In May, 1866, tenders were sent in for the engineer to the Commissioners of Sewers, Mr. William Haywood's, design for the Holborn Viaduct. This design did not include the bridge over Farringdon-street (which Mr. Jones's did). The lowest tender was that of Messrs. Hill & Keddell, 99,837l. This tender was accepted, and on Monday, June 4th, 1866, the work was commenced.

The plan of the bridge across Farringdon-street was settled in the Court of Common Council, on December 6th, 1866. Its cost (afterwards ascertained) is to be under 15,000l. The ironwork only of the bridge is to be by Messrs. Cochrane, Grove, & Co., of Woodside Ironworks, near Dudley.

So, sir, we see that the carrying out of Mr. Jones's plan would have cost, in round figures, 240,000l.; the carrying out of Mr. Haywood's, admittedly inferior, will be 115,000l. These are the constructional costs of the two schemes. But Mr. Jones's viaduct would have been finished and open for traffic (and the ground in a relettable state) in the middle of 1866—nine months after commencement. When Mr. Haywood's will be finished Heaven only knows. It has already been twenty-six months in hand.

In a report of Mr. Joseph Cubitt, who was

consulted in the matter by the Improvement Committee, of which Mr. Deputy Fry is chairman, Mr. Cubitt says that "a reasonable time for the completion of the viaduct would be fifteen months from the date of the order to proceed." This report was received by the Improvement Committee on December 19th, 1865.

The great excuse is that the stone for the bridge is not ready. I will make no remark on the unwise selection of an unprocurable stone for a work which required to be done rapidly. But assuredly there is much more of the viaduct besides the bridge to finish.

Nor will I intrude on your space by quoting from the reports which have from time to time been made to the Corporation and to others as to the immense yearly loss which was inflicted on the public by old Holborn-hill when in its integrity, though I have some of the reports before me. Of course the annual loss now is much greater.

Some day I shall be glad to be allowed to describe the street which is to "wander" from Bartlett's-buildings to Ludgate Valley-circus. Gresham-street is crooked enough, but this street—bah!

JASPER.

RAILWAYS AND THE PUBLIC.

THE article in the last number of the *Builder* under the head of "Railway Fares and Management" induces me to address you the accompanying remarks. It is now about four months ago that you were good enough to notice a pamphlet* I had published on the subject, and since then events have occurred which I think render what I then considered advisable (viz., the transferring the whole system of railways in the United Kingdom to the State) now an urgent necessity. Not that the attempt lately made by the southern railways to impose upon their daily customers when once the directors imagined they had fairly caught them in a trap needs the interference of Government, for I fully believe the inhabitants in those districts will be equal to the occasion, and be able to bring the companies to their senses, but that the possible recurrence of such a course would retard, and in fact altogether prevent, the suburban building schemes which were just commencing to effect so much good for London and other over-crowded cities. This would of course recoil upon the shareholders, who would ultimately be ruined; that is their own affair, but the evil done to the community at large by such impolitic, I might almost say dishonest, measures must in future be guarded against by the State.

The only way that this can be effected is, that all the railways should be united under one management. Without this no considerable saving can be made, and the system cannot be developed as it ought to be; no Boards representing different, and in many cases conflicting, interests, can ever be made to work for the public benefit. The interests are national, and the management, to be effective, must be national also.

The scheme I have briefly sketched out in my pamphlet would prove equally advantageous to the shareholders, the travelling public, and the community at large.

RAPHAEL BRANDON.

THE INFLUENCE OF FOREIGN ARTISTS ON BRITISH ART.

YOUR publication of the discussion of this subject at the Institute of Architects, so far as it referred to principles, gives me the opportunity, which I embrace, of replying to some of the remarks of the speakers who followed me.

I think Professor Donaldson correctly states that the leading object which Mr. Wyatt seemed to have in view was this—"To follow out and to give us the history of the artistic training of the mind, which eventually produced the invention or adoption of a new style of art altogether." It did not appear to me that he succeeded in doing so much as this, and in particular that the assertion he made at the outset respecting the "decrepitude" of the Perpendicular period of English architecture, as compared with subsequent efforts, was unwarrantable, and, though unintentionally, yet really a falsification of the facts of the case. So far from this, I ventured to assert, and beg now to repeat, that no sub-

sequent style in England ever attained to such a "vigorous manhood;" at the same time I am, of course, aware that, judged from a purely artistic point of view, the earlier periods of English Gothic architecture were more elegant and refined, but they had their counterparts on the Continent, whereas the Perpendicular style is unique, and is nowhere else to be found.

"It is curious to observe," says Ferguson in his "History of Architecture," "how different the course of events was in France. While Saxon common sense was gradually coming to the surface in this country, and curbing every fancy for which a good economic reason could not be given, the Celtic fancy of our neighbours broke loose in all the playful vagaries of the Flamboyant style."

The glory of this age of art was its independence of all the world, its self-reliance, and carelessness of its own architectural precedents, with all their numberless claims of matchless beauty—its strong and manly persistence in working out its own ideas of beauty of form and colour, and modes of expression and impression. Granting every defect to exist which our more recent culture has alone enabled us to detect growing out of, and incidental to, the technical excellence of its marvellous masonry and carpentry; *individuality* never was more clearly stamped upon the architecture of this country than at that very period which Professor Donaldson and Mr. Wyatt agree to consider the period of its culminating decrepitude.

The recognition of this historical fact was the chief justification of its employment in the new Houses of Parliament. We had nothing else we could equally claim as a national style of art.

Is there any subsequent style that would bear the same archaeological investigation and yield such rich acclimated fruits, while admitting of the introduction of all the science of the nineteenth century? Will Sir Christopher Wren's Abbey towers bear a moment's comparison? and however sublime his reproduction of Italian architecture undoubtedly is in St. Paul's Cathedral, it is *Italian still*, and cannot be said to be more original or vigorous than Sir Charles Barry's reproduction of English architecture in the palace of Westminster, which alone is *English still*. The problem of ecclesiastical Roman art had been already worked out in Italy, while Barry had to secularize Medieval art and adapt it to a building of the most complex character of modern times. Barry resuscitated a neglected but *national "true style"*. Wren produced an English version of an Italian rendering of a Roman prototype. Therefore I still think I am justified in expressing the opinion that as a matter of fact there is no sufficient evidence given that the architecture of the period in question was in a "state of decrepitude" or that the architecture of Jones and Wren has greater claims to be considered as having attained to a "vigorous manhood." The peculiarities of the style, more especially as they affected fenestration, are thus admirably summed up in that truly philosophical and rigidly impartial history Ferguson's before quoted, which peculiarities should have commended it to those who cannot believe in "sentimentality in any shape."

"It may not be quite clear whether William of Wykeham (1368-1404) invented perpendicular tracery; but certain it is that the admiration excited by his works in this style at Winchester, Oxford, and elsewhere gave a death-blow to the Decorated forms previously in fashion. Although every lover of true art must regret the change, there was a great deal to be said in favour of the new style. It was pre-eminently constructive and reasonable. Nothing in a masonic point of view could be better than the straight lines running through from bottom to top of the window, strengthened by tracings where requisite for support, and doubled in the upper division. The ornaments, too, were all appropriate, and, externally at least, the whole harmonised perfectly with the lines of the building. Internally, the architects were more studious to prepare forms suitable by their dimensions and arrangements for the display of painted glass than to spend much thought on the form of the frames themselves. The poetry of tracery was gone, but it was not in this respect that we miss the poetic feeling of earlier days. The mass was gradually taking the guidance of the work out of the hands of the educated classes, and applying the square and the rule to replace the poetic inspirations of enthusiasts and the delicate imaginings by which they were expressed."

What Wren achieved, however, was an example of the faithful following of a *noble ideal* triumphing over the narrowness of the times in which he lived, and the debased state of the arts in this country which had resulted from Henry's introduction of the imitative styles and patronage of foreign artists in the sixteenth century. The Great Fire of London gave the occasion, and enabled Wren to rise to be the greatest architect of his age; and, considering the difficulties he overcame, "right royal" is a happy appellation by which to designate his achievements. Of his works we have good reason to be proud, and

need nothing but his own monument over his tomb to vindicate his power. If Henry had patronised Englishmen, giving them all the means of self-improvement he had himself enjoyed, what might they not have achieved? Instead of this, he ignored their existence, and fostered foreigners, introducing a system of art-larceny as demoralising as it was vain. Till then art had developed for good or ill from one native phase to another. Thereafter it was made a matter of merchandise, and was bought and sold ready made, and borrowed plumes were accounted more valuable than native worth. The power was there, independent thought and technical excellence; it needed only opportunity and time to further develop itself as knowledge increased. Henry was too impatient, and killed the goose to get the golden eggs all at once. The following title of an Act which received the royal assent in the thirty-first year of his reign does not say much for the liberality of his mind—"An Act for abolishing diversity of opinions, &c."

Mr. Wyatt reiterates an apparent truth when he says that "embodiments of beauty were given to the world by men given up to vices and evil passions;" but his statement of an apparent fact is beside my argument. I do not deny that bad men have produced splendid specimens of art; but I affirm that they cannot reach the *highest*. I believe that their works would have been nobler, sublimer, diviner, nearer to nature, and sweeter to observers, had they been executed under higher ideas or ideals, and that no art deserving the epithet of a *new creation* is possible that denies the necessity or ignores the influence of the exercise of the noblest part of our nature, of which it should be the visible expression. But this seems to me so obvious, and is, to a certain extent, admitted by Mr. Wyatt, that I need not add another word in reply to Professor Kerr, who "takes leave to criticise in what is (I hope, I may say, without being at all offensive) not the most elevated style of criticism that can be adopted under the circumstances."

EDWARD C. ROBINS.

A LONDON WANT.

WITH some reason a correspondent, "J. T. D.," writes,—A mania for theatre-building seems to have set in, and capitalists are found willing to speculate largely in this very doubtfully profitable field of enterprise. Meanwhile, those who have the means of supplying something London positively needs, and which fairly managed could scarce fail to pay,—a good hall or several halls for lectures and meetings in the heart of the metropolis and the more dense and demonstrative of the outlying boroughs, such as South-wark and Lambeth and the great East-end,—make no effort in the right direction. Could not you point to the neglect with a view to its being remedied?

THE SCIENCE OF COLOUR.

SINCE I wrote the letter you were good enough to insert in the *Builder* of the 8th inst. I have obtained Mr. Benson's book, which I have read through carefully. It well deserves perusal, being a very interesting work, containing much subject for consideration, and many coloured diagrams, illustrating his natural theory of colour. But though I admire the ingenuity and ability with which this book is composed, I more strongly than ever contest its correctness. I do not believe that blue, green, and red are the primary or fundamental colours of light. I am not convinced by any of the experiments. On the contrary, I cite this strong illustration. If you look through a prism on a page of the coloured diagrams on a black ground, you will perceive a strong reflection of blue above every example. If you look at the same examples on a white ground, you will see a reflection of deep yellow over each. Thus, yellow is to white what blue is to black. How can you ignore yellow and retain blue as a primary?

I lay no claim to a philosophical knowledge of the subject, but I have the opinion that light emanates from electric action; that the positive pole is represented by yellow deepening to orange and red, and the negative by blue intensifying to violet.

As to the experiments made by a piece of plate-glass bringing the reflection of one colour upon another, I consider them most interesting

* "Railways and the Public."

and most inconclusive. It is true that if you reflect the yellow upon the blue you produce a grey tone, but that is probably caused by the opacity of the yellow shading, and not commingling with the blue; a deep blue, on the other hand, seems to have little power when reflected on the yellow, and alters it but slightly.

I will not attempt to enter further on this subject at present, it would take up too much space in your valuable paper; but I have felt bound to respond to the appeal of Mr. Benson in your last number.

JOHN G. CRACE.

SEA-WATER FOR TOWNS.

A CORRESPONDENT—J. F. Wadmore—repeats a suggestion before now made in our pages—

Reading the paper in your last number on the insufficient and defective state of our water supplies, in all places, but chiefly in our large towns and manufacturing districts, reveals a state of things in this our nineteenth century which, with all our luxuries, shows a want of one of the first necessities of our existence.

It has often occurred to me, and must have done so frequently to others, that much of this waste might be saved, and the health of many of our towns greatly improved, by the use of sea-water, where practicable. For instance, baths and washhouses, when used for the purpose of ablution, and in the case of road and street watering, flushing of sewers, and other kindred purposes. There are of course many places where the levels would be an insuperable objection to its adaptation, but in others ordinary hydraulic appliances might be made available for its transit; and a stationary engine-house, at intervals, calculated according to heights and distances would, either with a canal or iron pipes, be all that was necessary to insure an abundant supply.

With respect to the metropolis, it would not be necessary to go further than Herne Bay, and in Liverpool a less distance would suffice; and a reservoir on Shooter's-hill, Hampstead, or other spots, would have sufficient elevation for the supply of the greater portion of our great city.

With regard to the expense, I do not conceive that it would be more than any of our similar works, and might form a fit and proper object for the Metropolitan Board of Works to carry out, seeing that it would be greatly for the common good, and, in a sanitary point of view, of incalculable benefit to all classes, whether rich or poor.

On the walls of the heltry are four tablets, on which are recorded certain exploits of the "College Youths" and "Cumberlands."

The present ringers, who are members of the Cumberland Society, attend for practice every alternate Tuesday evening, the faithful steeple-keeper, Mr. John Cox, being the conductor.

THOMAS WALESBY.

WALWORTH COMMON ESTATE COMPETITION.

SIR,—In your paper of the 8th instant you inserted a letter sent to the guardians by the unsuccessful competitors, protesting against their award, premiums having been given to plans which in several important points did not comply with their printed instructions, and, at the same time, asking them to appoint a professional man to go through the plans and decide on the merits.

Enclosed I send the reply received from the clerk to the Board, and, as it is evident that any further appeal to them on moral or equitable grounds would be utterly useless, the only course left open to us is to take such legal steps to enforce a fair adjustment of our claims as we may be advised.

A. G. HENNELL.

The clerk, in reply, forwards the following:—Resolution: "That the Board have already decided the question, and see no reason to reopen it."

SIR,—No doubt in competitions of this kind one or two competitors will be dissatisfied with the result, and will vent themselves through the columns of a newspaper, and after which the profession cannot shut their eyes to such facts, and competitors complain of a great injustice being done to them, and expose it by every means in their power, and by a formal protest published in many journals calling upon the Board of guardians to do them justice by re-considering their decision, and pointing out to them their mistake, it becomes a very different matter indeed, and the public, as well as the profession, are naturally well looked for a satisfactory explanation.

But what has been the result? The guardians of St. Mary's, Newington, have refused to give these gentlemen any satisfaction beyond telling them "the matter is decided."

I would ask, is this the proper course for a public Board to adopt? and are they at liberty to induce, by advertisement and printed instructions, a number of professional gentlemen to expend two months of their time, and money, in getting up plans for an honest competition, to find that the only two plans out of twenty-two sent in which have not complied with those instructions, are pronounced of inferior merit, are the ones to which the principal premiums are awarded, and then to be told the matter is decided?

Is there no redress for such injustice? Are the rate-payers aware of this fact? and do they agree with the selection made by the guardians (which has been pronounced by every notice I saw the plans to be most outrageous)? I cannot believe it.

E. R.

COLOUR BLINDNESS.

CAN you or any of your correspondents inform me whether there is any remedy for what is termed "colour blindness"? In my case I cannot, with confidence, distinguish some greens from browns or drabs, although when they are all together I can see the difference, but not apart. Is there any artificial means of producing the effect of gas or candle light upon green? If so I could tell a green at once by its bluish hue. I can, without the least difficulty, distinguish every other colour, whether compound or primitive. If you could give me any information on this difficulty you would greatly oblige

A DECORATIVE ARTIST.

THE GRASS IN THE PARKS.

SIR,—I am anxious your useful journal should draw the public attention to the state of the ornamental grass in the parks. Great pains and expense were expended in making the garden in Hyde Park, between the Marble Arch and Stenhope Gate. The grass which makes good a contrast to the flowers when kept green and close, has a very dull brown appearance, not from the great heat, but from the carelessness of those who have the charge of it. When watering the flower borders, the men water the ribbon borders with a watering-pot, treading daily on the same spot. The consequence is that the grass is entirely worn away. There is a long hose used daily on some of the beds—why could it not be used here? On the opposite side of the road, the old reservoir was made a quasi-ornamental garden, with sloping grass sides. To protect this bank, iron railings were placed, but children would make this a playground, and the principal amusement seems to be to run up and down the bank till nearly all the grass has disappeared. Again, the new fountain, erected by a well-intending Censor, has plots of grass at each angle, equally protected by iron railings; but this is tempting to get over; consequently, from the children playing on the plots, the grass has disappeared. Nothing is prettier than a nicely-kept garden; but nothing so invitingly neat as an unscrupled one. If the expense of maintaining these gardens in a proper condition is too great, let them be done away with, and let the flowers and ornamental grass be reduced to such dimensions as funds will allow. A new hobby has sprung up on the south side, which is most carefully tended; but do not let the old love be neglected when, with a little pains, we might get an ornament. Let us not lose on idleness.

AN OLD SUBSCRIBER.

THE PROPOSED MORTUARY, ST. MARY-LEBONE.

THE following is the official description of this establishment, as furnished to the vestry of St. Marylebone by its chief surveyor, Mr. T. Gant Browning:—

"The style of the building is to be very plain Egyptian, 23 ft. long, 18 ft. wide, and 17 ft. high, the walls of brick-work stuccoed, and the floor of stone, covered in by an iron roof, which will have the centre part only filled in with rough glass. The other portion of roof, measuring nearly three-fourths of the whole area, will be covered in with slates, hoarding, and felt.

For the purpose of admitting fresh air to the floor level, there will be a trench the whole length on each side of the building, covered with an iron grating; each trench will have five communications with the external atmosphere by means of air-bricks.

For the escape of vitiated air there will be an opening at least 3 in. wide all round the eaves of the roof, and the upper part will be entirely open, but protected from rain by means of a projecting frame glazed with rough glass, and kept sufficiently high to admit of a very free escape of the impure air which may ascend into the upper part of the roof."

CONSPIRACY AND INTIMIDATION BY MASONS.

THE first sentence on "picketing" has been pronounced on the case of the Sheffield masons, charged by their employer, Mr. James Powell, with conspiracy and intimidation. This was the case tried at the Midland Circuit, in the Crown Court, Leeds, before Mr. Justice Lush, in which John Sheridan, Isaac Morton, John Morton, Henry Hinchcliffe, James Butler, Alfred Staley, Joseph Armstrong, and Daniel Sanderson were indicted for unlawfully conspiring together to injure James Powell in his trade as a mason and builder, by molesting, obstructing, and using threats and intimidation to such workmen as might be willing to be employed, and also with prejudicing, injuring, and oppressing James Powell in his trade, and with detaching certain workmen from continuing to work for him at Sheffield, on the 15th of April, and on other dates. The indictment contained twenty-five counts, varying the statement of the offence.

For the prosecution it was stated that Mr. James Powell had contracted to build a house at Sheffield, and had a quarry about six miles from the site of the building. He found it more convenient to dress the stone at the quarry than to carry it to the building in the rough, and there chip and dress it. On the first day he attempted to carry out this plan two of the defendants, Sheridan and Isaac Morton, came to see him, and informed him that the course that he was pursuing was contrary to their code of rules. He replied that their rules were nothing to him, and he should pursue his own course. Sheridan said there was a builder who had refused to set according to the rules, and he had become a ruined man, and was obliged to leave that part of the country. He added that he did not mean this as an intimidation. The following day Mr. Powell's men struck. He told them that unless they returned to work before the following Monday he should find others to do the work. He then sent to London for workmen, and eight men came. They were to come to work the following morning. They did not come. They had been spoken to, and advised not to work for Mr. Powell, as it was a "black" job. There was a club held at the Dog and Partridge public-house, where the men from London were invited to go, and where they went, and were advised not to work, and persuaded to leave the town, and received a few shillings to enable them to leave. On the road from the lodgings of the London men to the building there were men standing as pickets, and there were often small crowds of men standing about and shouting, "Bah! black sheep!" but these ceased as soon as Mr. Powell looked round. The eight men all left Sheffield without doing any work. Mr. Powell afterwards procured three others from London. They went to work the first day, but the following day they also were persuaded to go. Large placards were posted about the town, which was a "Notice to Stonemasons," advising masons not to work with Mr. Powell, as he had broken one of the rules. Advertisements were also put into two Sheffield newspapers to the same effect.

It appeared that there was a rule of the Masons' Union that piecework should not be done, and the defendants appeared to think that the having the work done at the building instead of at the quarry would be in the nature of piecework.

At the close of the case for the prosecution Mr. Seymour, Q.C., submitted that there was no evidence of a conspiracy to do an unlawful act.

His Lordship said there was a question for the jury if men put themselves in a road and shouted for the purpose of making others think they would be molested: the question for the jury is *quo animo* the act was done. It must be by some threat or intimidation—that is, by some working upon the fears of the party.

Mr. Fitzjames Stephen, Q.C., submitted that there was no evidence of an agreement to do an unlawful act. The presence of the men at the club and the advice they gave Mr. Powell, and so giving him the money, so also was the placard and the advertisements. With respect to shouting on the road, no one was present at the time except Hinchcliffe.

His Lordship still thought the case ought to go to the jury, but he thought there was no evidence of any threat or intimidation to the master. The case would therefore be confined to intimidating or molesting the workmen.

Mr. Seymour, Q.C., having addressed the jury for the defendants.

The Judge summed up the law and the facts with great care, and the jury found three of the men—Armstrong, Hinchcliffe, and Sanderson—guilty of intimidation. On pronouncing sentence, the Judge said,—My learned colleague and myself have considered the circumstances of your case with a view of determining what sentence we ought to pass upon you, and we have come to the conclusion that we cannot deal with you as he (Mr. Baron Bramwell) dealt with the prisoners whom he tried at the Old Bailey some time ago for the same offence. The question of picketing came then for the first time before a criminal court—its legal quality had not previously been declared—and at the close of a long trial the defendants and the other members of the union to which they belonged expressed themselves satisfied that they had com-

THE BELLS OF ST. BRIDE'S, FLEET STREET.

THE beautiful steeple of the Church of St. Bride—or St. Bridget—by Sir Christopher Wren, contains a melodious peal of twelve bells in D, the weight of the largest bell, or tenor, being 28 cwt.

These bells, as intimated in my former paper on the peal at St. Martin's, were cast by Abraham Rudhall, of Gloucester, and they respectively bear the following inscriptions:—

1. Prosperity to all our benefactors. A.R. 1719.
2. Prosperity to all our benefactors. A.R. 1719.
3. Michael Evans, Frel. of Westminster, and Vicar of St. Bride's. 1719.
4. A.R. 1719.
5. John Eocking, Thomas Colborn, Churchwardens. S.K. fecit, 1736.
6. Abraham Page and Phillip Robinson, Common Councilmen. S.K. fecit, 1736.
7. Abraham Rudhall, bell-founder. 1719.
8. Peace and good neighbourhood. God save the Church and Queen.
9. Prosperity to all our benefactors. A.R. 1710.
10. Abraham Rudhall, of Gloucester.
11. Prosperity to England. Mr. John Grainger, Mr. John Hathaway, churchwardens. Mr. Andrew Redgate, Mr. John Jackson.
12. A.R. 1710.

The bells Nos. 3 to 12, forming a peal of ten, were made in 1710, and Nos. 1 and 2, making a peal of twelve, were cast in 1719.

The fifth and sixth bells were re-cast in 1736, by Samuel Knight, of London, founder of the grand peal at St. Saviour's, Southwark.

As I have said, the first and second bells of the present peal of twelve were cast in 1719. I may add that "they were purchased with the joint subscriptions of the 'College Youths' and 'Loudon Scholars,'—afterwards, 'Cumberlands,'—for their own practice, and were kept secured from the use of other ringing societies some time afterwards by means of a chain affixed to each bell."

mitted a breach of the law. Moreover, they saw they could not adopt the practice of picketing, so as to be of any use to themselves, without violating the law, and they therefore gave an assurance that the practice should be discontinued for the future; and upon that ground it was that my learned colleague felt himself justified in discharging them without passing any sentence at all, merely getting them to enter in their own recognisances to appear for judgment when called upon. You (to the defendants) have deliberately, and with knowledge of the case to which I have just been alluding, attempted to practice picketing; and you have done it, according to the finding of the jury, upon which I must act, by means of intimidation and annoyance, and therefore brought yourselves within the criminal law. I can readily believe what was stated by your counsel, that you took legal advice before you so acted, and that you intended to keep yourselves within the limits of the law. But I cannot sympathise with persons who, for the purpose of injuring another, intended to go to the verge of the law, and happen to be betrayed beyond it. I hope this will be a warning to you and others not to enter upon a practice so perilous, because you cannot say how far you may be led beyond the point marked out for yourselves. I feel bound to pass a sentence upon you in order to deter others from following your example, and to teach you and others that the law, while it will protect you to the full in the enjoyment of your rights, will also compel you to respect the rights of others. The sentence upon each of you is, that you be imprisoned for four calendar months.

CASES UNDER METROPOLITAN BUILDING ACT.

NOTICE TO DISTRICT SURVEYOR.

Of the 31st ultimo, at the Clerkenwell Police-court, Mr. Cumber, one of the partners in the firm of Messrs. John Nutt & Co., the contractors for the erection of Lisington new work house, appeared in answer to a complaint preferred against him by Mr. John Turner, the district surveyor of the eastern division of Lisington, under the Metropolitan Building Act, for that he had not given him a proper and sufficient notice, under the 38th section of the said Act, whereby he was unable to carry out the duties of his office in reference to public buildings.

Mr. Joseph Turner, solicitor, in stating the case on behalf of the district surveyor, said that the district surveyor had written to Messrs. Nutt & Co. in reference to the insufficiency of information given in the notice, and requesting them to submit the drawings and plans of the proposed work for his approval, and had also laid the case before the superintending architect of the Metropolitan Board of Works, who had communicated to Messrs. Nutt & Co. that the usual practice of builders was to give the district surveyor, in such cases as this, copies of the plans, &c., and that as they had still failed to supply that information, and the building was in course of erection, he, the district surveyor, therefore deemed it necessary to take these proceedings, and contended that the notice given by Messrs. Nutt was not a sufficient notice, inasmuch as "the area, height, &c., of the proposed building or buildings" were not given, and that consequently it was impossible for the district surveyor to approve of the construction thereof, as required by the 38th section of the Act, which provides that "every public building, including the walls, roofs, floors, galleries, and staircases shall be constructed in such manner as approved by the district surveyor."

The notice given was then put in. Mr. Cumber, on the part of Messrs. Nutt, admitted the insufficiency of the notice, but submitted they could give no further information, as the plans and drawings were not in their hands, and the architect to the building had prohibited any copies being made of them. An adjournment was agreed to, at the suggestion of the magistrate (Mr. Barker), to enable the defendants to supply the necessary information and particulars.

At the adjourned hearing of the case, on the 14th inst., it was stated by the solicitor that some further particulars had been given to the district surveyor of the buildings in course of erection, but that these were not sufficient to enable him to approve or object to the construction of the buildings. Mr. Cumber said Messrs. Nutt had written to the Board of Guardians, acquainting them of these proceedings, and requesting that copies of the plans might be forwarded to the district surveyor, and that the district surveyor had been informed the plans might be inspected at the clerk of the works' office on the ground, and that they had never before been required to furnish such plans, &c.

Mr. Barker expressed his sense of the hardship it was upon Messrs. Nutt to have to supply particulars, &c., which they had not received from the architect, and that he should have arranged by this time to give the information necessary for the district surveyor, and he decided the notice was not sufficient, and imposed a penalty of £5, and 2s. costs.

PROVINCIAL NEWS.

Framlingham (Suffolk).—The people's hall here, which, with its staircase, turret, &c., forms a conspicuous object on entering the town from the railway, has lately been opened. It comprises large hall, reading and committee rooms, and other conveniences. The works have been executed under Mr. Sugden, of Leek, architect, by Mr. Bedwell, of Braddeston, near Wickham Market.

Leek (Staffordshire).—The guardians of the Leek union have decided on the erection of male and female fever and convalescent wards, with nurses' rooms, baths, &c., in connexion with the union workhouse at Leek. The arrangements of the proposed new buildings include such provisions as the experience in hospital construction of late years has shown to be indispensable in such buildings. Mr. Sugden, of Leek, is the architect.

Newham.—The Severn Bank Hotel, Newham, has been opened. The building consists, on the ground floor, of a vestibule hall and corridor, from which access is obtained to a series of rooms devoted to what is called the "service" of the hotel—viz., bar, manager, porter, still-room, larder, china pantry, staircases, &c.; and down a few steps are a spacious kitchen, scullery, cook's pantry, larder, and coal and wood stores, &c. For the visitors there is a coffee-room, 40 ft. by 22 ft., and a commercial and smoking room, with a billiard-room. A balcony runs round the river front, from which are obtained views of the Severn and surrounding scenery. There is a roomy staircase to the first and second floors, and on the first are three large sitting-rooms, each communicating with bedrooms, and four other bedrooms, with bathroom conveniences, housemaids' closet, &c. The next floor contains ten bedrooms. The elevations are executed in red brick, with Bath stone dressings. The grounds are only partially laid out, but it is intended to form terraces. The building is fitted up with hot and cold water on every floor, and gas. The contract for the works was taken by Mr. J. Coleman, of Cheshill, builder. The architect under whose superintendence the works have been carried out is Mr. A. W. Mahery, of Gloucester.

Scarborough.—The commissioners of the piers and harbour of Scarborough have received twenty-three plans from engineers for the proposed extension of the harbour. The following list shows the names of the competitors, with the estimates of cost of their respective schemes: Cabitt, Westminster, 22,000l. and 25,000l.; Cox, Westminster, 5,482l.; Whitaker, Lambeth, 16,000l. and 21,000l.; Shelford & Robinson, Westminster, 16,752l.; Haughton, London, 45,180l. and 19,885l.; A. Scott, London, 14,481l.; Forrest, Westminster, 23,511l.; M. Scott, Westminster, 19,000l. and 25,000l.; Pain, Westminster, 16,972l.; J. E. Dowson, Scarborough, 7,700l. and 18,620l.; Henslow, Lynn, 35,016l.; Wise, London, 25,000l.; Casbourne, West Hartlepool, 11,348l.; West, Boxmoor, 52,416l.; Cooper, Leeds, 30,203l.; Lang, Manchester, 28,000l., 40,000l., and 52,000l.; Donl, Westminster, 30,000l.; J. D. Climie, Scarborough, 15,228l.; J. Austin, Scarborough, 17,135l.; Nisbet, Sunderland, 7,500l. and 9,500l.; W. Climie, Scarborough, 14,460l.; Redman, Westminster, 18,000l. and 24,000l.; Lintock, Liverpool, 14,600l. With but two or three exceptions, the several schemes do not differ very widely as to the proposal in the main, which was to erect a new pier to the west of the present western pier, the latter and the island pier to be removed.

Great Yarmouth.—The Octagonal Tower at the Trinity Works, rising to the height of 75 ft., is now completed, and, from its position at the south end of the town, forms a conspicuous object. The view from the summit is extensive. The contractor was Mr. Bennett, and Mr. Williams superintended the works.

Holywell.—The corner-stone of the new wing of the Girls' Orphanage at Pantasaph, near Holywell, has been laid by Lady Clare Feilding. The new buildings are from the designs of Mr. Edmund Kirby, architect, Liverpool.

CHURCH-BUILDING NEWS.

East Aclam.—The ancient parish church of East Aclam, dedicated to St. John the Baptist, having become very dilapidated through age, was some time ago pulled down and a new edifice has been erected on the same site, and was lately opened for divine worship. In style of architecture the new church is Early English. It consists of a nave and chancel and western tower. The porch is on the south side of the nave, and the vestry is on the north side of the chancel. The roof is high pitched and open timbered, and covered in with grey slates. The nave is fitted up with open seats of deal wood stained and varnished, and they are provided with book boards. The stalls in the chancel are of oak, and so are the pulpit, lectern, and reading-desk, the former standing at the entrance to the chancel on the north side, and the two latter on the opposite side. The altar-rail of oak is supported by iron standards, and underneath the east window is the reredos, which is composed of encaustic tiles of various patterns, and in the centre is a cross. This is the work of Messrs. Maw & Co., of Broseley, in Shropshire. The new structure has cost about 1,250l. The whole of the stone and sand which have been

used in the erection of the new church were gratuitously given by the Crown, from the estate in the parish belonging to the Woods and Forests. The extreme inside length of the church from the east wall of the chancel to the west wall under the tower, is about 80 ft., the width of the nave is 25 ft., and the breadth of the chancel 20 ft.; the height from the floor to the apex of the roof being nearly 40 ft. The windows have all trefoil heads, and are filled in with cathedral glass, and have coloured margins. The east window is of three lights, that in the centre being much larger than the side lights. The west window is of two lights, and those in the side-walls of the chancel and nave are lancets, and also of two lights each. The font, which is of Caen stone, is situated between the porch and the tower on the south side of the nave. The flooring is laid down with coloured tiles.

Womersley.—The ancient church at Womersley, after being closed for twelve months, during which time it has been restored, has been reopened for divine worship. Mr. Crossland, of Leeds, a pupil of Mr. Scott's, has carried out the restoration. The entire flooring has been lowered about a foot, the previously buried bases of the pillars brought to light, and the defaced and almost obliterated capitals restored. The whole interior of the building, which is a mixture of the Norman and Early English styles, and appears to have been built in the thirteenth century, during the transitional period of architecture between the Norman and English, has been so scraped and renovated as to considerably lighten the appearance of the dull and heavy masonry. Various unsightly objects, in the shape of an ugly gallery and high-backed pews, have been removed, the latter being replaced with the more modern open sittings, and re-arranged so as to increase the accommodation of the building,—seats being now provided for about 230 persons. A number of old round Venetian windows in the chancel, south aisle, and transept have also shared a similar fate, and the light is now admitted through some Decorated ones, in which, however, the general style of the architecture of the building is carried out. In addition to this the chancel has been improved by a stained glass window, by Hardman, which has been put in by the Hon. Stanhope Hawke. The subject chosen for illumination is the Resurrection of our Lord, which forms the centre, and on one side is a representation of His appearance to Thomas, and on the other of His appearance to Mary Magdalen. Another stained glass window, by Gibbs, but not yet completed, presented by Lady Louisa Cator, is also to be put in at the opposite end of the church. An organ, costing upwards of 200l., and entirely paid for by the parishioners and their friends, has taken the place of the less pretending harmonium. This has been built by Mr. Brindley, of Sheffield, and is placed in a side chapel. The screen-case is constructed to suit the church, and the front pipes arc decorated.

Weymouth.—St. John's Church has been enlarged. The nave has been prolonged 15 ft., and the transepts extended 6 ft., besides being made double the original width and divided by arcades. The chancel has received an extra length of 9 ft., and a chancel chapel has been added, also a porch facing the Preston road, while on the opposite side have been built vestries for the clergy and choir, and also an organ chamber. The enlargement has secured accommodation for about 320 persons. Mr. Dodson was the contractor. The enlargement has given an opportunity to various benefactors to beautify the church by memorial windows inserted in the chancel and transepts, in addition to the two windows placed in the east and west ends of the edifice, the former by Captain Hawkins, and the latter by the present incumbent. The windows in the north and south sides of the chancel have been bestowed by Mr. W. Thompson. The northern represents the meeting of the Saviour and Mary Magdalen in the garden. The southern portrays the three women going to the sepulchre, after the Lord's resurrection, and being met by the angel, who addresses them, "Why seek ye the living among the dead?" These windows were executed by Messrs. Ward & Hughes, of Solo, the makers also of the western window. Dr. Smith has also placed two windows in the south transept. One of these represents the principal personages of the *Te Deum*. The other window has for its subject the 4th chapter of Revelations—St. John beholding the throne of God in heaven, with the four-and-twenty elders worshipping, and the seven lamps of fire burn-

ing. In the north chancel a stained window symbolises the raising of Lazarus from the dead. The other window remains unfiled, except by rough glass. The last-named stained window was supplied by Lavers & Barrard, of London. The reredos has been backed with Portland stone, and will shortly be illuminated with the commandments, &c. The chancel aisle is distinguished by moulded shafts, the only occurrence of this class of sculpture throughout the church. The choir stalls in the chancel are of plain oak, with carved poppy-leaves at the ends. The organ has been removed to the chamber on the side opposite where it formerly stood. The chancel has been raised 3 ft., and the space within the communion-rails 18 in. A new chancel arch has also been built, with the capitals carved with foliage. The church has been plastered throughout, the roof cleaned, and the pews re-varnished.

Liverpool.—The foundation-stone of a new church, to be called St. Nathaniel's Church, for the Windsor district, Toxteth Park, has been laid. The site of the church has been chosen in Oliver-street, occupying a central position in the midst of a dense population. The site is irregular in shape, being bounded on three of its sides by Pine, Grove, Oliver, and Dinorchen streets, in consequence of which the architect's arrangement of plan has been somewhat restricted. The general form of the building is that of a nave and aisle church, with western tower, chancel transepts, and large circular chancel apse, the whole width of nave. One of the transepts is devoted to children's seats, and the other to the organ-chamber and vestry, &c. The nave and aisles are divided by an arcade of four arches, which support a lofty clearstory. The roof of the church will be constructed in the form of a barrel vault, without tie-beams, and is designed for painted decorations at a future period. The seats, one-half of which are to be free and unappropriated, will be of open benches. The structure is intended to be built entirely of brick, no plaster whatever being used. The tower and slated spire will be carried to a height of 110 ft., and will form a prominent object from the surrounding neighbourhood. The style of the edifice is twelfth-century Gothic, partaking much of the character of the brick erections of Northern Italy, and dependent for effect rather upon proportion and simplicity of detail than ornamentation. The cost of the edifice complete will be about 3,600*l.*, accommodation being provided for about 750. The contractor for the works, which will be completed by March next year, is Mr. William Murphy, the architect being Mr. David Walker, Liverpool.

Hulme.—The foundation-stone of St. Stephen's Church, Gloucester-place, Hulme, has been laid by the Earl of Ellesmere. Since the schools and master's house were built, a parsonage has also been erected on the adjoining plot of ground. The group of buildings is now being completed by the church, which is rising on the site at the corner of Gloucester-place and the City-road. Its plan is simple, consisting of a broad nave of three bays or arches in length; aisles, which are carried on round the west end of the nave; a chancel, the full width of the nave; chancel aisles; organ-chamber; vestries, &c. The roofs of nave and chancel are on the same level, and the point where they meet is marked by a belfry or *flèche*, that will rise to a height of 86 ft. from the ground. The chancel is turned towards the city road. The wall, to a height of about 18 ft., will be unpierced by window, door, or any opening, but will be relieved by a brick arcade. The chancel window is of large dimensions, being about 30 ft. high by 15 ft. wide. The chancel gable will be about three times as high as the two-storied house adjoining. The architects are Messrs. Medland Taylor and Henry Taylor.

Kildale, in Cleveland.—The Church of St. Cuthbert, at Kildale, in Cleveland, has been rebuilt, and re-opened for divine service. The old fabric, now demolished and supplanted by the present structure, was very old and dilapidated. At first it was thought that it might be restored and enlarged, and, as it consisted only of a nave and chancel, that a north aisle might be added, and some portions of the chancel repaired. Mr. G. F. Jones, of York, architect, received instructions to this extent merely, but he found that the walls were so dilapidated, and the structure generally so decayed, that any attempt to patch it up would be a waste of money. Shortly after plans and drawings were prepared for a new edifice the arrangements were completed for the building of the new church, whose style of archi-

ture is that of the Early Geometric. The stone of which it is erected was obtained gratuitously from a quarry on the estate of the second son of Captain Turton, of Larpool Hall, the quarry being about two miles distant from Kildale. The church is built of pitched faced walling and chiselled dressings, and the stone is of a durable character. The church consists of a nave, chancel, and north aisle, the entire inside length from east to west being 81 ft. The nave is 44 ft. long by 19 ft. in width, and the space between the floor and the central part of the roof is 29 ft. The north aisle is the same length as the nave (44 ft.), and its width is 10 ft., the extreme inside breadth of nave and aisle together being 81 ft. The chancel is in length 26 ft., by 15 ft. in width, the height to the apex of the roof being less by 3 ft. than that of the nave—namely, 26 ft. On the north side of the chancel there is an organ chamber and a small robing closet. The tower, which stands at the west end of the nave, is 66 ft. in height to the apex of the slanting roof. The chancel floor is laid down with Maikin & Co.'s encaustic tiles. The floor of the nave consists of dressed flags. The roofs of the chancel, nave, and north aisle are open timbered and hoarded, and they are covered in with Westmoreland slates. The seats in the church are wooden, and of deal wood, stained and varnished, the ends being of pitch pine. The seats in the chancel and at the east end of the north aisle are of oak, and also the pulpit and reading-desk. The east window is of three lights, and Geometric in character. Those in the chancel are cusped lancets, and the lights in the north aisle are also lancets. The windows in the south wall are of three lights, and the whole are filled in with cathedral glass and stained margin, with the exception of the two-light window in the west wall underneath the tower. This window is filled in with stained glass of Early Geometric pattern, and the tracery is a simple quatrefoil, also of Geometric design. The architect, Mr. G. F. Jones, has presented this window. Messrs. Hodgson, of York, have completed the filling in of the windows throughout, and Mr. Cole, of York, has executed the carved work of the church internally and externally. The present structure is larger than its predecessor, but only accommodates about 200 persons. The expense incurred has been about 2,000*l.* The tower of the church has been rebuilt by subscription.

DISSENTING CHURCH-BUILDING NEWS.

Calne (Wilts).—The Free Church here, which has been reared and completed in something less than twelve months, has been opened for divine service. Mr. Stent, of Warminster, was the architect. It stands in the centre of the town, in a somewhat confined situation, in Church-street—the site formerly occupied by the old Bear Inn. The style is Early English. The extreme length of the building inside is 91 ft. (the chancel being 21 ft.), the width 37 ft., and sufficient accommodation is provided for seating a congregation of 420 persons, or more, if required. All the sittings are open, and half of them will be unappropriated—for the use of the poor. The nave terminates with a circular chancel, lighted by six lancet windows, filled in with stained glass of a quiet design; and a tracery west window, of suitable stained glass, modifies the lighting of the church, which, in other respects, is lighted with tinted cathedral glass. The roof throughout is of open wood-work. The entrance is by one doorway in the centre of the frontage, and through a doorway on the north-west angle of the church. Another door at the north end also admits to the building, near the vestry and organ-chamber. The walls are built of native stone, with Box dressings, the interior being faced with Farley stone. The church is heated by Messrs. Haden & Sons' hot-air apparatus; and the stained-glass windows are by Horwood, Brothers, of Frome. Messrs. Light & Smith, of Chippenham, were the contractors; and the whole cost (including the schools in the rear) has been 5,000*l.*

Sheffield.—A new Wesleyan Chapel is about to be built at Ran Moor, Sheffield, from designs by Mr. John D. Webster, architect, Sheffield, which were selected in a limited competition. Accommodation is provided for 300 or more adults, with a gallery for children.

Ross.—The new Congregational Church has been so far completed as to admit of being opened for divine service. The church is erected on a new site in the Gloucester-road, the old

chapel in Kyrle-street having been disposed of. It is erected in the Middle Decorated style of architecture, and consists of a projecting porch-entrance, carried on coupled columns, having foliated and decorated capitals; a lobby in which the stairs to the gallery lie right and left; a nave and two aisles; and an apsidal recess for the pulpit. The lobby is separated from the chapel by a wooden screen of open Gothic work, filled with fluted plate-glass. There are side and end galleries, in the front of which is open geometrical ironwork, with moulded cappings, which will be coloured in maroon and gold, and backed with crimson cloth. The roof, which is of very high pitch, is open arched, boarded and ceiled, octagonal in form, with arched ribs; it is carried on cast-iron pillars from the floor of the chapel, having wrought-iron hammered foliated capitals, and forms five bays in length and three in width. The apse is opposite to the entrance, and contains seven single-light trefoil-headed windows, which are filled with stained glass, the gift of Mr. Walwyn, of Ross. The chapel is lighted on each side by three three-light and one two-light windows 14 ft. high and 6 ft. wide, divided by transoms, and having geometrical tracery of varied designs. At the end fronting the street is a five-light window, 20 ft. high and 10 ft. wide, with geometrical head, and filled with stained glass, by Harwood, of Newport, the gift of the architect. The floor of the chapel is boarded, and the whole of the seats are open benches with sloping backs, and will be stained and varnished, as is also the roof and pulpit. The whole of the ironwork, which is by Cornell, of Cheltenham, and the capitals of the pillars will be similarly coloured to the front of the galleries. The roof is covered with particoloured slates—green and purple—and the gables will be capped with wrought-iron finials decorated in colour and gold. The windows have drip-stone terminations carved. The interior length of the chapel is 60 ft., including the apse and lobby, and is 37 ft. 6 in. wide, clear of the walls. From the floor-line to the wall-plate is 21 ft., and the pitch of the roof is 23 ft., thus giving a total height of 49 ft. On either side of the apse there are minister's and deacons' vestries, the dimensions of the former being 12 ft. by 7 ft., and of the latter 13 ft. by 12 ft. Underneath the chapel are school-room, class-rooms, and ladies' vestry, approached from the street by an open door-way and steps on the south-side of the building. The school-room will accommodate about 250 children, and is 37 ft. 6 in. by 25 ft. The class-rooms are 15 ft. by 12 ft., and the ladies' vestry 11 ft. 6 in. by 12 ft. The height of these rooms on the basement-floor is 12 ft. There are all other conveniences on this floor, including a boiler-room, 10 ft. by 10 ft., in which is placed the warming apparatus, by Bright, of Carmarthen, for heating the chapel in winter. The open space on either side of the porch will be enclosed with iron palisading. The building, which will accommodate about 400 persons, is constructed of local and Forest stone, from the contractor's own quarry, with Bath stone dressings. The contract was 1,600*l.*; but there are certain extras which will bring up the amount to about 1,700*l.* or 1,750*l.* Mr. Durke, of Cinderford, is the contractor; and the architect is Mr. B. Lawrence, of Newport.

STAINED GLASS.

Lincoln Cathedral.—A stained-glass window is in course of erection in this cathedral to the memory of the late Chancellor Bird. The medallions represent God's revelation under three dispensations—Life in Christ, Out of Sin and Death, Through Substitution and Sacrifice. The two circufossils contain representations of St. Peter and St. Paul, and the three large lights, which contain three medallions, are devoted to the following subjects:—The Expulsion from Paradise, the Sacrifice of Abel, the Translation of Enoch, the Tower of Babel, the Sacrifice of Abraham, the Translation of Elijah, the Adoration, Gethsemane, and the Supper at Emmaus. The window, which is the gift of Mr. Samuel Hanson, of London, is the work of a Nuremberg firm.

Loversall Church.—A stained-glass window, which has been purchased by subscription by numerous friends, in memory of the late Mr. Simpson, of Loversall, has just been placed in the chancel of Loversall Church. The window is by Messrs. Ward & Hughes.

Whitechurch Church.—Messrs. Ward & Hughes,

of Soho-square, have recently completed in this old church a window, which has been erected by their surviving children to the memory of the late Mr. and Mrs. Churton. The architecture of the edifice is of the Roman type; and a semicircular-headed window, measuring 22 ft. 6 in. by 8 ft., on the south side, has been filled with painted glass of the sixteenth-century character, treated with large-sized figures, the costumes of which are executed with a view of representing the Biblical period. There are two subjects: that above the gallery is the "Meeting of Jacob and Joseph in Egypt;" the subject below is the "Death-bed of Jacob." The ornamental portion is characteristic, and a jewelled border surrounds the whole.

SCHOOL-BUILDING NEWS.

Chelmsford.—The new London-road Independent Sunday-schools have been opened, in connexion with the New-road chapel. These schools have been erected opposite the Cloisters, by Mr. Cozzett, of Woodham Walter, builder, from designs by Mr. C. Pertwee, of Chelmsford, architect. The building is of white brick, relieved with yellow bands and niches, the window and door-openings having circular heads, and the general character of the architecture being Romanesque. On the ground-floor is a school-room, 70 ft. by 30 ft., capable of accommodating 400 children, and 100 in a gallery at the end. Opening out of this room are five class-rooms for boys, each affording space for twelve to fifteen scholars; also a senior class-room for about twenty persons. At the end of the school-room are two class-rooms for girls, and an infant school-room, 22 ft. by 14 ft., for 100 children; also a kitchen or heating-apparatus room, and other conveniences. A stone staircase at the end of the school-room near the girls' entrance, leads to four girls' class-rooms upstairs, accommodating from twelve to fifteen in each room. All these rooms open direct into the gallery. The large room is 21 ft. high to plate, and about 25 ft. in centre, and has a semi-open roof with arched trusses, the timbers being stained and varnished. All the rooms are lined round 4 ft. in height with dado boarding, and are fitted up with proper seats, benches, and hat-rails. The whole will be heated in winter with warm air, upon the plan of Mr. Allaway, of Manchester, engineer. The class-rooms will be lighted with starlight burners, and the large school-room by three corona gaslights. The stonework has been executed by Mr. Wray, and the painting, &c., by Mr. H. Tanner. The total cost, including purchase of site, has been 2,512l.

Tynemouth.—The chief stone of Tynemouth Priory National Schools has been laid by the Duke of Northumberland. The site is at the north end of the village. Their cost will be 2,000l., and a deficiency of 500l. remains to be raised. The schools are designed by Messrs. Anstin & Johnson, of Newcastle, in the Early Pointed style of architecture. Considerable progress has been made in their erection. The present arrangement of the ground-floor is T-shaped, comprising a large room, 48 ft. by 25 ft., to be used for girls and infants; and, at right angles to this, a boys' school, 51 ft. by 19 ft., with class-rooms, lavatories, &c. It is intended hereafter to erect a room for the girls similar to that of the boys', and so to bring the building into the form of the letter H. The boys' school and class-rooms are lighted by windows with geometrical tracery, and by plain lancets; the large room by lancet windows, with rose windows above them, treated as dormers. A spirelet, containing a bell, will be placed on the roof. The arrangements for heating and ventilation will be complete. The buildings are of local sandstone, with bands of red stone from Penrith. The site contains an area of an acre, and was presented by the Duke of Northumberland. It will be surrounded by appropriate wall and iron railing, and is bounded on three sides by new roads in course of formation on this part of his Grace's estate. The contractors for the several works are Messrs. T. Alexander, mason; J. & W. Lowrey, carpenters; T. Sauderson & Co., slaters; Wilkinson & Co., plasterers; Mather & Armstrong, plumbers; Donkin, ironfounder; and Richardson & Co., painters.

Rattinghope.—The foundation-stone of a new district school has been laid here. Mr. Smalman Smith, of Stonebridge, prepared the plans, and Mr. T. Cooke, builder, of Criffden, is carrying

them out. The building is arranged to accommodate thirty children, and there will be a master's house, with parlour, sitting-room, and three bed-rooms, &c. The whole is built of stone, from the Stiperstones range, and local brick. The bell-turret will be covered with bright red tiles, and the roofs with blue and purple slates. It is proposed to introduce some stained glass into the windows of the school-room, the work of a member of the Scott family. There will be a bronze bell, which will occupy the turret. The cost of the building will be about 400l. At a comparatively short distance from the school a new parsonage-house is to be erected, of which Mr. Smalman Smith is also the architect. It will be built of the materials of the locality, viz., selected Norbury stone, and local brick inside. The walls of the upper floor will be of brick externally, arched with white Staffordshire bricks. The roof will be of tiles. The cost will be about 1,600l.

Louth.—The foundation-stone of the new building for the Grammar School of King Edward VI., Louth, has been laid. The site of the new building, now in course of erection, is at the back of the old school, which is still standing. The school proper is to be built quite back to the boundary-wall of the playground; the old school will then be pulled down, so that there will be a considerable open space in front of the new building, which will front School-house-lane. Several blocks of old buildings, at the corner of School-house-lane and fronting Gospel-gate, have been taken down, and the Bede-houses are being erected where they stood.

Books Received.

A Treatise on Lathes and Turning. By W. H. NORTHCOTT. London: Longmans, Green, & Co. 1868.

The treatise under notice contains a good deal of practical information as to plain turning in all its simpler and less expensive forms, as well as on the more elaborate work of advanced practitioners of the art. The volume is confined to turning as it exists, and does not deal with it historically. Indeed, the author thinks that any historical disquisition on an art which is essentially modern, would be useless; and almost all he says on this subject is that doubtless the modern lathe may have originated in the ancient potter's wheel, and that whether the crude principle were derived from the ancient Greek or the aboriginal savage is a matter of little or no moment to us.

VARIORUM.

"Eleventh Report of the Vestry of the Parish of Chelsea. 1866-7." Printed by Bell, 133, King's-road, Chelsea. 1868. This voluminous report has been printed under the authority of the vestry. The volume comprises upwards of 400 pages octavo; but the report proper fills only about fifty of these pages, all the rest being an Appendix, containing documents of various kinds, statistical tables, correspondence, &c. There is nothing calling here for special remark.

Miscellaneous.

THE CHARTER-HOUSE.—The project for widening Wilderness-row from Goswell-street to St. John-street, involving the use of land appertaining to the Charter-house estate, is about to be carried out.

LYNN DOCK.—The Government have consented to advance the 20,000l. authorised to be raised on debentures in aid of the share-capital of this scheme. The advance is made under the provisions of an Act of Parliament for the promotion of such public works, and on the recommendation of Mr. Kendal, C.E., who has inspected them on behalf of the Admiralty, and reported favourably of them. It is intended (and the contracting parties have agreed) to vary the original design for the dock, by making the slope of the sides steeper, and facing them with concrete blocks, instead of concrete laid on the slopes. The estimated additional cost is 2,200l., and the effect will be to give an additional acre of water area, besides more space for warehouses, &c. The works are making considerable progress.

THE ELECTRIC ORGAN.—The electric organ from Her Majesty's Opera, Drury-lane, is being erected at the Polytechnic Institution, above the proscenium in the great theatre. Messrs. Bryceson have to construct a large and powerful electric organ to suit the requirements of Her Majesty's Opera, Haymarket, now being rebuilt after the fire, and which will be re-opened next season.

ONE RESULT OF HIGH FARES.—On Saturday last Messrs. Richardson, Slade, & Elson entertained the whole of the men in their employ, at Caterham. A long day of fifteen hours was passed in the pleasantest manner, in the pleasantest part of Surrey. Owing to the rise in railway fares, the journey to and fro was made by road, which proved much more agreeable, and was cheaper than the same journey by rail.

DANGEROUS STATE OF A SUSPENSION BRIDGE AT CHESTER.—The suspension bridge across the Dee, and leading to Queen's Park, has been found to be defective, and not safe in its present state. Messrs. Bryan Johnson, engineer, and Richard Davies, city surveyor, have examined it, and they say in their report,—

"The suspension chains are fastened direct to the arching and column heads, and there is no provision made for any movement of the chains which may arise from either expansion and contraction by the weather, or by the swinging motion produced by people passing over it. In consequence of the above omission the upper portions of the columns have gradually given way, and now lean towards the river, while the lower halves of the columns being in contact with the roadway are still upright. We applied a plumb-line to the columns, and found some of them as much as 3½ in. out of the perpendicular, and none less than 2½ in. We recommend that these two points be at once put right, and this can be done without much trouble. We also wish to record our opinion that at no time should a great number of people be allowed on the bridge at the same time."

Mr. Mallison, of Manchester, the owner of the bridge, has been written to, and his earliest attention requested. As this is a bridge much used by the Chester public, meantime the police have instructions to prevent crowding upon it.

RUST'S MATERIAL FOR DECORATIVE PURPOSES.—A company is being formed to bring into use Mr. Jesse Rust's "manufacture of a material for decorative purposes, by melting glass and sand together in a furnace, with the addition of metallic oxides, and moulding the same into the requisite forms." The promoters claim that it is an almost indestructible material, which, while lending itself gracefully to every form of mural ornamentation, provides a substance for mosaic flooring, which must tend to introduce more generally among us that form of pavement. It is stated that the material can be sold 1s. a yard cheaper than coloured clay tiles, and yet produce a profit of 50 per cent. to the manufacturers at even the present working expenses.

"The profit to be made on the polished material will appear from the following figures. The price of a 9-inch boss in polished granite ranges from 22s. to 25s.; in polished marble, from 15s. to 20s. In the patent material a 9-inch boss, as hard as granite, and with all the appearance of marble, can be manufactured at a cost of 6s., which includes the present extravagant item of 3s. for polishing, which charge, in the event of complete works being established, could be reduced to one half. A 9-inch boss therefore of the patent material sold at 12s. 6d. would show the enormous profit of 150 per cent. on the present cost of manufacture."

THE SUSSEX ARCHEOLOGICAL SOCIETY.—This year the Sussex Archeological Society visited Rotherfield and Mayfield. It rained the whole day, and the meeting was by no means so numerous as it would otherwise have been. At Rotherfield Church Mr. Mark Antony Lower read a paper on Rotherfield. Mr. Durrant Cooper pointed out various alterations which had from time to time been made in the edifice; and the company then went to Mayfield, about three miles from Rotherfield. The church was first visited, and afterwards Mayfield Palace. In the great hall of this building Mr. Durrant Cooper read a paper on the "Antiquities and Archeology of Mayfield." It was originally intended to visit and inspect the ancient houses in the town; but the rain ruled it otherwise, and the majority of the party proceeded at once to the school-room, where several relics of antiquity, lent for the occasion, were viewed. The general meeting for business was held in the school-room, and was presided over by the Rev. E. Turner, of Maresfield. Four new members were elected. The dinner took place in the society's marquee, which was erected in the grounds adjoining the parsonage. About 230 tickets had been taken; but very little over half of that number sat down. Umbrellas had to be resorted to for protection even under the canvas of the marquee. Lord Colchester presided.

The Builder.

VOL. XXVI.—No. 1334.

*The Hospitals of the World.**



HERE is little that need now be said to the readers of the *Builder* on the subject of hospital-building; and we might perhaps complain that the advantages derived from our labours by the

author of this last book on hospitals is scarcely admitted as it should be. However, we will let

that pass. The book comprises a recital of the requisites of hospitals in construction and appliances; an inquiry into the best mode of administration of such charitable institutions; a considerable amount of information relating to special hospitals, such as those devoted to convalescents, lying-in patients, incurables, lunatics, consumptive patients, children's hospitals, eye, fever, military, lock, Samaritan, orthopedic hospitals, those in tents, marquee, and huts; notices of hospices and workhouse infirmaries; a chapter on dispensaries; a report upon the plans in continental cities for the relief of patients at their homes; and brief descriptions of about 200 institutions in Europe, Asia, and America. The ground-plans of about fifty hospitals are given.

If we would realize the wide importance of perfection of hospital accommodation, we must bear in mind that 170 deaths out of every 1,000 in London take place in hospitals. It is difficult for the mind to grasp the misery of 12,000 deaths in the metropolitan institutions as the average amount. Yet 12,000 times those in authority in the various hospitals of London give quiet instructions that the cold, stiff form that has then ceased from suffering should be removed, and the bed whence it is taken made up afresh for another patient. In England and Wales, in 853 institutions, where there were 154,602 inmates in 1867, there were 32,437 who closed their eyes for ever in them. The greatest sanitary precautions and most complete sanitary contrivances, doubtless, could not have saved all these lives, but we may take it for granted they would have considerably augmented the crowd of convalescents that went away rejoicing. What these precautions and contrivances should be it is the aim of Dr. Oppert to show; the system of relief, however, occupying scarcely a secondary place in his work. He gives the preference to the pavilion plan. Speaking of the exterior of a hospital, these are our author's views:—

"Whatever," he says, "may be the style of architecture—Gothic, Italian, or mixed—I should not object to a fine clock-tower and an ample porch. The chimneys can need not look ugly, and narrow entrance-doors can be avoided. The architect ought to dispense with arched windows. A little stained glass in the chapel is not very expensive. Simple iron railings may surround the building at some distance, and there need not be an entrance looking like a triumphal arch. The material of which the walls are built should be good bricks, and the architect may avail himself of Portland stone and terra-cotta."

He adopts the arrangements now usually approved. The offices for administration and the sleeping-rooms of officials and nurses should

be separated as much as possible from the wards. He would have no hospital more than two stories high, as the vitiated air ascends. The kitchen should be a separate building, connected with the main building only by a corridor, so that no smell of cooking should pervade the house. The wash-house and the dead-house should be alike detached. The water-supply should be abundant and good. The staircases should be stone, and wide enough to admit of carrying up the patients conveniently. Linnenshoots of earthenware should be provided close to all wards. About thirty beds, or a few more or a few less, he considers the most suitable number in a ward. The basins in lavatories should be of glazed earthenware, and those that are emptied by tilting are preferable to those furnished with plugs. Waterclosets should be everywhere provided instead of latrines. Knobs that are pressed by the finger, to admit hot or cold water into the lavatories, are more desirable than taps. The bath and lavatories he places in one apartment, divided from a ward by a ventilated passage-way, and the sink, urinals, and waterclosets in a corresponding one exactly opposite to it. The headsteads should be iron, painted a cheerful-looking colour, and on castors, except in the surgical wards. They should be of a convenient height, for though a low bedstead is preferable for a patient given to fall out of bed, it is a serious inconvenience to those attending him. Dr. Oppert mentions the case of the surgeons who attended the wounded during the July fights in Brussels, 1830, and who, owing to constantly stooping over the low beds, were hardly able to keep upright when walking. The best mattress is a spring one covered with horsehair at least 2 in. thick. There should be a head-shelf, foot-board, a rope with a hand-grasp, a chair, and a marble-topped side-table to every bed; and a low screen painted a dark green colour at hand to be used when needed. A long table with a marble top should be in the centre of the ward, and a sideboard and a few easy chairs should not be wanting. Gas, with ventilating pipes to carry off the foul air, is the best means of lighting.

With regard to warming, Dr. Oppert's sympathies appear to be with the continental stove rather than with the open chimney and fireplace. The German stove is used in the hospitals of Russia and North Germany. This is formed of clay and claytiles, and, although capable of being made ornamental, is generally found to be anything but beautiful in these buildings, where the cost is a consideration. He says, if large, they interfere with the ventilation, for the air does not circulate in the recesses in which they stand, nor in the space between them and the wall; nevertheless, they seem indispensable in climates north of the 54th degree, as there are no other means for heating the wards so gradually, thoroughly, and retentively. Iron stoves are smaller and less expensive, but the heat is not maintained for so long a time; they are useful, however, where it is an object to obtain heat quickly for a short period. In the Berlin *Charité* hospital the stoves are placed in the wall dividing the wards from the corridors, whereby one stove serves both apartments; but this plan our author opposes, as a waste of surface heat upon the intersecting walls. He speaks well of the remodelled fire-grate made of brick grates in an iron stove, where the air is supplied from behind the grate, and the smoke is directed into a chimney without a register. There is an air-chamber behind this grate communicating with the outer world, whence, after the air is heated, it is carried up a shaft and dispersed in a ward by means of a *louvre*. The expense of these, 30*l.*, is the chief objection. The French calorifères are iron stoves unrounded with brick mantels, whence the hot air in the intermediate space ascends through apertures to the ceiling. In the great Parisian hospital *Lariboisière* the heating and ventilation are combined. There

are two systems in use, both of which work well. On the female side water is heated in a boiler, whence pipes convey it to a reservoir or tank, from which it is conducted to the several floors, and hack again to the boiler. The pipes pass through four stoves on each floor.

"The ventilation is caused by the heat of the reservoir to which all the foul-air channels lead. The reservoir containing several divisions, forms a large surface, from which heat is thrown out. The foul air ascends through the channels formed by these divisions, and ultimately escapes by a chimney. Fresh air continually replaces the impure, being admitted through channels which end in the outer walls, and communicate with the stoves. The following is the second system, the system *Grosvolle-Thomas-Lawrence*. There are four stoves filled with water in each ward; this water is heated by steam pipes from a boiler in the cellar, each pavilion having its own boiler. The ventilation is by forcing in or injecting the air. An air-shaft, higher than the chapel, communicates with a cellar, where a fan is placed. This fan or ventilator has four wings or blades, bent to an angle, and revolves very quickly, viz., 400 times a minute; it is set in motion by steam power. It draws the air from the shaft and forces or injects it into a channel, which takes it to the wards. The air passes through the stoves in the wards, and from their forty-eight apertures and some openings in the flooring it moves up to the ceiling with a considerable force, and replaces the foul air at the ceiling, which finds its way out through apertures near the floor."

Notwithstanding this care and expenditure, *Lariboisière* has nearly the highest death-rate of any of the Parisian hospitals; and, although it is urged that one-third of the patients are tuberculous, and a large proportion hopelessly sick when admitted, it is certain the expectations based on theoretical calculations have not been fulfilled. We believe that operations are less successful where artificial systems of ventilation are in use than where a sweetening of the air is relied upon from the opening of doors and windows.

Without a proper amount of cubic space per patient the best methods of ventilation would not be sufficient. Medical men are frequently pressed by architects to state the amount they consider adequate.

The author of the present book, after giving the composition of pure air, allowing for the carbonic acid exhaling from the lungs and skin, and the watery vapour lost by the body, giving the results of various experiments made by German philosophers, comes to the following conclusion:—

"Taking into consideration all the impurities caused from spittings, bedding, poultices, infusions, bathing, &c., Poncelet thinks the sick require about double the quantity of air that would be considered necessary for healthy people; this would be 30 or 40 cubic metres per bed per hour. But 40 cubic metres will be insufficient when patients suffer from gangrene or typhoid fever, especially when the temperature is high. A much larger supply is then desirable, the amount of which I scarcely can state in figures."

We may add that 60 cubic metres (2,100 ft.) are considered necessary in *Lariboisière*. Our author sums up his tenets concerning ventilation in nine dogmas, to which we refer those employed in hospital construction or management.

We have described and illustrated before now the workhouse infirmary of the *Chorlton Union*. It consists of five oblong blocks or pavilions, 100 ft. apart, connected at the southern end by a long arched corridor, which forms the means of communication. Each pavilion is three stories high; and the ward on each floor is 124 ft. long and 24 ft. wide, and has beds for thirty-two patients. Each ward is approached from the south end by a spacious staircase, and all are alike provided with a nurse's room, 12 ft. by 11 ft.; a scullery, 12 ft. by 10 ft.; a water-closet for the nurses, and a hoist at the south end; and in two small projecting wings, at the north end, with two waterclosets for the patients, a sink for cleansing the bed-pans, a closet for brushes, &c., baths, lavatories, dust-shoot, and foul-linen shoot. The cubic space per patient is 1,350 ft. The height of the wards is 14 ft. 6 in., 14 ft., and 15 ft. There are various contrivances to admit the outer air. The long sides of the walls of the wards have a series of windows, divided into three, facing one another, 4 ft. 8 in. wide, and extending from 2 ft. 9 in. above the floor to the ceiling. We have already illustrated these windows.

* "Hospitals, Infirmaries, and Dispensaries; their Construction, Interior Arrangement, and Management, with Descriptions of existing Institutions, and Remarks on the present System of affording Medical Relief to the Sick Poor." By F. Oppert, M.D., L.R.C.P.L. London: John Churchill & Sons, New Burlington-street, 1867.

There is a *louvre* over the door from the staircase, and a swivel window at the opposite end of the ward, by means of which a current of fresh air can be obtained without opening either door or windows. At various points there are air-shafts running up the walls which discharge themselves above the roof level; as well as a number of small air grids built in the walls close to the ceilings. The floors are provided with hit-and-miss gratings, with galvanized iron horizontal tubes to conduct fresh air to the foot of the beds when required. The windows of the top wards do not reach the ceilings, as the upper floors are partly in the roofs. To compensate for this difference there are large revolving ventilators on the ridges. The lighting is by gas. Three suspended rings of burners, with a funnel-shaped hood, terminating in an iron flue communicating with a shaft in the wall, are placed in each ward. The warming is effected by open fire-brick fireplaces. An iron hood partly closes the upper part of the opening, which is furnished with a hit-and-miss grating, which can be opened when the fires are burning brightly, to admit of a stratum of air being drawn off up the chimney. The drainage is kept outside the building, and in the three principal chimney-stacks of each pavilion a drain-ventilating flue is built unconnected with any other, but placed between two smoke-flues, so that their heat may assist in forming an upward current. Charcoal-boxes are placed on the tops of these drain-ventilating flues to destroy the gases. Dr. Oppert mentions as a defect that the inmates complain of cold, and sometimes catch cold, which fact he attributes to a draught from the top of the windows straight down to the beds.

American hospitals resemble those of England both in construction and administration. The Boston Free Hospital is on the pavilion plan, is two floors high, and affords ample cubic space. At one end of each ward are rooms for the nurse and a separation-room, and at the other the *hata* and waterclosets. The peculiarity of this plan is, that the six pavilions are distributed round a centre, as though they were the arms of a cross, and the connecting corridors are curved, and radiate from the centre. The Hammond Hospital, on the Chesapeake Bay, consists of sixteen pavilions placed in a circle, the centre of which is occupied by the administrative buildings. The Philadelphia temporary hospital was also on the pavilion plan. The wards, some of which contained forty-eight beds, were one story high, and built of wood. 214 temporary hospitals, containing 134,000 beds, were erected in the space of four months in the course of the late war.

Indian hospitals present very different features. The columns of the *Builder* have from time to time furnished descriptions of hospitals in various parts of the world, and some of these are reproduced in the present work. The account of the European hospital in Bombay will be thus familiar to our readers. In East India the native or military hospitals are mere sheds, furnished with mats instead of beds. The patients dress their own food according to the manner prescribed by their religion, contenting themselves with receiving medicine only at the hands of the authorities. In consequence of this arrangement, hospital cookery is lamentably neglected. With but one or two exceptions, states the author, upon the authority of Dr. Gordon, there is not at the present day a cooking range in any regimental hospital. The cooking-place is the ground, and the rice is baked in the oinders. Corresponding with this shortcoming is the fact that one matron is considered able to nurse the invalids of a battalion.

The famous pavilion hospital of Bordeaux, the first built upon the principles laid down by the Paris Academy, is outlined, as is the scarcely less celebrated institution in Brussels. Of the German hospitals he gives no attractive report. They are often of great extent and ancient origin, but the construction is nearly always defective. The corridor system is most in vogue. The Bethanien hospital, Berlin, founded in 1847, is on this plan. So is the Katholisches Krankenhaus. So, too, is the principal portion of the Charité hospital, where 1,400 patients are received. In the Summer Lazarth, a detached block, there are two floors over a cellar or basement, and several of the rooms in the basement are used to live in. There is an anatomical school in connexion with this institution, for which there is every accommodation. The new Charité, Berlin, is built in the form of a horseshoe. The Allgemeine Krankenhaus, Munich, for 500 patients, is an oblong building, having

two central courts, divided from one another by a central block, in which the kitchen and some private wards for patients who pay are situated. In this building the lower wards have stoves, furnished with hollow columns of cast iron, which ascend through the three floors. These columns are covered in the upper wards with glazed tiles, leaving ornamental apertures through which the warmed air passes. Besides this arrangement, there was an elaborate system of channels for foul air leading to the stoves on the ground-floor, and air-towers with air-channels between them and the wards, and other air-channels running through the roof, which branched off with smaller ones, communicating with the space between the iron columns and the tile mantels. But this scheme proved a failure, for the foul air often remained stagnant in the channels, and sometimes came back again into the wards. The apertures have since been closed, and the stoves treated as calorifères. There is a system of ventilation in use at the Anshülfe Krankenhaus, Munich, which Dr. Oppert thus describes:—

“There are calorifères in the wards, composed of an inner stove of cast iron, a brick mantel, and a movable top made of tin; the latter has a large aperture leading to the roof, and a smaller one, which opens from the floor in the usual way. There are foul-air-channels leading to the roof; they end by two apertures in the walls of the wards, an upper and a lower one, and either may be closed by a valve. There is an anemometer placed in each channel, and a permanent indicator shows how the air moves inside, if rapidly or slowly. This is a novel and an economical system, but I doubt if it will be quite satisfactory, because the draft will not be strong enough in the ejection channels. In summer time this is to be improved by a gas-burner, which is lighted in the shaft near the roof.”

The Vienna General Hospital is built round nine square courts, most of which are laid out as gardens, with fountains in them; three thousand patients can be accommodated here in ninety-three wards; and there are four amphitheatres, two dispensaries, three laboratories, two large kitchens, washhouse, several ice-pits, besides the officers' apartments and offices. The floors of the wards are of red brick. There is no artificial ventilation and no water-closets. Unless a recent change has been made, says the author, there are night-stools in the corners of wards, standing behind curtains! No small-pox patients are received. Every patient either pays for himself or is paid for by the municipality or parish. First-class patients pay 4s. 4d.; second, 2s.; third, 10d. per day. Out of every hundred patients who find shelter here, thirteen or fourteen do not recover, despite the gardens and fountains. In the Hospital Rudolph-Stiftung, built by the Emperor of Austria, in commemoration of the birth of his eldest son, a combination of the pavilion and corridor system has been tried. Its construction occupied more than four years. In the centre is a court 180 ft. by 330 ft. laid out as a garden. Around this run two-storied lines of building over ground floors, except on the east side, where the hall is only one story high. From this quadrangle project three pavilions, containing sick-wards, a fourth set apart for the administration and dispensary, and two others fitted up with baths and waterclosets. The pavilions project 84 ft., and are 12½ ft. apart from one another. The cubic space per patient is 1,480 ft. The windows are double and 10 ft. high, two-thirds of this height opening like doors, and the top third is movable, and can be made to incline inwards by a screw and toothed wheel, which fixes both the outer and inner portion at the same time. Dr. Böhm's calorifères are used for heating, and gas, with ventilated globes, is employed for lighting. The Italian hospitals, which are nearly all of Medieval origin, and attended by monks and nuns as nurses, have frequently been convents in the first instance, and are therefore but defective buildings as hospitals. The classification of the patients is very imperfect. The Ospedale di Sta. Maria Nuova, Florence, was founded in 1289, and by the addition of wing after wing is still available. There are about fifty wards in it, and 1,200 patients. At Geneva is another large ancient ospedale, constructed round courts. At Mantua the Austrians have built a hospital, which the author calls notorious for its unhealthiness. The grand hospital at Milan was formerly considered a model. We examined it personally a few years ago, and could not endorse that opinion.

It was opened in the year 1456, and can contain nearly 3,400 patients, but the usual number is under 2,600. It is situated close to a thoroughfare, and a canal runs at its back, the water of which moves a four-mill, used to grind corn for the inmates. The buildings are one story high, except in the centre, where we find two floors. The

buildings stand around square yards, the principal one being much larger than the others. The principal wards form a cross, in the centre of which is a copola, with an altar beneath it, where divine service is performed daily, in sight of the patients. These wards have corridors on both sides, which are not so lofty as the ceilings of the wards, and consequently there is plenty of room for windows above these passages. The height of these wards is between 30 ft. and 50 ft. at the highest point; the ceilings are vaulted, the floors covered with red bricks or flags, this being preferred for coolness. The outside wards are nothing but spacious corridors. The latrines are at one end, and the less said about them the better. There is no warming apparatus, but small portable stoves for charcoal; they are rarely used, the climate being so mild. The windows are used for ventilation. The cubic space for each patient is more than 2,000 ft.

We have to add to this picture of an Italian hospital, in which Medieval devotional intensity pervades everything from the construction to the attendance, that there are six establishments in connexion with this, devoted to special forms of human infirmity, five of which were once convents. Naples has a hospital, called Della Pace, that was originally a palace. It has one ward 300 ft. long and 130 ft. wide, with handsome columns supporting the arched ceiling. The Ospedale San Luigi di Gonzaga, in Turin, built for the dwelling of a nobleman, is in the form of a St. Andrew's cross. There is a chapel in the centre; from this depart four arms, or blocks, two stories high, each of which contains a long ward, with a corridor on each side of it. There are openings in the wall over each bed, through which food and medicines can be passed without entering the ward. Another opening serves for a sink. The latrines have marble seats, and are supplied with water. Six large fires in the cellars are supposed to ventilate the wards at night. All the additional accommodation for the physicians, dispensary, offices, dead-house, &c., are placed in blocks to the right and left of the St. Andrew's cross thus occupied by the wards. This is an interesting example.

The Russian hospitals are palatial in their appearance. They are three and four stories high, and placed in large gardens. The wards are heated for the most part, by Russian stoves, which make the air very dry, though the clay stoves used in North Germany are sometimes seen; and some wards have open fireplaces in addition. The bad corridor plan is most general. A large living-in hospital is on the point of being closed on account of its defects; and as lunatic asylums are in course of re-organization all over the country, we may infer that a future survey of Russian hospitals will be more profitable than any now undertaken would be.

A few particulars of a Swiss hospital must close our notice of Dr. Oppert's book. The Zurich hospital shows the pavilion system in a modified form. The front, consisting of a centre three stories high, and two wings two stories high, is 559 ft. long. The central pavilion contains all the accommodation for the service, administration, and instruction; the females are on one side of this, and the males on the other. There are five wards on each floor in each wing, and between each ward there is a nurse's room; on each floor all these wards and rooms open into one long corridor. The cubic space is ample. The bedsteads are of wood, and placed along the walls, instead of the usual material and disposition. Something like the aroma of Swiss forests and a vision of Swiss lakes and mountains come to us when we read that the windows open on little balconies. There are tile-stoves for warming in the central building, and hot-water pipes in the wings. The last are placed in coils near the walls, and surrounded by perforated plates, have much the appearance of stoves. The doors, which open into the corridor, have casements instead of panels in their lower parts, for the purpose of admitting fresh air when desired, without opening the whole door.

The strong point of Dr. Oppert's book is that a large number of plans are therein brought together; the weak one is, that the bad and good are not sufficiently discriminated.

MEMORIAL PORTRAIT.—The working men of Durham have subscribed for a portrait of the Very Rev. Geo. Waddington, D.D., Dean of Durham, to be placed in the Durham County Hospital, to which the dean has been a great benefactor. The portrait was painted by Mr. Clement Burlison, a Durham artist, and it has been placed in the principal convalescent ward of the hospital. The presentation ceremony has just taken place.

SAVANS IN NORWICH.

THE proceedings of the British Association for the Advancement of Science have been so fully reported, far and wide, that our readers will probably thank us for confining ourselves to brief notices of some few of the papers on subjects oftenest treated of in our journal. The address of Dr. Hooker, the president, was full of brave and thoughtful statements, which have, of course, provoked criticism, and will continue to do so. As an example of the views held by the advanced thinkers of the Congress, we give the peroration of Professor Tyndall's inaugural address as president of the Mathematical and Physical Sciences Section.

Materialism.

"In affirming that the growth of the body is mechanical, and that thought, as exercised by us, has its correlative in the physics of the brain, I think the position of the 'materialist' is stated as far as that position is a tenable one. I think the materialist will be able, finally, to maintain this position against all attacks; but I do not think, as the human mind is at present constituted, that he can pass beyond it. I do not think he is entitled to say that his molecular groupings and his molecular motions explain everything. In reality, they explain nothing. The utmost he can affirm is the association of two classes of phenomena, of whose real bond of union he is in absolute ignorance. The problem of the connexion of body and soul is as insoluble in its modern form as it was in the pre-scientific ages. Phosphorus is known to enter into the composition of the human brain, and a courageous writer has exclaimed, in his trenchant German, 'Ohne Phosphor kein Gedanke.' That may or may not be the case; but even if we knew it to be the case, the knowledge would not lighten our darkness. On both sides of the zone here assigned to the materialist he is equally helpless. If you ask him whence is this 'matter' of which we have been discoursing, who or what divided it into molecules, who or what impressed upon them this necessity of running into organic forms, he has no answer. Science also is mute in reply to these questions. But if the materialist is confounded and science rendered dumb, who else is entitled to answer? To whom has the secret been revealed? Let us lower our heads and acknowledge our ignorance one and all. Perhaps the mystery may resolve itself into knowledge at some future day. The process of things upon this earth has been one of amelioration. It is a long way from the Ignoradon and his contemporaries to the president and members of the British Association; and whether we regard the improvement from the scientific or from the theological point of view, as the result of progressive development or as the result of successive exhibitions of creative energy, neither view entitles us to assume that man's present faculties end the series—that the process of amelioration stops at him. A time may, therefore, come when this ultra-scientific region by which we were now enfolded may offer itself to terrestrial, if not to human investigation. Two-thirds of the rays emitted by the sun fall to arise in the eye the sense of vision. The rays exist, but the visual organ requisite for their translation into light does not exist. And so from this region of darkness and mystery which surrounds us rays may now be darting which require but the development of the proper intellectual organs to translate them into knowledge as far surpassing ours as ours does that of the wallowing reptiles which once held possession of the planet. Meanwhile the mystery is not without its uses. It certainly may be made a power in the human soul; but it is a power which has feeling, not knowledge, for its base. It may be, and will be, and we hope is turned to account, both in steady and strengthening the intellect, and in rescuing man from that listlessness to which, in the struggle for existence, or for precedence in the world, he is continually prone."

The Rev. Canon Girdlestone read a paper on,—

The Condition of the Agricultural Labourer, especially in the West of England.

The Rev. Canon observed that the progress of manufacture, so far from lessening, had rather increased the value of land. Fortunes made in manufactures were generally invested in land, and Great Britain retained, and was likely always to retain, its character as an agricultural country. Landowners occupied the highest positions and enjoyed the greatest social privileges.

Public opinion, the reform of universities and public schools, the facility for foreign travel, and the admixture of the manufacturing classes with the old landed proprietors, had much raised the character and improved the tone of the latter. Still, especially in the West of England, there were many of the old school remaining who resisted all progress. The race of farmers was much improved, but not so much in the West of England as elsewhere. The land was also much improved; a larger area was brought into cultivation, and each acre was made to yield more. In this respect also, in the West of England, there was less improvement than elsewhere. Nowhere had the improvement of the agricultural labourer kept pace with that of the landowner, the farmer, and the land itself. In the West of England the condition of the labourer was very little different, and, in some respects, it was worse than it used to be. Wages were low, while fuel and provisions were dear, and the poor-rate was so administered as to quench every feeling of independence. In the West of England an agricultural labourer had till lately only 7s. or 8s. a week, and now only 8s. or 9s. Unless he was a horsekeeper or a shepherd, he had to pay out of this 1s. to 1s. 6d. a week for house-rent, and provide food, clothing, medical attendance, fuel, and every other necessary for himself, wife, and family. He paid a high rent for potato ground, and fuel he seldom got, except at the cost of many hours of hard work. He had three pints or two quarts of cider a day, and he had a portion of his wages often paid in grist, which when grist was dear was an advantage, but otherwise a loss to him. He was often not allowed to keep a pig or poultry, lest he should steal food for them from his master. He worked nominally ten or ten hours and a half a day, with an hour and a half deducted for meals. He was almost always, however, kept a much longer time than this, and was seldom paid anything for overtime, except by bread and cheese in harvest time. Women got 7d. or 8d. per day for out-door work, with a quart of cider, and boys small sums in proportion. The men breakfasted before they left home on "tea-kettle broth," which consisted of bread and water with a little milk if (which was not often the case) it could be got. For luncheon and dinner, which they took with them, they had coarse bread and a little hard, dry, skim-milk cheese, at 3d. per lb. For supper, on their return home, they had potatoes or cabbage, with a very small slice of bacon sometimes to give a flavour. Butchers' meat they seldom saw, except it was given to them. They were unable to lay by anything, and few comparatively belonged to benefit societies. They were long-lived, but even in their prime feeble, and at the age of 50 they were often crippled with rheumatism, the result of poor living, sour cider, a damp climate, hard work, and anxiety combined. There remained nothing for them but parish pay and the union. There were many exceptions to this general rule, often even in contiguous parishes, owing to the presence of an intelligent resident landowner, or the immediate neighbourhood of a large town, mines, or manufactures. The wages of the agricultural labourer were always higher in the neighbourhood of towns, mines, and manufactures. The condition of the agricultural labourer varied, indeed, greatly in different parts of England; but the fact that in agricultural districts the poor-rate was very high, that there were more marks than signatures in the marriage registers, that recruits from the same districts were seldom able to read or write, that our prisons were filled from the same districts, and the general conviction that agricultural labourers were wholly unfit to be trusted with the franchise, were real and reliable evidences of the low condition of this class of men. That which was really required for the agricultural labourer was, in one word, "independence." At present he was the most dependent of any class of labourers. In order to change this—firstly, good wages were required in proportion to quantity and quality of work, but always, in the case of an able-bodied and industrious man, enough to keep him and his family, with a margin for insurance against old age or sickness; secondly, well drained and ventilated houses, with at least three bedrooms and all other appliances for decency, with a provision also against taking in lodgers, such houses to be in the control of the landowner rather than the farmer; thirdly, greater facilities for education should be afforded; fourthly, all "mops" and hiring-fairs should be abolished, and a good system of registration should be generally adopted and made known through the instrumentality of

the penny papers throughout the country; fifthly, agricultural labourers' unions of a strictly protective character, and well guarded against intimidation, to either employers or fellow-workmen, might be formed with advantage—the whole system of unions was not to be condemned because of outrages committed by a few; sixthly, there should be legislation in favour of the agricultural labourers, especially as regards education, and the administration of the Poor Law by a central board of disinterested officers, instead of by a local board of landowners and farmers. Legislation so far had done less for the agricultural labourers than for any other class, although landowners and farmers had a special pecuniary interest in the improvement of the rural workman. The outspoken language of this paper provoked frequently excited interruptions of dissent.

Mr. F. S. Corrance, M.P., read a paper on

The Social Condition of the Wage Class.

He traced at considerable length the rise of a great wage-paid class, and the industrial transformation of the North of England, and then proceeded to inquire whether the Poor-law legislation for thirty years had been successful. The last thirty years had been a time of peace, of free trade, of unequalled increase of wealth, of unparalleled emigration; but the expenditure in poor relief had increased in 1867 to 6,959,840*l.*, as compared with 6,317,255*l.* in 1834, the population of England and Wales being 21,100,000 in 1867, as compared with 14,322,000 in 1834. Was, then, pauperism extirpated? Had the rates decreased? Were the Poor-laws abolished? He feared that these questions could not be answered in the affirmative. On the contrary, the system had taken firm hold of men's minds, and as a vested interest it claimed its place. It was an important source of patronage and place, and the management charges were daily on the increase, having been 596,162*l.* in 1853, 696,095*l.* in 1863, and 730,704*l.* in 1867, showing an increase in fourteen years of 134,542*l.* Morally speaking, what men had the present system reclaimed? Whom had it made more provident? What encouragement or assistance did it hold out? It acted by repression, it pauperized, it exacted a hard and rigid test. Poor-laws might satisfy a present requirement, but they could not cure pauperism. Taught self-dependence, and with self-interest prescribed as the great rule of life, the working classes set to work according to their light, and applied the doctrine to some remarkable effects. The number of friendly societies had now reached 24,800, with 3,000,000 members, and 20,000,000 of assets in hand. At the close of 1866 the number of depositors in savings banks amounted to 2,149,764, and the deposits to 44,465,806*l.* All these facts seemed to him clearly to indicate the necessity of authority to guide and direct the efforts made, and to protect the weak. All that was ever urged against friendly societies tended to such a point; they were sometimes the speculations of clever knaves, or were conducted for the benefit of a public-house. He considered that medical clubs were a great advance upon the medical assistance afforded by the Poor-law Board. The objects embraced under the co-operative associations were multiple, but they might be divided into at least three classes,—societies for the transfer of goods or merchandise, societies of credit, and societies of production, building societies coming under the latter head. Even in agriculture co-operation had been tried with a fair amount of success. That such a system could or would ever supplant scientific agriculture, aided by machinery, need not be dreamt of. As regards trades unions, considered purely as such, if under a new sense of power and liberty ignorant or half-informed men had acted upon a doctrine which learned men had sanctioned—that of self-interest—it was not to them alone that blame was to be attached. These men were bad economists; they were reckless except of present gain. Their morality was not the morality of the upper classes; but these things did not grow up in a night—they followed as darkness followed light. They would pass away, but the dawn might not be yet. Upon the whole the Poor Law had failed, and an increasing pauperism and a vicious code of social laws were no safe or pleasant features. Was there no gentler code which we could suggest more in accordance with social economy and the Christianity we professed?

Very great interest was excited by these two papers, and the discussions were long and valuable. We may, perhaps, return to them.

The Pecuniary Results of Prison Labour.

On this subject Sir J. Bowring read a paper. He said the objections to making prison labour profitable might be mainly grouped together under four heads: first, that prison discipline should be simply deterrent; secondly, that to teach a convict a trade was to place him in a better position than the honest man outside the prison; thirdly, that prison labour would be put unfairly in competition with honest labour; fourthly, that in agricultural counties the teaching prisoners other trades would lead to a scarcity of agricultural labour and to a rise in wages, to the detriment of the agricultural interest. As regards drunkenness, which was the main source of crime, Sir John characterised it as the great Christian vice, or one which professedly Christian nations exhibited in its most offensive and dangerous form. As regards the argument that prison discipline should be deterrent, the policy of appealing to the hopes as well as to the fears of convicts might be advantageously adopted. Again, in few instances could convict labour be so productive as prison labour, since all social influences and stimuli were wanting while the improved appliances so usefully introduced in manufactories were also not within the reach of the convict. If convicts, too, had been at work in the open market, would they not have brought their competition to bear upon the price of labour and products? After all, convicts were "in-door servants"—who were bound to give their services to those who provided for them. As to the objection that teaching convicts a trade would injuriously affect the agricultural labour market, was the apparent desire to obtain goal birds among the rural peasantry creditable? Was not the elimination of convicts from any occupation or interest an advantage? The economical aspects of the question were, however, of less importance than its moral aspects. A goal might be made a reformatory school, and by beneficent influences faculties might be developed, the existence of which might not be at all suspected. The prisoner ought, indeed, to be made the confederate and not the foe of society, a supporter of the law and not the breaker of it; and prison labour was, he contended, a great influence which might be enlisted to conduce to this result. Sir J. Bowring proceeded to cite statistics to show the excellent results which had followed the introduction of prison labour at Wakefield, Taunton, and elsewhere. The Indian prisons were made more than self-supporting by prison labour, while the re-committals were small. The experience acquired in American prisons was to the same effect. In Massachusetts some of the products of the prisoners carried off prizes at the Paris Exhibition, and purchases were made by the King of Prussia and the Emperor of the French. At Wakefield the earnings of the prisoners in 1867 were 7,384*l.*, and the whole of the trade capital which belonged to the Government, amounting to 10,000*l.*, had been repaid. The average earnings of each prisoner were, in 1864, 4*l.* 12*s.* 6*d.*; in 1867 they were 7*l.* 4*s.* 7*d.*. In the Salford prison the net earnings were 3,369*l.*, being an average of 5*l.* 18*s.* 10*d.* per prisoner. At Bradford, in the five years ending 1857, the profits derived from the results of industrial labour introduced in the county prison by the present governor, since his appointment in April, 1853 (and which had been conducted without any aid from the county-rates) were 985*l.*; in the five years ending 1862, 1,367*l.*; and in the five years ending 1867, 2,506*l.* Including work done in and about the prison, for which no charge was made to the county and other receipts, the total profits on prison labour for the past fifteen years were estimated at 9,618*l.* As regards the Massachusetts prison, the net profits to the state of prison labour in 1867 were 22,345 dollars, while for 1868 it was estimated that the total profit would rise to 25,000 dollars. The re-committals of prisoners in Massachusetts were also relatively moderate.

Mr. J. Wyatt, of Bedford, Sir Willoughby Jones, Mr. Bracebridge, and other gentlemen took part in a short discussion which followed, the general tendency of the opinions expressed being in concurrence with the paper of Sir John Bowring. Sir Willoughby Jones, however, remarked that, as our prisons were at present constructed, the system of reproductive convict labour could only be applied to a limited number of prisoners. In the Norfolk county prison the treadmill was now reserved for strong abeddoed convicts, while the weaker were kept to remunerative occupation.

Science and Abyssinia.

In the course of a paper on the geography of the Abyssinian expedition, Mr. G. R. Markham, the Government geographer of the expedition, said the remarkable passes from the coast to the highlands of Abyssinia have been thoroughly explored, the mountain chains forming the watershed of a vast region have been examined, and the numerous sources of the great fertilising tributaries of the Nile have been accurately surveyed. Besides the observations I have taken, that most zealous and indefatigable of quarter-master-generals, Colonel Phayre, has completed a rough but useful survey of the whole country traversed. Dr. Cooke, notwithstanding severe illness, has done much valuable meteorological work; and the officers of the Indian trigonometrical survey have completed the mapping of the eastern portion of the Abyssinian highlands. But, important as the geographical results of the expedition have been, our science is not the only one that will be enriched by it. Mr. Blandford, who, from his intimate knowledge of the analogous formations in the Deccan, was peculiarly well qualified for the work, has found the geology of this part of Abyssinia to be exceedingly interesting—so interesting that he resolved to be amongst the last to quit Abyssinian soil. He has also added to our knowledge of the zoology of the country, and ascertained the existence of four distinct zones into which the fauna is divided. Mr. Jesse, who was sent out by the Zoological Society, and several officers, have also made large collections of skins, both of birds and mammals. The botany had been already thoroughly worked out by M. Schimper, the Nestor of King Theodore's captives. The country on the line of march also presents many points of antiquarian interest. The ruins of the Greek emporium at Adulis, on the coast, and of Koheito, at the head of the Degana pass, offer a field of research of no common interest to the archaeologist as throwing light on the ancient intercourse between the Axumite kingdom and the Egypt of the Ptolemies. The cave church at Dongola, the curious ruin at Azula, and the famous caverns of Lalibela, illustrate the late period when one of the most ancient Christian churches was established in Abyssinia. Nor can it be said that nothing of antiquarian value was to be obtained worth taking away, when several thousand MS. parchment folios were found in the library of King Theodoros, and a golden chalice, belonging to Sultan Segwed, a king who flourished in the sixteenth century, were amongst the plunder of Msghala. The main objects of the Abyssinian expedition have been gained. The men of science who accompanied the expedition have not returned empty-handed, and there are a few regions on the globe where so much could be found to repay inquiry.

The Broads of East Norfolk.

The title of a paper by Mr. R. B. Grantham, C.E., and had reference to water-supply, storage, and drainage. These broads, or lakes, he said, were not commonly found in the same geological formations in England. As an instance of utilizing the waters of these broads, and also of improving lands affected by them, he referred to the Great Yarmouth Waterworks Company, taking water from Ormesby, Rollesby, and Filby Broad (possessing together an area of from 400 to 500 acres), and supplying the town of Yarmouth and its neighbourhood; and the cases of improvement of land by drainage as carried out at Martham, Somerton, and Winter-ton, and Beccles, and other places about to be constituted drainage districts. To show the origin of the broads, he described the geology of those portions of the country in which they are situated, and from this and certain historical facts he deduced the conclusion that the eastern valleys of Norfolk were formerly branches of a wide estuary, and that the present rivers and broads are the remains of that large body of water. He then proceeded to refer to the valleys of the rivers Bure, Yare, and Waveney, and their tributaries, the combined water-sheds of which extend over parts of Norfolk and Suffolk, and embrace an area of 1,210 square miles, or 774,400 acres. The Bure and the Yare together drain more than half Norfolk, the Waveney only a small portion, but a large part of Suffolk. In Ormesby Broad, on the north side of the Bure, the surface of the water is 2 ft. or 3 ft. above the high water of the Bure at the sluices at the end of Muckfleet. It is said to be 20 ft. deep in some places, which would make its bottom considerably lower than low water in the sea. Pro-

bably the bottoms of many other broads may be below the level of the sea, which may be accounted for by depressions and upheavings of the formation. River-beds are not unfrequently lower than the low water of the sea, and this occurs far up their courses away from the sea. In some cases this may be traced to the force of the currents deepening them, but in the broads there are no currents or other disturbances to cause an excavation of the bottom. The Broad is supplied by streams running into them from minor valleys and springs which rise in the formations, to which they form catchment basins or reservoirs, and are no doubt performing a most important and useful part in the economy of water supply by detaining superabundant quantities of water from storms and continuous wet weather; and they prevent inundations in the lower parts of the country by affording time, where the inclination in the main valley is slight and the velocity naturally slow, for floods to pass off at each successive low tide. With regard to the scour of the river Yare, Mr. Grantham was of opinion that it would be most desirable to deepen the whole of Breydon Water and impound a larger body of back water, and thereby further increase the scour at the bar. Passing to the subject of drainage in connexion with the broads, Mr. Grantham did not recommend their conversion into agricultural land, considering the great importance of keeping them as reservoirs, particularly those of large area, in which the water would continue good and wholesome. The land to be acquired by draining the broads, if that were possible, would amount to 2,500 acres, which is a trifling quantity as compared with that which may be retained round about them, or with the quantities which might be improved in many other parts of the county. The drainage he would recommend was that of the marshes and swamps, which were mostly caused by the broads and the rivers in connexion with them. Most of the lands he had seen in this state would be highly productive and profitable if they could be deprived of the surplus water and so maintained. At the same time he would secure the means of using the water for irrigation, if necessary. This conversion of the marshes into profitable and remunerative land need not interfere with the impounding and storing the water in the broads. By the improvement of so much land a large amount of additional permanent employment would be given to the population, and the healthiness of the localities would be increased. Although large bodies of water might be objected to, he did not consider them so injurious as the miasma arising from the evaporation and exhalation from the decaying of the vegetation of large tracts of marshes, which is the chief cause of fever and ague in the tropics and other similarly circumstanced countries and districts.

We must end, for the present, with a brief notice of what Mr. Jas. Fergusson said

On Buddhist Architecture.

The discourse was delivered at an evening meeting in the Drill-hall, and was listened to with great attention, which is more than can be said of the audiences on some other occasions. His subject being an Indian one, was consequently a subject upon which much ignorance existed in England, and he was enabled to give a great amount of information which had the charm of novelty. He first referred to the foundation of the Buddhist faith by a native prince named Sakya Mune, or Buddha, several centuries before the Christian era. This prince abandoned all his worldly comforts and possessions, chose an ascetic life, and for fifty years lived under trees and taught the doctrines he wished to disseminate, viz. kindness to animals and to all living things, and, above all, brotherly love and kindness to all men. But it was not till 300 years after his death that Asoka made it the State religion, and was said to have converted all India to the faith; and it was still 600 years later that Nagarjuna established ministers and gave Buddhism a clergy, and from that time it spread over Bnrmah, Siam, into China, all over Tibet, and the greater part of Asia. A very remarkable fact, however, was that, although Buddhism was still the religion prevailing over a great part of Asia, there was not now to be found a single Buddhist in India, the land of its birth. Having given an elaborate description of the monuments of Sauchi and Amravati as examples of the structures raised in honour of Buddhist saints, the lecturer went on to refer to the details of the architecture of several periods, the sculpture proving beyond all doubt that tree and

serpent worship, which was the religion of India previous to the introduction of Buddhism, had again gradually crept into the new faith. Tree and serpent worship, he observed, had at some period or other prevailed all over the world, and doubtless the frequent reference to trees and serpents contained in the Holy Scriptures was in some way connected with this practice. Trees and serpents also held a high place in all the mythological fables; and his opinion was, that if this subject were thoroughly looked into they would arrive at an amount of ethnological and religious knowledge now quite unsuspected. All over the steppes of Asia, throughout Scandinavia, and in this country, wherever they found these rude tumuli, they found traces of the same race that erected similar monuments in India; and though he did not say that people came over from India and taught the people of this country to erect Stonehenge, nor that they had any connexion with the people of India, yet there was this great underlying stratum of population, who cropped up in Europe and other parts of the world as well as in Asia, and wherever they came to the surface their monuments were similar in character, and all more or less applied to the same purpose. Originally funereal, they gradually became temples and relic shrines; but they were all monuments of one great people, and all expressed more or less distinctly one idea. He was convinced that when this subject was fully investigated they would have a very interesting picture of a people who were now only known by their rude monuments all over the globe.

SUMMER DIARRHŒA IN LARGE TOWNS.

We are rather too much in the habit of regarding as inevitable and unavoidable certain violent fluctuations in our national death-rate, looking upon them as the natural result of the season, and the alterations of temperature in our uncertain climate. It is beyond denial that in winter the duration of life of the nation, but more especially of that portion living in large towns, rises and falls in almost unvarying sympathy with the mercury in our thermometers; but we have yet to learn how much the loss of life through the various diseases of the lungs, which ensue directly the temperature falls to the freezing point, may be lessened when the social and sanitary condition of our town populations shall have been raised to a very different standard from that which is now in force. So with the summer season, it is only necessary to point to the present season as a striking example of what may be observed in a series of years, that continued high temperatures and a rainfall far below the average have always produced an excessive mortality in the shape of an epidemic of summer diarrhœa. In cold wet summers there is little or no mortality from this cause. The year 1860 is perhaps the strongest example of such a season, and in that year the deaths from diarrhœa in England and Wales were less by something like 10,000 than the average number.

Summer diarrhœa seldom becomes epidemic in England until the middle or end of July; but this year it appeared in the middle of June, produced without doubt by the excessive and unusual temperature. In London the deaths from diarrhœa rose from 31 in the second week of June, to 66 and 171 in the last two weeks, and had increased to 412 in the last week of July; since which the numbers have declined to 384, 294, and 245, in the three weeks ending Saturday, 15th instant. These numbers are exclusive of a weekly average of 30 deaths in the eight weeks ending 15th instant, which have been referred to cholera and choleraic diarrhœa, many of which are doubtless only severe cases of diarrhœa.

The Registrar General's weekly return has recently published the mortality from diarrhœa in several other large English towns besides London, and it will be interesting to compare the relative fatality of this summer scourge of large towns, in the metropolis and in the provincial towns. For the purpose of comparison we will use the returns for the four weeks ending the 15th instant. The ten towns below are those for which weekly returns of mortality are published, and they are arranged in the order of their annual death-rate per 1,000 from diarrhœa, in the four weeks above mentioned.

	Annual rate per 1,000 in four weeks.
Newcastle upon Tyne	44
Bristol	54
London	57
Bradford	84

	Annual rate per 1,000 in four weeks.
Liverpool	10.8
Manchester and Salford	11.1
Sheffield	11.1
Hull	13.7
Leeds	13.2
Birmingham	16.7

From the above table it will appear that although the prevalence of diarrhœa in London in the past four weeks has raised the deaths by about 300 per week, the mortality from this complaint in proportion to population has been much more excessive in all the large provincial towns, except in Newcastle and Bristol. Although to some extent the fatality of an epidemic may be taken as a test of the general sanitary condition of any community, the above figures, if well considered, will show that some exceptional causes must be found to account for three towns like Hull, Leeds, and Birmingham, whose death-rates have recently been so satisfactory, suffering so severely from this summer diarrhœa.

The experience of cholera epidemics has taught us the first importance of an abundant and pure water supply, and the severe penalties which the absence of this necessary has entailed on different town populations; it is, therefore, natural to consider that the excessive fatality of diarrhœa in a town so generally healthy as Birmingham, at least throws some suspicion upon the quantity and quality of the water supply of that town. This high mortality, moreover, recalls to mind the fact that Birmingham is still without a medical officer of health, who in such a time as the present is especially necessary to organise an effective distribution of preventive medicine, and to secure as far as possible the instruction of the poorer classes in the necessity for prompt attention in the earlier stages of the complaint. Another important duty of a medical officer is to use every possible precaution against the sale of fruit and other perishable articles of food in a condition unfit and poisonous for consumption.

The low death-rate from diarrhœa in Newcastle is in a great measure due to the greatly improved sanitary condition of the town, but has been doubtless considerably influenced by the more moderate temperature which has prevailed in this northerly town. In Bristol and London the sanitary arrangements, although still admitting of improvement, are in a more satisfactory condition than in most other towns, and to this may be attributed the smaller proportional fatality of diarrhœa. The fatal prevalence of all kinds of zymotic disease in both Manchester and Sheffield discloses a sanitary condition which explains the high death-rate from diarrhœa. It is to be hoped that greater sanitary activity, favoured by the recent lower temperature and heavy rains, will go far to reduce the fatality of the epidemic, that the death-rate of 1868 will still remain one of the lowest on record.

The present mortality, however, should stimulate the efforts of all sanitary reformers to devise such precautions as will offer a greater security to our infant-town populations, from this annual scourge of diarrhœa.

THE GIRENCESTER ARCHÆOLOGICAL CONGRESS.

ON the 12th inst., when the Fairfield windows were visited, as already related,* the day's excursions included visits to the churches of Ampney Crucis, Maysey Hampton, and Bibury, Mr. E. Roberts, F.S.A., the hon. sec., undertaking their exposition.

At Ampney Crucis,

the vicar, the Rev. Mr. Brewster, gave an account of the accidental discovery of the head of the cross, and Mr. Pianché stated that the figure in armour was of the date of Henry VI., about 1430-40. Mr. Black considered that the base was originally an engineering landmark of the Romans. Mr. Roberts, in the course of his remarks, said that the interest in Ampney Crucis had hitherto centred in its cross, but that its story, like the history of Gloucestershire, still remained to be told. Since Rudder wrote, now nearly a century since, vast strides have been made in the system of researches, and enormous amounts of materials have been gained. There is no archaeological society in the county, and probably in consequence much has been lost sight of or failed to be recorded; but the more generally

diffused love of antiquities has led to inquiries, and it is desirable that the history of this and other places, scarcely touched on by Rudder and Atkins, should be more fully written. As regards Ampney Crucis, the materials are few.

At the time of Domesday survey the manor of Ampney Crucis was held by the abhey of Tewkesbury, which continued in possession until the dissolution.

Downnemeu and Qnennington appear to have been places visited annually by Edward I.; and each year, except those occupied by his French and Welsh wars, viz., about five years, he remained from three to twenty-nine days. Edward II. also lodged at Downnemeu in 1326, preferring either Gloucester or Cirencester when on his journeys hither.

As regards the cross and church, the work on "The Crosses of Gloucester," by Pooley, has views of it as well as descriptions. The date of the cross appears to be about 1430, and it is particularly interesting from having its upper part nearly perfect. The church has some remains of the Norman period. The chancel arch of that date is well preserved, and the doorway to the rood-loft remains.

Bibury.

The manor of Becheherie, or Bibury, is one of those the history of which commences with "Domesday Book." Mr. Roberts mentioned some curious benefactions recorded.

1. Hugh Westwood gave by will in 1559 for four of the most impotent and poor men of Bibury for maintenance, clothing, and firing, and who are lodged in his almshouse, a rent charge producing 18s.

2. John Smither gave by will, in 1621, 10l. vested in the churchwardens, being borrowed for the use of the church thirty years before, for four widows in Bibury if possible.

3. Thomas Tawney gave by will, in 1676, 50l. (lent to the church in 1754) for the use of the poor.

It appears, therefore, that sums of money were borrowed from parishioners for the use of the church, and remained a rent charge upon the parish.

The church consists of a nave 75 ft. 5 in. by 22 ft. 6 in., being slightly narrower at the west end; a south aisle, about half the length of the nave, and 13 ft. 6 in. wide; and a north aisle the whole length; a chancel 44 ft. by 15 ft., a west tower, and a south porch.

"This church may be appropriately described as an unknown treasure. It has been said repeatedly to have a very curious history if only it could be made out. In the absence of perfect records, we are driven to read its history in its walls. Undoubtedly, then, the foundation was Saxon, and many parts remain to show its size and construction. The nave is large, and the construction shows that the Saxon church was limited to nave and chancel. The latter, however, was not of the same shape or size that it now is, having been shorter, and terminated in an apse. The chancel opening bears every appearance of being the original size. The nave has been lengthened westward from the five arcades inserted in the Saxon walls, on the north side, of Transition or late Norman date; while the arcades on the south side are of a later date.

At the west end on the south side are three lancet windows, one being at a lower level than the others, with a circular or cyclet-hole window over it, splayed inside and out, precisely similar to those discovered at Framingham Earl, in Norfolk, and others which I have before pointed out in that district. I understand that Mr. Scott, who restored this church, considered this window to be Saxon. Now, although there is much of Saxon in this structure, I believe this window to be of the earliest Norman period. It is in a very peculiar position, and appears to me to have lighted a former loft. In the north aisle I must call your attention to the small piers or buttresses which are peculiar to Saxon work though in this instance it varies from the ordinary type, and seems to have been seriously restored. I have made inquiries of Mr. Scott, but I cannot ascertain what was done there. The chancel, as I have said, was lengthened, but still at an early date, the eastern amburies being always an evidence of early times. There are as many as eight amburies altogether, and two piscinas, both with shelves. Five of the amburies have been closed by doors.

Externally there are two carvings, one of Late Saxon scrollwork, and the other of Early Norman; one built into the wall of the chancel

* See pp. 595, 615, and 618, ante.

and, as our member, Mr. Irvine, thinks, marking the end of the Saxon work; the other is at the south doorway."

Richard of Cirencester.

At the evening meeting, Mr. Leviau, M.A., read a paper on "Literary Forgeries," which remarks on Richard of Cirencester, and his writings. After some introductory observations, he referred to numerous notable literary forgeries, commencing with those of Ireland in the beginning of the present century, and including the Byron and Shelley forgeries. He then came to the work alleged to have been written by Richard of Cirencester, but which was a forgery. Richard of Cirencester was a monk of the Benedictine order, who lived between the middle and the end of the fourteenth century, dying at Westminster between 1400 and 1402. The work "De situ Britannia," put forth as emanating from the polished brain of Richard of Cirencester, was proved to have been written by Charles Julius Bertram, a Copenhagen professor. The fabrication had been detected by Mr. Woodward, and by this imposition a number of valuable hooks written on the authority of these fabricated volumes had been vitiated. In these days, said Mr. Leviau, when my lords and honourable gentlemen, with that deep erudition which they individually and collectively possess, sit on parliamentary benches, and after having themselves doubtless mastered all the *arcana* of the most abstruse of the *ologies*, look down serenely like the gods in "Lucretius" upon those less happy mortals who are arranging up the steep paths of learning that lead to their empyreal heights, and are laying down laws with respect to competitive examinations, compulsory education, and the various other methods of torturing which they invent for the purpose of bringing less enlightened folks up to their own intellectual standard, they may perhaps allow an outsider to remind them that oven they themselves, the Civil Service Examiners, the Council Office, the "experts," and the learned societies are not infallible, but that when such base metal as Bertram Cirencester, or Cirencester Bertram, has been allowed for so many years to pass current among us, it may fairly be asked *quis examinabit ipsos examinatores?*

Mr. Gordon Hills mentioned, on the authority of Mr. Freeland, M.P. for Chichester, a remarkable case of historic forgery, or mistranslation, of an Arabic MS.

Mr. Black pointed out at some length his reasons for disbelieving the historical work attributed to Richard of Cirencester. He, with many others, amongst whom was his friend Sir Richard Hoare, were at one time in favour of the work, but no one conversant with the writing of the period at which this was supposed to have been written could for one moment be deceived by it. It was, in his opinion, a base fabrication, which had tended to throw into disrepute the "Antonine Itinerary," which has since been found, in the distances and measurements, to be as correct as Bertram's is incorrect.

On Thursday, the 13th, the Association went by the Roman-road, Akeman-street, to the source of the Thames. Upon this spot, which is known as "Thames Head," seven springs rise; but, in consequence of a pumping-engine situated at a short distance from it, and which supplies the Thames and Severn Canal with water, the basin was at this time quite dry, and had been so for some weeks previous to this visit. Before the construction of the canal a copious stream flowed from this spot. At an evening meeting afterwards, Mr. G. B. Wright read a paper on the origin of the name Thames. The chief place visited during the day was—

Malmesbury Abbey,

where Mr. Gordon Hills gave, in his usual sound clear manner, a full account of the buildings. In the course of his remarks, Mr. Hills directed attention to the fact that three of the flying buttresses on the south side were in a most perilous condition, and said the effect of a wet season or frost upon them might be exceedingly disastrous to the only remaining portion of the ancient fabric. 1,000*l.* spent upon the building now prevent its destruction.

On Friday, the excursion was to Daglingworth, Dunstbourne Rouse, and Elkstone, under the guidance of Mr. Thos. Blashill. Before examining the church at Daglingworth the party were conducted to the ruins of a fifteenth-century building, now partly roofless and partly converted into cottages, and which has been locally considered as the remains of a branch house of the nunnery of Godslow, in

Oxfordshire. It was stated that an architect had even fixed the position of the refectory and some other portions of the monastic edifice. Mr. Blashill showed from extracts from the register of the property belonging to the nunnery, which is deposited in the Bodleian Library, that they held only the advowson of the living, and pointed out the strong presumption that this was the ancient manor-house. There is a large porch, with a handsome archway and angle buttresses. Within the porch is a recess on the right for a staircase, and over it appears to have been an oratory; a window with a recess, like that of a piscina, but without the nasal drain, still remaining on the east-side wall. The porch is near the centre of the southern side of the main building, which measures about 54 ft. by 19 ft., and contains remains of good fireplaces, windows, and doorways, from which the original design might be traced. A deed, of the date of Philip and Mary, which was afterwards produced by Mr. Mullings, proved to be a lease of the manor-house and dovecot, and confirmed the conclusion already arrived at as to its history.

The church of Daglingworth appears in the ordinary catalogues of Anglo-Saxon buildings, and it certainly possesses several of the characteristics usually considered to belong to that early period. Until its enlargement, within the last few years, it consisted of a fifteenth-century tower, a nave, having a crippled semi-circular arch thrown over it between the porch and the western end, and a chancel. The western face of the wall above the arch in the nave had an altar, standing on two small Norman columns, with scalloped capitals, and projecting from the wall at the level of the wall-plate. A rough oak roof, of more recent construction than the trussed rafter roof of the rest of the nave, covers this portion. The walls also are thicker, although they form a straight line on the outer face. Mr. Blashill pointed out that this must have been the ancient tower, with a chapel on the first floor. Much of the ancient work was lost in adding an aisle and vestry on the north side; but all the old angles have what is known as "long and short" work, with a rebate run down at about 6 in. from the angle, clearly defining the timber-like construction. Possibly the plaster with which many early churches were covered stopped against this rebate. There is a narrow semicircular chancel-arch and a narrow south doorway. Each has splayed and square strings, to act as capitals, with a flat bead decoration in the chancel, and a flat plated ornament in the porch doorway. Very small, narrow, round-headed windows, with wide inner splay, did exist throughout the church, one or two of which can be clearly traced, and a small stone, with two semicircular-headed piercings, of pre-Norman character, was clearly made out from a few remains of inverted letters to be part of a Roman altar. Mr. Prebendary Scarth and the Rev. Mr. Joyce having arrived independently at the same reading of the inscription. The masonry generally is decidedly of a better description than is usual even in early Norman work,—so good, indeed, as to throw strong doubts upon the early date put down for the building. There is, however, no doubt as to the extremely early character of some sculptured panels which were found built up in the chancel-arch. They represent Christ seated; the Crucifixion, in which are two Roman soldiers, one having a spear and the other having a sponge upon a reed and a vessel for vinegar; and St. Peter, with the keys. The moustache on the figure of our Lord, the tunic in which he is dressed, the knotted girdle, the large heads of all the figures, and, as Mr. Gordon Hills pointed out, the uncrossed position of the feet in the Crucifixion, all show Saxon workmanship. The visit of the British Archaeological Association is likely to lead to the complete examination and illustration of the architecture of this interesting building.

The Church of Elkstone

is of the class of Norman structure, remains of which exist at Ifley, Kilpeck, Shobdon, Stowley, and other places, and are dated early in the latter half of the twelfth century. In this case the influence of the work at Malmesbury Abbey is clearly visible. There is a good doorway with the beak-head ornament, a rich chancel arch, two vaulted compartments in the chancel, the ribs in the eastern one meeting in four grotesque heads. The east end is square, and over the whole of the chancel is a room which appears to have been much higher in the last century, and is fitted as a dove-cot. The nests are composed

of portions from the old parts of the church; one piece of sculpture with a scalloped ornament appears Roman in character (it is near the Roman road known as Irmin-street, and there are Roman villas in the neighbourhood), but possibly the whole of the fittings of the dove-cot might prove, if carefully examined, to have been added since the Reformation. The eaves of the nave have grotesque corbels, as is usual in these twelfth-century buildings.

The buildings visited, though small, were of interesting character, and, though the day was showery, the view from Birdlip-hill over the vale of the Severn was magnificent. The line of the Irmin-street running straight as an arrow on Gloucester, whose town was a fine feature in the view, the distant view of May-hill, the range of the Malverns, and the rich valley with isolated hills, altogether made up a scene of hearty English in character, but rare even in England.

In the evening amongst the papers read was one by Mr. J. R. Panché, Somerset Herald, on

The Norman Earls of Gloucester,

wherein he argued in favour of the existence of an Earl of Gloucester (a William Fitz-Enstace) previous to Robert the Consul; and, referring to the errors committed and perpetuated by persons who did not sufficiently understand the subjects discussed by them, went on to remark,—“My amiable friend, the late Thomas Haynes Bayly, in one of his pleasant Songs of Society, said

‘It’s pity when charming women
Talk of things which they don’t understand,’

Without, by any means, endorsing this opinion, I do not hesitate to assert that it is a much greater pity when sensible men commit the same impropriety. A right honourable senator, who deservedly enjoys a high reputation for general knowledge and remarkable oratorical powers, not long ago, stated at a public meeting that he believed something useful was to be learnt from the study of every science—except that of heraldry. Here was an undoubtedly sensible man talking of what he did not understand, and it is the more to be lamented because he was unnecessarily giving the weight of his great opinion to a very silly prejudice, which I am happy to say is becoming rapidly destroyed by the proof constantly afforded of the exceeding value of heraldry to the student of our National Antiquities, whether historical, genealogical, or artistic. In conclusion, I must beg you to understand that, while arguing in favour of the existence of a Norman Earl of Gloucester previous to Robert the Consul, I am not hacking up a favourite theory, or interested in anything beyond arriving at the truth. Had my inquiry resulted in an adverse conviction, I should have stated it with equal satisfaction. The great object of such a society as ours, and our strongest claim to your support, is the establishment of facts by the critical examination of statements reported without question by writer after writer until ever becomes so venerable from antiquity and the sanction of apparent authority, that the archaeologist who would destroy it is accused of sacrilege and twitted with being untrue to his order. At the same time it is his duty to respect tradition, which is so frequently founded on fact, however distorted; and carefully to preserve every fragment of local history which is not contradicted by official record or opposed to common sense. Such a fragment I consider Dr. Powell’s note on the Battle of Cardiff; and while by no means insisting on the accuracy of every particular, I venture to think that, disentangled of the obvious misconceptions which have hitherto mystified and disfigured it, the ‘plain unvarnished tale’ is not unworthy of further investigation by the antiquaries of Gloucestershire.”

We are not pretending to mention all that was done and said, and must pass on to the very interesting visit paid to the site of the newly discovered Roman villa at

Chedworth,

where the area of the discoveries was pointed out, and, by the aid of a plan, the situations of the different apartments, bath, hypocaust, &c., were traced by the Rev. Prebendary Scarth, Mr. Grover, and Professor Backman. The villa is situated on the Great Foss-road, about eight miles from Cirencester, and sixteen from Gloucester, on the small river Colne. The buildings form three sides of a square, and the property belongs to the Earl of Eldon, with whose sanction excavations have been made by Mr. J. Farrer, and the site traced out, or the greater part of it. A large quantity of Roman relics have been dis-

covered, all of which, with a few exceptions that have been carried off to London, have been deposited in a museum erected on the spot for their reception. We have before now referred to this villa in connexion with the interesting fact that the Roman remains display *Christian symbols*.

Prebendary Scarth read a paper descriptive of the discovery, and showed that, although much of the villa had been brought to light, the whole had not been disclosed: fresh foundations of walls were being constantly found. There were undoubted proofs that the villa had been destroyed by fire, and the discovery of 257 coins, mostly of the Roman period, enabled them to fix pretty accurately the date of its destruction. No Saxon coins had been found. The position of Chedworth was marked on the map of Roman Britain in *Monumenta Historica*, but it was not mentioned in Horsley's map. Mr. Scarth proceeded to describe the general plan of the villa, which appeared to be divided into two parts, one the residence of the owner, the other allotted to the servants of the farm, which was generally attached to these rural villas. A perfect Roman villa, according to Columella, contained three parts:—1. The villa urbana, or owner's residence. 2. The villa rustica, or residence of the bailiff. 3. The villa fronsaria, or barns or out-houses. The peculiar situation of that at Chedworth had led to its preservation. It was situated on the declivity of a hill, and after destruction had probably been left until the underwood had hid it from view, and gradually covered up the remains. This would account for so much good masonry being left undisturbed. The pavements were very perfect and of a high order of merit, and probably were executed by the same artists who had laid down those found in and around Cirencester. One of these,—viz., that adjoining the principal bath,—had already been drawn and described by Mr. Crover; but there was another in the same line of building equally worthy of note, containing the figures of a dance somewhat resembling our present waltz. The writer went on to describe the finding of the Christian emblems, but we are tempted in lieu of following him to avail ourselves of information furnished some little time ago by the Rev. S. Lysons, who was present when the monogram was discovered. We give it under a separate heading. Suffice it to add, that the British Archaeological Association have spent their week in Cirencester with singularly good effect.

ROMAN REMAINS AT CHEDWORTH.*

To the accident of a lost ferret we are indebted for the discovery of one of the most interesting Roman or Romano-British villas existing in this country. The under-keeper, in thrusting his arm into a rabbit burrow to pull out the recalcitrant animal, at the same time drew out a number of tesserae, which being submitted to the inspection of those who understood such matters were at once pronounced to be of Roman type, indicating the existence of a pavement at that spot. Further search proved the correctness of the suspicion, and fortunately Mr. James Farrer, being a man of scientific pursuits, was not one who would allow the suggestion to remain without further inquiry. It is interesting, not only as revealing to us a work of art of the times when the Romans held sway in this country, but still more so from the historic fragments which may be collected from hence, and which, when pieced in with history and tradition, help to restore a link which was well nigh obliterated, in consequence of the loss of that historic literature which I cannot help thinking we must have once possessed. It is well known that in the second invasion of this island by the Emperor Claudius, the Romans, after a rapid march across the country, advanced with comparatively little opposition on the part of the Britons as far as the county of Gloucester, then inhabited by a people by some historians called the Dobuni, by others called the Dobuni, according as might be the curial perception of the pronunciation of their name by those who recorded it. History also tells us that some of the British princes were favourable, rather than otherwise, to the Romans, and others were soon converted into obedience. History, such as we have it, relates that Arviragus, king of this country, a king whose name is recorded by Juvenal, made terms with the emperor, and was permitted to retain pos-

session of his kingdom; that this king having reigned honourably forty-four years, and having during that time visited Rome, returned to his kingdom, and was eventually buried at Clonchester. At this time Vespasian, father of Titus, the conqueror of Jerusalem, was lieutenant of the emperor in Britain, and to him British historians attribute the foundation of the town of Cirencester, or, rather, its conversion from a British settlement, called Caer Corin, then the capital of the Dobuni, into a Roman fortress, with the Romanised British name of Corinium. Discoveries in that town give reason to believe that there is every probability of the truth of the tradition. Its Roman occupation, its Roman walls are unquestionable, and why should not Vespasian, who Roman history tells us was in Britain at that period, have transformed it from a British settlement into a Roman town? But to return to Arviragus. He is not only said to have been king of this country, but also to have been a Christian, one of the earliest British Christians. Bigland, the county historian, tells us that in this very parish, within a mile of this Roman villa, about the year 1750, the vestiges of a Roman bath were discovered at Listercomb-bottom; there were a spring and other necessary appendages. Most of the bricks of which it was built were legibly marked ARVIRI, describing, probably, says Bigland, by connected initials, the titles of the legion which was stationed here. But, as I cannot discover in these letters any way corresponding with them, and as they do form the very legend upon the coins attributed to Arviragus, I was most anxious, on the discovery of this interesting villa, to ascertain whether any other evidence might be found connecting this place with the traditional British king which might in any way confirm the story of his Christianity.

From our early chroniclers we learn that the Emperor Claudius made friends of some of the British princes, and left them in charge of the governments they had previously held, as the kings of Oude and Delhi, and other rajahs, have been left by our Government in India. This view is confirmed by the Roman historians Tacitus and Xiphilius; and we read in Juvenal that Arviragus was still at his government in the reign of Domitian, in which there is nothing inconsistent, considering the great length attributed to his reign by all the chroniclers. Arviragus then, being king of the Dobuni, of which Corinium (Cirencester) was the capital, one is not surprised to find the bricks discovered at that city also inscribed with the same mark of ARVIRI. Several of these exist in the Cirencester Museum. Whether or not that sovereign had at so early a period exacted a tax on bricks, and had them stamped with his legend, we cannot now say. They must have got their revenue from something, and therefore such a suggestion has nothing impossible or improbable that I am aware of in it. That both the Romans and Britons imposed taxes upon their people is unquestionable. The British coins marked *taxio* have been considered by some writers as signifying that they were used for paying the taxes. The British word *tasg* undoubtedly means a task, an imposition, or tax. I see no reason why we should be more surprised to see the sovereign's name upon these bricks than to see V. R. (our own sovereign's mark) upon any excisable article. The Romans had a tax upon salt, and the Emperor Vespasian, the founder of Cirencester (so says Suetonius), imposed a tax upon wine; a tax upon catables was imposed by Caligula, and why not on bricks? I may remark that the pigs of lead of the Roman times, of which there are several specimens in the British Museum, invariably have the mark of the emperor in whose reign they were moulded. It would be interesting to know whether any bricks of the Roman times with the legend of Arviri are discovered in any other county. Mr. Farrer kindly invited me to visit this place during the progress of the excavations; and at the time when the workmen arrived at the foundation-stone of the principal entrance of the villa, knowing the custom of most nations to inscribe the foundation-stone with some emblem of their faith,—the Egyptians with the Scarabeus, the Jews with the ineffable name, &c.,—I caused the workmen to turn up the stone, when, to my great interest and delight, I discovered the Christian monogram, the two first letters of the name of Christ, evidently marking that the builder of that villa was a Christian. This monogram was precisely of the character of those seen on the coins of the Emperor Augustus

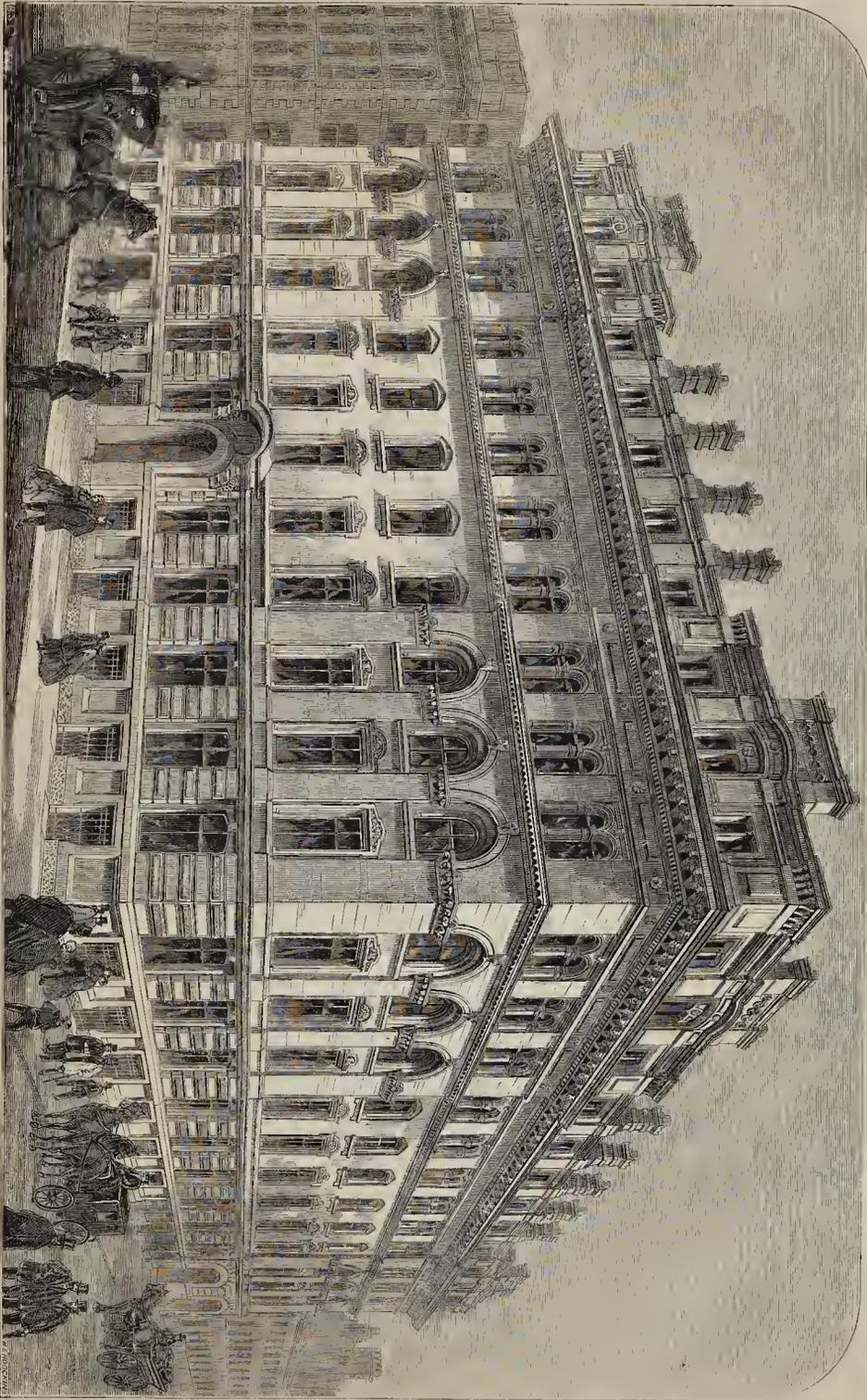
and his brother Decentius, who—Britons by their parentage, as we read in Zonarus—reigned A.D. 350. This type, however, I find on the Christian tombs, in the catacombs of Rome, reaching back to the times of Hadrian, who commenced his reign in 116 A.D., if not indeed, to a remoter period, and is, I believe, as old as the Apostolic times. This was not, however, the only specimen of the monogram: on further research I found no less than four other instances of it. It has been the prevailing opinion that the monogram originated in the time of Constantine the Great, but my own reading, confirmed by Signor Erasmo Pistolesi, on the Vatican at Rome, shows that Constantine only adopted a symbol well known among Christians from the earliest period of Christianity. But the historic chain does not cease here. I received a letter from Mr. Farrer, informing me that a sculptured stone had been found, with letters inscribed on it, requesting me to examine it on my next visit. On having the stone washed, I found the letters PRASIASATA, which is the abbreviation of Prasiatagus, as ARVIRI is of Arviragus. Here we have the name of another British king, known in history as the sovereign of the Iceni, who made his will, dividing his property in favour of the Roman Emperor Nero and his own two daughters. Prasiatagus, Prasiatagus, or Prasiatogus, as his name is variously written, was the husband of the celebrated Boadicea, also called Boudicca, and Bonidicca, and Voadica, according to the phonetic perceptions of the historians who record it. She was the queen who revolted against the Romans for taking rather more than the lion's share under her husband's will.

I think I have read somewhere that Boadicea was daughter of Arviragus, though I cannot find the passage. It is, however, probable that she had something to do with this county, for the coins bearing her legend, "BODOV," according to Akerman, are not found out of the confines of Oxfordshire and Gloucestershire.

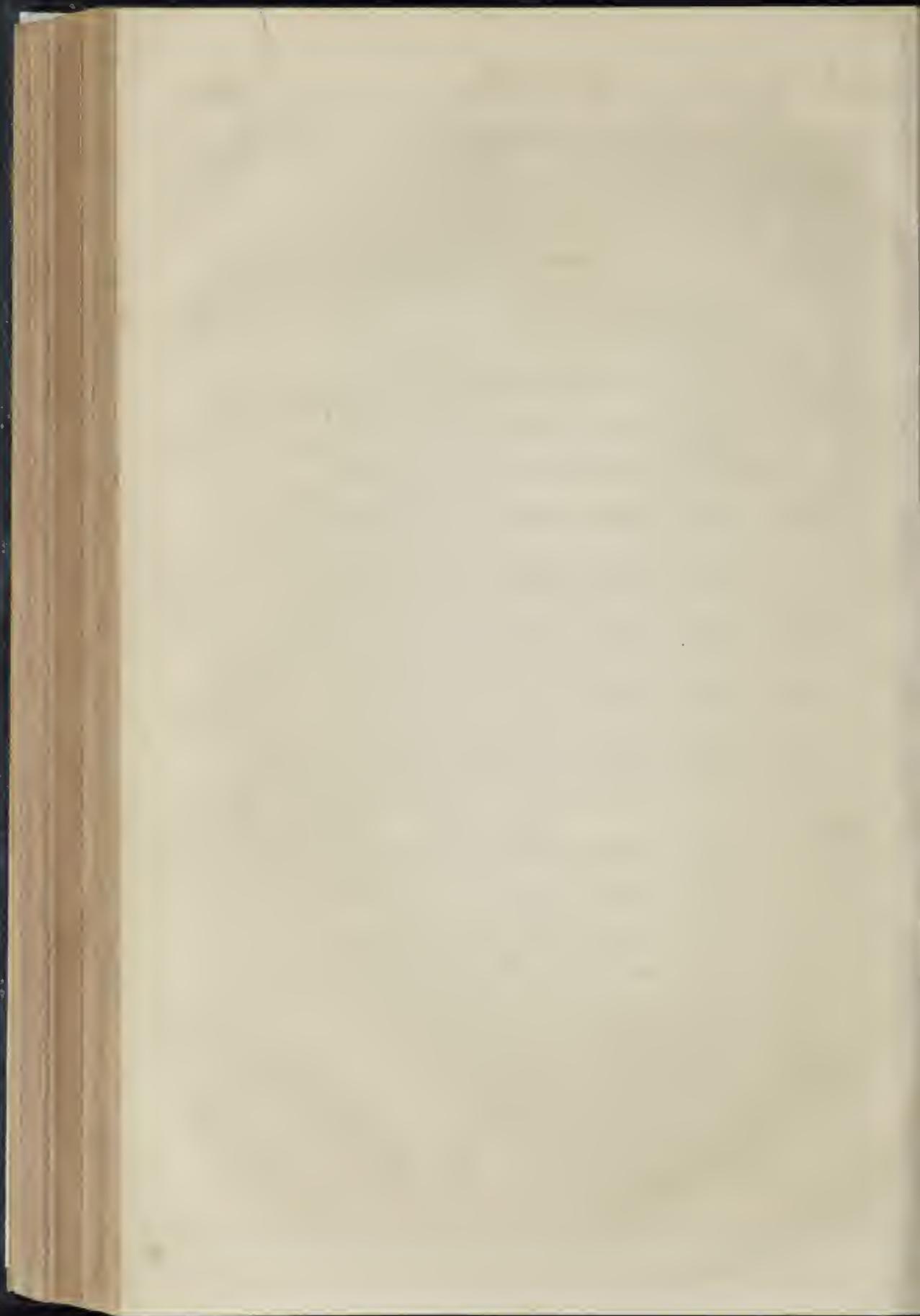
The traces of the early British Christianity, which are so decidedly asserted both by heathen and patriotic writers, have been hitherto but scantily discovered. Yet every year is producing more specimens. I am inclined to think that they have not been sought after, and when found have been overlooked or not understood. In the present instance the probability is that, had I not been present and searching for these evidences, the stones would have been thrown away with the rest of the rubbish and lost. The same monogram is found in mosaic on one of the pavements at Frampton, in Dorsetshire. Nor does it urge against the Christianity of the possessors of these residences that the Christian emblems are found mixed up with those of the heathen gods and goddesses, because no doubt intermarriages between heathen and Christians at that period must have been very frequent. Moreover, during the four hundred years' residence of the Romans in this country there must have been many changes of occupants of these villas, having different religious views. But I have remarked at this villa the singular absence for the most part of heathen emblems.

I have remarked, too, upon the existence of a chamber or building having an apse, presenting every appearance of a baptistery, of an octagonal form, which would scarcely, I think, have served the purpose of a bath, there being already two other bath establishments for the villa in another locality. In the corner of this building was an altar, but I failed to discover any heathen emblems about it. Whether this building was a baptistery is, of course, a matter of considerable question; but, if it was not, what was it? It was scarcely a bath,—it is not deep enough; besides, there are other baths in sufficiency; neither was it a well, for the same reason; nor a reservoir for the supply of the baths, for either of the large baths would exhaust four times as much as this contains; besides, a well or reservoir would not have required so grand a building. And then, what about the altar in the corner of the building, and the space occupied by the apse? This space would give room for the witnesses of the baptismal ceremony, who by standing in that position would face nearly or quite due east. Again, just over the altar are three peculiar niches. These are very remarkable, as possibly suggesting a Tritonian worship. These circumstances, at any rate, deserve much consideration. Whether all these circumstances united together may carry any weight in confirmation of some of the traditions of our early historians is for readers to judge.

* See above.



A MANCHESTER WAREHOUSE (MESSRS. A. GULLIE & CO.'S).—MESSRS. MILLS & MORGENTHAU, ARCHITECTS.



THE SCIENCE OF COLOUR.

I AM not surprised at the hesitation of your correspondents, Mr. Crace and Mr. Colling, in accepting what is to me evidently the only true theory of colour. I started myself with the same prepossession in favour of the doctrine that red, yellow, and blue were the simple or primary sensations of colour, and that their complementaries were green, purple, and orange. I began with endeavours to ascertain by rotation of coloured discs and other means the correct hues of these six important colours, and spent much time to little purpose, for nothing would come according to the theory; red and green would always make a dull yellow or olive green, yellow and purple would make a dull red, orange and blue would make a dull purplish hue, while blue and yellow would always most provokingly produce a neutral grey.

Then, again, I endeavoured to find out what could be the meaning of the doctrine that red, yellow, and blue would neutralise each other in the proportion of 5, 3, and 8, and what was the ground on which it rested; for it seemed natural to suppose that if white was a sensation compounded of those three sensations, then the intensity in which they existed in white ought to be regarded as equal. Having with some difficulty procured a copy of Field's work, my faith in the doctrine was somewhat staggered by finding that the only ground stated was that the thicknesses of certain coloured solutions, which, when superposed, transmitted a neutral light, were proportionate to 5, 3, and 8. Field seems not only to have disregarded a fact which is obvious to the eye, and was lucidly explained by Sir Isaac Newton two centuries ago, in his answer to Hooke, that the colours of solutions and other transparent bodies vary in hue as well as in darkness with the thickness of the bodies that produce them, because these bodies extinguish the differently-coloured rays at different rates, but also to have committed the amazing oversight of enjoining that the quantity of the colour transmitted was some way proportionate to the thickness of the solution. And on no better ground, it seems, this very equivocal doctrine has been ever since accepted by artists almost without examination or question.

I wondered, too, why yellow was the brightest of all colours, since orange and green, which were supposed to contain the red and blue of the full white, in addition to the yellow, ought to be still brighter; and why purple, which contained two primaries combined, must be darker than either of them separately. Is it possible, I thought, that red and blue light produce a mutually darkening effect on each other, and all illumination depends on the yellow? But if so, how is it that white is brighter than yellow?

It would be tedious to mention the absurdities and inconsistencies that naturally arise in following out a false theory. I will only add that after many vain attempts to produce anything like a perfect and harmonious system of colours upon the red, yellow, and blue theory, I was surprised to find a passage in Dr. Thomas Young's lectures maintaining that green, and not yellow, is the simple sensation, and afterwards met with Professor James Clerk Maxwell's account of his experiments, which confirm that opinion by proving distinctly (what, indeed, the unaided eye, when once attention is called to the fact, immediately recognizes) that of all the colours of the prismatic rays which compound the sensation of white, the red, green, and blue are the deepest, or most nearly pure; so much excelling the rest in this respect, that their mixtures are capable of producing all the intermediate colours with the depth they possess in the spectrum. As this doctrine perfectly agrees with all the results I had obtained, both by mixing coloured lights, and by presenting coloured surfaces to the eye in such rapid succession that the sensation excited by one had not faded before that excited by another had been produced, I had now little difficulty in accepting it, especially as it quickly appeared to me to give results far more harmonious and satisfactory to the eye than those deduced from the other doctrine. And as all carefully considered experiments with the prism, both in analysing the colours of pigments (such as that mentioned in my former letter), and in obtaining the colour of combinations of the prismatic rays (such as those tried by Mr. Crace when he viewed white and black spaces through the prism), perfectly agree with the new theory, I make hold to assert that it is impossible for any reasonable

man who knows the facts to withhold his assent from it.

I should like here to call special attention to a very simple and satisfactory experiment, which is perhaps more instructive than any other single experiment, except that of obtaining the spectrum of a brilliant white line. I shall assume that the reader is acquainted with and admits the foundation-doctrine of all that is known about light and colour: I mean Newton's great optical discovery that the white solar light is a mixture of an infinite number of different kinds of rays, all differently refrangible, and all distinguished by the peculiar sensation of colour which they produce in the eye; and that the prismatic spectrum of a line of such light is nothing else but a series of similar lines adjoining each other so as to fill a rectangular space, varying in colour from the red of the least refrangible ray to the violet of the most refrangible ray, through all the series of the prismatic colours, which to all persons of ordinary trichromatic vision at once arrange themselves in three conspicuous bands of red, green, and blue: the orange, yellow, and yellow-green which lie between the best red and green rays, and the mixtures of green and blue which lie between the best green and blue rays, being (in the pure spectrum of a narrow stripe of white) almost lost, on a general view, in the superior strength of those three predominant colours. I will also assume that the reader admits that the several rays, when mingled, each produce their proper effect on the eye, and that the resulting sensation is therefore a compound of the several sensations proper to the component rays. Without these premises no explanation can be given of the phenomena of light and colour, or of the particular experiment I propose to notice here, which is most easily performed in the following way.

Take two rectangular pieces of white paper, with clean edges (half-sheets of note-paper will do); support them over a dark cavity so that they touch at one corner, the right-hand edge of one piece being in a line with the left-hand edge of the other, and the bottom or near edge of one in a line with the top or far edge of the other; and let the paper itself be strongly illuminated. Now, holding a prism parallel with and at a moderate height above the line formed by the top and bottom edges that meet, view the spectra of the two white spaces. A charming assemblage of colours appears, arranged in the following order:—

WHITE,	BLACK,
Pale greenish yellow,	Dark violet blue,
YELLOW,	DUCK,
ORANGE,	Sagegreen-blue,
SCARLET,	SKY-GREEN,
Dark red,	Pale sea-green,
BLACK,	WHITE.

The opposite colours are perfectly complementary to each other, each containing exactly what the other wants to make up the full white of the paper; for if one of the white spaces is pushed laterally so that its spectrum is added on to the spectrum of the other white space, the two instantly neutralise each other, and white alone appears through the prism where the colours appeared before.

But how are these colours produced? Simply by adding together successively larger and larger portions of the pure prismatic rays, beginning at the red end on one side, and less and less portions beginning at the violet end on the other side. For the prism merely displaces rectangular spaces of the different prismatic colours (which without it are all seen together in the white), according to the refrangibility of those coloured rays, and the colours appear in the space between the greatest and least displacement on each side. This will be best seen if we distinguish the several prismatic rays by different letters, as by *a* for the extreme red, *b* for the next red nearer to orange, *c* for the next, and so on, down to *f* for the extreme violet. We can then show the formation of these colours as follows:—

$$\begin{array}{l}
 a + b + c + d + e + f \\
 a + b + c + d + e \\
 a + b + c + d \\
 a + b + c \\
 a + b \\
 a \\
 \text{NIL.}
 \end{array}
 \quad
 \begin{array}{l}
 \text{NIL.} \\
 f \\
 e + f \\
 d + e + f \\
 c + d + e + f \\
 b + c + d + e + f \\
 a + b + c + d + e + f
 \end{array}$$

By producing at the side a simple spectrum from a white stripe in the line of the top and bottom edges which meet, it is easy to see what prismatic rays are combined to form any given colour in either of these two compound spectra; and it will be found, on the one hand, that the

addition of all the green rays to all the red makes the best yellow; and that the further addition of the blue rays converts that yellow to white; and, on the other hand, that the addition of the green rays to the blue makes the best sea-green, which the further addition of the red converts into white.

This single experiment shows conclusively, without a possibility of mistake, the nature of all these colours which are formed by combining the rays of different portions of the spectrum beginning at one end or the other, and also places those which are perfectly complementary in juxtaposition with each other; and it seems impossible to avoid the conclusion that the best yellow is opposite and complementary to the best blue that can be presented to the eye, and the best red or scarlet opposite and complementary to the best sea-green; the colours produced by adding together continuous parcels of the prismatic rays being the best of their kinds that are possible. In like manner, by looking through the prism at a stripe of white (about a quarter of an inch wide) on a black ground, continuous with a similar stripe of black on a white ground, and properly adjusting the distance of the prism, the best possible green may be seen in juxtaposition with its complementary pink.

If any confirmation is asked for as to the truth of these being complementary colours, besides that afforded by such experiments as those mentioned in my former letter, cut out some circles of white card-board, and having painted opposite halves of each with the pigments which best represent them, such as the brightest ecarlet vermilion and verdigris, the brightest cobalt blue and king's yellow, the deepest emerald green and brightest rose madder (the latter should be toned with a slight mixture of cobalt, as it is not usually sufficiently blue), pierce their centres with small pieces of wood, tapered, and set them spinning. If the colours are laid on in proper strength, all the three tetrads will exhibit the same neutral grey.

I am obliged to Mr. Crace for the commendation which he so liberally awards to my treatise in his last letter, and am glad that my attempt to elucidate this inviting subject should be so candidly discussed; but I think that further consideration would lead him to abandon such crude and shadowy views of the nature of light and colours as were maintained by Goëthe in Germany, and by Field and Hay in England, who, with all their merits in other respects, were no philosophers. They are merely delusions which Newton put out of the domain of science two centuries ago, as that marvellous monument of genius, his treatise on optics, conclusively shows. However opaque the substance may be which reflects yellow light, the light itself cannot be opaque; rays of all colours cross in all directions without interference.

The first part of Mr. Colling's letter, in your number for August 15, is, I think, answered by the experiment proposed and explained in this letter, and in my treatise; but he makes one observation which requires remark. He says, "But green is immediately formed by allowing the yellow to approach the blue ray." A little consideration of the nature of the experiment will show that green appears when the white space is so narrow, or is viewed at such a distance, that the red in its spectrum no longer overlaps the green: so that it is, in fact, formed by subtracting the red from the yellow. Hence the green is darker than the yellow was, not lighter, as it would be if produced by adding the blue to the yellow.

I need not enlarge upon the natural phenomena which Mr. Colling next endeavours (though but lamely) to account for on the supposition that yellow and blue make green, and then uses as arguments to prove that doctrine. The colours of the sky, which vary from blue, through pale sea-green, to the glowing hues of sunset, have never, so far as I know, been fully and satisfactorily accounted for. Contrary opinions have been maintained by those most capable of judging. It may, however, be safely said that the sky-green is not formed by seeing blue sky through the yellow ray of the setting sun, since if those rays could possibly constitute a medium which would act like a wash of gamboge over a blue surface, the green they would so produce would be darker than the sky-blue, instead of brighter, as sky-green is. But, in fact, as we find by many direct and unexceptionable experiments that yellow and blue lights thrown together into the eye produce the sensation of white and not of green, the real cause must be other than that suggested by your correspondent.

Mr. Colling seems also under a mistake as to the nature of the colour of the greens of vegetation. Whether dark, as in ivy, or light, as in a blade of fresh grass, if analysed with a prism they are all seen to be yellow-greens, scarcely ever exhibiting even the pure prismatic green, which is of the hue of the pigment called emerald green, much less containing an excess of blue, as he seems to suppose; in fact, a large part of the light they reflect or transmit to the eye is red, and a very small part blue. Of this he may easily convince himself, by comparing the spectra of leaves with the spectrum of white light, by a method similar to that proposed for analysing the colour of king's yellow in my former letter.

The height of the sun makes a considerable difference in the solar spectrum; the atmosphere, or the aqueous vapour in it, absorbing some rays more than others. The extreme violet and red rays can only be seen when the sun is high and bright. Change of season cannot reasonably be supposed to produce any direct effect on the solar light which reaches us, so that the expressions which Mr. Colling uses, "the blue cold ray of spring," and "the sun's rays becoming redder and more powerful in autumn," have, I fear, nothing in nature to justify them. The sun's light, in our latitude, is obviously more powerful in May than in September; and it differs but imperceptibly in colour at midday, all the year round.

The admitted importance of right views on a subject on which such difference of opinion exists, will I hope be a sufficient apology for this long communication.

W. BENSON.

P.S.—I have omitted to notice the circumstance mentioned by Mr. Crace that all the coloured spots on a black ground in my diagrams, when viewed through the prism, exhibit strong traces of blue. All ought to do so, except those which belong to the group of colours containing no blue, and the traces of blue can hardly be said to be strong in these. Scarcely any blue comes from the spots of Indian lake, vermilion, cadmium, and king's yellow; very little from the spots of emerald green and viridian, not more than the red on their opposite side. But very strong traces of green and of red may be noticed on the opposite sides of the king's yellow and cadmium, though somewhat less green in the latter, red and green being essential to the constitution of those colours. Whatever blue is in them arises from the imperfection of the pigments, and from the white superficial reflection. The yellow seen over the coloured spots on the white ground, as may be seen by its being strongest over the black spot.

THE FAIRFORD WINDOWS.

It is proposed to form a committee, with the co-operation of the Vicar of Fairford, and of the inhabitants of the district, for the purpose of making complete and faithful records and illustrations of the Fairford glass, the authorship of which has been ascribed to Albert Durer, and towards conserving what must be considered masterpieces by whomsoever executed.

THE LATE MR. GEORGE ROWDEN BURNELL.

THE death of Mr. George R. Burnell, known as the writer of several scientific works, and which occurred at his residence in Kensington Garden-terrace, on the 23rd of July last, in his fifty-fourth year, should not pass unrecorded. His attainments were numerous. He had an extensive knowledge of languages, and had resided in America, France, and Belgium, besides visiting Spain and Sardinia.

About seven years of his life were spent in France, during which time he was engaged on the Paris and Rouen Railway, and as superintending architect of the Havre Docks. On the cry being raised of "La France pour les Français," in 1815, he returned to England. Though he executed several works both here and abroad, his bent was decidedly literary. He contributed several articles to the *Builder* early in his career, especially on roofs. In 1857 he wrote a rudimentary work on "Limes and Cements;" in 1861, "The Annual Retrospect of Engineering and Architecture." He edited "The Builder's and Contractor's Price-book" and "The Engineer's and Architect's Pocket-book." He was

connected, too, with the *Journal of Gaslighting* for many years, and wrote several papers for the Institution of Civil Engineers, for which he received prizes: he was the author of many articles in Brande's "Dictionary of Science," and in the "Dictionary of Architecture," published by the Architectural Publication Society, especially one on the word "Abattoir."

Mr. Burnell was a relative of Mr. W. Tite, M.P., and at his suggestion was made a member of the Government committee, appointed to inquire as to the preservation of the stone of the Houses of Parliament,—a committee, by the way, that sat long, published a useful report, and never received the slightest acknowledgment of its services.

Mr. Burnell endured previously to his decease a long and painful illness.

WORDS OF WARNING FROM WORTH.

A SUSSEX Antiquary says it is stated that Worth Church, one of the few Saxon buildings remaining to us, is to be restored, and hopes it is in good hands, and will be rightly cared for. Our correspondent continues,— "The ugly gallery, I am told, is to be taken away, and something done to the spire; and the archway of the south transept, which is wider at bottom than at top, is to be made upright! Surely that will not do, will it? Had it not much better be left alone? The south transept, it seems, belongs to Rowfant, and the parish must, under penalty of forfeiture, repair it; which is to be done by substituting open seats. The north transept is to be opened out into the church again."

We participate in the writer's anxious desire that nothing damaging should be done, and shall be glad to learn that the superintendence of the work is in proper hands.

THE EPIDEMIC AT GULDFORD.

SINCE we drew attention to the sanitary condition of Guildford the epidemic has somewhat declined. From June 1st it has attacked more than 400 persons, and there have been twenty-two deaths. Besides the fever, diarrhoea has also been unusually prevalent, and several cases of English cholera have occurred, as well as croup. The fever has attacked all classes, and in some cases it has been rapidly fatal: the chief inspector of the county constabulary died within forty-eight hours of the commencement of the attack. No endeavour has been made by the local authorities to check the progress of the epidemic. The local Board is most blameable for not taking measures even to ascertain the presence, or watch the progress, of so fatal a disease, far less to arrest it in the way prescribed by the Sanitary Act.

METHODIST NEW COLLEGE, BELFAST.

THIS new college has been opened. It is situated on an elevated site at University-road, in the vicinity of the Botanic Gardens. The building is 260 ft. in length from east to west, by 170 ft. from north to south. On the students' side are thirty-two rooms for thirty-six students (nearly all in separate apartments), average size, 16 ft. by 10 ft.; two large class-rooms, 25 ft. by 16 ft. average; a library, 38 ft. by 18 ft. 6 in., and 14 ft. high. On the boys' side are three dormitories, average size 50 ft. by 25 ft., lofty and well lighted, affording accommodation for eighty boys as boarders. Two of these dormitories are so arranged as to give each boy a separate chamber or "cubicle," of convenient size, so as to secure, to a great extent, the privacy and comfort of a separate room. There are three masters' rooms, in immediate connexion with the dormitories. There is a library, or reading-room, for the boys, 36 ft. by 18 ft.; four class-rooms, average size 30 ft. by 18 ft.; school-room, 55 ft. by 27 ft., and 20 ft. high, giving accommodation to 100 day boys, in addition to the boarders. There are common to both departments, a public lecture-hall, 55 ft. by 27 ft.; dining-hall, 50 ft. by 22 ft. There is a separate infirmary, or hospital, distinct from either department. Water-closets, baths, and lavatories, with hot and cold water laid on, are provided for each department. The principal staircases are of stone, and careful provision made against

fire. The corridors and rooms are well warmed and ventilated throughout. There are three residences—for the principal, head master, and theological tutor respectively. The boys' playground is of ample extent, and is to have a large covered space for exercise in wet weather, with gymnastic ranges for the principal kitchen, as well as all the other kitchens throughout the building, are by Flavel, of Leamington. These were specially selected by the building committee from the agents, Messrs. Richard Patterson & Co., Belfast, who held the contracts for the entire cooking apparatus, gas-pipes, and electric bells. The builder was Mr. Henry, of Belfast; and the architect, Mr. Wm. Fogarty, of Dublin.

CESSPOOLS IN RAMSGATE.

A CORRESPONDENT,—Mr. Thomas Hall,—writes thus:—Happening to stay this week at the crowded watering-place Ramsgate, I was thunderstruck at the extraordinary sanitary arrangement, or rather disarrangement, of the town. I was informed that each house is supplied with an immensely large cesspool, which is supposed to be emptied every three years. Over this is placed the water-closet seat, without either trap or water laid on. The one at the house I was staying at had not, I was assured, been emptied for over nine years; and, being constructed as above described, there arose a continual odor I should not like to sniff for long.

THE NEW TRENT BRIDGE.

ON Tuesday morning last the Bridge Committee met at the public offices to receive the tenders, and to determine upon the contracts for the new bridge over the Trent. Tenders were required to be delivered before ten o'clock in the morning, and forty-two by that time were received. The range in the estimates was very considerable, as will be seen from the following list; and many of the first firms in the country were competitors. The works are divided into two contracts; No. 1 being for the general builders' brick and stone work; and No. 2 for the cast and wrought iron work. The names and amounts are as follow:—

No. 1. CONTRACT.

Dennett & Company, Nottingham	£21,650 0 0
Lepish & Knowles, Shipley, Leeds	20,100 0 0
Shaw, Head, & Company, London and	
Stockton	18,388 0 0
Worcester Engine Company, Worcester	18,343 10 0
London Engineering and Iron Ship	
Building Company, Poplar, E.	17,600 0 0
Hewitson & Dargies, Lancaster	15,965 14 10
Henry Jackson, London	15,500 0 0
Benton & Woodiwiss, Derby and Glossop	14,837 0 0
E. V. Ponsoby, Sheffield	13,150 0 0
Charles Verity, Doncaster	12,672 0 0

No. 2. CONTRACT.

E. V. Ponsoby, Sheffield	14,674 0 0
Durlston Belge and Roofing Company	12,600 0 0
Cochrane, Grove, & Company, Dudley	11,687 0 0
Fairbairn Engineering Company, Manchester	11,500 0 0
Thames Ironworks Company, Blackwall	10,900 0 0
Worcester Engine Company	10,679 10 0
Close, Ayre, & Nicholson, York	10,431 0 0
London Engineering and Ship-building	
Company	10,200 0 0
Haywood, Derby	10,000 0 0
Leeds Railway Plant Company	9,545 0 0
Phillips & Company, London	9,500 0 0
Cliff & Company, Bradford	9,465 0 0
Butlerley Company, Alfreton	8,575 0 0
Gusson & Company, Leicester	8,514 0 0
Handyside & Company, Derby	8,294 0 0
North Staffordshire Engineering Co.	8,113 0 0
S. Ruston & Company, Doncaster	8,030 0 0
Benton & Woodiwiss, Derby and Glossop	8,019 11 11
Wm. Richards & Company, Leicester	8,487 0 0
Buller & Pitt, Leeds	5,436 11 0
Shaw, Head, & Company, London and	
Stockton	8,250 0 0
Horsley Company, Tipton	8,200 0 0
Eastwood, Swinburn, & Company, Derby	7,187 0 0
Smedley & Company, Belfast	7,072 8 0

Nos. 1 and 2 CONTRACTS TOGETHER.

Worcester Engine Company	28,852 0 0
E. V. Ponsoby, Sheffield	23,105 0 0
London Engineering Company	27,500 0 0
J. Phillips, Westminster	27,480 0 0
Thomas Bramble, London	27,125 0 0
Shaw, Head, & Company	
Stockton	26,036 0 0
Benton & Woodiwiss, Derby and Glossop	23,366 0 0
Cliff & Company, Bradford	22,938 0 0

After consideration, the Bridge Committee unanimously accepted the tender of Messrs. Benton & Woodiwiss, of Derby and Glossop, for the stone, brick, and other work of Contract No. 1, amounting to 14,837*l.*; and the tender of

Messrs. Andrew Handyside & Co., of Derby, for the ironwork of Contract No. 2, amounting to 9,291*l.*—the total sum being 24,131*l.* The estimates of Mr. Tarbotton, the engineer of the bridge, delivered to the committee for the corresponding works, were as follow:—Contract No. 1, 15,000*l.*; Contract No. 2, 9,500*l.*: total, 24,500*l.*

It will be seen by referring to the list, that the lowest tenders for the two contracts, added together, amounted to 19,744*l.*, and the highest tenders, so added, amounted to 36,564*l.*

RAILWAY MATTERS.

The inhabitants of Plaistow are displeased with the want of early and late trains by the Tilbury and Southwood Railway, and have sent a memorial to the directors on the subject. It is urged that if greater facilities were afforded for reaching the City and returning from it, the vicinity would become more populous, and the railway profits be increased.

A farmer has got a verdict against the Lancashire and Yorkshire Railway Company for 13*l.*, damages for the destruction of a straw-stack by firing from sparks, or rather a live coal, from the funnel of one of their locomotives.

Mr. G. Remington proposes the construction of a railway from the South-Eastern Railway at Appledore to the town of Lydd, a descending gradient of 1 to 70 for 3½ miles to Duogeness, where the level of the railway-tunnel intended to pass under the English Channel would be 240 ft. below the level of low-water spring tides; and from the latter level the line was to rise at the rate of 1 in 3,795 for about 7 miles, then a descending gradient at the rate of 1 in 1,200 for about 8 miles to the centre shaft, and thence another descending gradient of 1 in 3,265 for 11 miles to Cape Grisnez; from this point rising gradients of 1 to 70 and 1 in 81 to join the French railways. The height of the tunnel would be 30 ft. from the soffit of the arch to the centre of the invert, leaving a clear headway of 20 ft. for the trains. The space between the rails and the invert would be occupied by a spacious sewer, running along the central line of the tunnel, and on each side of it two air-tunnels for the purpose of providing ventilation. The width of the tunnel was to be 25 ft. It was proposed to carry the tunnel through the Wealdon formation, consisting of very strong clay, beds of freestone, and freshwater limestone all the way. The estimated cost of the works, allowing 638,000*l.* for contingencies, was 7,000,000*l.* The probable income of the railway was estimated by Mr. Remington at 1,625,900*l.* per annum, the working at 650,360*l.*, and the net profit at 975,540*l.*

FREE LABOUR REGISTRATION SOCIETY.

The Committee of the Free Labour Registration Society have presented their first report. They say that during six months they have provided permanent employment for upwards of 1,000 workmen in various trades, "thus showing an average of more than 150,000*l.* a year, as the wages obtained for members." Bearing in mind the industrial depression under which the country has been and still is suffering, the committee think that this fact will be received with satisfaction. The society and the principles it advocates are, it is stated, making steady progress to the confidence of all classes of operatives. The names, ages, addresses, and references as to character and ability of upwards of 14,000 union workmen have been up to the present time registered in the books of the society. Complaint is made that while workmen have not been slow to avail themselves of the advantages held out by the society, employers of labour have not evinced an equal alacrity. "This," the committee say, "is no doubt partly to be accounted for by the depressed state of the labour market, but it is also in a great measure caused by the unwise practice, now too prevalent, of leaving all arrangements with the men to foremen and others, who are, in many cases, the unscrupulous adherents of trades unions. Conciliation and arbitration being the chief features of this society, it is sought to promote these objects by bringing masters and men more cordially and trustfully face to face." The benefit club is making, on the whole, satisfactory progress; and it is hoped that the time is not far distant when its operations will be very largely

extended. The committee say they believe that one example of a sound society like theirs in full operation will ultimately be of greater use than the exposure of the false grounds of any number of other societies. To the report are appended several letters from employers, speaking in the highest terms of the society's operations, and praising the good character and efficiency of the men sent by them. A London master builder writes (and his letter is a specimen of many others):—"I can testify that your society is working an under-current of good which all employers are feeling the benefit of, though they may not openly acknowledge it, and I do hope they will respond to your appeal and support you liberally."

THE NEW LAW OF COMPENSATIONS.

In the New Regulation of Railways Act an alteration has been made as to the law of compensation for lands purchased or injuriously affected by railways, and which amendment, if adopted, will materially change the practice in "compensation cases." By the 41st section (31st and 32nd of Victoria, cap. 119), it is declared that, whoever, in the case of any lands purchased or taken otherwise than by agreement for the purpose of any public railway, any question of compensation to respect thereof, or any question of compensation in respect of lands injuriously affected by the execution of the works of any public railway, is, under the provision of the Lands Clauses Consolidation Act, 1845, to be settled by the verdict of a jury empanelled and summoned as in that Act mentioned; the company or the party entitled to the compensation may at any time before the issuing by the company to the sheriff as by that Act directed, apply to a judge of any one of the superior Courts of Common Law at Westminster, who shall, if he think fit, make an order for trial of the question in one of the superior courts upon such terms and in such manner as to him seem fit, and the question between the parties to be stated in an issue to be settled in case of difference by the judge, or as he directs; and such issue may be entered for trial and tried accordingly in the same manner as an issue joined in an ordinary action, at such place as the judge directs, and the proceedings to be under the control of the Court as an ordinary action. Furthermore, it is provided that whenever a company is called upon or liable under the Act mentioned to issue its warrant to the sheriff in the case of any disputed compensation, and the company obtains a judge's order, the obtaining of the same and notice thereof to the opposite party is to be a satisfaction of the company's duty in respect of the issue of the warrant. The verdict of the jury and the judgment of the Court upon the issue, as regards costs, &c., to be entitled to the same effect as if the verdict had been obtained before the sheriff on a warrant issued by the company under the recited Act. The provisions as to compensation cases have immediate operation.

A "MIDDLE ROW" IN THE CITY.

Sir,—It took thirty years of agitation to abolish "Middle-row," but they are erecting another in the City at the present time!

Walking down Cheapside the other day, I held another Middle-row in process of formation. Would you allow me, in the *Builder*, to put on record a protest against such a monstrous absurdity. It seems almost incredible that such an idea as leaving twenty or thirty houses between Cheapside, Bucklersbury, the Poultry, and the Mansion House could be seriously entertained; but let everybody go and be convinced of the fact.

Another City matter. Can any individual give a reason why the south side of Newgate-street was not widened instead of the north side? (The improvements at Christ's Hospital, I suppose, did begin it.) Suppose this to have been done, and the ground that lay waste at the west end of Cheapside (it used to be said for the purpose of making an opening into St. Paul's Churchyard from St. Martin's-le-Grand), not built on, then have set the houses back from the Post-office to the first or second lane in Cheapside, and we should have had it and Newgate-street one thoroughfare, with a very slight deviation. ONLY A TAILOR.

A CHALLENGE TO BUILDERS OF CONCRETE HOUSES.

Sir,—I have long taken deep interest in the question of concrete for building, and have been at some considerable trouble to arrive at a fair decision as to its merits. Of the capability of the material I have no doubt; my hesitation rests solely on the economy of construction. Now, to adopt Mr. Tall's motto: "An ounce of fact is worth a ton of theory," I beg through you to place this practical test for those who have faith in the patentee's assertion, that concrete "is only half the cost of brickwork." I require four ordinary six-roomed houses erected. I will find all the materials on the ground at the price named in Mr. Tall's pamphlet, and will agree to pay for the work performed at the highest price he names, viz., 2s. 6d. per yard; further, I will undertake to pay 40 per cent. of the cost of the apparatus for one house, which is estimated at 75*l.*

The party who undertakes the work may or may not contract for the carpentry, as he may prefer.

Should any doubt arise as to the work being properly done, I shall be happy to abide by your decision, for which, of course, I should be pleased to pay. G. C. J.

THE VENUS DE MEDICIS AND "LA BELLE TAILLE RONDE."

All the dimensions of the healthy adult torso of the human body are greater from side to side than from front to back; therefore the epithets "belle" and "ronde" in the above-quoted dictum, as applied to the "taille," waist, are utterly inadmissible. The smallest diameter of the waist, or that from front to back, of the Venus de Medicis is 7½ in.; and the larger diameter is 9½ in.

If now an oval be struck, having for its larger diameter 9½ in., and for its smaller 7½ in., the periphery or circumference of this oval will measure 27 in.; that is, for all practical purposes, three-sevenths of 5 ft. 2 in., the height of the Venus de Medicis in the perfectly erect position. If, therefore, any lady, knowing her height, would take the trouble to divide it into seven equal parts, three of those parts ought to be, according to that universally acknowledged standard of beauty, the exact circumference of her waist or the naturally smallest part of the torso. It may also be confidently asserted, as in the case of the shoe (see *Builder*, August 15th, "Apropos des Bottes"), that anything less than three-sevenths of her height for the circumference of the dress of that part of the body, will not only be out of proportion, but will occasion discomfort and inconvenience, and if much less will produce considerable pain and ultimate irremediable deformity not without its concomitant evils, which are fully described, by competent authorities, under the word "Corset," in the *Penny Cyclopaedia*. JOSEPH BONAMI.

"PARVISE."

Touching the discussion at Cirencester the other day, on the meaning of this term and the use of the building erected on the south side of Cirencester Church,* Mr. Thomas Wright, M.A., writes:—

"On my return I looked up that question of the parvis. *Paravise*, the word in Medieval Latin, is a mere corruption of the Greek word for paradise. It is explained by the Greek lexicographer, Hesychius, as the place in the locality for walking about. It was the place before the Greek temples where the philosophers walked and discoursed. It appears that in the early Greek churches it was usually planted with trees, and hence it gained the name of paradise. In Medieval times all sorts of business was transacted in the parvis. The scholars in the university of Paris sometimes held disputations there, and it was the common place for the consultation of lawyers. I can easily understand how in Cirencester it has been the place of meeting of the municipality to discuss the affairs of the town; and that that worthy lady, Alice Avening, might have thought it a public service to erect a building on the spot to keep the municipal authorities out of the rain. The only difficulty I have with it, is that there appears to be no authority for calling it a parvis (pronounced, of course, rightly, parres, but in English it was probably called parvis). But in the registers read by Mr. Black, which must of course have given the name as known at that time (since which we must suppose such a corruption of parvis must have taken place), it is called the 'vice'; and, as vice meant a novel or winding staircase, it was the word for it. It may be that the name may have arisen from such a staircase having been the original access to the room in which we met and talked,—nothing to do with parlor."

* See p. 507, ante.

SANTARY STATE OF STAFFORD.

We have received from those on whom we can rely statements as to evil and dangerous conditions existing at Stafford, which call for the immediate attention of the authorities. Amongst other things, the drainage is very defective.

Dr. Day, writing on the same subject in a local paper, says,—

"To my mind it is plain that if a balance were struck between the amount that would be required for the drainage of Stafford, and the saving that would be effected by such drainage, in *human life, human sickness, sorrow, and suffering*,—not forgetting the before-mentioned 'poor rates'—a comparatively limited period would be sufficient to clear off any debt it might be found necessary, in the first instance, to incur. I know that there are some persons in the town who comfort themselves with the belief that because the general death-rate of Stafford is a fraction or so below the average death-rate of all England (this being about 23 in the 1,000 per annum), therefore the health of the borough must be good; but surely they do not know, or, if they do know, they ignore, the circumstance of the Registrar-General having expressed the opinion that all death-rates exceeding 16 or 17 in the 1,000 arise from preventable causes,—yet further, they should bear in mind that even if the town be healthy, according to their idea, there can be no good reason why it should not be rendered more healthy, if it be practicable to make it so."

CHURCH POLYCHROMY.

Sir,—On your readers give me any information on Polychromy? Among the hills and vales of Cumberland and Westmoreland there is great room for improvement in church decoration, and very simple means for any such improvement; we cannot raise money for carvings, sculpture, &c., but anything that would be effective, church-like, durable, and easy of execution, as well as cheap, would do much for the bare walls of our churches, especially in chancels, and tend to render what are in appearance little better than barns now, something more like houses of prayer and praise. Your kind insertion of this will be a great favour to many down here.

R. C. H.

DAMP DRIVING THROUGH BRICK WALLS IN EXPOSED SITUATIONS.

Sir,—I have tried a remedy suggested some time ago in the *Builder*, of carefully covering the wall with mottled soap dissolved in water, and, in twenty-four hours after, laying on a coat of alum dissolved on the coating of soap, but I found that the bricks, which were red, obtained a very decided tinge of blue when they had received the first wash of the soap, which was in no way removed when the alum was applied. The unsightly appearance given to the building quite precludes our using this remedy. If any of your readers have in their experience found anything else that will keep damp from driving into or through walls already built, and will inform the profession through your valuable paper, they will, I am sure, confer a great benefit to the public.

UNDESIRABLE.

THE CIRENCESTER AMPHITHEATRE.

Sir,—On looking at the Roman amphitheatre, at Cirencester again, I think the shortest diameter was originally 130 ft., and not 129 ft., which it measures now. The soil has slipped down the slope on both sides a little, and thus rendered the distance across somewhat less than it was when used as an amphitheatre.

This has not occurred with the longest diameter, because there was no bank at the extremities.

JOHN BAYVELDE.

THE GATESHEAD PLATFORM ACCIDENT.

The coroner for Chester Ward of the county of Durham, has held an adjourned inquest, at Gateshead, relative to the death of James Barnet, seventy years of age, formerly an agent, who died on the 11th of August from injuries received on the 11th of June by the fall of the gentlemen's platform at the ceremony of laying the foundation-stone of the new Town-hall.

The coroner, in opening the business, said that it had been proved that the platform did fall; that Mr. Barnet, who was upon it, received injuries, and that he died in consequence. Their inquiry would have reference to the cause of the disaster. They would have to ascertain who drew the plans, who gave the instructions, and who built and who inspected the platform.

Mr. John Johnstone, the architect for the new Town-hall buildings at Gateshead, deposed that on the 3rd of June last he made out to get two platforms erected for persons to view the ceremony of laying the foundation-stone at the request of the Town-hall Sub-committee, which consisted of the Mayor (Mr. R. S. Newall), Mr. Ald. Bigger, Mr. Ald. Johnson, Mr. Redman, and Mr. B. Frazer. After viewing the ground, the sites were arranged, and on Friday, the 5th of June, he called upon Mr. Bell (who had contracted with Mr. Bulman for the joiner work), and told him to prepare the timber and have it sent over to start work on Monday, the 8th. He saw John Mason (Mr. Bell's foreman), and made a sketch on a bench of a plan of how he wanted the platform erected, so as to guide him in selecting the different lengths. On Wednesday, 10th June, he (Mr. Johnstone) had occasion to go to Hexham to assist in the laying of a foundation-stone there; and before he went (on Tuesday evening) he gave particular instructions to Mr. Bell and his foreman (Mr. Mason) that the gentlemen's platform was to be erected in strict accordance with the ladies' platform, adding that the former was to be an elongation of the latter. He also asked Mr. Burnup, clerk of the works, to see to matters generally whilst he was away. On Thursday morning, when he returned from Hexham, he was

astonished to find it had been erected on a different plan from that which he had prescribed, and remonstrated with Mr. Mason on the subject, and the answer which he received was, that the sub-committee had altered it on Wednesday, the 10th (the day that he, Mr. Johnstone, was away), and had given orders through Mr. Burnup, clerk of the works, to that effect. Mr. Burnup had given orders that the gentlemen's platform was to be erected on the plan of an inclined plane, instead of with steps. He told Mr. Mason that he was astonished at so great a change having been made in the plan, and that he could not then be responsible for the work; and further, that he might finish the platform according to the instructions which he had received from the sub-committee, and that he (Mr. Johnstone) could not take any further interest in it, or words to that effect. He considered that the mayor had some practical skill, and that the other gentlemen who acted with him had a knowledge of those matters. He did not examine the platform, and, having every confidence in the builders, allowed two of his own clerks and his stepson to go upon it during the ceremony. His own business caused him to be engaged in another part. He did not give any formal notice to the mayor of declining the responsibility; he did not consider it his duty to do so, as he had never received any notice of the change that was made in his plan either verbally or by letter. The pressure on the platform constructed on an incline would be forward, and the strut springing from the foot of the upright at the back would lose its service, unless there was one placed in the opposite direction, and the joints or uprights in the front of the platform, near the level part, were sufficiently strong. He saw no supports to resist the forward pressure under the open space near the foundation-stone. It would have been sufficient to make a strut with a bell forward to counteract the pressure in that direction. The platform seemed to have given way at the open space, as the wall was displaced upon which it had abutted. On a graduated step and platform the pressure was vertical, but on an incline plane platform it was forward; on the first, only two persons could move; on the last, the entire number of spectators might, by starting in motion, be pressed forward without the loss of resistance. The gentlemen's platform was built to contain about 500 people.

The coroner inquired how many persons were upon the platform when it fell, and Mr. Elliott, the chief constable, who said he was experienced in judging of numbers, replied 250. The point was disputed, others saying 300. The witness being requested to state the number he felt very indignant on finding that his plan had been altered, and that he had been interfered with, but did not express his annoyance or objection to the mayor on Thursday morning when he saw him on the ground. He had full confidence in the practical skill of the mayor and members of the sub-committee, and therefore did not complain to them or the town-clerk. He considered that the other six heads against his, and he must have been in error. Moreover it was (as the coroner had remarked) a disagreeable thing for him to find fault with his employers. He said his plan had been entirely superseded by a plan which gave notice to resign. In that particular case, which referred to the voluntary erection of a temporary platform, for which he was to have no remuneration, and with regard to which he had received formal notice of alteration, he did not think it necessary to give formally notice of being relieved of his responsibility. He did not, however, being requested to state the number of persons he thought that his plan had been altered. There was no bad feeling between himself and the mayor.

Mr. J. Mason, joiner, of Cambridge-street, Newcastle, and foreman to Mr. Geo. Bell, the builder of the Gateshead Town Hall, said he had received instructions from Mr. Burnup, clerk of the works, to construct the gentlemen's platform on the afternoon of Wednesday, the 10th June. He was to make it on an easy slope of 2 ft. 6 in., from back to front, and it was to be dealed or plankd over instead of stepped. Nothing was said about nuts or anything else. Mr. Bell's instructions were with reference to Tuesday night, before he went to Hexham, that they were to erect the gentlemen's on the same principle as the ladies' platform, and draw them out a plank plan to convey the idea. The gentlemen's platform was built in plan to an incline instead of a gallery. The benches were placed across the joints, every other one being fastened with four 6-inch clipped nails; he preferred those which were wrought up, but put the other in as he had his own accord, because he was afraid of the platform going in that direction. He considered the platform on an incline not so strong as the galleries. The benches were in the front of the platform—where it fell—were 4 ft. apart; but the alternate ones were not let into the ground.

A Jurymen: That accounts for the accident.

The coroner: Why were they not let into the ground? Witness: Because of the stones. The alterations caused me to be hurried. Had the platform been constructed on Mr. Johnstone's plan I should not have been so hurried, as the steps for the gallery were all cut.

Mr. William Burnup, clerk of the works, said he did not receive any instructions from Mr. Johnstone, the architect, about the erection of the platform, nor did he interfere in any way with the exception of making known the orders of the sub-committee at two o'clock on Wednesday afternoon.

Mr. Geo. Bell, builder, Westgate-hill, Newcastle, was the sub-contractor under Mr. Bulman, for the erection of the Gateshead New Town-hall, and Mr. Mason was his foreman. He was employed by Mr. Johnstone to erect the ladies' platform, and the instructions he received in relation to that he received with reference to the gentlemen's platform were from Mr. Burnup, at half-past seven on Wednesday night. He told him that the sub-committee had been on the ground and had altered the plan of the gentlemen's platform altogether. He (witness) said "Very well, they know best what they want," and Mr. Burnup replied "If you do not like the alterations, you may say when he comes back," and witness said, "Never mind Mr. Johnstone, you carry the instructions of the sub-committee out." He said they had likewise given instructions to the joiner to alter the ladies' platform. "Well, by all means do it." He believed he asked Mr. Mason if the borough engineer had looked at it, and he replied that he knew nothing of the borough engineer. He said he had asked the borough engineer if he saw, and he thought that he knew something about the matter. He thought, also, that the borough engineer would have inspected the stand of the ladies' platform. He said he had seen the stand of the ladies' platform.

The coroner: If you had not considered some one would have inspected it you would have spoken about the matter? Witness: Yes; I dare say to Mr. Johnstone. The timber used was good. I told Mr. Johnstone that they had altered his plan, and he said, "Who the devil did that?"

The coroner: If a building you were building was altered in your absence by your employers, what plan would you adopt?

Witness: I should ask my employers why they altered it.

The coroner: Would you have gone further?

Witness: That would depend on circumstances. Mr. Johnstone is a very good-tempered fellow, or he would have gone to his employers and said, "I cannot be responsible." I should have done that. They (his employers) should have sent some notice to him about having altered his plans.

The Mayor explained that the borough surveyor (Mr. Borrie) had nothing to do with the Town-hall buildings. Witness then said he considered the step plan the safest, as the people were standing at ease in that case, whilst on an incline, with their toes downwards, they were pressing forward. The people could be more densely packed on an incline than on a stepped platform.

Mr. Robert Stirling Nevill said he was mayor of Gateshead and one of the sub-committees appointed to make arrangements for the laying of the foundation-stone of the Gateshead New Town-hall. He suggested that the level of the platform should be lowered, and that planks should be placed on the slope. The suggestion was thought to be a good one.

The coroner: By whom? The Mayor: The members of the sub-committee, and it (the suggestion) was therefore adopted. No orders were given about uprights, rafters, or struts. The order was to leave out the witness applied for the planks caution it felt. The slope was to be 2 ft. 6 in. instead of 6 ft., as Mr. Johnstone's scheme would have carried out. Mr. Ald. Johnson said to the joiner, "Now, mind you make it four inches mould; make it more than three inches, or you will find it out; but if you make it too weak, every one will have reason to complain." The man said he would attend to it. They made some alterations by way of strengthening the ladies' platform, and he considered it the committee's rather than Mr. Johnstone's.

The coroner: Was the other platform which you altered inspected by the witness? The Mayor: Yes; so far as the altering it into the form of the incline plane was concerned. This was the committee's recommendation. According to engineer's advice, the pressure was allowed on a platform of 100 square feet; the forward thrust is in proportion to the angle of the rise, and by lowering the platform to 2 ft. 6 in. from 6 ft., we lessened the thrust in exactly the same proportion.

Mr. Johnstone stated that the pressure was so great that the coroner dislodged 15 tons of masonry. The coroner said that he need not go through the whole of the evidence, as much of it did not relate to the inquiry. There were many engineering points which would not bear at all upon their verdict. It became them now to inspect the work, and to witness applied to witness caution it felt. He thought that, to get rid of the responsibility on either part, there ought to have been some remark made by one of the members of the sub-committee to Mr. Johnstone that he was to be careful of the pressure.

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The jurymen retired, and returned after an absence of one hour and three-quarters with the following verdict:—That James Barnet died on the 11th of August from a fracture of pyramis, caused by injury to his foot by the falling of the platform at Gateshead on the 11th of June last; that the falling of the platform was caused by the want of proper precautions in the construction of the platform; that Mr. Johnstone, the architect, could not give up his responsibility without first naming the fact to the sub-committee when he was on the platform on Thursday; that the sub-committee were equally to blame for altering the plan in the absence of the architect, and their not seeing that the platform was properly inspected.

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CHURCH-BUILDING NEWS.

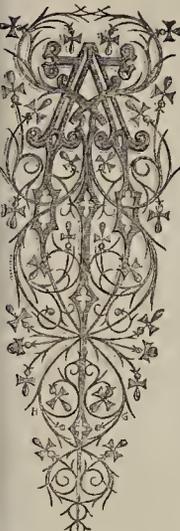
Berden (Essex).—The parish church here has been re-opened after restoration under the direction of the diocesan architect, Mr. Joseph Clarke. The chancel has been almost entirely rebuilt. A considerable quantity of the old stone carving has been preserved. The number of sittings has been largely increased. The whole work has been completed at a cost of nearly 1,900l.

Stockton Heath.—The new church here has been consecrated by the Bishop of Chester. The edifice is in the Geometrical style, from the designs of Mr. E. G. Paley, of Lancaster. It consists at present of a nave and south aisle, both 75 ft. long, and a north transept 16 ft. by 16 ft., with an organ chamber and vestry. The chancel is 32 ft. by 25 ft. The exterior of the walls is of Runcorn stone, the interior of white bricks, of roof and pewing of Baltic timber, the doors of oak. The edifice has eight stained windows, executed by various artists. The large east window, by Messrs. Clayton & Bell, is the gift of Mrs. G. Greenall, of Walton Hall, and illustrates the principal events in the history of our Lord's Passion. The two smaller chancel windows are the gift of Miss Forde, of Stockton Heath Parsonage, and represent the incidents which took place at Bethany, and on the morn-

The Builder.

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Railway Construction and Feeding.



PERIOD of unusual immunity from accidents to railway travellers has just been terminated by the occurrence of two disasters of almost unprecedented magnitude. The Mont Cenis surface-line has been closed, and partly carried away by a landslide; and the Chester and Holyhead Railway has been the scene of a collision involving an explosion of petroleum, and causing the instant death of at least thirty-three passengers.

The latter accident, which appeals to the English public with that irresistible eloquence which, in our country, always echoes from the tomb, appears in the first instance unaccountable. Part of a luggage train is said to have become detached from the locomotive, and to have run down an incline, on which the Irish mail, rushing up at the rate of forty miles per hour, came into collision with the trucks. Notwithstanding the fact that this part of the line was on a curve, it seems inexplicable that such a collision should have occurred. What could have been the nature of the look-out kept by the engine-driver?

The shock is said to have exploded a quantity of petroleum, placed on one of the trucks at the end of the luggage-train. This statement is probably intelligible in one way. The shock of the collision may have started the vessels containing the inflammable material, and thrown some of the escaping contents into the fire-box of the engine. The combustion of the remainder of the cargo would be inevitable.

We have no wish to dwell on a catastrophe which will tingle in the ears of every one that hears of it, and that is being dissonant at a considerable length before a coroner's jury. It is one of those events which bear on the management of traffic, but which have nothing to do with the construction of a railway. With the *Mont Cenis* slip the case is reversed.

Judging from the imperfect accounts that have yet reached us, it seems that an *éboulement*, or landslide, caused by violent rain, carried away both road and railway, interrupting absolutely the passage of diligences, and allowing only of an interrupted service for the locomotive route (even if that be not now stopped). Several complaints are made that the officials, when the worst of Continental railway servitudes, give no warning to the passengers, such as might allow them to halt at a place where shelter could be found, or to arrange their steps to an unbroken line of

conveyance. But neither this usual French tyranny over unfortunate railway travellers, nor the interruption of the line itself, comes under the head of casualties special to the *Mont Cenis* line. The misfortune has overtaken the road with even more disastrous effect than that produced on the railway. Unless it be asserted that the vibration of the engine has hastened the detachment of the slip (which, if the case, can have only been a question of time), the cause of the displacement has nothing to do with railway locomotion any more than with the old traffic by diligence. It is a danger peculiar to the locality, as might be that arising from a snow-drift or an avalanche, and might beset the pedestrian or equestrian traveller with as much peril as the railway passenger.

The question, therefore, of the applicability of the system introduced by Mr. Fell, or of any other method of surmounting steep gradients, or piercing mountain passes, is only incidentally touched by the occurrence of the *Mont Cenis* slip. All engineers know the peculiar dangers that attend the passage of mountain chains. That which is novel to our experience is the method of so applying tractive force as to enable us to overcome the resistance offered by the power of gravitation to the ascent of lofty heights, while at the same time we adopt the same means for obviating the resistance of friction that have led to the improved travelling of the last third of a century. The resistance offered to going up hill, as far as actual lifting of load is concerned, can be diminished by no human skill: we can only apply adequate power to lift the load. The resistance offered by friction to the passage of the *diligence* or the wagon we have reduced, by the introduction of the surface line, to the 7 lb. or 8 lb. per ton common to the more level lines of railway.

The great object which has to be carried out by the various and successive improvements in internal communication which have taken place since the middle of the eighteenth century may be stated in one word as the diminution of friction. The substitution of a water surface for a land route, in the case of inland navigation,—the prevention of the deep ruts and water-logged holes that rendered our highways all but impassable in winter before the time of MacAdam,—the introduction of steel springs for carriages,—the placing of cast-iron plates to bear the wheels of the small mineral trucks of the tramways,—the iron railway introduced by Stephenson,—the subsequent step of "fishing" the rails,—the application of steel instead of iron,—and the high finish now attained both in locomotives and in some of our carriages,—are all so many steps in the reduction of running friction. Without now analysing this general expression into its constituent elements, it may be considered that a pull of seven or eight pounds weight on a well-ordered railway is more effective than that of a horse, or even of a team, under the ordinary circumstances of the winter road traffic of 1760.

The carter, or the coachman, before the date of Macadam, had indeed the knowledge that a hill was an element of difficulty. Then the opposition to progress arising from bad roads with which he had to contend was such that a gentle ascent, where the road naturally drained itself, was often preferable to a level route, where the drainage was bad. Distance, in barbarous countries, is measured rather by time than by space,—by hours rather than by leagues,—and the general travel-worthiness of a road was regarded as a question of experience, depending on soil, on undulations of the ground, on amount of mending required and lately effected, on the character of the coach-master or of the whip, rather than as a simply scientific matter.

But when once it became evident how much mastery over distance was to be attained by the

use of a rigid support for the wheels of heavily-laden vehicles, more exact views as to the force of locomotion followed as a matter of course. Thus it was constantly present to the mind of George Stephenson, in every step of his career, that while the engineer would almost annihilate friction, he was unable to elude the force of gravitation. Let him produce a road and a carriage by means of which the force of a child would effect far more than that of the finest team on the old mail routes, on a level,—the level was a *sine qua non* condition for the full development of the advantage of the new system. Let the rigid road rise at the rate only of 1 in 300, a rise all but imperceptible to the stage-coachman, and the power required for propulsion must be doubled. In fact, by reducing running friction to a minimum, the difficulty of ascent appeared, relatively, to be raised to a maximum. If friction could have been so far done away with that a wagon could have been propelled by a touch, still the slightest ascent involved the need of a power adequate to lift the load in the air to the exact height attained by the summit of the incline.

With this unquestionable fact clearly in view, it was the object of the engineers of the school of Stephenson to reduce gradients, as they were called, to a minimum, and rather to wait upon nature, by following the circuitous course of a river valley, than to force nature, by the construction of lines made as the crow flies, involving not only heavier earth-works, but also steeper gradients, than those of a valley route.

Of the mechanical truth of the principle always insisted on by Stephenson there can be no question. But locomotion, although dependent on mechanics, is not simply a mechanical question. Locality goes for much. In the actual configuration of the surface of a country certain differences of level exist, and, roughly speaking, have to be accepted and provided for. To surmount an unavoidable hill, even though you have the advantage of running easily down again, is a positive loss of power and source of cost. But to carry a traffic from London to Birmingham it is necessary, sooner or later, to raise the weight carried from the level of the Thames to that of New-street or the Bull Ring. There is no avoiding the actual rise.

Thus in selecting river valleys, in following the courses of canals, in excavating and tunnelling so as to reduce intermediate summits, much may be done to economise tractive power. But no care, and no outlay, will reduce the cost due to the actual difference of level between termini. The cost of working a line may be indefinitely increased, but that power adequate to overcome that further dead weight of gravitation must be produced there can be no doubt at all.

With this question of unavoidable cost of going up-hill, put it in the best manner you can, has often been blended an entirely different consideration. It is that of the application of power. The first circumstance on which the possible speed of railway travelling depends is, that the adhesion of the driving-wheel to the rail is sufficient to allow of the propulsion of the train. When it came to be a question of climbing it was feared that this adhesion would not suffice. It was proposed, and indeed carried out, by Mr. Robert Stephenson, that the inclines of one in seventy-five and one in sixty-six on the extension from Camden Town to Enston-square should be worked by a stationary engine. It was only experience that decided that locomotive power was available, as well as more convenient, over these inclines. At the Lickey incline, near Bromsgrove, another case where the natural features of the country refused to be coerced by the engineer, an incline of one in thirty-two was worked by locomotives from the

very opening of the Birmingham and Gloucester Railway. The past summer has seen the solution of the same problem on the Mont Cenis pass. As far as the application of locomotive power is concerned, it is now certain that inclines of one in forty, one in thirty, and even more, are perfectly manageable. The question, then, reduces itself to one of expense.

Were a group of lines, differing in their gradients, or, at all events, differing in the amounts of actual lifting work that has to be accomplished in the transit of each convoy, to resemble each other in every other element of working cost, it would be possible to ascertain from the accounts, if properly kept, what was the different amount of summit level to be surmounted in each case. From the present state of the returns made to the half-yearly meetings of the various companies, cumbersome and voluminous as many of them are, it is impossible to arrive at any such definite result. But looking forward to the time when uniformity of management, of accounts, and of dividend, shall result from an efficient central control of the railways of the United Kingdom, we are justified in expecting that a direct correspondence between the cost of locomotive power and the character of the grading of a line will be found invariably to exist.

Clear perceptions as to what amount of economy is, and what is not, attainable by the employment of rigid bearing surfaces for roads underlies the solution of that important question as to street railways, and branch or supplementary lines, which is now commencing to attract the attention of the public. To the short-sighted proceedings of the directors of the South-Eastern railways we shall, no doubt, owe an earlier practical insight into this subject than could otherwise have been anticipated.

In fact, we see in almost every part of the country lines of streets forming themselves near and around the stations of our various railways, or parallel to their course. That which most follows is the arrangement of railways, tramways, or anti-friction roads of some kind, parallel to the direction of our streets. When we once distinctly understand what can and what cannot be effected by the reduction of friction, we shall hasten to grasp the advantages which are to be derived from the introduction of street railways. The most remarkable part of the matter is, that we have drawn so little practical inference from the information which we have actually acquired. How long is it since lines of rail have been laid through the docks at Liverpool? How slow and tentative have been the arguments for running decks, of the steamers for Dublin, Galois, Brazil? The saving of time, of expense, of annoyance, of everything worth saving, that arises from a prolongation of a line of rails to the very end of a journey, instead of condemning all descriptions of passengers to a supplementary cab, or omnibus, or carriage, is at least equal to that which is effected by the substitution of a good pier, alongside of which a steamer can moor, and from which the passengers can step on board, for an open and crazy boat.

As the supplement, or rather complement, to the existing system of English railways, the introduction of light branches, and of street rail or tram ways can only be a question of time. What is less certain, but highly important, is, the further question of how far light street railways, worked by horse power, or, perhaps, by light locomotives,—engine and carriages being made of steel, and designed for passenger traffic alone,—may be available to check such a public injustice as that now in course of perpetration by the directors of the South-Eastern lines. Speaking with due reserve, and without any wish to give value to the patent of Mr. A., or to the project of Mr. B., we think that such a check is attainable. The next Parliament would feel, it is probable, compelled to authorise a scheme for which the capital was found by aggrieved residents acting in self-defence. The cost, if we take such experience as is to be gleaned abroad, would not exceed from 3,000, to 4,000, per mile, for the Grindsett and Hammarline, of thirty miles on a 3 ft. 6 in. gauge, was opened in 1864 at a cost, including rolling stock and stations, of 3,000, per mile. We call the attention of those of our friends who are smarting under the recent inflictions of railway penalties to this subject. Mr. Watkin and his brother directors may yet prove to be benefactors to their countrymen, as the means of introducing, in spite of themselves, light suburban passenger railways into the outskirts of the metropolis.

WATER SUPPLY, SEWAGE, IRRIGATION, AND NAVIGATION.

In the pages of the daily papers there have appeared lately articles upon the subjects of water supply, sewage, irrigation, and navigation, from the pens respectively of Sir John Kenzie, C.E., and Mr. W. B. Adams, C.E.; treating very ably of the above important subjects; and, following as they do in the wake of the *Builder*, and of Mr. Bailey Denton, whose arguments they fully corroborate, it is sincerely to be hoped that as we have succeeded in arousing a feeling of strong interest and ardent sympathy in the cause, and have enlisted the services of some shrewd and sound thinkers upon the subject, it will be pursued with energy and determination, until a satisfactory result has been produced alike beneficial to all the very important interests involved. We trust this momentous question may not be allowed to lag or drop again until it has been practically solved, and placed in that clear and unerring light that public opinion may fully understand the question, and thus by these means our future legislators may be educated, trained, and induced to develop a perfect remedy by imperial legislation.

The long period of drought through which we are now passing has extended over an interval of nearly three months (except in a few isolated cases of rainfall, or thunderstorms in a few instances). From Manchester, Halifax, Sheffield, Bradford, and many other places the wail is for water; and even in those places where it was supposed the supply was skillfully arranged and carefully calculated to be full and ample for all times and seasons, the hope has not been verified. This last season has aroused the fears and anxieties of the denizens of our cities and towns, and the population of the country generally, lest a total failure should take place; and it has already produced a disastrous and damaging effect on vegetation, except to one cereal crop, which is fine and superabundant, evidently thriving best in a dry season; and this will serve in some measure to counterbalance the loss to the country in the lamentable failure of other produce. Our barley and oat fields look stunted and thin, and our turnip fields are comparatively bare; so that, doubtless, though we may have a cheap loaf, the price of meat and other necessities of life will be comparatively high, unless the markets of the country are equilibrated by importations of those articles of consumption from other parts.

This extraordinary dry season, with all its serious consequences, ought to arouse the energies and sympathies of our Government, our legislators, and holders, agriculturists, and our town populations generally, to this very important subject—perhaps one of the most important subjects of the day and hour; and that this partial privation of this very necessary element of life in animated nature and the vegetable world may be the means of working a large amount of public good, by directing earnest attention more particularly to it, with the view of enlisting the national sympathies in that direction, leading to a large and comprehensive measure that will prove an effectual remedy to this state of things. It is an admitted fact, and patent to all, that in every part of this country we have at some period of the year copious supplies of rainfall, yielding a superabundance of water to replenish our rivers, brooks, and springs; and we ought, as a matter of right and duty, studying the national welfare, to utilise and economise these blessings so hominously showered down upon us, and to make proper and ample provision in the rainy season, by storing up our surplus water, that will fully and at all times carry us over a dry season, so that neither man nor animals, nor even vegetation should perish for the want of copious supplies of this vital and indispensable element of existence.

In the case of our water-supply we fail to exercise that far-seeing and provident principle which is usually thought to distinguish the race of Anglo-Saxons, and which peculiarity exalts them above the ordinary run of nations; and as our common country becomes more dense and thickly populated, and agriculture is made to yield manifold crops under the pressure of a scientific mode of culture, the rainfall of the country must, as a matter of necessity, be collected and utilised, at any rate, so far as it is required for the proper water-supply of the population, for the purpose of irrigating the land, and to keep open and in proper order our various navigations.

It is perfectly astonishing how rapidly agricultural produce springs up and grows in tropical countries in those periods of the rainy season that are alternately showery and sunshine; the copious down-pour of rain and the heat of the sun between the showers force vegetation so rapidly, that it may almost be said to be seen to grow; and the sowing of the seed, the growth, the maturity, and the gathering of the crop, are a work of only a few weeks, and such crops that would gladden the hearts of our husbandmen; while, on the contrary with us, the various progresses described are spread over the best part of the year, and the result is at all times a matter of speculation, grave anxieties, and doubts.

In those tropical countries where maize forms the staff of life, the yield from cultivation is marvellous, one grain of maize producing from 400 to 800 fold, if the situation be favourable to its growth, and it is well supplied with water, either from rainfall or irrigation. The latter will more than double the crop.

In countries which we have known, maize grows to a height of from 10 ft. to 14 ft., and from the time of sowing the seed to gathering in the harvest there is a period of only about six weeks; it shows plainly and incontestably what an incentive to growth and production a plentiful supply of water is, whether in the shape of continuous showers or irrigation, and with the all-powerful rays of a tropical sun, the earth yields forth her increase in great and surpassing abundance.

But even the production of that useful cereal, maize, is excelled in those countries by another tropical plant called the "plantain," which is wonderfully luxuriant; and next to maize forms the principal food of the people.

The stem is soft, herbageous, 15 ft. or 20 ft. high, with leaves often 6 ft. long and nearly 2 ft. broad. The fruit is about 1 in. in diameter, and 8 in. or 9 in. long, and it grows in clusters. When ripe it is filled with a pulp of a luscious, sweet taste, somewhat resembling ripe apples. Its yield is enormous. From a single acre it is calculated to produce a quantity equal to the crop of 133 acres of wheat, or 44 acres of potatoes.

And these are cases in point of what may be done on a fruitful soil, with plenty of sun, and an ample supply of water for irrigating purposes.

This year we have had a taste of a tropical sun and heat, but we unhappily lack the liquid and invigorating element to render the visitation a blessing, and an advantage to agriculture. Let us picture to ourselves what would have been the result if the rain-falls of last winter had been collected and stored up on the drainage area of all our rivers, and our lands had been laid out scientifically for the purposes of irrigation, the produce of all kinds would have been manifold, splendid, and magnificent, and such only as those who have observed such remarkable circumstances in those highly-favoured lands above mentioned, where the vegetable productions are extraordinary and wonderful, are able to appreciate.

In India and other tropical countries a scarcity of rainfall or a comparatively dry season means a shortness or failure of the crop; and if a copious supply of the vital element is so necessary there to infuse life and vigour into plants, it is equally necessary with us in many seasons, and particularly in this just elapsing, as our agriculturists look tamely but anxiously on while the scorching rays of a powerful sun wither and parch up their precious and costly crops, and they are quite helpless to avert the calamitous result.

Our system of agriculture appears to be open to considerable amendment and improvement, such as are capable of meeting all the requirements and necessities occasioned by the changeable character of the climate. In certain seasons under-drainage is necessary to render the soil dry, and to carry off the surplus water that would otherwise injure vegetation, which, in a dry season, would be of very questionable advantage, if not a positive injury; and in dry seasons we ought to be prepared with a sound, practical system of irrigation, that would supply the deficiency arising from a lack of rainfall; and if the sewage of our towns, which is now to a considerable extent thrown into our rivers and wasted, is not fully equal to supply the necessary amount of the aliment necessary for the food of plants, the rainfall of the district stored up should be resorted to, to support vegetation in a healthy state, and to aid in the increase of the productions of the soil, so essential to the wants of a largely increasing population.

There is one subject to which Sir John Rennie draws particular attention in the case of the River Thames, and that is the deposit of the solid part of the London sewage in the navigable channel of the river at its outfall, and thereby causing an accumulation of mud-banks injurious to the navigation.

This is certainly an evil, but we apprehend it is only of a temporary character, as it cannot be supposed that so large a quantity of valuable manure can be thus so ruthlessly thrown to waste, particularly as its value and the necessity for its use to agriculture is now coming to be understood; but even the deposit there is better than when discharged into the river, as formerly practised, poisoning most barbarously the very atmosphere we breathe. It is rather a difficult matter, no doubt, in the present state of the question, to devise a practicable scheme, and hastily solve the problem to deal satisfactorily with so large a volume of sewage; but the day is surely not far distant, as so many skilful, enterprising, and energetic men are turning their attention to this much-voiced question, when the sewage will be applied to its only legitimate uses as a valuable manure, although many may doubt whether land is always in a condition fit to receive it; that is, when crops are about maturing, when the earth is already saturated with moisture, or under times of frost, as the sewage will never cease to flow, and means must be devised at those times to purify and otherwise utilize it, so as to prevent it further injuring our rivers and brooks. But plans appear to be now the subject of experiment, which may lead to some practical result.

Though there are difficulties attending it, they are such as may be grappled and dealt with, as may be evidenced at many places in the country on a small scale; and although the progress to mature successful plans has been somewhat slow since the question was first mooted, we hope soon to see it brought to an nearly issue in a well-considered and practical measure, alike beneficial to the welfare of our thickly populated cities and towns and the general interest of agriculture. Science is making rapid strides in the improvement of agricultural implements. We now have the aid of all-powerful steam and machinery to assist in gathering in the crops more efficiently and expeditiously than by the old system of manual labour: this harvest, in consequence, we have not heard a complaint made of the scarcity of the soil for the benefit of man. Let us, therefore, at once avail ourselves of her wise and able teachings and endeavour to profit as largely as possible by her grand discoveries.

It is quite idle to suppose, and unworthy of our national character, that the very material of all others that our agriculturists require to replenish and invigorate the soil should be thrown to waste, and thus made to defile the precious water of our rivers, spreading disease and misery through the country instead of life, health, and plenty; material which would at the present time have been the salvation of many crops, and great wealth and happiness to the industrious husbandman, and have absolutely made the difference between abundance, plenty, and cheapness, and shortness, scarcity, and dearth. We ardently hope that so time will be lost in applying a remedy to this anomalous state of things, and removing this foul blot from our national escutcheon.

As the poet says, it is a pleasant contemplation—

"To scatter plenty o'er a smiling land,
And read its history in a nation's eyes."

The area within the rock-bound margin of our little island is so limited, and our population increases so rapidly (notwithstanding the drawbacks of colonial emigration), that it means can be desired to grow more blades of corn on cultivated land, and make our large tracts of wastes and barren sands to blossom like the rose by the means pointed out, it would be a difficult matter to estimate the amount of benefit the nation would derive from it, and those men who aid in any way in solving the difficulty, and triumphing over it, will be as worthy of all honour, and their names will be as rightly inscribed on the tablets of fame as those who devote their lives and talents to adorn the councils of their lives and who dazzle with their lore and eloquence the subject of the navigation of our rivers and canals is also of the greatest importance, and rain-fall should be conserved for the purpose

of aiding the supply of water to them in periods of drought.

In a former article we drew attention to the efforts made by our old canal engineers to supply canals at the early period of their history, as it was then of the utmost importance that those great arteries of the country should be kept open to traffic at all times and seasons, and we give them credit to a considerable extent in having succeeded in doing so; but the abstraction of the water for our town wants from the sources through which they obtained it, has absorbed to some extent their principal sources of supply without affording them an adequate equivalent; and on these grounds we ought to store up our rain-fall in winter and spring, to keep open and in proper action these important channels of communication, as well as to aid in replenishing and renewing the continuous flow of the water in rivers and canals.

As the weather we have had for some months past has been of a tropical character, there is little doubt we shall have a rainy season of some length, and during that period it is to be apprehended we may be visited with epidemic and endemic diseases, as at those times in the tropics a heavy visitation of sickness usually follows the change in the season. Let us, therefore, hope that the authorities of our cities and towns will see that their houses are put in order, so that should these expectations be unhappily realized, we may be in a condition to ward off the evil consequences, or at any rate to mitigate them so far as human care and foresight can accomplish it.

The work will be incomplete so long as they cast a valuable fertilizer of the soil to waste, robbing our lands of their proper natural aliment, defiling the most beautiful objects in our picturesque scenery.

PETROLEUM AND LEGISLATION FOR IT.

The heartrending disaster which occurred at Abergele on Thursday, August 20th, by which thirty-three persons were ushered into eternity, naturally leads us to inquire concerning the nature of the substance which produced such dreadful destruction of human life. Petroleum is met with at Inuiskillin, Canada West, Kenhawa in Virginia, Sootsville, Ky., Oil Creek in Venango Co., Pennsylvania, Duck Creek in Monroe Co., Ohio, and Liverpool, Ohio. It was formerly collected and sold by the Seneca and other Indians, and is hence called Seneca or Genesee oil. It is also found in Burmah. In 1862 about nine millions of gallons of petroleum oil were imported from the United States; of this large quantity nearly half came to England. In 1866 the yield was so large from the States that it was actually in excess of the demand. A district of Scotland west of Edinburgh goes by the name of the "Scottish Petrolia." This consists of oil-bearing shale, and is so valuable that a piece of land before worth 2,000l. is now worth 200,000l. These bleak inland farms have been found to be mines of wealth, and villages will spring into towns.

Petroleum (Greek *πετρα*, a rock, and *λαϊον*, oil) is a mineral substance very like naphtha, composed of a number of hydrocarbons. Geologists consider it to be a product of the bituminous shale, which attains in America enormous extent and thickness; in Michigan a thickness of 4,900 ft. Others regard it as a product of the distillation of subterranean coal-beds, and conceive the cavities of the upper strata serve as receivers to the vast coal retorts below; from such cavities the condensed vapour may be supposed to filter through the soil sometimes to much lower ground than its source, i. e. on the principle of an artesian well. Dr. Mantell says, "It appears probable that petroleum has originated from the coniferous trees whose remains have contributed so largely to the formation of coal; and that the mineral oil is nothing more than the turpentine oil of the pines of former ages: not only the wood, but also large accumulations of the needle-like leaves of the pines, may have contributed to this process. We thus have the satisfaction of obtaining, after the lapse of thousands of years, information as to the intimate compositions of those ancient forests of the period of the great coal-formation, whose comparison with the present vegetation of our globe is a subject of so much interest. The mineral oil may be ranked with amber, succinite, and other similar bodies which occur in the strata. The springs of petroleum do not seem to depend upon combustion,

as has been supposed, but to be simply the effect of subterranean heat. According to the information we now possess, it is not necessary that strata should be of very great depth beneath the surface to acquire a temperature equal to the boiling point of water or mineral oil. In such a position the oil must have suffered a slow distillation, and have found its way to the surface; or have so impregnated a portion of the earth as to form springs or wells."

Mr. Sonstadt says it is scarcely possible to bore deeply anywhere near the Ohio river without striking a source of the oil. Nor, judging by analogy, does there appear to be any likelihood of these wells failing for hundreds of years.

When petroleum is distilled at a low heat benzine is obtained. This is a light and very combustible fluid, too dangerous to be used for illuminating purposes, but very useful for cleaning fabrics from grease spots. The next substance obtained is paraffine (French, from Latin *parum*, little, and *affinis*, allied), so named for its resistance to combine with an alkali. This is also called Belmontine oil, from Belmont, one of Messrs. Price & Co.'s manufactories. A lubricating oil used for machinery is also obtained by further distillation, and also Belmontine, a solid substance of a fine translucent white colour, which makes beautiful-looking candles at a small cost. The stearic acid in these candles possesses a high illuminating power, and thus with a finer wick we get a brighter light than ten of the nearly obsolete "dips" used to give us. Dr. Stearns has shown that paraffine is the best water-proofing agent that we possess.

Petroleum oil is not nearly so dangerous as turpentine oil. It will not explode unless mixed with three or four times its bulk of atmospheric air. Paraffine oil cannot be ignited under a temperature of 140° Fahrenheit.

Petroleum is said to have been used for lamps in Ohio as early as 1819. The first well at Oil Creek, Pennsylvania, was sunk in 1863, and a tax was laid upon the oil in the United States in July, 1864.

The legislation on the subject in England is contained in two Acts, passed in 1862 and 1868; and of these measures the following is a carefully condensed summary.—

The Act of 1862 recites the expediency of providing for the safe-keeping of petroleum and certain products thereof that are dangerous to life and property from their properties of giving off inflammable vapours at low temperatures. The Act provides that petroleum shall include any product thereof that gives off an inflammable vapour at a temperature of less than 100° Fahrenheit. It will be seen below that the Act of 1868 is much wider in its operation, and includes many substances not products of petroleum. Under the Act of 1862, every vessel carrying petroleum, or entering any harbour within the United Kingdom, is to conform to any regulations made by the harbour authorities as to the place at which she is to be moored. Disobedience entails a penalty of 20l. a day. The vessel may be removed to a safe place at the expense of the owner or master. The provision in the Act of 1862 respecting the storage of petroleum has been repealed by the Act of last session. The latter Act provides that, from the 1st of February, 1869, no petroleum shall be kept, otherwise than for private use, within fifty yards of a dwelling-house or of a building in which goods are stored, except in pursuance of a licence given in accordance with the Act of 1862. Conditions which may seem expedient to the local authority may be annexed to any such licence as to the mode of storage, the nature of the goods with which petroleum may be stored, the testing of petroleum, and generally as to its safe-keeping. Petroleum kept in contravention of the law shall be forfeited, and, in addition thereto, the occupier of the place in which such petroleum is kept shall be liable to a penalty not exceeding 20l. per day during the time the petroleum is illegally kept. Under the Act of 1868, the interpretation of the word "petroleum" is extended to mean all rock oil, Rangoon oil, Burmah oil and any product of them, and also any oil made from petroleum, coal, schist, shale, peat, or other bituminous substance and any product of them that gives off an inflammable vapour at a temperature of less than 100° Fahrenheit.

The licences which are referred to above, may be granted in the City of London by the Court of Lord Mayor and Aldermen; in the metropolis outside the City, by the Metropolitan Board of Works; in English and Irish boroughs, by the council; in Scotland, by town councils, or police

commissioners, or county justices of the peace, according to circumstances; in any harbour, by the harbour authority; in places in England or Ireland, not boroughs, by local trustees or improvement commissioners, or by justices assembled in petty sessions. Licences are valid if signed by two or more of the persons constituting the local authority, or executed as other licences are executed by the same authority. They may be granted for a limited time, and there may be conditions annexed as to removal or otherwise, which the local authority thinks necessary for diminishing the risk of damage from explosion or fire. If the licence be refused, or be granted on unsatisfactory conditions, the applicant may demand a certificate of the grounds of refusal, or of attaching such conditions, and he may memorialise the Secretary of State, or (if in Ireland) Lord Lieutenant, who may make inquiry; and, should he think proper, may grant the licence in the manner prayed for. Of all forfeitures and penalties half is to go to the crown and half to the informer, unless such informer be a servant of the person informed against, in which case the informer's half shall be applied in such manner, and to such other purpose as the convicting justices may think fit. Respecting Scotland there is a provision for imprisonment for a period not exceeding three months, if the penalties be not paid. The clause respecting Scotland says nothing about the informer receiving half, but leaves the half which is not for the crown to be disposed of as the magistrates direct. Petroleum may be searched for in the same manner as, under the Gunpowder Act of 1860, gunpowder may be searched for; and all the provisions of the Gunpowder Act relating to searches are to be incorporated with the Petroleum Acts.

In order to protect the public against explosions, it is enacted by the recent statute that, from the 1st February, 1869, no person is to sell, or expose for sale, for use within the United Kingdom, any description of petroleum which gives off an inflammable vapour at a temperature of less than 100° Fahrenheit, unless the bottle or vessel containing such petroleum shall have attached thereto a label with the following words, in legible characters: "Great care must be taken in bringing any light near to the contents of this vessel, as they give off an inflammable vapour at a temperature of less than 100° Fahrenheit's thermometer." Any person acting in contravention of this provision is to be liable for each offence to a penalty of not exceeding 5*l*. Inspectors of weights and measures are empowered by the late Act, at all reasonable times to inspect and test all petroleum kept, offered, or exposed for sale; and if it shall be found under circumstances infringing the law it may be seized, and, upon conviction, forfeited. The inspector is to retain a sample, and the offender is to be liable to a penalty not exceeding 5*l*. If, however, the accused shall claim to have a further test made on his behalf, the magistrate hearing the case shall call before him the public analyst, or, if there be no such officer in the district, some other person having competent chemical knowledge, who shall test the sample and give evidence of the result. The analyst is to be paid a sum not less than 2*s*. 6*d*. nor more than 10*s*. 6*d*., and in case of conviction the offender is to pay the cost of the analysis. All offences under the petroleum Acts may be tried as petty offences, by any magistrate acting under any general or local police Act.

There is a schedule annexed to the new Act containing, in minute scientific detail, instructions as to the mode of testing petroleum in order to find out at what temperature it gives off inflammable vapour.

Paraffine was discovered by Reichenbach, in coal, wood, and tar, in 1830; and Dr. Lyon Playfair directed the attention of Mr. Young, some years ago, to a thick, dark-coloured, oily liquid, oozing from the roof of an old coal-mine in Derbyshire. He found it was a kind of mineral naphtha, purified it, and a factory was established; but as the oil soon ceased it was discontinued. Mr. Young then tried experiments on the coal, from which he considered that the oil must have been distilled, and he found that coal distilled at a low temperature, yielded a considerable amount of gas, and no tar at all, but in their place a large amount of vapour, which could be readily condensed into an oil, &c., into paraffine oil. A factory was established, and the process patented in 1850, at Bathgate, near Edinburgh, which now employs more than 800 men. The crude oil procured by

the first distillation is a thick, dark-coloured liquid, and the first step towards its purification, consists in simple distillation, which, observes Mr. Tegetmeier, is performed in large iron stills, weighing as much as five tons each. In these the oil is distilled, there being left in the still a mass of bright shining hard coke, which is nearly as possible pure carbon. The oil is then mixed with oil of vitriol, and after having been allowed to rest, is distilled again, and separated into four portions, naphtha, paraffine oil, lubricating oil, and solid paraffine.

Colonel Julius Adams, of New York, made experiments on the use of petroleum as fuel in combination with steam, for the heating of steam-boilers. The advantage of the oil as a fuel for marine engines have been thus stated:—

"Rapidly with which steam may be raised, reduced dimensions of boiler and furnace below that required for coal,—the continuous firing effected by feeding the fuel through a pipe into the furnace, thereby preventing the great loss of heat in the furnace every time a fresh supply of coal is thrown on, and the rush of cold air upon the opening of the furnace-doors,—the freedom from smoke, cinder, ash, or refuse of any kind, which in coal reaches from 7 per cent. to 16 per cent. of the whole amount. In the ability to command a forced fire almost instantly, without a forced draught, which under some circumstances at sea, is of vital importance. In dispensing with the numerous class of coal-heavers, stokers, &c., and all the inconvenience of raising clinkers and ash from the furnace-rooms; and, finally, the diminished space occupied in the storage of the fuel."

Experiments were afterwards made at Woolwich, conducted by Mr. Richardson. His report informs us that 1 lb. of oil will evaporate about double the weight of water which 1 lb. of coal, burnt in the ordinary way, would evaporate. If the price of the oil is materially reduced the substance may come into use for engines instead of coal. Mr. Richardson says:—

"The experiments at Woolwich were necessarily commenced with the best and more expensive petroleum. Nothing was known of their properties as fuels; the result has proved that those which contain spirit and burning oil are not so well suited for fuel as those from which they have been extracted; but until a method was arrived at of getting rid of the smoke no others could be used. The smoke was mastered by simply decomposing a little water-vapour, carbonizing and burning the gases. The heavy oils, as they are termed,—those from which the spirit and burning oil have been extracted,—are about the consistency of gas-tar. Their market-price is at present 5*l*. per ton. When we remember that the gas-tar is the same as the heavy oil, only in a more concentrated form, and that it can be obtained in any quantity at 1*s*. per ton, cheapness would be the result of an enlarged manufacture."

Petroleum oil has been used for fuel in a steam fire-engine in Boston, U.S. It does not, like other fuel, clog the exhaust-pipes. In this instance the engine gained 90 per cent. of water-pressure in excess of any other machine on the ground.

A large percentage of petroleum may be distilled from pitch, but the process is expensive, and the smell of the oil so procured very offensive; so that petroleum obtained from it is not likely to come into competition with that which comes up from the ground in a liquid state. The Pitch Lake, in the Island of Trinidad, is one of the most extraordinary phenomena of the volcanic kind in the world. Curiously enough the vegetation around is very rich, and the pitch appears to give a deeper tint of green to the plants. The lake is about a mile and a half in circumference, and except in the wet season a person may walk on the solid pitch for a considerable distance from the edge. It is a hit-and-miss quicksand, and in some places an oily substance oozes up when the foot is put down. A stont pole will disappear, when planted in the asphalt, in the course of a quarter of an hour; so it is as well for persons to take the policeman's advice, and keep "moving on." Natural channels intersect the lake in all directions, filled with the clearest fresh water. Fish have been found in these streams. There is certainly a communication between the lake and the sea, for marked poles have been thrust into the lake and engulphed, and in the course of a few days afterwards they have been picked up on the seashore. Mr. Rowland says it is probable that the Pitch Lake may at any time belie the experience of the inhabitants, and show itself in the terrible shape

of an active discharging volcano, having a crater a mile and a half in circumference, full of the most destructive and ruthless agents it is possible to imagine. There is, in fact, nothing to show that there is not a slumbering volcanic agency which at any time may bring destruction on the island. In Canada the deposits of asphaltum or mineral pitch are called gum-beds. A cubic foot of this, it is said, represents the effusion of 60 to 80 cubic feet of lubricating oil, and from 100 to 120 ft. of illuminating oil. This might perhaps be made available for engines. Some of the best oil-wells in Canada are sunk on or near these gum-beds. Apropos of oil, the *Athenian*, some time ago, stated that at Biren, a Swiss village which tourists will remember when walking up the valley of the Subr, the inhabitants have begun to manufacture oil from chafers. The process was initiated by two men, who having noticed that a chafar looked greasy when squeezed, thought that the grease might be useful for the wheels of their cars. They caught a number of chafers, subjected them to pressure, and obtained a quantity of greasy fluid, which after a few days became clear and yellow, and on trial was found to burn brilliantly, with an agreeable odour. Forthwith there was a general chafar chase after the villagers, of which the results are said to exceed their expectations.

The paraffine oil surpasses every light in brilliancy combined with economy. One gallon of paraffine oil is equal in illuminating power to one gallon and a fourth of the best petroleum oil, or to 26 lb. of wax candles, and to 36 lb. of ordinary tallow candles; so that as Mr. Tegetmeier remarks, one pennyworth of paraffine oil is equivalent in light-producing power to 1 lb. of common candles. Here is therefore another instance out of many in which science has benefited the working classes. In many a cottage, instead of a dirty-looking "dip" giving a poor light, we see a neat lamp fed with this oil at half the cost of the former, with many times its illuminating power. And in all sections of the middle classes the beautiful paraffine candles have taken the place of the commoner sorts. In the matter of light, the progress effected in this generation contrasts most surprisingly with the aggregate of the progress effected in all previous generations put together since the earliest dawn of authentic history. A writer in the *Spectator* a short time ago, drew attention to this fact, pointing out that the lamps and torches which illuminated Belshazzar's feast were probably just as brilliant, and framed out of nearly the same materials as those which shone upon the splendid fêtes of Versailles, when Marie Antoinette presided over them, or those of the Tuileries during the imperial magnificence of the First Napoleon. Pine-wood oil, and perhaps wax, lighted the banquet-halls of the wealthiest nobles, alike in the 18th century before Christ, and in the 18th century after Christ. There was no difference except in finish of workmanship and elegance of design—little if any advance, we mean, in the illuminating power, or in the source whence that power was drawn—between the lamps used in the days of the Pyramids, the days of the Coliseum, and the days of Kensington Palace. Fifty years ago, that is, we burnt the same articles, and got about the same amount of light from them, as we did 5,000 years ago. Now we use gas of which each burner is equal to fifteen or twenty candles; or when we wish for more, we have recourse to the electric light or analogous inventions, which are fifty-fold more brilliant and far-reaching than even the brightest gas.

SAVANS IN NORWICH.

RETURNING to the papers read by Canon Girdlestone and Mr. Corrance on

The Condition of the Agricultural Labourer,

noticed in our account of proceedings by the British Association for Science,* we add some of the observations made during the animated discussions that followed.

Professor Leone Levi said: The subject with which these papers dealt applied to two-thirds of the population of the country, and to some of its largest interests, for he believed that the income of the working classes amounted to 400,000,000*l*., and that of the agricultural labourers might be taken at 60,000,000*l*.. He sympathised with a great deal that had been

* See p. 635, ante.

brought forward by Canon Girdlestone, but at the same time he thought that there were other circumstances than those which had been referred to that ought to be taken into consideration. The labour of the agriculturist was a very healthy one, and the labourers were long-lived, so that they received wages for many years; whereas the working man of Sheffield, although he might get from 2l. to 3l. a week, could not look forward to the enjoyment of those wages for a period of more than twenty years, at the end of which time he left a widow and probably a family. Therefore, if the Sheffield workman received more wages, his position was not thereby improved, because the agricultural labourer continued to live longer and to support his family for a more extended period. Upon a broad view he did not think that wages paid in the country were unfairly low. They were certainly better now than they were some years ago. To his mind it was not by strikes that wages were to be improved. For if labour was suspended there could be no wages, and the result was diminished capital or reduced wealth. Consequently, strikes were rather a hindrance than a stimulus to the progress of wages, although in some isolated cases a temporary improvement might be obtained by resorting to such questionable means. If the individual members of the working classes, instead of studying the improvement of their homes and morals, began to engage in politics and formed societies for defending their political rights, he thought they would rather lose than gain by their efforts. In respect to co-operation, by means of unions, he thought that though these might be a useful medium for those who attained a certain amount of education, it was hardly a system that could be resorted to at the present moment with any great advantage to the working classes. If this country were to keep *pari passu* with other countries, all anxious to make progress, and ready to make the greatest sacrifices in accomplishing that object, it must go forward and not backward in this question of education. Another point was that it was important for the working classes to concede they were responsible to society generally for the manner in which they filled up their time; wasted their opportunities, and lost the chances which were seldom given to them more than once.

A member said he thought it was a discredit to the country that the principal buildings in our towns should be the gaols, workhouses, and lunatic asylums; and he was of opinion that if they were removed into the country, and their inmates set to work in their immediate neighbourhood, it would be a vast improvement on the present system. With regard to the question of co-operation, he instanced the case of Mr. Briggs's colliers, who were allowed a share in the profits of their labour, and stated that the system had been found to work with great success.

Dr. E. Crisp offered a suggestion to the effect that reading-rooms, and places where the agricultural labourers might assemble for purposes of recreation and instruction, should be established for rural districts. He also recommended the adoption of the co-operative principle, as already carried out in the co-operative stores of London and other large towns.

Dr. Farr, thought it was quite right that they should take into account the duration of the agricultural labourer's life, and they ought likewise to consider the expense to which he was put, and the fact that if he were to get into an urban district, although he might receive more wages, the difference in his expenses would probably be such as to render him no better off for the change. It had been said by Mr. Hodgson that there was nothing so fallacious as figures, except facts. The fallacy of facts generally consisted in this, that an exceptional fact was taken and considered as an illustration applicable to the general state of things. He could not help thinking that the facts presented by Canon Girdlestone to some extent belonged to the class of exceptional facts; consequently they could have no general application. He trusted that the consideration of this question would take some really practical and tangible form, and that some resolution might be adopted that would have this effect.

Mr. H. E. Blyth expressed his regret that there should exist in any part of the country a class of men of whom such a picture could be drawn as that which had been placed before the association by Canon Girdlestone. He should not call in question the data from which the rev. canon

had drawn his paper, inasmuch as he had had no opportunity of visiting North Devon, and of finding for himself the actual condition there of the landowners, farmers, and labourers. But he must humbly protest, in the name of the Norfolk men, against the application of such an illustration to the condition of the agricultural labourers of this county. They had not heard that legislation had done anything for the betterment of the people, and that education was defective; but no system had been suggested which was likely to settle the question satisfactorily. Education was undoubtedly a subject deserving of the most serious attention, particularly by those who filled the situation of masters and employers. With regard to the condition of the agricultural labourer in this country, he was sorry to say, from an experience of fifty years as a master, that the labourers did not set so high a value upon character as formerly, and that the masters were more lax than they used to be in considering the character of those whom they engaged. Speaking as a farmer, he regretted to say that the agricultural population was not progressing as it ought to do, either in a social, moral, or economical point of view. But with regard to economy, if the employers spoke of the want of it among the labouring class, could they to those in their own sphere as examples worthy of imitation? The employers ought to endeavour to set an example which the lower classes might be expected to follow. They ought, first of all, to train up those who had to get their living by the sweat of their brow in such a way that they might fulfil their duty in the condition of life in which they were placed, and, ultimately, without or in spite of legislation, emerge therefrom, or improve their present condition.

Mr. C. S. Read, M.P., in a paper on recent improvements in Norfolk farming, afterwards read by him, said on this same subject:—The wages of the agricultural labourer in the last ten years, have been raised by nearly two shillings per week, and it is quite certain the men will not perform the same amount of work on this increased price. This is easily proved by comparing the price of piecework with what it was a few years ago, but as the agricultural labourer has already formed the subject of two separate papers, I will not venture any further remarks on the subject. You, Mr. President, said that, in your opinion, one great reason for the unsatisfactory condition of the labouring population was their ignorance of political economy, and the chief hope you had of any improvement was their being taught the ground-work of this great science. In that I most cordially agree, for I protest against the partial application of scientific theories to agriculture. If hitherto political science has been applied only so far as it favours the consumer. You have exposed our agricultural produce to the competition of the cheap labour of the world, and to successfully hold our own we must have cheap labour too. In my small way I have done what I can to improve the condition of the agricultural labourer, and though I am ignorant of science, I believe my ideas are closely allied to sound political economy. I contend that the price of labour must in a great measure depend on supply and demand. In seasons of great mercantile activity our young labourers migrate by scores and hundreds to the north and to London, without the aid of any registration societies; for our great employers of labour have agents all over the country always looking out for strong active hands. Even our old labourers are not ignorant of the rate of wages paid elsewhere, but they know that high wages invariably mean longer hours, more work, and expensive living. Political economy would also tell the agricultural labourers that the way to raise their condition is not by combining together to do as little work as they can in a day, but to improve the quality of their work, and so earn more wages. I believe that every young agricultural labourer has the means of acquiring the most perfect independence; but he must learn to rely on his own industry, skill, and frugality, and not upon charity, an easy-going master, or the parish, for his support.

A committee was appointed to consider whether any steps should be taken to improve the condition of the agricultural labourer, and to report to the next meeting of the association.

Physical Sciences.

In the Mathematical and Physical Science Section, Colonel Strange read a paper "On the Necessity for State Intervention to Secure the Progress of Physical Science." The author

stated, that knowledge, of whatever kind, was promoted principally in three ways,—viz., by teaching, by education, and by exhibition. Unless the young were instructed, unless the workers advanced beyond what they learnt when young, and unless the world was reminded of what had been done, and of what remained to be achieved, knowledge must languish. The provision, such as it was, which had been made in England to meet these three main requirements had grown up casually with the progress of society, and was not equally complete in all branches of knowledge. In literature extensive provision was made for instruction in our private and public schools and in our universities, while the fine arts were less cared for. They formed as yet no avowed part of general education in England. Neither music, painting, nor sculpture was taught systematically in our schools, nor encouraged warmly in our universities. The provision made in our academies for its extension was meagre in the extreme—from no fault, perhaps, of the professors or the system, but chiefly from the fact that this requirement was provided almost wholly from private, and, therefore, inadequate, resources. Art was better, if not perfectly, provided for; but that our pictures, statues, and music were seldom good was due to our imperfect means of teaching and of extension. The conviction long held by thinkers and workers in science that a knowledge of the products and the phenomena of the material universe should form a large part of the education of its inhabitants seemed at last to have dawned on society generally. It was one of the opinions of the day that scientific was at least of equal value with classic lore, that it must be infused early and freely into the minds of even children, and that it must be recognised in universities as an essential branch of a liberal education, sharing the honours and privileges heretofore too largely absorbed by Greek, Latin, and logic. Colonel Strange proposed the foundation of a national institution expressly for the practical advancement of scientific research apart from education—an institution for workers as distinguished from learners. Such an institution implied a building or buildings planned with a view to modern scientific requirements, of which the chief were ample space, absolute stability, and perfect command of light and temperature. It seemed indispensable that such an institution, being maintained at the public expense, should be as accessible as possible to the scientific public.

Water Power.

Mr. T. Login, C.E., read a paper on "The Abandoning and Transporting Power of Water." After referring to the importance of water as an agent in adapting the world to a condition suitable for the habitation of man, the author observed that the power derivable from water, and the resistance of water to bodies passing through it, had been well investigated; but of the transporting power of water at different velocities very little was known. In illustration of this fact he spoke of the great controversy now going on between Sir Arthur Cotton and Sir Proby Cautley, two of the greatest engineers India had ever produced, with reference to the great Ganges Canal, and observed that on the correct settlement of this dispute great interest depended. Not only was it a subject for the philosopher to study, but for the politician, the philanthropist, and Christian, as the future prosperity of the great continent was bound up in it. Having entered into a minute account of observations taken in India with reference to the slope required to transport the earthy matters held in suspension, and prevent the canals from silting up, he arrived at the following conclusions:—That the transporting power of water must depend to some extent on the nature of the earthy matters to be transported; that water containing large quantities of such matters required greater slope than those containing small quantities, and that without a sufficient slope the earthy matters became deposited on the bed of the stream; that any obstruction in a silt-bearing stream will at once cause a deposit, which, if allowed to accumulate, will eventually cause an alteration in the course of the current; that water containing no such matter would continually deepen its bed had not nature provided that at certain seasons the rivers flowed under both conditions, and so preserved the balance. These observations led to the deduction that the slope of every canal intended for irrigation purposes should depend upon the velocity of the stream, the amount of

earthly matter held in suspension, and the character of such matter.

Professor Rankine observed upon the necessity that existed for greater attention being paid to irrigation in this country. Any one who travelled through the country within the last few weeks must have seen land where vegetation had been dried up, although in many cases there was an abundant supply of water within a few yards, which, however, was not available for want of the means of applying it. He suggested the appointment of a committee to investigate the power of water in transporting matters of different kinds, which distinction had not previously been known to science. Mr. Vignoles agreed in the desirability of irrigation, which was more especially valuable in Italy, Spain, and other countries, but in England he thought there was not uniformly such a scarcity of water as would render necessary any extensive works of the kind.

Patent Monopoly as affecting Progress

was treated of by Mr. Dircks, C.E. The author alluded to early State papers and scientific literature as recording secret and also patented inventions, thus distinguishing two classes of inventions, the former including inventions which two often never come to light, the latter those open to public use. He next distinguished patents as a monopoly in an individual property, —an otherwise secret invention,—one to which the possessor has an inalienable right. Noticing the obnoxious system that prevailed in the reign of Elizabeth, he traced the progress of improvement in the patent laws from James I. to the present period, freely admitting the importance of those reforms, and the possibility of carrying them still further. Regarding the so-called "frivolous patents," he considered they formed a very insignificant portion of the large numbers of patents granted annually, and likewise that it was next to impossible to distinguish between great and small inventions in reference to practical manufacturing operations, very small matters frequently engaging a large amount of labour and capital. Tracing the progress of patents from the one to six obtained annually during several reigns to the 3,000 or 4,000 annually granted at present, he concluded that a case of improvement and encouragement in science and manufactures was thus clearly made out, enumerating at the same time a variety of entirely new and most important chemical and mechanical manufactures, and recording the names of many distinguished patentees whose operations had no better protection than the old, expensive, and very defective patent laws that existed to the end of September, 1852.

A paper by Mr. Bell Galloway "On Inventors and Inventions," was read by the secretary. The author stated that for some years past foreign nations had offered great inducement to inventors and skilled workmen to leave England, and as the result, much of the engineering and other branches of manufacture was now being done in foreign countries. With a view to prevent the continuance of this state of things he suggested the creation of a special fund to develop important and approved inventions, and that the association should ask for the whole of the balance of the money which has arisen from the working of the patent law, now amounting to a million sterling, as the nucleus of a fund for this purpose.

In the discussion which followed, Mr. Drayton well condemned the proposal of the author of the last paper. He denied that the fund accumulated amounted to anything like a million sterling, and said that such a proposal as that of Mr. Galloway would be a most prolific source of jobs, and the people who had to disburse the rewards would be amongst the most abused people to be met with in the country.

Capital and Labour.

Mr. Samuel Brown, in his inaugural address as president of the Economic Science Section, referred to the relation of wages to capital as a subject of vital importance in maintaining the position of this country in its competition abroad as well as with its peace and prosperity at home. He said, the opinion that labour and capital must be in antagonism, each trying to subdue the other to its own terms—an opinion which can only be entertained in ignorance of their relative functions—is becoming gradually undermined; and the earnest efforts of some of the most practical and enlightened employers of labour, aided by the increased intelligence and better feeling produced by conciliation, on the working

classes, have allowed some important experiments to be fairly tried to reconcile the two opposing foes, and to bring them into harmonious working together. A most influential general committee has been formed under the auspices of the National Association for the Promotion of Social Science; and in a meeting at which the Right Hon. W. E. Gladstone presided, the question was debated, and certain general principles laid down for the course of proceeding. But the work to be accomplished is of the most laborious character. It is to be hoped, at any rate, that the clumsy and barbarous system of strikes and lock-outs which destroy both the small savings of the workman and the capital out of which he hopes to increase his wages, and which keep up a perpetual source of irritation and ill-feeling, will be abolished as an insensate and reckless process. Trades unions are contended for by some as useful and effective, if not carried on to the injury of the trade, or to the detriment of the nation, and provided the members pursue their own objects without undue coercion of others. But without coercion and oppression how can they fulfil their objects? The limitation of times of labour, the depression of the sober, industrious, and most skilful workmen to an average level of the more idle and unskilful, the exclusion of apprentices, and the dire effects in other branches of the trade or manufacture in which without wishing to strike themselves, the workmen are dependent on the continued labour of others who will not work, naturally drive capital away into other countries or other trades, and thus leave the infatuated workman with worse prospects of success than when he began the strike. The president suggested as a powerful mode of co-operation, because it appeals more directly to the self-interest of the working classes, industrial partnerships in which the masters and workmen may unite together, by the adoption of which he believed the greater part of the difficulties between labour and production would vanish. The proper rate of honours for labour must, no doubt, depend on the proportion which the labour bears to the other costs of production, and of bringing the article to market. Mr. Brown thus concluded:—"In social science and political economy statistics may be considered the collection of experiments by the results of which we observe the hidden workings of the laws which regulate the social condition of man and his progress in civilization. The growth and decay of population, the freedom of capital and the rights of labour, the duty of voluntary or enforced education, the extent of Government interference in labour or manufactures, the competition of prices, the true principles of commerce, the most effectual means of suppression or prevention of crime, the theory of taxation and national loans, and multitudes of similar questions, are all governed by subtle laws affecting the free will of man, checked and kept in place by similar actions in others, of which we catch a glimpse sometimes by their irregular action in enforced or abnormal conditions, and sometimes by our having discovered and acted in harmony with the natural law which governs them. But as society is perpetually changing, what we have discovered and thought to be truth seems frequently inadequate to account for the new phenomena presented. It is only by extending our observations from the narrow sphere of a single country or a single class to all countries and all classes, by a uniform collection of statistics, as is now being done by all the Governments in Europe, by noting differences as well as analogies, and confessing and correcting errors and comparing the operation of the same causes under various conditions of interference, that we shall throw light on the many involved problems of social and political economy which modern civilization presents.

ABERGAVENNY TOWN-HALL AND MARKETS COMPETITION.—The commissioners met on Friday, 23rd ult., and decided to give the first premium, 50*l.*, to Messrs. Wilson & Wilcox, of Bath; the second, 20*l.*, to Mr. Haddon, of Hereford; and the third, 10*l.*, to the local competitor, Mr. Nevill. There were sixteen competitors. Each of the commissioners was furnished with a tabular paper, upon which were arranged the various requirements of the competition, and as each competitor fulfilled or failed in the particular requirement under consideration there was accorded or not a mark against his name. The work will be commenced at once.

ANTIQUITIES OF CORNWALL.

Early Christian Symbols.

At the recent meeting in Cirencester, Mr. J. W. Grover read some "Observations on Relics of Ancient Cornwall," which carried on the subject opened by the Roman remains at Chedworth,—namely, the occurrence of Christian symbols on works of very early character,—a point of extreme interest. We print the greater portion of Mr. Grover's paper:—

My object, he said, is not to bring before you any new discovery, but rather to draw attention to such points of archaeological interest as occurred very forcibly to me during a few days' stay in Cornwall last year; and I trust those who may have already investigated the subject of early Cornish antiquities will forgive me if I should happen to repeat what they already know; whilst those who have not had the opportunity of looking into the history of that ancient country will feel more interest in doing so, when I say that it clearly exhibits signs of very early Christianity,—of an earlier character, and of a date perhaps as old, if not older, than that which we find marked off in the Roman villa of Chedworth. Indeed, I must say that the general subject of early Christianity in Cornwall, in Roman times, seems to me to help us materially in our contemplation of the marks which are found at Chedworth, and in a very few other parts of Britain, as mentioned in my late paper in the "British Archaeological Journal" on "Pre-Augustine Christianity in Britain." Cornwall is, indeed, a land of mystery; it seems to have been the head-quarters of Druidism in its most advanced state of development. Except Brittany itself, I know no land more rich in all those precious relics of ancient heathenism, which we know by the names of Meni-herion, monoliths, tumuli, karns, circles, &c.,—clearly all of Eastern origin, and such as may still be seen in the valleys of Anti-Lebanon, and amongst the countries of the old Chaldean. When Christianity first dawned upon Cornwall the people were devoted to this Druidism, a religion which seems to have been a singular combination of the worship of many deities with a supreme belief in the *one God*. The Druid adored the sun, moon, and stars, and all the sublime works of nature—rocks, trees, fountains, caves,—to which worship Cornwall was peculiarly conducive. That it was Christian when the Saxon invaded it, is proved by the fact of the inhabitants having purchased permission from the invaders to exercise the Christian religion (*Rudborne Chron.*, lib. 2, chap. 1; also *Hist. Mey. Winton. Angl. Sann.*, 1, 157). That Cornish Christianity, like that of Wales, was of Eastern origin is shown by the Passover having been kept on the same day as that on which the Jews held it, and contrary to the Church of Rome. The Cornish continued independent in matters of religion till A.D. 905; the Saxons then held a synod, whereat sundry provisions were made to recover them from their "errors"—that is, their "refusing to acknowledge the Papal authority." (*Repin. Hist.*, vol. 1, p. 112.) And Usher says (*Hist. Brit. Antiq.*, p. 1152) that they would no more communicate with the Saxons than with Pagans, accounting that of themselves and of the Welsh the only true Christianity. I believe it is generally admitted that the religion of the Nazarene was generally favourably received by the Druids; and it is also known that before its advent they were accustomed to venerate the cross in the form of the tan. One solitary instance of this form remains—in a single upright stone—upon which is an inscription—"Christus hic jacet, Cunoconci filius." Mr. Edward Lhwyd fixes the date of this relic in the fifth or sixth century; Mr. Moyle places it in the fourth or fifth. No reason is given why it should not be even earlier. Druidism was of Eastern origin,—and there seems good reason to suppose that it continued its connexion with the East by some remote channel, probably Africa, throughout the Roman dominion. Could Eastern Christianity have passed along the same channel? The tan cross was an Egyptian emblem, and is called the *crux ansata* the key of the Nile, and was thought to be the emblem of life. St. Anthony, who was an Egyptian saint, is shown with it in the Middle Ages. It was also the all-potent sign of the Knights Templars. Mr. Syer Cuning, in a paper read before the British Archaeological Association, June, 1867, draws attention to the fact of its still being in use among the Celtic nations, and exhibits a specimen obtained from a Kantine peasant in

Ireland, who could give no further account of it than that it was a favourite form among "certain people" in County Cork. Sir J. Gardner Wilkinson has a passage in his "Ancient Egyptians" (Ed. 1854-1-277) so singularly applicable to this Cornish stone that I give it:—"The origin of the tau I cannot precisely determine; but this curious fact is connected with it in later times, that the early Christians of Egypt adopted it in lieu of the cross, which was afterwards substituted for it, prefixing it to inscriptions in the same manner as the cross in later times, and numerous inscriptions headed by the 'tau' are preserved to the present day in early Christian sepulchres at the great Oasis." Plato, who lived four centuries before the Christian era, advocated an idea of the Trinity, and expressed an opinion that the form of the second person of it was stamped upon the universe in the form of a cross (see "Justin Martyr ad Timonem," p. 36). St. Augustine even goes so far as to say that it was by means of the Platonic philosophy that he was enabled properly to understand the doctrine of the Trinity. Certainly the τ cross is an excellent symbol of the mysterious three in one. Montalembert, I believe, and several other authorities of opinion that the earliest cross was that of the τ (tau). Mr. Broughton supposes that this was the shape of the cross upon which our Lord suffered. The Samaritans, long before Christianity, are proved to have used the same figure. Another singular feature connected with this subject is that the Egyptian τ and Δ , which were interchangeable letters, both conveyed the same idea of the Trinity, or three in one equal, the Δ being Δ .

The ancient church of Perranzabuloe, so well known, will soon become a matter of history, for a recent visit shows that exposure is working its rapid annihilation; and not a hand is stretched forth to preserve this interesting memorial of the long-forgotten past. There are, however, several remains of ancient chapels in West Cornwall, which appear to deserve the equal honours of extreme antiquity. One of these is the venerable oratory of St. Gothian on the eastern side of St. Ives Bay, which, from the rudeness and gaunt character of its masonry, belongs clearly to the earliest ages. No cement is used at all, and no mouldings of any sort are found. Around it many skeletons are buried. At Porth Cornow, near St. Levan Church, on its southern coast of the Land's End district, are the ruins of another of these ancient oratories or chapels. Strange to say, this relic of primitive faith stands upon a tumulus, under which a sepulchral urn was found a few years ago. One of the most satisfactory evidences of the very early date of these rude structures is to be found at the stormy promontory of Cape Cornwall, which is called by Borlase the Promontory of Helons, the son of Priam, who is said to have come over with the renowned Brutus. The edifice I allude to is called Parc an Chapel, and resembles Perranzabuloe. Near it, and proving its remote antiquity, was found a small stone bearing the famous monogram, the *Chi Rho*. In the same district another example of this is found at St. Phillack. I attach importance to the presence of this holy seal, which we find also at Chedworth, because several antiquaries have, as usual, endeavoured to disprove the great age of Perranzabuloe, and would assign it to the eleventh or twelfth century. Certainly, as far as it is individually concerned, there is no absolute proof of its being built in one century more than another, but there is universal tradition, and that is backed up by the general appearance and character of the work, which is clearly not Medieval. When to this comes to be added the early Christian seal in close proximity to a similar structure near at hand, the evidence acquires weight. Vestiges of these small rude oratories may be traced in many parts of the Welsh coast, and, as I have before stated, the Cambrian antiquaries give an almost apostolic foundation to many of their churches and monasteries, so much so that one is fain to doubt. Montalembert, in his "Monks of the West," a work which in spite of the heaty of its composition is, in my opinion, very likely to damage the cause of pre-Anglo-Saxon faith—so mightily does the fabled zeal take the place of historical fact—states that Ninian (A.D. 370-94), built a little stone church on the peninsula of Galloway, called Candida Casa, or Whitechapel. He also informs us that modern research has discovered and registered as many as ninety churches, whose origin dates from the times of Columba—as many as fifty-three being still traced in Scotland. These rude relics of

early piety very much resemble the ruins of Perranzabuloe. It would not be fair to quit Cornwall without a further brief notice of those remarkable stone crosses which the traveller meets at every turn, and of which so little to the purpose has really been said by the learned. Who were the pious masons who chiselled them? The Rev. W. W. Haslam, an excellent Cornish antiquarian, attributes them to the early Christian converts of Britain. I think he is right, although it is important to observe that the character of them differs very greatly, some being the work of men in later ages, who improved upon the ideas of their forefathers, and by degrees introduced the figure of the crucified Redeemer. The earliest forms are those of the Greek cross. Perhaps the Tau stone which I have described may be taken to be the very earliest, and marks the Eastern character of the whole. Some of them partake of the lofty taper outline of the Egyptian obelisk, and, like it, are covered with quaint markings and mysterious Eastern devices. The explanation of them appears to me to be this:—The Druid, before his conversion, was wont to erect stone menhir-herion; you see them all over Cornwall. They are but rude prototypes of the stone crosses which succeeded them, and to which the convert transferred his allegiance and his symbolical ideas. This, I think, may be taken as proved by the fact of their being found only in the counties where Druid remains abound, and it was a very natural transition of idea. They abound on the entire western coast, as far north as Angus, where they are very numerous, but of a type later than the Cornish examples. Hallowed relics of the long-forgotten past! how eloquently, yet how silently, do you tell of a rude but pious age! It is very important to remember what Didron says (p. 376) on the subject of the Greek and Latin cross:—"These types were not at first specially confined, the one to the Greek, the other to the Latin church; they were originally common to both countries, and were admitted indifferently by both." Again,—"Still, the most ancient Greek sculptures at Athens, in the Morea, in Macedonia, and in Constantinople, contain crosses with branches of unequal length. That primary type must, therefore, have been known and practised in Greece. As to the second, the cross with equal branches, it is the most commonly adopted by the Greek Church." In Cornwall we have the four forms,—the Greek, the Latin, and the Tau cross, as well as the *Chi Rho*. The two latter symbols are undoubtedly of the Roman period. The two former, very probably, belong to the same age, but not necessarily; one remarkable fact, however, remains to be noticed, and that is, the presence of sculptured figures in tunics, with the arms outstretched, both upon some Latin and Greek crosses: this clearly is the first idea of the crucifix, although according to Didron, p. 250, this emblem was very unusual in the sixth century, and is there mentioned as a novel representation by Gregory of Tours. We are, however, told of a little image which placed itself miraculously upon the cross executed by an artist named Mark, a contemporary of Diocletian era, A.D. 300, which represented not the crucified Saviour, but Emmanuel (see "Labbe Concilium Collectio Maxima," vol. 7, col. 768, second Council of Nice). Images or representations of our Saviour upon the cross were unknown in the early Christian catacombs. I believe it is correctly maintained that to the impure sect of Egyptian Gnostics, we must attribute the early introduction of little images of our Lord. These statues were made of gold or silver, after the heathen pattern of those of Pythagoras, Plato, and Aristotle, who were all honoured with a similar kind of worship,—if we can believe St. Irenaeus and St. Epiphanius. We know that the Emperor Alexander Severus placed amongst his Lares figures of Christ and Abraham opposite those of Orpheus and Apollonius. Everything, says Didron, countenances the opinion that "from the commencement of the third century images of Christ were in circulation among the faithful—at least among those of the lower order—and particularly in Rome, where Gnosticism had made many proselytes;"—and, he might have added, Cornwall. The Rev. W. Haslam attributes these figured crosses to the Roman epoch, and he draws attention to one in the parish of St. Buryan, three miles from the Land's End, situated one mile from Churchtown, in a corner of the road running down to some ancient ruins called the "Sanctuary." He thinks the character of this relic is Byzantine and massive, and resembles the few illustrations which remain of early

crosses at Constantinople. He tells us, moreover, that the human figure was carved on crosses in the time of Constantine, and he quotes a passage from Lactantius in proof,—I think not very conclusively. Gretzer tells us that the crucifix was in use at the time of Tertullian, but where he obtains his authority is not stated. There are some crosses in Cornwall which represent the human figure in a manner which would lead to belief of its having been added at a later period. At the churchyard, Sanceed, is a very ornamental example, about 6 ft. high: on this side it shows a triangular pattern very common in British jewellery and earthenware; on the face is shown a vase, and what appears to me to be the rood. I would name one illustration of perhaps the earliest and primary form of the Greek Cross, as found in Cornwall; it bears the inscription—"Isidocus Vitalis Filius Torrici;" in its execution there is not the least deviation from the Roman capitals, two names of the person buried are also given: this is a feature which marks the Roman character of the work, the cross at the top is within a circle; Borlase is surprised to find it on a piece of Roman work; he therefore assumes without any reason that it must have been cut at a later period. We may, in fact, trace the various forms of the cross; from its stern primitive outline to the many florid examples, which were clearly executed in times verging on the Norman Conquest. The Tau of the Druid being converted into a symbol of Christianity, as used on the Nile; then comes the *Chi Rho* of the times of Constantine and his predecessors, the Greek and Latin forms following on promiscuously through the Middle Ages.

CAIUS GABRIEL CIBBER, OR CIBERT, SCULPTOR.

The father of Colley Cibber was Caius Gabriel Cibber, or Cibert; he was born in the year 1630, and died in the year 1700.

In the marriage register of St. Giles's-in-the-Fields, London, I had the good fortune to discover the following entry, now for the first time in print:—

"L. L. 1670. Nov. 24. Caius Gabriel Cibber, widr-[widow], and Jane Colley, spinster."*

Future historians of the stage, and future writers of lives of actors, will doubtless refer to the columns of the *Builder* for the fact I now bring to light.†

The following extracts are taken from the accounts of the paymaster of the Royal Works at Hampton Court, in King William III.'s reign. The Earl of Portland (William's favourite Bentinck) was superintendent of the works at Hampton Court:—

"Caius Gabriel Cibber, carver, for a great Vauze of white marble, enrich with divers ornaments, with a pedestal of Portland stone, also enrich, 234*l*. More for a great marble Urn, with divers base relieves and figures, 521*l*. 12*s*. In both, 755*l*. 12*s*."—*Works at Hampton Court, 1689—1696*.

"Gabriel Cibber, statuary, for two coats of arms in Portland stone, several statues and figures in metal, and for carriage of the statues and other charges, 530*l*."—*Works at Hampton Court, 1691-4*.

"Gabriel Cibber, statuary, for insculping the reliefs on the tympan of the great frontispiece with iconological figures, and for several journeys of himself and men to look after the performance, 400*l*."—*Works at Hampton Court, April 1st, 1691, to March 31st, 1696*.

I come now to the works at Kensington Palace:—

"Gabriel Cibber, statuary, for four great flower-pots of Portland stone, richly carved,

* Walpole writes—"I can only find that he [the sculptor] was twice married." The register quoted above confirms what Walpole believed to be the case. L. L. has some reference to a marriage by licence.

† The will of the widow of Samuel Cooper, the celebrated miniature painter (died 1672), contains the following entries, now first published:—

"To my nephew and godson, Alexander Pope, my painted china dish, with a silver foot, and a dish set in gold, and after my sister Elizabeth Turner's decease, all my books, pictures, and medals set in gold.

To my cousin John Hoskins, my husband's portrait in crayons, and all my husband's linings that shall be with me at the time of my decease. Also Sir Peter Lilly's picture in oil." [I wonder much where this can be.]

My funeral expenses, and the monument over my grave, not to exceed 50*l*. [Cooper's monument in old St. Pancras Church, London, was crowned by a palette and brushes.]

† This noble vase was removed from Hampton Court to Windsor by King George IV.

1871. 10s.—Works at Kensington Palace, October 1st, 1861, to March 31st, 1866.

The second wife of our sculptor was the daughter of William Colley, Esq., of Glasston, in the county of Rutland, great-grandfather of Sir Anthony Colley.*

At a sale at Sotheby & Wilkinson's, November 27th, 1861, forty-four drawings for sepulchral monuments by Gibber were sold for the insignificant sum of 11. 3s.

The Triton Fountain, at Chatsworth, was made in 1688 by our great statuary.†

PETER CUNNINGHAM.

WORKMEN'S REPORTS ON THE PARIS EXHIBITION.

DURING the continuance of the Paris International Exhibition a few members of the "Working Men's Club and Institute Union" (an ugly title that should be changed as soon as possible), who thought it important that means should be devised for enabling British workmen to visit the Exhibition and manufactories in Paris, at a cost which would enable a large number to enjoy that advantage, formed themselves into a committee to effect this object. A report shows that upwards of 3,200 persons availed themselves of the arrangements thus made; and that, including the delegates who went to Paris under the auspices of the Society of Arts, 700 British artisans were enabled to inspect the principal industrial establishments in that city. To render these visits as useful as possible, the committee announced their intention of giving prizes for reports on the branches of industry which the visitors severally represented. A fund of 45*l.* was raised for this purpose and for the printing of such of the reports as might be found worthy of publication. On the recommendation of Mr. Austen H. Layard, M.P., the Committee of Council on Education made a liberal grant to this prize fund, on the condition that copies of the reports should be distributed gratuitously to a certain number of public institutions.

As might have been expected (considering what was being done by the Society of Arts), the committee did not receive a very large number of papers, and the volume published is a small one.‡ It consists of the following reports:—

1. "Pottery and Porcelain." By Thomas Kirkby, Trentham.
2. "Gold and Silver Work." By P. Rasmussen, London.
3. "Educational Appliances." By Henry Major, Nottingham.
4. "Maps and Educational Appliances." By A. T. Greenwood, Congleton.
5. "Preparation of Leather." By Alfred Heswell, Bermonsey.
6. "Watchmaking." By J. E. Bradshaw.
7. "Iron, China, and Ceramic Ware." By John Randall, Salop.
8. "Cabinetwork." By H. D. Hand, Salford.
9. "Cabinetmaking and the Woods employed in it." By C. A. Hooper, London.
10. "Cabinetwork." By Thos. Paterson, London.
11. "Tools and Machinery for the Manufacture of Steel and Iron." By Percy A. Sanguinette, Chatham.
12. "Brickwork and Concrete Building." By — Simpson.

Appendices.—Report of the Paris Excursion Committee; Conditions of the Prize Competition; Rough Notes and Reminiscences of the Committee's Work.

We quote a paragraph from Mr. Hooper's report on "Cabinet Making." Touching polishing:—

"The process of polishing should have some notice in a report upon wood. The niceness of the grain displayed to so much advantage in screens, where 'feathers' and 'crisps' of every design are produced, would not exhibit half their beauty were it not for the labour and skill of the polisher. But here there is too often the fault of hurry, and what we call 'scumming' the work. Polishing, to stand in wear, should never be hurried. Without entering into the secrets of the trade I may add that it ought to be repeated at certain intervals, so that the grain may be well filled in before it be finished off, or it will soon expose its deficiency in wear. A piece of good work well polished will always show to the best advantage and will increase in beauty and richness by use if properly attended to. Where there is carving, and the fingers of the polisher cannot apply the rubber, a thin coat of

* Lysons's Environs of London (St. George's-in-the-East), ii. 437.

† See the late accomplished Duke of Devonshire's "Handbook of Chatsworth," privately printed by the duke a little before his death. Three days before the duke died I had a note of invitation from Sir Joseph Paxton, written at the request of the duke, that I should arrange and catalogue his portraits at Chatsworth and Hardwick.

‡ "Modern Industries: a Series of Reports on Industry and Manufactures as represented in the Paris Exposition in 1867." By Twelve British Workmen, visiting Paris under the auspices of the Paris Excursion Committee. London: Macmillan & Co., 1868.

varnish can be applied with a brush so as to put a gloss on it, as it protects the wood from dirt and dust which would otherwise so eat into the fine and delicate parts that it could not be removed. Much must in this case depend on the knowledge and skill of the polisher."

The same writer has a lofty notion of the advantages enjoyed by French workmen. He says:—

"I sum up the causes of our decline in trade in this fact, that as workmen we are not encouraged to elevate or improve ourselves, nor are we treated as men who hold responsible positions in the world. We are only 'mechanics' in the common application of the term. No attractions of a rational, refining, elevating nature are generously offered to us. We need look no further for an answer to the question as applied to my own trade, in which so much knowledge and appreciation of art design and skill are necessary, 'where Continental workmen successfully compete with British industry, is it due to superior manipulative skill, or to the adoption of some labour-saving process and more efficient machinery.' It must be evident to every thoughtful observer that their superiority is largely due to their training and education. Higher aspirations are created, better tastes and improved habits are formed. These imbibed in early childhood are afterwards practically exercised from manhood. The workman unites the love of art and the culture of refined taste with the pursuit of his calling in the workshop. This, then, may be said to be the 'more efficient machinery' which is in operation in France, and which I hope to see adopted and brought to bear on us and on our children in liberty loving England. Across the Channel no obstructive or needless restrictions clog the progress of the workman. There every encouragement is given him by the Government, which concerns itself with industry in the workshops, improved dwellings for the people, and healthful recreation at all times and in all places. The ruling powers in France had their truest policy to be to look to the welfare of the working class—the creators and producers of the nation's wealth."

Well-informed or ill-informed as the reporters may be, we fully endorse Mr. Hodgson Pratt's remark that this volume contains evidence of the healthy mental stimulus which the insight into the social and industrial condition of the French people has given to the minds of our artisans.

Mr. Dexter, who has edited it, explains how it was that the guarantors were called upon to pay a certain amount of the cost of the excursions:—

"They thought that, under all the circumstances, they would be fully justified in securing accommodation for 112 men per week for five months; and if that anticipation had been fully realised, and the beds thus paid for in advance had always been occupied, no loss would have accrued. The slight change in the number of excursionists over and above their outlay would have covered all the expenses for advertisements, printing, office, &c. However, the result in point of fact was that, while the committee had to engage a great amount of extra accommodation in August, to the extent sometimes of 20 beds a week, in the two last months of the season a very large number of their 112 beds were every week unoccupied."

Hence the deficiency.

THE TWO BRIDGES.*

"God's blessing on the architects who build
The bridges 'cross deep rivers and abysses,
Else all impassable to human feet." LONGFELLOW.

1848.

I stood in London, on Westminster Bridge,
Old Labeley's camel-bridge, with hump awry:—
A half-burnt palace creeps up on one ridge,
Vast fragrant mud-banks greet the nose and eye,
On either bank what can sad Taste deprecate,
But dreary, doleful roofs, eyesores a hundred,
A minor mass and wretched rookery? *So*
So that, for aces, Seine-bred minds had wonder'd
How sane John Bull could e'er have so insanely
blunder'd.

1868.

Again upon Westminster Bridge I stand,
The unrival'd span of many-bridg'd Page,
A joy of Art for every coming age.
Where, now, a stately path margins the Strand,
And, in the mind's eye, structures may be seen'd,
Fitting such site (all slimy late, and slobbery),
By grateful labour hewn—by genius plan'd.
Doubt not, Art, that interloping jobber
Lay on this golden chance the hand of greed and
robbery!

STONE-WORKING MACHINERY.

Messrs. ROTHEOE & BASTIN are now sending out machinery which has the effect of cheapening very considerably the production of good masonry. We have examined the machines as set up for Messrs. Holland & Hannen, behind the fine houses they are erecting at Grosvenor-gardens, on the Marquis of Westminster's estate. These are three in number, and are respectively for sawing, surfacing, and moulding stone. The saw-machines are each capable of taking in blocks measuring 9 ft. one way, 7 ft. the other, and 4 ft. 6 in. thick, and cutting them into any

* Suggested by the essay in the *Builder*, p. 581, ante, on "The Future Architectural Bank of London among European Cities."

required thicknesses. They are made of wrought iron, and have an arrangement for connecting with saw-tillers and cutters; and they are suspended by suitable chains, links, &c., supported and working into grooved pulleys, fitted with adjustment so as to regulate the speed of the saws according to the quality and character of the stone, also a proper arrangement for removing the frames entirely up out of blocks of stone. The motion of the saw-frames is horizontal.

The planing and moulding machine has two tool-boxes, carrying where necessary four tools, and is so constructed that the tools cut both in and out travel of machine. The planing and moulding, therefore, can be carried on at the same time, either together or separately, and in two or three pieces of stone may be operated upon in one machine. The tool-holders are arranged so as to receive the cutters according to any required design.

The surfacing or rubbing machine consists of a cast-iron bed-frame, having a revolving top of 9 ft. diameter (it may be larger), the metal in which is very carefully selected and prepared. Proper arrangements are made in the framing, so that the upper surface of revolving plate can be easily adjusted. A small crab-winch is fitted to the framing for shifting and removing stones from the table. This seems a particularly useful machine.

The power for driving these machines and a circular-saw rope feeding-bench is supplied by a 12-horse power engine.

The manager of the works where these have been set up (Mr. Pyle) speaks highly of them as the result of his experience, and considers the saving effected fully 60 per cent., as compared with the results of hand-labour. It seems clear that for large operations this machinery may be used with advantage.

SMOKE PREVENTION AT HANLEY.

AN inquiry into the subject of the prevention of smoke, directed by the Secretary of State, has been held at Hanley, in pursuance of a requisition by a large number of the principal inhabitants. The inquiry was held in the townhall, before Mr. R. Rawlinson, C.B. At an adjourned meeting, Mr. McMahon said since the commissioner last sat, the town council had done all that he then suggested. They had appointed a smoke inspector, who had made and recorded a great number of facts respecting the smoke produced in the borough. The council, acting on his report, had served notices upon a number of manufacturers, and in six cases, these notices not having had the desired effect, summonses had been issued. The Act left the decision of cases of this kind entirely in the hands of the magistrates. The commissioner said he was quite prepared to admit that time must be allowed to the town council. Nothing would be required from them which was unreasonable, impracticable, or opposed to common sense. It might take weeks or months to make all the alterations required. He believed that the necessary reform would be one of slow growth, and he hoped the council would proceed in a conciliatory spirit, and that goodwill would be displayed on both sides. The law required the local authority to see that no one carried on his business ignorantly or willfully to the injury of his neighbor, but the law did not require any man to do that which was scientifically impossible. To show what might be done, he mentioned that since Lord Derby's Act came into operation for preventing nuisance from alkali works, and limiting the escape of vapours to 5 per cent., there were some manufacturers who did not allow 1 per cent. to escape, and the average was much less than 5 per cent. After further procedure, including a good deal of evidence on the subject in question, the commissioner said he thought the course taken would be the means of doing good, and had no doubt that in future generations, when the various processes of manufacture had been brought to a degree of perfection which could not yet be claimed for them, people would look back with wonder at the evils and nuisances which had to be endured. He had no doubt that a large proportion of the smoke nuisance might be prevented, and if gentlemen would set to work and do what ought to be done in this matter they would not only set a good example to the country, but would render it unnecessary for the Secretary of State to interfere.

LEICESTERSHIRE ARCHITECTURAL AND
ARCHÆOLOGICAL SOCIETY.

The general annual meeting of this society was held this year at Kegworth. The members and their friends assembled at the Mechanics' Institute, and proceeded thence to the church, at which the Litany was read by the Rev. Jos. Clarke, M.A., rector of the place. After service Mr. M. H. Bloxam descended upon the architectural features of the church.

The inspection having been concluded, the party proceeded to the museum of antiquities and other objects of interest, which were arranged in the school-room of the village. In the afternoon a party visited Kingston Church. At six o'clock a dinner took place at the Flying Horse, at which the Rev. J. Clarke presided.

At half-past seven in the evening a public meeting was held in the Mechanics' Institute, which was completely crowded on the occasion. The chair was occupied by the rector.

The chairman, in opening the proceedings, read a note from the Ven. Archdeacon Fesnon, regretting that he could not be present, on account of the death of the Bishop of Peterborough. He then read a paper, entitled "Memorials of Kegworth."

Mr. Bloxam then proceeded to read a paper, "On some Discoveries made in the Progress of the Restoration of Lutterworth;" and the Rev. E. Tower one entitled "Richard Fowke's Journey to Freestone Shore, illustrative of Social Life amongst the Middle Classes at the Commencement of this Century."

Mr. Thompson not being present, owing to ill-health, a paper announced by him, "On the Objects of the Leicestershire Architectural and Archæological Society," was not given, but in lieu of it Mr. North read a short paper on the same subject.

A vote of thanks was unanimously accorded by the meeting to the society for coming to meet at Kegworth, and a hope was expressed that at no distant date they would come again.

The excursion took place the following day. A good deal of rain had fallen in the night, but the morning proved remarkably fine and the party enjoyed an extremely pleasant drive through a varied country. The next stage was Bunney, and the company successively visited the churches of Wysall, Willoughby, Wymeswold, Rempstone, Costock or Goringstock, East Leake, and West Leake; Mr. Bloxam making occasional remarks as they went along. The party then returned to Kegworth, and there separated.

SCHOOLS OF ART.

The Dorchester School.—The first public meeting for the distribution of prizes in connexion with this school has been held. The meeting was convened at the Shire-hall, and was attended by a large company of the friends and supporters of the institution. The attempt to establish a school for promoting a love and taste for the fine arts in Dorchester has been attended with gratifying success. The chair was occupied by Mr. John Floyer, M.P. for Dorset, and president of the school. The prize drawings were suspended around the hall, and proved a source of interest to the visitors, by whom they were inspected before and after the meeting. The President, in opening the proceedings, spoke in terms of congratulation and encouragement. He said: "We have not achieved, I believe, any very brilliant success, but we have achieved at least as much as we expected, and perhaps almost as much as we could have hoped for. I am informed that the classes have been very fairly attended. That destined especially for operatives has not been so fully attended as we could have wished, but still there has been a tolerable attendance even in that class, and I am informed that the results of their studies and their works are of a very satisfactory description. Mr. Dewar Campbell, the master of the school, said there were very few of the students, possibly none, who fell short of the average; and there were many whose talents raised them above the level of mediocrity. There were some few who might attain to any point of excellence which their ambition proposed to them; but which their perseverance in study must second. In reference to the Government awards, he thought that when the annual report reached them they would find they occu-

pled a very respectable position among the schools of the country.

The Bridport School.—This school is conducted by the same master as the Dorchester school. The second session has been commenced, on which occasion the various works of the most meritorious students were exhibited in the lecture-room of the Literary and Scientific Institute. The prizes were distributed by Mr. T. A. Mitchell, M.P., and the room was filled with not only students, but most of the leading gentry of the town and neighbourhood.

CONGRESS OF GERMAN ARCHITECTS
AND ENGINEERS.

The following is the programme for the fifteenth annual meeting which this year assembles at Hsinburg, as we advised our readers some time ago. August 31st, first *Conversations* in a pavilion specially erected in the centre of the "Alster" Basin. September 1st, Sessions, general and in sections, after which visits to the principal objects of interest in the city; then a steam trip down the Elbe. In the evening a special representation at one of the theatres. September 2nd, Breakfast at the Zoological Gardens; at ten a meeting in the Arta Gallery; at two p.m. inspection of the new mail steamship *Cimbria*, and trip down to Blankenese, where dinner will be provided. In the evening second *conversations*, concert, and fireworks. September 3rd, to Lubeck and back. September 4th, Sessions during the morning and the last *conversations* in the evening. For those who can remain a few days longer, various excursions to Kiel, Heligoland, &c., have been organized.

PROVINCIAL NEWS.

Rochester and Chatham.—The whole of the alterations and improvements ordered by the corporation to be carried out at the Cuildhall having been completed, the building, together with the council-chamber adjoining, have both been re-opened, after being closed for several months. The carved ceiling has been entirely restored, while the whole of the full-length portraits of the ancient city worthies on the walls, including Sir Godfrey Kneller's portrait of King William III., recently valued at 800 guineas, have all been restored. The interior of the hall is lighted by a series of sun-light burners in the centre of the ceiling. The whole of the alterations and improvements have been carried out under the superintendence of Mr. H. Andrews, the corporation surveyor.

Bury.—The laying of the corner-stone of the castle and army of the drill-hall now in course of erection at Bury, for the 8th Lancashire Rifle Volunteers, was made the occasion of great rejoicing in that town. The estimated cost of the whole will amount to between 2,500l. and 3,000l., and up to the present time 1,500l. have been subscribed. The building is erected on the site of the old Bury Castle, and will consist of a large drill-hall, a strong room for the safe custody of arms, a guard-room, an orderly-room, a reading-room and meeting-room for the privates, a non-commissioned officers' room, and a dwelling-house for the drill-instructor. The building will be of brick, with a stone front, in the castellated style. The drill-hall is 108 ft. long by 70 ft. broad, and 20 ft. high. This hall was opened in November last, and since then has been made use of for drilling in. The headquarters have been completed as far as the first story. Messrs. Farrer & Slyam, of Manchester and Bury, are the architects; and Mr. John Hall the builder of the head-quarters.

Newcastle-upon-Tyne.—The new premises of Messrs. George Angus & Co., leather and gutta-percha manufacturers and merchants, situated in Craigher-street West, a new street that promises to add to the architectural features of Newcastle, have been formally opened by the mayor (Mr. H. Angus) in the presence of a large assemblage. Craigher-street West is to take the place of a wretched and dilapidated street known as St. John's-lane, extending from Bigg Market to Westgate-street. This new street constitutes a part of the much-needed improvements projected by the corporation, and it is contemplated by the original designs to prosecute the work of improvement until an almost straight and wide thoroughfare stretches between the Central Railway station on the south-west and

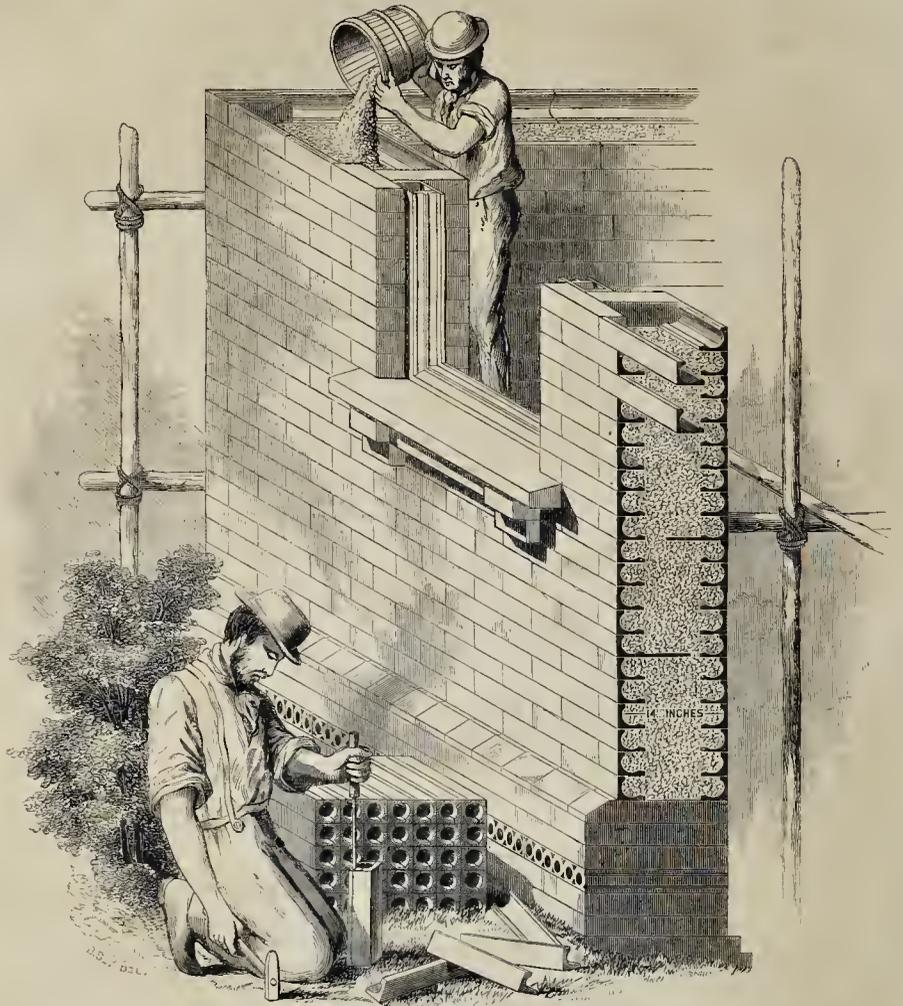
the Grey Monument on the north-east. The work, as a whole, has come to be designated the "St. John's-lane Improvements." The new building for Messrs. Angus & Co., situated on the north-east of the Savings Bank, occupies an area of 3,000 square yards. There are also 600 square yards adjoining, which can be built upon when necessary. It is three stories in height. At the rear are three floors, one above another, each having an area of 90 ft. in length and 45 ft. in width. The upper story will be used as a manufactory, and the other two as warehouses. The front shops will be used for the India-rubber and gutta-percha business of Messrs. Angus & Co., and the upper stories will be let chiefly for office purposes. Not far from the building are large tannery works, formerly belonging to Alderman Sillock, and here the firm are about to erect extensive machinery for the manufacture of hose belts. The façade of the building is about 90 ft. in length. The style of architecture is French Gothic. Over the principal entrance is a carved bull's head—the crest of the firm. The stone of which the building consists was obtained from the Wilsopon and Branton quarries. The architect was Mr. Gibson Kyle; Mr. Curry did the carving; Mr. W. Robson was the builder; Messrs. J. & W. Lowrey had the contract for the carpenter work; the plumber was Mr. Watson, of the High Bridge; Mr. Richardson, Clayton-street, did the painting and decorating; and Mr. Charlton was the plasterer.

FROM SCOTLAND.

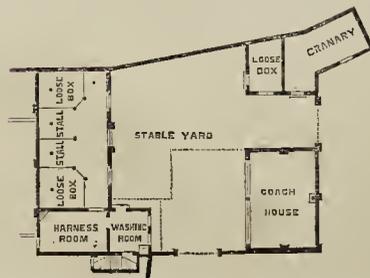
Edinburgh.—The alterations and improvements in the Antiquarian Museum of the Royal Institution, which have been in progress since the opening of the year, are being pushed forward. The floor has been lowered 2 ft. 8 in., to Playfair's original design, and the effect of this alteration, according to the *Scotsman*, is a marked improvement in the appearance of the hall. The joinery work is now finished, and the curator is engaged in re-arranging the collection. The heavy upright cases have all been let down from their old position against the walls by means of pulleys, and are now on the new floor.—The building operations in connexion with the new market in Prince's-street are progressing with rapidity. The bulk of the mason work is now nearly finished, the only remaining portion of the rubble building yet to do being the walls at the south-west end of the area to be occupied by the market. The sbslar coping and pavement, &c., in Prince's-street, probably will not be laid until the early part of next year, as it is desirable that the embankment put in behind the heavy retaining wall should be as much consolidated as possible previously, in order to prevent subsidence. The old building known as Trotter's Warerooms is about to be removed.

Portobello.—The road-steamer has been at work here almost daily. It has run at a high speed over the wet soft sand of the seashore as far as Joppa, and then, wheeling round, returned at a still higher speed. It ran with great ease and perfect steadiness eight and ten miles per hour. The india-rubber wheel-tires run over sand, whether wet and soft or dry and loose, with equal facility, making only the merest trace of a track, scarcely ever so deep as one inch, and generally not exceeding half that depth. This power of running over loose sand is one which, it is believed, will give Mr. Thomson's invention great value in many countries where the roads are often little better than mere tracks covered with sand or earth, and such vehicles, we may add, may yet be the true "ships of the desert," when the camel is set aside as out of date and antiquated, as he looks.

Glasgow.—The foundation stone of a new building in connexion with the Glasgow Industrial Schools now being erected at Mossbank, near Hogganfield, about three miles from the city, has been laid with Masonic ceremonial. The Industrial Schools originated in the Ragged Schools, established some twenty-one years ago. At present there are fully 500 children in the institution. Additional accommodation being required, the directors purchased the farm of Mossbank, consisting of 13 acres, at a cost of 900l. The building is to be of red, white, and black brick, 240 ft. in length, and three stories in height, with a spire, and will contain about one thousand children. The foundation stone was laid by the Earl of Dalhousie, Grand Master Mason of Scotland.



CONCRETE AND FACING BLOCKS: DETAILS OF CONSTRUCTION.

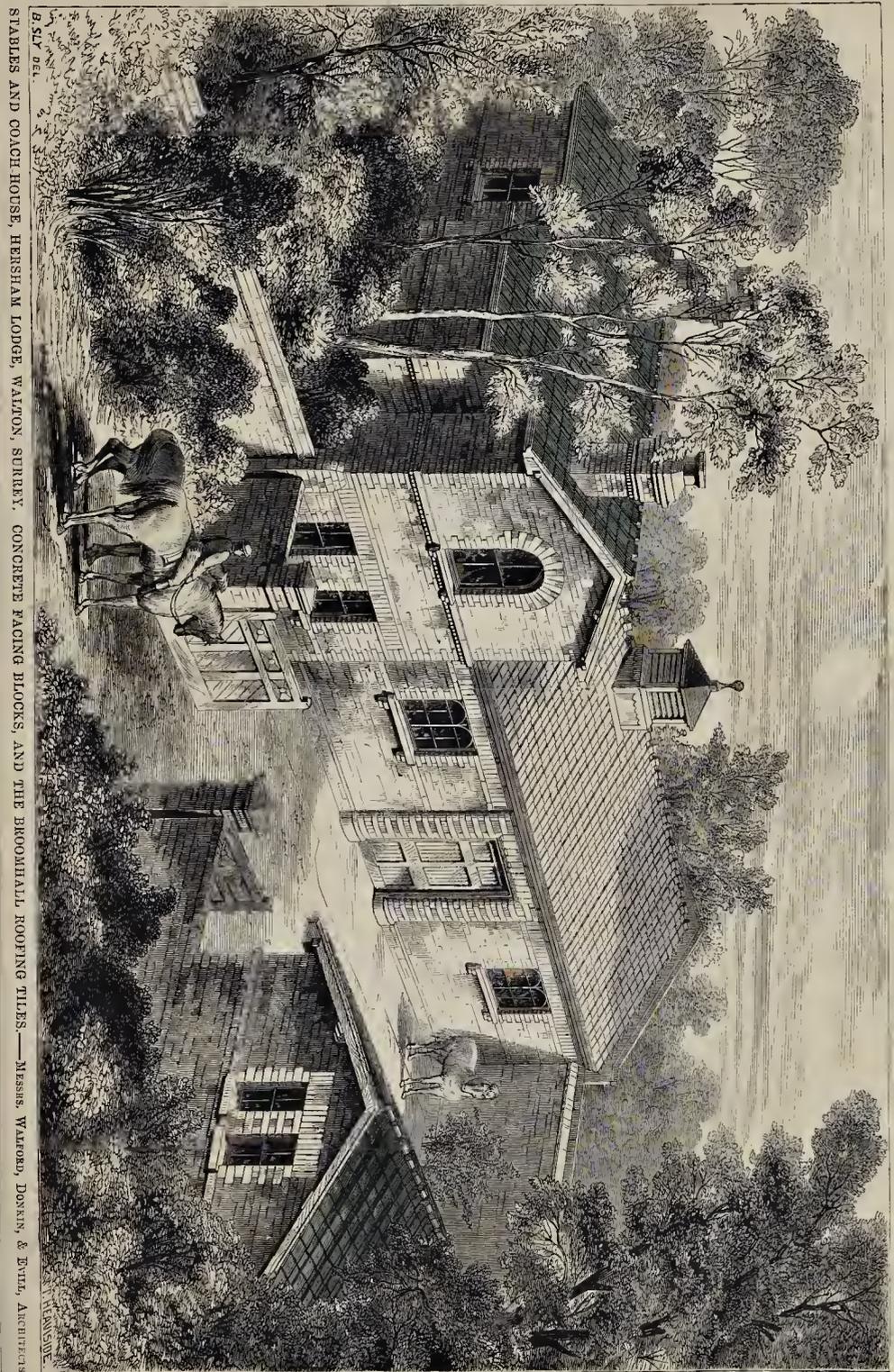


Plan of Stables and Coach-house, Hershams Lodge, Walton.

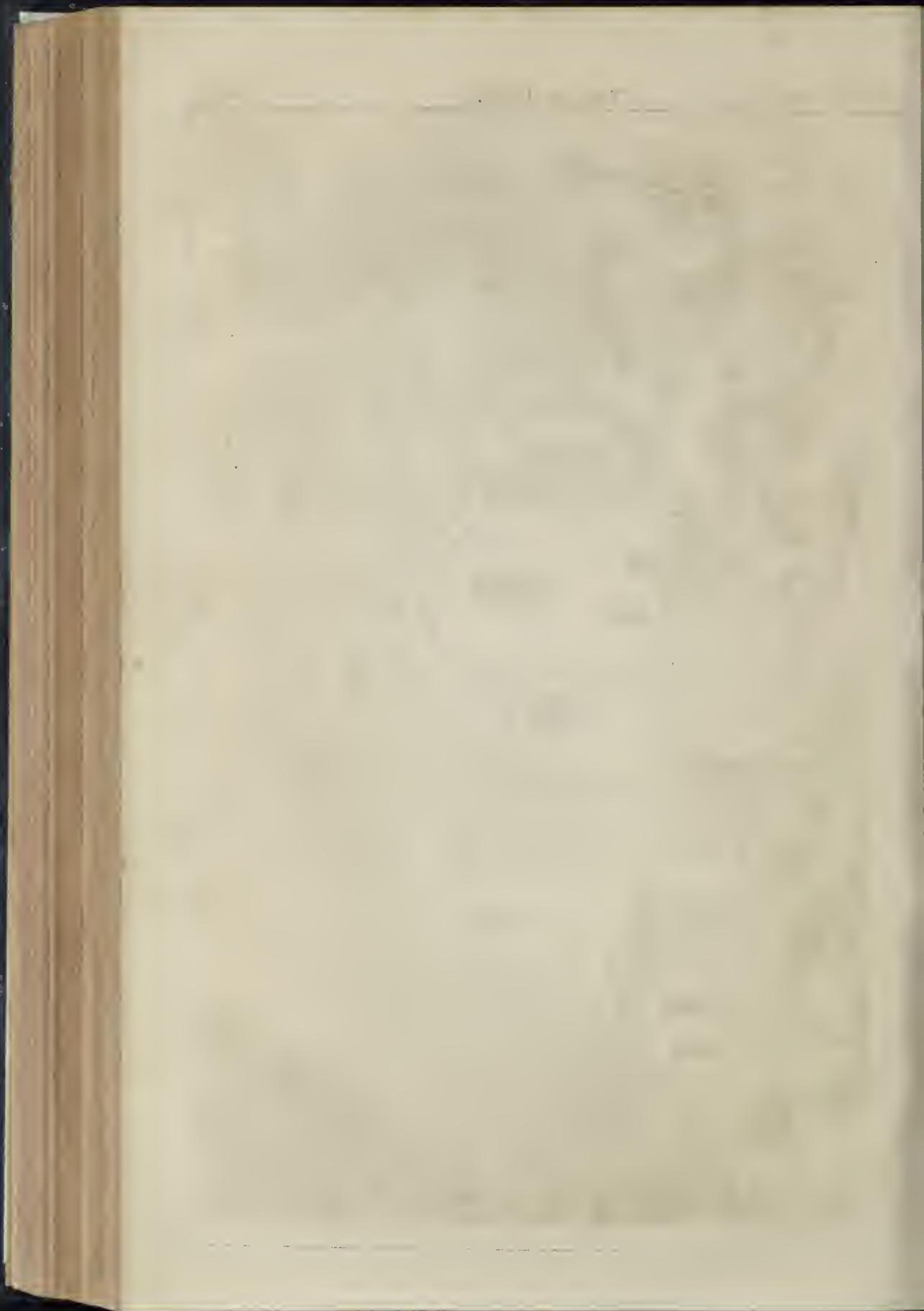
STABLES, WALTON, SURREY.

NEW MODES OF CONSTRUCTION.

MANY ingenious efforts are being made to bring again into use the principles of building in concrete with a view to economy and strength, to some of which modes we have already drawn attention. In our present number we give illustrations of some new stables and outbuildings recently erected at Hershams Lodge, Walton, Surrey, for Mr. B. Barton, upon a plan which seeks to overcome the disadvantage of a rough external surface by the use of a facing block; a detail of the working of which we annex. These angle facings are 12 in. long made in pairs, separable by a blow, and are used as blocks to any thickness of wall; the interspace being filled up by the labourers with concrete, course by course. With lime-concrete it would be necessary to guard against the effects of its expansion in setting. Using cement, the archi-



STABLES AND COACH HOUSE, HERSHAM LODGE, WATTON, SURREY. CONCRETE FACING BLOCKS, AND THE BROOKHALL ROOFING TILES.—MESSRS. WATFORD, DONKIN, & EVILL, ARCHITECTS.
 B. SLY DEL. W. HANSIDE SCULPT.



teets say no inconvenience of this kind was found.

We understand from the architects that the cost is from 8l. 10s. to 9l. 15s. per rod, reduced; according to the facilities of getting gravel or burnt ballast. The thicker the walls the greater the saving.

These blocks were obtained at the Broomhall Tile Company's wharf at 45s. per 1,000. The roof is covered with patent tiles from the same firm.*

A few points in the detail of the building are, perhaps, worthy of notice.

The coach-house doors are fitted with Messrs. Clark's patent revolving shutters in lieu of folding gates; the other external doors are suspended and slide upon a bar against the wall. A ventilator, constructed in wood, with plate-glass louvres and top, provides for lighting as well as ventilating the stable. The internal fittings are all of wrought-iron from the St. Pancras Iron Works, and the building generally is fitted up in a very complete manner.

Messrs. Walford, Donkin, & Evill were the architects; J. Mr. Ingram was the builder. The total cost will be about 1,000l.

COURTS OF CONCILIATION AND ARBITRATION.

The manufacturers and operatives of the Staffordshire potteries have just formed a court of conciliation and arbitration for the settlement of disputes in the pottery trade, consisting of ten employers and ten workmen. The operative members of the court were appointed at a large and enthusiastic meeting of potters at the town-hall, Hanley, at which Mr. J. Ashford Wise, formerly M.P. for Stafford, presided. Mr. Wise said he anticipated the happiest results from the adoption of the principle of conciliation and arbitration. Courts of conciliation, he said, existed in ancient Greece and Rome, and had been in operation since 1808 in France, where there were eighty boards of conciliation and arbitration. In the last few years no less than 174,487 trade disputes had been settled by the lesser court, which consisted of four members, leaving nearly 10,000 for the decision of the larger or Arbitration Board; but when it was found that these 10,000 cases could not be settled by the court of conciliation, 4,589 were withdrawn, and only 5,178 went before the higher tribunal. These courts worked well in Belgium, but had been most successful in Denmark and Norway, where the principle had been applied not only to trade purposes, but to a settlement of differences in private life. Three years before the establishment of these courts there were 25,000 cases for the lawyers, but in the year following their formation there were but 9,000. The time had come for legislation on this question in England, and then submission on one side and dictation on the other must cease.

THE TELEGRAPH ACT.

The statute passed on the day of the prorogation to enable Her Majesty's Postmaster-General to acquire, work, and maintain electric telegraphs, is an important measure. In twenty-four sections the preamble is worked out. The uniform rate, subject to regulation, of messages throughout the United Kingdom, and without regard to distance, is to be not exceeding 1s. for the first twenty words, and not exceeding 3d. for each additional five words, or part of five words. The Postmaster-General is now authorized, with the consent of the Treasury, "out of any moneys which may be from time to time appropriated by Act of Parliament, and put at his disposal for that purpose, to purchase for the purposes of this Act the whole or such parts as he shall think fit of the undertaking of any company." Telegraph companies are empowered to sell their undertaking, under certain conditions specified, with a provision as to the appointments of their servants by the Government, or compensation by way of annuity. The Postmaster-General is to enter into contracts with certain railway companies mentioned in the Act, and very specific directions are given as to such acquisition. The Postmaster-General is to transmit to their desti-

nation all messages of a railway company in any way relating to the business of the company in the United Kingdom free of charge. All matters of difference between the Postmaster-General and railway companies are to be settled by arbitration. There are provisions in the statute to enable the Postmaster to acquire the right of way over canals. It is constituted a misdemeanour in any person having official duties to disclose or to intercept messages. In the schedule annexed to the Act, thirteen agreements with railways and telegraph companies are referred to, subject to the approbation of Parliament; and it declares it to be expedient that agreements should be made with other railways set forth, including the metropolitan districts. Three months' notice is to be given by the Postmaster-General to the companies. By the statute the Postmaster-General, with the approbation of the Treasury, can purchase the undertakings of telegraph companies.

AMERICAN ANTIQUITIES.

We are told of some discoveries recently made by railway surveyors on the banks of the Little Colorado river, in the territory of Arizona; walls of buildings still 8 ft. or 9 ft. high, irrigating canals, and the ruins of a castle, of which the walls are still 30 ft. high. The ruined buildings are of hewn stone. A paper recently read at a meeting of the American Association for the Advancement of Science, held in Chicago, on the "Geological Evidences of Man's Antiquity in the United States," maintained that four American races preceded the red man: first, the mound-builders; second, a race in the territory now called Wisconsin; third, a warlike race in the region south of Lakes Ontario and Erie; and, fourth, a religious people in Mexico. Pottery, arrow-heads, &c., have been found, the writer said, in conjunction with and beneath the mastodon and megatherium. While Dr. Hooker has been drawing public attention to a race who erect dolmens, &c., in India, Mr. Squiers has been photographing ancient dolmens in Peru! The sitting posture in which the dead were anciently placed in Mexico and elsewhere in America, too, is interesting in connexion with the ancient "old world" races who also buried their dead in a sitting posture.

THE REMAINS OF WILLIAM RUFUS IN WINCHESTER CATHEDRAL.

It being very desirable to remove the Rufus sarcophagus from its inconvenient position, between the north and south doors of the choir and near the altar, the dean and chapter resolved to do so if the sarcophagus were found to contain no human remains, as was believed to be the case. It was, therefore, opened, but the almost entire skeleton of a man of about 5 ft. 9 in. in height was found in it; so that in all probability the legend that Cromwell's soldiers abstracted the bones to throw them at the windows is untrue. The authorities, therefore, have resolved to allow the sarcophagus to remain where it is, unless it can be established that its present position is not its original one, as is also believed. Besides the bones, the sarcophagus contained fragments of corroded lead, a few morsels of gold tissue and a turquoise stone, probably the remains of a ring, and a small ivory carving. The tomb had seemingly been rifled of a lead coffin, gold embroidered cloth, &c., but the skeleton is thought to be that of Rufus.

MONUMENTAL.

Statue of Duke of Cumberland in Cavendish-square.—This equestrian statue, which stands upon its stone pedestal in the centre of the enclosure, and which was erected in 1770, has become so dilapidated that it is about to be taken down to be recast.

Tomb in Southampton Cemetery.—A tomb has just been erected in memory of the late Mr. Councillor Bull, from the design of Mr. C. A. Monday, of Southampton, architect. The style is Gothic, of the latter part of thirteenth century. The memorial is arranged for a family tomb. Above the base, the whole of the work except the columns is executed in Portland stone. Above the York stone base is a stone plinth,

relieved by ornamental sinkings in the stone-work; above this, each side of the tomb is divided into four panels, and each end into two panels, by polished granite columns and stone caps and bosses, carved with conventional foliage. These columns, caps, and bosses support a series of intersecting arches. The angles of the tomb have octagonal shafts. The whole is surmounted by a moulded cornice, in which is introduced the tooth ornament. The top stone is in one piece, and over 10 ft. long and 4 ft. wide. The whole of the work was executed in the stone-yard of the firm established by the late Mr. Joseph Bull.

Memorial of Alexander III. of Scotland.—A public meeting has been held in the Town-hall, Burntisland, Fifeshire, for the purpose of considering the propriety of erecting a memorial of Alexander III. Mr. Roger Sinclair Aytoun, M.P., occupied the chair. Mr. George Seton, Advocate, Edinburgh, moved, and it was unanimously resolved:—"That a tablet, Celtic cross, or cairn, be erected to the memory of Alexander III., on the 'King's Rock,' between Burntisland and Kinghorn, being the spot to which the body and horse of the king are believed to have rolled after falling over the cliffs above." A committee was appointed to carry out the object of the meeting. A design, in the form of a Celtic cross, has been prepared for the committee by Mr. M'Glashan, sculptor. Were Scotsmen to erect a series of statues or other memorials of their old kings, as Parliament has done of old English kings at Westminster Palace, good and well; but it seems an odd movement this, to commemorate one of the old Scottish kings who is already better remembered than others who perhaps better deserve remembrance.

Statue of Napoleon I. at Grenoble.—The new statue, on the Place d'Armes, has been inaugurated in the presence of the troops forming the garrison and of an immense concourse of the population. Senator Larrabit, who had arrived expressly from Paris, presided. In the evening there was a grand banquet and fireworks followed.

FROM IRELAND.

Delfist.—The foundation-stone of the new Wesleyan chapel, Coote-hill, has been laid. The site chosen for the new building is about midway on the left down Bridge-street, and opposite the old building. It is an oblong building, 54 ft. in length by 31 ft. in breadth. The architect is Mr. Hallam, of Rockcorry. It is designed to accommodate about 250. It will contain two aisles, without either gallery or pulpit; for the latter there will be a raised dais or platform. The old preaching-house will be converted into a school-house in connexion with the chapel; and it is also in contemplation to build a residence for the minister.

INDIAN AND CELTIC MONUMENTS.

Sir,—In reading a notice of Mr. Fergusson's paper on "Buddhist Architecture" in the *Builder* of the 29th ult., and a paper on "The Tinnevely Pearl Fishery," by Mr. Markham, as well as other papers relating to India, I have observed an identity in sound and meaning of many words both in the Indian and Gaelic or Celtic languages. Mr. Markham in his paper on "The Pearl Fishery of Tinnevely," read before the Society of Arts, says—"The head-quarters of the fishery were then, and indeed, from the days of Ptolemy to the seventeenth century, continued to be, at Choylye, or Coyl, or Sacl, as Barbosa has it, literally 'the temple.'" Here we have the word *choyl*, or *coyl*, almost identical in sound and perfectly identical in meaning with the Gaelic word *kille*, or *kil*, a church or temple, the *f* having the long sound as in *kine*. This word *kille*, or *kil*, forms the prefix to the names of many places in Ireland, Scotland, and Wales. If we give *ch* the soft sound in the word *choyl*, it will sound nearly like *sacl*, as Barbosa has it, which word *sacl* sounds very much like *gael*, by giving *a* its soft sound, or that of *j*; so that the Choylic, Gaelic, Saelic, Keltic, and Celtic people originally meant a temple-going or church-going people. Take, again, the word Brahmin or Brahmane, as the French spell it. The first syllable *Brah* is evidently identical in sound with the Gaelic word *Bragh*, which means ever, or everlasting, and the word *mane* signifies spirit; so that the

* Of these tiles, which cost 5l. 5s. per 1,000, the company say, 185 cover 100 ft. superficial; 2,000 of them weigh about 2 tons. Proper ridge and hip tiles form part of the arrangement.

compound word Brahmin or Brahmane literally means "everlasting spirit."

Mr. Fergusson states in his paper that "he did not say that people came over from India and taught the people of this country to erect Stonehenge, nor that they had any connexion with the people of India; yet there was this great underlying stratum of population, who cropped up in Europe and other parts of the world as well as in Asia, and wherever they came to the surface their monuments were similar in character, and all more or less applied to the same purpose. Originally funeral, they gradually became temples and relic shrines; but they were all monuments of one great people, and all expressed more or less distinctly one idea. He was convinced that when this subject was fully investigated they would have a very interesting picture of a people who were now only known by their rude monuments all over the globe."

The subject here referred to by Mr. Fergusson is certainly a most interesting one for investigation, and may—considering our present and future relations with India—prove most useful and profitable. I am quite convinced that a knowledge of the Gaelic, Celtic, or old Irish language, together with a knowledge of the structure of what are called Druidical altars and temples, will be found to facilitate the investigation. For instance, near Leeds there is a Druidical altar called "Brimham Rocks," the structure of which resembles Stonehenge. Apart from any ideas that may be suggested by the structure of Brimham Rocks, the very name affords evidence of the most convincing kind, that those who placed these Rocks in position held one and the same religion with the Indian worshippers of the god Brimha. This god is not to be confounded with another god worshipped in India called Brahma or Bramha. Brimha, according to Indian theology, is the only eternal, omnipotent, and self-existent god. Having been solitary and alone in the universe, he resolved within himself to create a goddess, who, in the process of time, laid three eggs, from which the three gods Brahma, Vishnu, and Siva were developed. E. NUGENT, C.E.

THE SCIENCE OF COLOUR.

I HAVE read through, several times with care, Mr. Benson's long letter in the last number of the *Builder*, in support of his theory on colour, but I only became more mystified instead of being enlightened. For I am informed that "blue and yellow would always most provokingly produce a neutral grey." (Mr. Benson must have used very bad colours.) That green added to red makes yellow, and that, by adding blue, yellow is converted into white! Really I must confess that I do not understand this; and if Mr. Benson were not an earnest observer, as I have every reason to believe he is, I should be tempted to say that it was simply ridiculous.

In Mr. Benson's own experiment, which he says answers the first part of my letter, although I fail to see how, if his papers are looked at diagonally with the prism, the yellow ray will be brought across the blue at the corner where the papers touch, and a brilliant green is the result; showing, as I said in my former letter, that "green is immediately formed by allowing the yellow to approach the blue ray." Indeed, Mr. Benson himself shows this is the case, when he says "that green appears when the white space is so narrow that the red in its spectrum no longer overlaps the green." Just so; but the yellow which comes next the red overlaps the blue and forms green. This is easily seen by widening the white line until you separate the yellow from the blue, when you have no longer any green.

As to my other illustrations upon the formation of green in nature, Mr. Benson simply shirks them, and falls either to explain or controvert them. He says that, if sky-green were formed as I say it is, it "would be darker than the sky-blue." How does Mr. Benson know that it is not? We cannot see the blue which is beyond except through the yellow medium, therefore we cannot compare the one with the other to know which is lightest or darkest. It is a very simple phenomenon, and very easily accounted for, in the same way that the more homely one may be of bringing a piece of blue paper under the influence of candle-light, when every one will exclaim that the paper is green, and not blue.

Again, I am told that I "am under a mistake as to the nature of the colour of the greens of vegetation." But I beg to say that Mr. Benson wholly misunderstands my illustration, the object of which is simply to show that green is a secondary colour and not a primary. I assert as a fact, that the foliage in the bud, before it is exposed to the atmosphere, is yellow, that it becomes of a greenish blue when it first bursts forth, and that it gradually becomes greener and greener, until it assumes, when fully developed, a dark blue green, all of which is gradually brought about by the chemical addition of blue, in some way, from the atmosphere, added to the normal yellow colour of the plant;—that the leaf again loses the blue, and falls in autumn, as in the case of the willow, yellow; thus illustrating, by the aid of nature, that green is a compound colour formed of blue and yellow; and to deny it Mr. Benson might as well deny that two and two make four. As to the nature of greens, whether they are yellow greens, or that "the light they reflect or transmit to the eye is red," is altogether beside the question. The variety of greens in nature is something positively wonderful.

Respecting the blue, the actinic or chemical ray, which is mostly in excess in spring, the yellow in summer, and the red, or ripening ray in autumn, that requires no observation of mine, as it is now well understood by all botanists, and that the sun's rays differ very perceptibly according to the moisture or dryness of the atmosphere. It is a question whether what we call white light exists at all; probably the term is only comparative, and that we view everything, more or less, through a coloured medium according to circumstances.

JAMES K. COLLING.

CHURCH POLYCHROMY.

YOUR correspondent "R. C. H." evidently wants information as to distemper colouring, for I believe there is no other kind of decoration which can be produced at so little cost. All he would require for this would be, say, for a dado round a chancel, half a pail of whitening (whiting and size), a pail of weak size, a pail of clean water, half a dozen pots, a piece of board, a straight-edge, a few painters' tools and fitches, and the requisite dry-ground colours. He would have his pattern, and should cut his stencils plates out of cartridge-paper and then oil them. To mix the colours he should put a quantity of the whitening into his pot, and make it of a proper consistency to work with by adding clean water; then put in his dry colours. He should try his colours on a board, allowing them to dry before judging of the tints. He will understand one colour may be put over another without the under one showing through. If he wants his colours to be their full depth of tint he must mix them with the size-water only, and the part on which these colours are to be put must be previously distempered white. I should be pleased to contribute a pattern or any further information to "R. C. H.," or any one with the same worthy object in view as that of decorating his church. F. R. M.

LIFE IN LIVERPOOL.

SINCE the publication of my former letter in your journal, the mortality in this town of Liverpool has increased from the then rate of 33.5 to 36.4 per 1,000, and this, too, although the heat of the weather had very sensibly diminished. The deaths have actually exceeded the births by thirty-one-tenth of the whole number nearly. How is this? Compare it with London. In London, in the same period, the deaths, according to the Registrar-General's return, were 24 per 1,000, and the births have exceeded the deaths by more than one-third of the whole number. This comparison is very damaging to Liverpool.

I have endeavoured in my former letter to point out two of the causes of this fearful state of things, and as since then I have suffered severely in my own health and in that of my wife and children, it is with all the greater reason I feel the necessity of some alteration.

The existence of the large number of middens in the town is undoubtedly the cause of a great deal of disease and death. I have endeavoured to ascertain why these places exist, and I am told that there is an overwhelming interest in

the town-council which prevents their conversion into closets. The sanitary reformers were strong enough some time ago to carry a law compelling the builders of all new houses to provide water-closets to them; but all then-existing middens are still emptied by nightmen, and the contents carted into the country for farm manure. And it sometimes happens that the removal to the country does not take place at once. It is always carried out and deposited on the pavement, ready to be put into carts; but the carts do not always come, and the filth remains till the next night, and perhaps till the morning following. I enclose an instance of this. The effect is most sickening. I can account for its continuance only by saying, as I believe, that the great bulk of the people here are excessively ignorant of the first principles of sanitary science.

With regard to the second cause I mentioned, the drinking customs of the inhabitants, I shall quote a few figures. I believe the population of Liverpool is something over half a million. These are supplied with intoxicating drinks from 2,500 licensed houses, or one house to about 200 persons, men, women, and children. To show that these houses are used I shall quote the records of Monday last, 17th inst., which say that there were no fewer than 273 persons in custody, 53 of these charged with felony, and the remainder with assaults and with being drunk and disorderly. And this, recollect, is for Liverpool only, and does not include Birkenhead. Is any comment necessary?

I have heard and read in newspapers that there was free trade in intoxicating liquors in Liverpool,—that licences were granted to any person who had the required accommodation. That, however, is not the case now, though it may have been so formerly. An instance of this has occurred within my own knowledge lately in which the owner of a corner house in a great thoroughfare has had it fitted up in a most expensive manner for the retail spirit, wine, and beer trade. He has been refused a spirit licence, and his house is now open as a wine and beer shop only.

Sir, it appears to me conclusive that a great number of people here die of poison. The system is poisoned by the immoderate use of bad liquor, and they live and sleep in crowded neighbourhoods, where each house has a midden seething and fuming in its rear, giving off poisonous gases, which, acting on the already weakened system, produce some kind of zymotic disease. This again is fed by more liquor taken as a remedy, which goes on till a doctor is called in, who generally finds the disease has reached a stage beyond his control.

And I say crowded neighbourhoods advisedly, for there are districts in Liverpool which beat London hollow in that respect, and which, if the law were properly carried out, would not exist.

There is one other circumstance which appears to me to be at least a proximate cause of mortality. I mean the existence of numerous burial societies.

These societies undertake to pay a certain sum at death, say 6*l.*, on condition that a weekly subscription of, say 2*s.*, be made to them. And they are very considerate, for they will not trouble you to bring them the money, but they employ collectors to call on the members for their twopences, which they do with a regularity which reminds a Londoner of the tallyman; and, indeed, his business partakes somewhat of that character, for he is paid usually by a percentage of some 25 per cent. on what he collects. And as these men pass from house to house, and find one recently come to be inhabited, they call and introduce themselves with, "Would you like to join the ———— Burial Society, sir?" Such a circumstance is within my own experience. And this applies to every member of the family, though only a day old.

Imagine the effect produced by the regular appearance of this collector upon the members of a family, especially if they be poor and ignorant, as is often the case. They would be forcibly reminded of death every time he called. For what reason does he come but that he may receive a small payment which is to secure a large sum to them at the death of one of their number? And it is within my own knowledge that parents whose natural feelings have been blunted by drink, and want, and care, have ceased to provide wholesome sustenance for their children when well, and proper nourishment and nursing when they fell sick, and have come to look upon the death of one of their children as a blessing, as a means whereby their empty pockets may

filed; a means perfectly legal because law seldom reaches them, and they know how to do the same. Is it not notorious that rich and low, children are looked upon as a nuisance; and that, while the rich succeed in preventing them coming into the world, the poor, so skillfully, succeed in sending them out of it otherwise, how is it that 103 children, under five years of age, have died of diarrhoea in one week this town? I would not have it supposed that I object to the principle of life-assurance; and assuredly it should be confined to the breadwinners of the family. Wherever else it is applied, it offers a direct premium on death, which abundant evidence proves is in these days neglected.

E. G.

PROTECTION OF BRICK WALLS FROM RAIN.

A CORRESPONDENT, "M.," writes thus:—"In answer to 'Utilitarian's' letter in your press of the 29th ult., requesting information as to the best method of preventing damp driving through brick walls in exposed situations, I beg to inform him that the best remedy he can have is the patent solution manufactured by Messrs. R. Gay & Co., of Alton, Lancs, which I find answers the purpose admirably, and renders walls quite impervious to moisture, whilst the composition itself is not acted upon by extreme heat or cold."

We know nothing of the merits of this solution, and we leave our usual course in thus venturing it. The writer of the note, however, makes a public appointment, and may be supposed to speak what he knows. The evil in question is so large and universal, the request for a remedy so constant, that we shall be glad to see confirmatory evidence if the solution be tried, so, to know whether or not it is applicable to all walls.

VALUE OF LAND AT MARGATE.

A CORRESPONDENT writes,—"The corporation of Margate bought, on a late occasion, an old town-land property known as 'Pot's Property,' in King-street, with a view to widen the thoroughfare. They gave 600*l.* for the land, some 40 ft. square, inclusive of the two old shops thereon, and have again sold the site by public auction, on condition of the sale being that the purchaser should pull down and clear the existing houses by the 31st December next, and give up a strip of the entire frontage, 8 ft. wide at one end, and 5 ft. wide at the other, for the purpose mentioned. The result of the sale shows that the Town Council estimate the value, and pay for the land they thus obtain for street improvements, at a figure seemingly out of all proportion to the demands of the borough, or to the wealth of the ratepayers.

The case may be stated thus:—The council pay for the entire property 630*l.*, and sell off the required portion for 370*l.*, thus paying for the widening of the street at a cost of 260*l.*, equal to 221 square feet, and so costs about $\frac{1}{2}$ *s.* per acre. Verily, there must be more money than land at Margate.

"A DRUIDICAL RACE IN INDIA."

SIR,—Under this title the attention of the public is drawn, for the first time, as it is imagined, the fact, adduced by Dr. Hooker in his address the British Association at Norwich, that there is a race in India who still practise observances which have been usually attributed in this country to the Druids. In 1864, however, a singular fact of this very kind was first brought to general notice by me in the *Builder*, with allusion to the religious observances of an Indian tribe inhabiting the Sub-Himalayas.

Dr. Hooker, in his address, thus speaks of the mid-like structures which he has seen in India:—"It will no doubt surprise many here to be told that there exists within 300 miles of the British capital of India a tribe of semi-savages who habitually erect dolmens, cromlechs, and other megalithic structures in their portions and very similar in appearance and construction to the so-called Druidical remains of Western Europe; and what is still more curious, though described as figured nearly a quarter of a century ago by Colonel

Yule, the eminent Oriental geographer, they are scarcely alluded to in the modern literature of pre-historic monuments, except by Sir J. Lubbock. In the *Bengal Asiatic Journal* for 1847 will be found Colonel Yule's description of the Khasia people of East Bengal, an Indo-Chinese race. Dr. Thomson and I dwell for some months upon the Khasia people, now eighteen years ago, and found Colonel Yule's account to be correct in all particulars. The undulating eminences of the country, some 3,000 ft. to 6,000 ft. above the level of the sea, are dotted with groups of huge unpolished squared pillars and tabular slabs, supported on three or four rude pillars. In one spot, buried in a sand-grove, we found a nearly complete circle of menhirs, the tallest of which was 30 ft. out of the ground, 6 feet broad, and 2 ft. 8 in. thick; and in front of each was a dolmen or cromlech of proportionately gigantic pieces of rock, while the largest slab hitherto measured is 33 ft. high, 15 ft. broad, and 24 in. thick. Several that we saw had been very recently erected, and we were informed that every year some are put up, but not in the rainy season, which we spent in the country. The method of removing the blocks is by cutting grooves, along which fires are lit, and into which when heated cold water is run, which causes the rock to fissure along the groove; the lever and rope are the only mechanical aids used in transporting and erecting the blocks. The objects of their erection are various,—as sepulchre, a marking spot where public events had occurred, &c. It is a curious fact that the Khasia word for a stone,—"man," as commonly occurs in the names of their villages and places, as that of Man, Manan, Manan, Manan, Manan, of Brittain, Wales, Cornwall, &c.; thus the same signification in Khasia the stone of oath; mamoo, the stone of salt; mamlong, the grassy stone; and just as in Wales men mark the hill of the big stone; and in Brittain a monolith is a standing stone; and a dolmen, a table-stone, &c. The establishment of a British empire among them renders it important that the inquiry into their origin, language, beliefs, customs, &c., should be followed up without delay. This will now be done, thanks to your representations, and I cannot doubt but that it will throw great light upon that obscure and important branch of pre-historic archaeology, the megalithic monuments of Western Europe."

The passage in the *Builder* of 1864, to which I have referred, is as follows:—

"Oracles are even now (or were lately) in full force in the Sub-Himalayas. In the *Asiatic Journal* of Bengal, vol. xviii, p. 239, is a curious account, by Mr. B. H. Hodgson, of an 'incantation,' as he calls it, named the bamboo festival of the Bodos, which was then still actually practised annually, by the Rauts of Sikkim, for the purpose of predicting the prospects of the harvest! In this modern incantation, thirteen priests (a devil's dozen) dance and chant with a monotonous invocation of a few fixed syllables and choruses, another—a creature of the priest,—called the Deeda, in whom the God or the Oracle is to be manifested. Each of the thirteen holds a bamboo pole in his hand. The chant and whirling dance gradually become fast and furious, till, suddenly, all the thirteen poles are concentrated to the one common centre of the circle, into a pavilion form, above the head of the central Deeda, who immediately goes off in what Mr. Hodgson calls an 'ecstatic fit,' but which a little more judiciously of what he was speaking of would have, no doubt, induced him to think was probably a real fit—of entrance-ecstasy, and ebullition of the Oracle—the God-possessed or God-given man, the Deeda,—in the encircled centre, was doubtless consulted by the surrounding priests. Even to the 'pavilion' there is, in all this, something peculiar and impressively Druidical."

The quotation occurs in a letter "On Circular Rock-marks and other Symbols" in the *Builder* of 2nd July, 1864. JOHN E. DOVE.

OVERCROWDING IN NEW YORK.

A RESIDENT thus writes of the dwellings inhabited by the poor in the more unhealthy parts of New York:—

"The ordinary way in which tenement houses in New York are built is as follows: let 25 ft. by 100 ft., and on this are erected two buildings, seven or eight stories high—one at the front of the lot and one at the rear—each 25 ft. by 40 ft., and separated by a court 20 ft. wide. Through each house, in the centre, runs a hall 5 ft. wide, and the space on each side of this, which is 40 ft. by 11 ft., is divided into four rooms, each 10 ft. by 11 ft. The room which fronts the street and the one which looks into the court have windows; the two middle rooms are lighted and ventilated only by the door which opens into the hall. Thus, upon this lot of 25 ft. by 100 ft. are crowded 128 apartments; and in each of these generally dwells a family, although in some cases one family contrives to pay for two rooms, in one of which the cooking, washing, and eating are done, while the other is the sleeping apartment. The rooms are about 7 ft. high, and get fresh air into them or foul air out of them is impossible. It is only in the best of these houses that one family has even one room to itself. In many of them, two and sometimes three families occupy the same room, and occasionally takes 'boarders' besides; so that in a single house of this size 800 men, women, and children eat and sleep. As misery loves company, the greater number of these fearful places are crowded together in the same quarter of the city; and in the same localities are hundreds of slaughter-houses, stables, tanneries, soap factories, and all sorts of similar nuisances, continually poisoning the air with the most noxious vapours. The moral influences of these neighbourhoods are as bad as their material surroundings, and here are the vilest brothels, the lowest shebeens, and the most beastly dance-houses. In the Fourth Ward of New York, a locality where there is a large amount of mercantile and manufacturing business is done, the population is crowded into the worst kind of 'tenement' houses, and an examination made of 200 of these houses, and the amount of air had only about 100 cubic feet of air-space for each individual, when 700 ft. is the least quantity in which a person can exist without detriment to his health. The insalubrious consequences follow. All sorts of zymotic diseases prevail in these quarters; the children die off with fearful rapidity; and the death-rate is often as high as 1 in 20, while in other portions of the city it is as low as 1 in 80. There is one curious fact which I have observed in my wanderings through the quarters of which I have

spoken, I did not find any Scotch people there, and on consulting the police and Board of Health records, I saw that while every other nationality under heaven was to be found in the Fourth and Sixth Wards, there was scarcely a Scotsman there, unless he was conducting some business as an agent. I found one item in my researches giving the census of 59 tenement houses inhabited by 882 families. There were 2 Welsh people, 7 Portuguese, 9 English, 10 Americans, 12 French, 35 Africans, 186 Italians, 189 Poles, 218 Germans, and 812 Irish. And these figures give a pretty good idea of all that part of New York which lies between the Battery and Canal street, and from which the heaviest Democratic majorities are given."

INTERCOLONIAL SOCIETY.

SIR,—A daily contemporary, in a recent leading article, announces "that there had been held, with little parade or ostentation, the first meeting of the above-named society, which is intended to supply a conspicuous want in our colonial system, and that its aims are so eminently useful that the wonder is they were not attained long ago."

In reference to this subject, will you kindly allow me space in your valuable periodical to record that, some five years since, I felt the need of a society having for its object the establishment of an Intercolonial Club-house, in some central position, say the banks of the Thames, where colonists might rendezvous and enjoy a temporary home, which should combine not only dormitories, but a museum for the exhibition of specimens of colonial products, natural and artificial, as well as a repository for records of colonial statistics, books, maps, &c., either for reference or purchase; thus centralizing the vast colonial interests of the empire upon the same principle that now leads to the centralization of the Government departments and of the Courts of Law.

Entertaining these views I committed them to writing, and had printed copies circulated among colonists, including ex-colonial governors, but they were so lukewarm in the matter that I suffered it to drop; the revival, however, of the project under the favourable circumstances narrated is most gratifying. W. N. CHAVRON.

PUBLIC BUILDINGS AND DISTRICT SURVEYORS.

At the Marylebone Police Court, on the 27th ult., Mr. D'Eyncourt was engaged for several hours in hearing a case, the decision of which affects three theatres now erecting in London.

The "Marylebone" theatre in New Church-street, Edgware-road, is now undergoing alterations prior to its being re-opened as the "Royal Alfred." Mr. Peebles, the district surveyor of the northern division of Marylebone, acting under the provisions of the Metropolitan Building Act, visited the premises, and noticing that the builder, Mr. Samuel Simpson, did not carry out the works in accordance as he was required, with the rules laid down in the Act of Parliament, he gave him notice of the alterations and additions which he required to be made. The builder paid no attention, nor did he appeal to the Metropolitan Board, but, according to the district surveyor's evidence, he proceeded with the work with extra speed. Under these circumstances the district surveyor took out a summons against the builder under the Building Act, for that he "did do certain things contrary to certain rules of the said Act; to wit, did construct the floors or corridors leading to the boxes upon the first gallery, and also the floor at back of said gallery, with combustible materials; and did omit to do certain things required to be done by the said Act; to wit, to construct the said floors with stone or other fire-proof material as required by sec. 22."

In the course of a long discussion as to what was meant by the term "corridor," and a reference to dictionaries on the subject, the case was simplified by the defendant stating that he had not obeyed the notice from the district surveyor for several reasons. The following are some of them:—

1st. The theatre was not essentially different from what it had been before the alteration, except that new material was used, the old having become so rotten that it was unlikely that the Lord Chamberlain would re-licence the theatre unless it was removed. The interior arrangements of the former theatre having been approved by the Chamberlain, all that was necessary for him was to get the Chamberlain's licence again. In cross-examination he said that the stage had been shortened, and the auditorium thereby enlarged. Under the new management the theatre would hold about 200 more persons. Mr. D'Eyncourt said he was strongly of opinion that the Lord Chamberlain's licence did not apply to the question as to the materials to be used in the construction of a theatre. Defendant said it did. For instance, if he deposited plans approved of by the district surveyor, but which did not meet with the approval of the Chamberlain, or (the builder) would have to alter those plans before he could get a licence. Mr. D'Eyncourt asked he was shown any section which exempted theatres from the operations of the Metropolitan Building Act. Plaintiff said there was no exemption for theatres.

2d. Defendant said he had built the Queen's and Holborn theatres, and there were surveyors in those theatres, as well as in Marylebone. They had not objected to the mode in which those buildings had been constructed, though it was precisely the same as in the present case. He said also that the Gaiety Theatre, and no difficulty was made by the district surveyor there. Mr. D'Eyncourt observed that one object contemplated by the Act was the safety of the public during fire; and to say that Mr. Peebles ought not to take any notice because two other district surveyors had not thought proper to do so, was no proof that Mr. Peebles was wrong.

3rd. Defendant said the plans were approved of by the officials at the Metropolitan Board who acted on behalf of the superintending architect; but it was contended by plaintiff that this was not an approval by the Metropolitan Board, which was not so.

Mr. D'Eyncourt said he considered this to be a new building, and that it came under the operation of the Building Act. He believed plaintiff had made out his case, and the necessary alterations must be made in accordance with the district surveyor's notice.

CHURCH-BUILDING NEWS.

Barnet.—Trinity Church, Barnet, has been consecrated. It was opened so long ago as the beginning of 1865 under license. The church was erected from the designs of Mr. Ewan Christian, and consists of a nave, north and south aisles, and apsidal chancel, with aisles; the southern aisle, which is used for the organ, has the vestry behind. The walls throughout are of brick with stone dressings. The nave roof is oiled with a harrel vault, with moulded ribs, tie-beams, and king-posts. In the aisles the whole of the timbers are exposed to view, and stained and varnished. The roof of the chancel is similar to that of the nave, both being adapted for decoration. The roofs externally are covered with slate; and the bell-cot, which is constructed of timber in connexion with the chancel arch, is covered with oak shingles, and is surmounted by a vane. The interior is fitted with open benches of stained deal, affording accommodation for about 420 persons. The passages generally are paved with red and black quarry tiles, and the floors of the chancel and communion space are laid with Minton's tiles—the latter being of encaustic patterns. Messrs. Dove, Brothers, were the builders, and the amount paid for their work was 2,996l. 4s. 6d.

Stroud.—The new church at Stroud has been opened for divine service. Various plans for the restoration were, we believe, obtained; and, among others, Mr. Gilbert Scott sent in a design. Ultimately, Messrs. Wilson & Wilcox, of London and Bath, were appointed the architects, and Messrs. Wall & Hook, of Brimscomb, the builders. Under their direction the old church, excepting the tower and spire, was rased to the ground. Of the 7,000l. required when the stone was laid, more than 5,000l. had been promised: the general subscriptions realised about 4,000l., and the remainder came from the Warneford Trustees, the Stroud Peoffees, the Diocesan Society, and the Incorporated Society. Save in regard to the spire, the rebuilding has been complete. The new building is cruciform, and comprises nave, north and south aisles, north and south transepts, chancel, north and south chancel aisles, south porch, and vestry on the south side of the chancel aisle. The tower and spire are at the west end of the nave, and the belfry is divided from the nave by an open iron screen. There are eight bells. The chief entrances are through the south porch and under the tower: there are also entrances on the east side of the north transept and through the vestry. The length of the nave is 77 ft.; its width, 23 ft. 3 in.; and its height from the floor to the wall-plate, 33 ft.; and to the apex of the roof, 43 ft. The north and south aisles are, of course, the same length: the north aisle is 13 ft. 3 in. wide; the south, 16 ft.; and the height is—to the wall-plate, 19 ft.; and to the apex of the roof, 32 ft. The north and south transepts are 22 ft. long and 19 ft. wide; the height of the side walls is 26 ft.; that to the apex of the roof, 42 ft. The length of the chancel is 29 ft.; the breadth, 23 ft. 3 in.; and the height—to the cornice, 26 ft.; and to the apex of the roof, 43 ft. The chancel aisles are 26 ft. long; the width of the north aisle is 15 ft. 3 in.; that of the south, 16 ft.; and the height of the wall is 18 ft.; and that to the apex of the roof, 31 ft. The nave is divided from its aisles by an arcade of five arches on each side. The columns are of blue Bristol Pennant stone, with carved Painswick stone capitals, from which the arches rise. The arches are also executed in Painswick stone, with moulded heads. There are twelve clearstory windows on each side, and they have blue Pennant columns, with moulded and carved caps, to correspond with those of the arcading below. The roof of the nave is of English oak. The whole of the roofs are circular-headed. Underneath the tiles is a layer of Croggon's patent asphalt. The nave aisles are lighted—the north aisle with four two-light windows in the north wall, and one three-light window at the west end; the south with three two-light windows in the south wall, and one three-light window at the west end. The north and south transepts have each a large four-light window in the gables, and also a three-light window in the east and west walls, all with moulded jambs and traceried heads. The north and south chancel aisles are divided from the chancel by two arches on each side, supported by moulded Painswick stone bases, beneath four clustered red Devonshire marble columns for each centre, and two for each respond. From the carved capitals spring the arches, which are deeply moulded, with red

Mansfield stone bands. These aisles have each a three-light window at the east end. Between the nave and the chancel is a moulded and carved arch, springing from carved corbels, on which stand black polished Devonshire marble columns. The east window has five lights, with deeply-moulded jambs and traceried heads. Between the chancel and its aisles, and also between it and the nave, are low Painswick-stone screens. The floor of the chancel is laid with Godwin's figured encaustic tiles; the floors of the nave and aisles and transepts and tower and porch are of Godwin's plain red tiles. The outer walls are faced with Painswick stone ashlar. The walls are built in diagonal-range stonework, pointed with bad mortar. The external dressings are of Bradford-on-Avon stone, obtained from the quarries of Rogers & Rollins. The entrance porch has a deeply-moulded arch, supported by blue Pennant stone columns, supplied by Mr. F. Greenway, of Downend, near Bristol, who also furnished the large columns of the interior arcading. The roofs are covered with Broseley coloured tiles, laid in alternate courses. The material employed throughout is chiefly native stone, and the architecture is Early Gothic, of thirteenth century. Save for those we shall mention presently, the windows are filled with cathedral-glass in tinted patterns. All the internal fittings are of English oak, and have been twice varnished. The oak fittings are open. They will accommodate about 1,200 persons. The painted windows are seven in number. One in the tower, by Ward & Hughes, represents Christ Blessing Little Children, and the cost of it has been collected by children of the town. The chancel-window, by Heaton, Butler, & Bayne, has five large lights, four of them with double subjects, representing the Annunciation, Visit of the Wise Men, the Appearance of the Angels, the Flight into Egypt, the Addressing of the Disciples, the Crucifixion (the large centre light), the Resurrection, the Ascension, and other incidents in the Saviour's life; and the tracery is filled with flowers and emblematical devices. The south chancel-aisle window has three lights, illustrating the Parable of the Talents, by Lavers & Barraud, and given by Mrs. Charles Stanton. The north transept window is given by Mr. Sidney Biddell and family, and chiefly illustrates Christ rewarding the just. In the tracery are angels and praying children hearing scrolls. The south-transept window contains large figures of the Evangelists. The window in the north aisle is given by Mrs. Chnitz, and that in the south aisle by Mrs. Hill, of the Thrupp.

Tickhill.—The Parish Church of Tickhill, after being restored and cleansed, has been re-opened for divine worship. The entire cleansing and restoration of the church was done by Mr. Athron, of Doncaster. The first week's work, which consisted in scraping off a thick enamel of whitewash was performed freely by a number of men in the village, and in three months the work was completed, the whole interior presenting a renovated appearance. Such of the windows and pillars as needed it were restored, and the walls, &c., cleaned and stuccoed. A new reredos, designed by Mr. Goddard, of Lincoln, and constructed of stone, alabaster, and slate, was placed in the chancel. By the liberality of Mr. B. H. Brookshank, the organ, which entirely hid the west window, was rebuilt and removed to the Laughton Chapel. The restoration of this instrument was done by Mr. Menceck, of Doncaster. The front pipes have been decorated by Mr. J. Hawley.

DISSENTING CHURCH-BUILDING NEWS.

Aslbourne, Derbyshire.—The chapel of the Countess of Huntingdon's connexion at this place, is about to be restored and enlarged, and the schools rebuilt. Messrs. Stonier Brothers, of Rochester, have contracted for the works, which are to be carried out under the direction of Mr. Sugden, architect, of Leek.

Barrow-in-Furness.—A Presbyterian church, costing some 1,400l., and calculated to hold 350 persons, has been formally opened. The Messrs. Hay, of Liverpool, were the architects.

Plymouth.—A Presbyterian church has been commenced here, which will accommodate 1,200 persons. The architect, Mr. J. L. Hodge, of Plymouth, has designed the building in the Italian style of architecture, and it will be of limestone, obtained from Pimplete and the West Hoe Quarries, faced with Portland stone. It will be 100 ft. by 55 ft., and about 50 ft. high,

lighted by thirty-seven windows, and there will also be a gallery. The estimated cost is 4,000l. of which one-half has been contributed. Mr. Walter Lethbridge is the contractor, and getting on with the work. The foundation-stone has just been laid.

Brighton.—A new church, unconnected with the Established Church, has been opened here for divine service by Dr. Canning. It is constructed of iron, upon the plans and under the superintendence of Messrs. Hemming, of London, and is said to be, with one exception—that of church at Cheltenham, built by the same firm—the largest iron structure of the kind in the kingdom. It provides for and accommodates a congregation of 1,500 persons; and on the occasion of its opening contrived to include within its walls some 150 more. The church is situated at the west side of Brighton, between the Western-road and the sea, close to Waterloo-street. It is Gothic in its general style and formation, with a central aisle and two side aisles, standing east and west with an eastern chancel, in which is placed the communion-table. It is highly decorated, and recourse has been largely had to both strong colours and gilding. It is thickly carpeted in addition throughout, and the open pews are cushioned in scarlet.

Knighton.—The new Wesleyan Chapel, a Cefinion, in the Knighton circuit, the foundation-stone of which was laid in April, has been dedicated to divine worship. The edifice was built by Mr. Pugh, of Bishop's Castle. It is in the Norman style of architecture.

Whitby.—A new Congregational Church, at West Cliffe, Whitby, has been opened for divine worship. The edifice was designed by Mr. J. P. Pritchett, of Darlington, and is in the Geometrical style. It consists of nave and aisles. Accommodation is provided for 950 adults on the ground floor and galleries in seats which are open and have low slanting backs, all of pitch pine, varnished. The contracts amounted to 3,300l., exclusive of warming apparatus, gas-fittings, and furnishing, which, with professional charges and sundries, will bring up the total to about 4,000l.

SCHOOL-BUILDING NEWS.

Worcester.—The new building for Queen Elizabeth's Grammar School has been formally opened. It is situated in the Tything, to which it presents its chief elevation. An unsightly row of cottages has been removed to make way for the new building. The material is Tewkesbury brick, with Bath stone facings and dressings, and the style is Elizabethan. There are on the west side, facing the street, three three-light square-headed windows, and a large five-light pointed window at the north and south ends. These windows have stone mullions and transoms. Above each window is an ornamental square and circular step gable, with a ventilating slit or opening in each; and the steeply-pitched roof is surmounted in the centre by an octagonal lantern-light or bell-turret, covered with lead, which also acts as a ventilator; a crown and weather-vane on its top. In a niche, canopied, over the central window of the front, is a statue of Queen Elizabeth, designed by Mr. Perkins, the architect, and executed by Mr. Boulton. The statue represents her Majesty crowned and holding the sceptre and orb. The porch by which the school is entered is at the north-west angle, and is composed of variegated bricks and freestone, and over the door is an ornamental gable containing a sculptured shield with the royal arms, and the initials "E.R." (Elizabeth Regina). The floor of the porch is covered with Godwin's encaustic tiles. The great school-room, which is about 11 ft. in height to the apex of the roof, 50 ft. long, and 27 ft. 6 in. wide, has an open roof, hammer-beamed, resting on stone corbels. This room is lined with white bricks, varied with red and black, has a hoarded floor, is warmed by a large open fireplace, and is provided with a clock. At the north end of the school a passage leads into a class-room, also into lavatories, robing-rooms, hat and cloak rooms, water-closets, urinals, &c., the offices of the masters being distinct from those of the boys; and at the rear are coal stores, with two fires courts and playground. The school and grounds are surrounded by a high fence, that of the front towards the street and sides being an ornamental railing, with stone piers. Between the front facade and the facade of the school is a distance of 27 ft., consisting of a gravel walk, with either turf or flower-

border. The entire cost will be about 1,600*l*. The architect was Mr. Perkins, and the builders were Messrs. Collins & Collins, of Tewkesbury.

Darleston.—The first stone of new schools intended to be erected in connexion with the parish church of St. Lawrence, Darleston, has been laid by Mrs. S. Mills, of Darleston House. The design is Gothic. The building will be 130 ft. in length and 68 ft. in width, and designed to accommodate 500 children, and will stand upon 2,040 square yards of land, valued at 306*l*., the gift of Mr. J. A. Dorset, of Woodville, Bromsgrove. It is estimated to cost 2,430*l*. The architect is Mr. A. P. Brevitt, jun., and the builder Mr. J. Wilkes, both of Darleston.

Hurstpierpoint.—The first stone of new parish schools has been laid. The schools, of which Messrs. Goutly & Gibbins are the architects, are to be a Gothic building of red brick, and will comprise boys' and girls' schools, each 46 ft. by 17 ft.; and infant school, 45 ft. by 17 ft.; and a master's house. The building is to cost 1,867*l*. Mr. F. Hollands is the builder employed.

Miscellaneous.

CRANE ACCIDENT IN MANCHESTER.—An accident, unfortunately attended with loss of life, has occurred at the works of Messrs. Bowden & Edwards, builders, Brook-street, Manchester. The owners were fixing a large boiler, weighing 7 tons, by means of two travelling cranes, calculated to move respectively 8 and 4 tons. Fourteen men were engaged in the work; and just as they were putting the boiler in its place, and when it was raised 3 ft. from the ground, the gangtree broke which supported the two cranes, and they both fell, breaking into several pieces. Seven of the men were knocked down and severely injured. One of them died on the way to the infirmary. The larger crane was a new one, but the smaller one had been in use fourteen or fifteen years, and the woodwork was much decayed, which was the cause of the accident.

THE BIRMINGHAM WORKHOUSE SCHOOLS.—The Birmingham guardians are again in a difficulty about the workhouse schools. The Poor Law Board decline to sanction the plans lately adopted, unless with modifications so extensive as greatly to enhance the cost. The guardians will not agree to some of these modifications. Neither do they revert to their original resolution to build completely separate schools, and so leave the workhouse free to its proper inmates, at the same time giving the children the means of escape from the miserable influences of pauper association. All the objections of the Poor Law Board, as the local journal notes, tend in this direction; and perhaps the Poor Law Board may ultimately insist upon the original plans being carried out. It would be cheaper in the end, as well as more beneficial to the children.

A STEEP RAILWAY.—A somewhat strange account of the railway to the summit of Mount Washington, New Hampshire, has reached this country. The station, at the starting-point, is 2,700 ft. above the level of the sea; and the road, when complete, will be two miles and 260 rods long, rising, it is said, in that instance, 3,600 ft. to the Tip-Top House, which is 6,300 ft. above the level of the sea. The average grade of the track is 1,280 ft. to the mile, but in some parts of the line the grade is increased to 1,760 ft. to the mile, or 1 ft. in every 3 ft. On this portion of the road the workmen, notwithstanding the sharp spikes in their shoes to prevent them from falling, could only build 25 ft. per day. The track consists of three rails, the one in the middle being of wrought iron, with cogs or pins corresponding to cogs in the driving-wheel. The train consists of the locomotive with a tender and one passenger-car. The locomotive of 35-horse power is built with its boiler suspended, so that it is always level; it weighs four tons, and pushes the train up before it. The driving-wheel is 18 in. in diameter. There is a similar cog-wheel on the tender, and another on the passenger-car, each strong enough to hold the entire train. Friction rollers, running under the edges of the middle rail, hold the train down upon the track. The ascent from the starting point to the second station, 5,300 ft. above the level of the sea, was accomplished in one hour and twenty minutes, including two stoppages for water. The descent occupied thirty-eight minutes.

ST. STEPHEN'S, WALDBROOK.—We are asked in more than one quarter to call public attention to a contemplated alteration in the position of the organ here, calculated some say, who know exactly what is proposed, to damage materially the effect of the interior as well as of the organ. The *Musical Standard* says the alteration will be a perfectly useless and wanton architectural innovation.

THE NEW CHANNEL DOCKS, BRISTOL.—There has been commenced at Avonmouth an undertaking which, it is hoped, will greatly benefit the trade and add to the prosperity of the city of Bristol; namely, Channel docks, for the accommodation of ocean-going steamers. The present docks are only calculated for vessels of moderate tonnage. The dock and adjoining premises are to occupy 70 acres of land. The dock is to be 1,400 ft. long by 500 ft. wide, and the lake will cover an area of 16 acres. The dock will admit any vessel second to the *Great Eastern*, being 450 ft. in length by 55 ft. in width. The vessels, having taken their berths, will have facilities for discharging their cargoes into warehouses or railway trucks. There is to be a tramway which will connect the docks with the Port and Pier Railway, and an important feature of the undertaking is the Junction Railway, extending from the present line to the three great local railways. Mr. Lawrence has the contract.

CURIOUS IDENTIFICATION OF STOLEN TOOLS.—At the Llanelly Petty Sessions a mason, living at Swansea, was charged by a carpenter, of the Brea, Llanelly, with having stolen some of his tools. Prisoner had in his possession a rule, which was one of the articles named previously as having been stolen. A small brass plate, about three-eighths of an inch wide, was let into the rule which prisoner had in his possession, upon which the owner's name had been engraved. Other articles answering to the description given by the owner were found in the prisoner's possession, except that they were not stamped with his name as described. It was found on examination that names had been scraped or cut out of the various articles, and on the exact places at which prosecutor said they had been stamped. Captain Cross, the magistrate, suggested that if the tools were dipped in boiling water the names would become quite intelligible again. The experiment was tried, and on each article, says our authority, the *Cambrian*, the name of the prosecutor, exactly corresponding with the stamp he produced, became readable. The prisoner was committed for trial. The curious fact here so ingeniously made use of reminds one of the puzzling Chinese mystery of silver plate which shows on one side what is chased or otherwise represented on the other.

ALTERATIONS AT CARLISLE GAOL.—The alterations of Carlisle gaol, in accordance with the requirements of the Prisons Act, are making rapid progress. There are 112 cells for males, arranged in two rows and in three stories. All the doors on each flat open into long corridors, which in the case of the upper stories are narrow galleries, so that the whole building is open from floor to roof with the galleries of the first and second floors projecting on each side. The cells are all flagged and have arched roofs. In the day time each cell is lighted by a square window strongly grated and guarded, and at night it is so illuminated by gas that the lighting apparatus is beyond the control of the prisoner. A cavity is made in the wall near each door, in which the gas-light will be placed. The inner side will be fitted with plate-glass, and on the outer side will be placed a good reflector to throw forward and diffuse the light in the cell. The water supply, like the gas, is also beyond the control of the prisoner. A brass water-nozzle will project into each cell, and at a certain hour, at which the water will be turned on, the gong will sound for washing. The prisoner must then draw his supply. At certain times, too, the supply for drinking will be turned on. In a cupboard will be conveniences, including a utensil upon the earth-closet principle, which has been substituted for the more costly system of water-closets for night use. The cost of water-closets as at first planned in each cell would have been about ten guineas each; whereas the whole of the furniture, under the plan adopted, will not, it is expected, cost more than 2*l*. for each cell. Whether the one be as good as the other is another question. The whole building will be heated with Gil's stoves, and preparations are now being made for laying the flues.

THE ASSOCIATED CARPENTERS AND JOINERS OF SCOTLAND.—The sixth annual demonstration of this association has taken place at Edinburgh, in the Corn Exchange, Grassmarket. When all had assembled the large building was completely filled, upwards of 3,000 being present—the ex-nationists having been joined by about 800 of the trade from Edinburgh and Leith. The addresses were chiefly on the advantages of social gatherings amongst the working classes, and advocated the cause of union, not for the purpose of aggression, but for the maintenance of rights.

DAMAGES FOR POLLUTION OF A STREAM.—In the case, *Scarlsbrick v. Ormskirk Local Board of Health*, the plaintiff, Lady Scarlsbrick, owner of extensive estates in the neighbourhood of Ormskirk, sought to recover damages from the Board of Health of Ormskirk for causing a nuisance by polluting a stream which, running through a portion of the plaintiff's property, communicates with the lake in Scarlsbrick Park. A verdict for 1,000*l*. was taken by consent, to be reduced to the nominal sum of 40*s*. if the nuisance complained of was abated. There were several other terms agreed to.

LAKE DWELLINGS IN SCOTLAND.—Interesting researches have been recently made on the Loch of Forfar. The existence of a crannog or lake dwelling on this lake has long been known, but its thorough examination has only now been made. The causeway was found to consist of a ridge of stones and marl, stretching across to the west end of the loch. On the north side there had been a row of piles, on the top of which were transverse piles, generally about 5 ft. below the surface of the ground. The examination led to the inference that the inhabitants were similar in their modes of life to those who erected the lake-dwellings in Switzerland.

BURIED ALIVE IN LAMBETH.—The Lambeth Waterworks Company have lately opened a trench at Surbiton, for the purpose of laying down a 30-inch service-pipe. Several workmen were engaged, and as they progressed the trench was filled in. The works were carried on under the contract of Messrs. Aird & Son, and the superintendence of an engineer of the water company's selection, and an inspector provided by the contractor. The works had reached Maple road, nearly opposite the Antelope Tavern, when there was a slip of earth, entirely burying a man named Dymond, and partially covering up two others, one of whom was embedded to his middle. Dymond was extricated alive, and taken to the Westminster Hospital, where he afterwards died. The men at work complained amongst themselves that the struts and shoring were insufficient, as it was light earth, the opening having been previously made for a similar purpose. They, however, made no formal complaint. An inquest was held upon Dymond, and the jury found a verdict of "Accidental death," but requested Mr. Trotman, the manager under the contractor, to act with greater care for the future. Mr. Trotman said the request of the jury was almost unnecessary, for great care was taken, but for the future the shoring and timber work should be particularly attended to.

DISCOVERY OF A ROMAN OVEN AT WINTERTON.—An interesting antiquarian discovery has been made in digging for sand, about half a mile west of the Roman road at Winterton, in a field about half a mile east of the Roman tessellated pavements. By the falling of a portion of the side of the pit there was exposed what appears to be a rudely-constructed oven, made by sinking a circular cavity, about 6 ft. deep and 6 ft. diameter at the top, becoming narrower towards the bottom, so as to be, in fact, an inverted cone. From the centre of the floor rises a pillar, 1 ft. 9 in. in height, and widening from 1 ft. diameter at the bottom to 1 ft. 10 in. at the top, which pillar widens suddenly so as to form a sort of mushroom-head, continuous in structure with the clay or mud floor and walls just described. A shallow groove runs all round the inside of the oven, a little above the top of the pillar, and broken pieces of blue Roman pottery are laid across from the pillar to the side of the basin, so as to cover in a sort of circular flue. Over these has been spread a thin coat of clay, similar to the rest of the lining, so that the upper story, so to speak, is a shallow pit, about 3 ft. diameter and 1 1/2 ft. deep. It may be that this was used for baking bread or other cooking operations, and that it was heated by a fire in the flue beneath. This upper part was filled with earth, plaster, broken Roman pottery, &c., and the flue with black ashes and Roman potshards.

FIRES IN LONDON.—Within forty-eight hours last week no fewer than twelve fires took place in the London district. How much longer shall we build houses as if expressly to burn?

CO-OPERATIVE CONGRESS.—At a meeting held at the offices of the Agricultural and Horticultural Association, to determine the time and place for holding a congress of the representatives of co-operative societies, partnerships of industry, trade unions, &c., it was resolved that the meeting shall take place in London, in the early part of February, 1869. Resolutions were passed to the effect that invitations be issued to co-operative societies, at home and abroad, and the friends of the movement generally, and a list of questions for discussions by the congress was drawn up.

EGRESS FROM OVERTURNED RAILWAY-CARRIAGES.—A proposal has been received that there should be openings or hatchways in the roofs of railway-carriages, so that if overturned the passengers could readily get out by opening these hatchways or roof-doors. The difficulty of keeping out rain would be an objection: however watertight such hatchways might be when made, they would be liable to become defective. It is difficult to keep even skylights watertight. Perhaps a lining of elastic indiarubber along the edge of the hatchway pressing on the roof-edge where they met might aid in keeping the whole watertight, the overlapping and all other arrangements being as carefully planned as possible.

BALANCE WEIGHT SIGNALS.—Mr. F. N. Giborne proposes to apply his ship and mine signals to hotels, hospitals, and houses. The principle is simple. The apparatus consists essentially of a balance-chain, working around indented pulleys, each pulley being placed in the centre of a dial, and furnished with an index, the connexion being so made that neither of the pointers can move without all the others adopting a precisely similar course. In the mining signals the dial is lettered "men," "up," "stop," "down," "men," respectively, and whenever either one of the pointers is directed to say "up" the engine-room bell gives the proper signal, and every pointer in the connexion is at the same instant turned to "up" also—in fact, the dials may be lettered to suit any kind of wording that may be considered necessary. As the weights at either end exactly balance each other, the index has no tendency to return to any zero, but remains at whatever point it may be set. The apparatus is self-adjusting, and transmits signals steadily, but little power being required to move it. The pointers and transmitting handles of every communicator and indicator can be quickly adjusted to the centre of a common order by simply turning the outside binding screw, which holds them in position. Any ordinary mechanic can fit it; and the cost price is said to be small, and the fitting inexpensive. Mr. Jerram, of Great Queen-street, Westminster, engineer, has undertaken the introduction of the mining signals.

BRADFORD BYE-LAWS AND TOWN IMPROVEMENTS.—Mr. Dewhurst, one of the borough magistrates of Bradford, is erecting an arched market for the benefit of a district where such a market is needed; and the corporation, who have an interest in putting down all markets but their own, have been attempting to stop the erection of the new market by various dodges, under pretence of the plans being inconsistent with the bye-laws. Six successive plans were prepared by the architects, Messrs. Lockwood & Mawson, but each time the requirements were only extended,—as, for example, in regard to the breadth of the street, and the arched. One bye-law stated that "Every new street, not being a carriage-road, shall be laid out and formed at least 24 ft. wide, and there shall be one entrance, at least, to every such street, of the full width thereof, and open from the ground upwards." As to the breadth of the street, the local Board, in the face of their own bye-law insisted, successively, on 36 ft., and even 42 ft., to which the plans were actually altered. Mr. Dewhurst being advised that "open from the ground" in the bye-law as it stood referred to the entrance and not to the street; and, being prepared with the evidence of various architects and others to the effect that ventilation, drainage, width, &c., were adequately provided for, at last proceeded with his market in defiance of the corporation, who cited him before the local magistrates; but they have just dismissed the case, after full and repeated hearing.

A ROMAN CATHOLIC CHURCH is about to be erected in York-road, Battersea. It is to be of brick, with windows and other dressings of moulded brick, in the style of the thirteenth century. Mr. Charles A. Buckler is the architect, and Mr. B. E. Nightingale is the contractor.

ISLINGTON NEW WORKHOUSE.—At the last meeting of the Islington Board of Guardians, some strange statements were made as to improper materials and proceedings in erecting the new workhouse, and by a series of resolutions the clerk of the works was placed in a wrong position in respect of the architect. The contractors should be either exonerated from the charges made, or requested to walk off the ground at once.

THE COLOSSEUM IN THE REGENT'S PARK.—It would be a matter for regret if the Colosseum were pulled down. Can nothing be done to prevent this? London is greatly in need of large and appropriate halls and meeting-places. It seems a pity to sacrifice a fine building of its kind easily convertible for such a purpose. A correspondent, Mr. Roumien, suggests that it should be made to take the specimens of Architecture and Sculpture of the British Museum, but we are not quite prepared to adopt this suggestion.

TECHNICAL INSTRUCTION FOR WORKMEN.—The Working Men's Club and Institute Union have obtained the authority of the Science and Art Department to engage the services of Mr. J. C. Buckmaster for the purpose of holding a series of meetings at the different workmen's clubs in London, at which he will explain the conditions under which the Department grants aid in the formation of science classes. The first of these meetings was held on the 25th ult., at the club called "The Bedford Institute," for workmen, in Wheeler-street, Spitalfields. Mr. Buckmaster gave a very clear statement of the great facilities afforded by the Department for the establishment of such classes. Those present were evidently not aware of the very small outlay necessary to provide systematic instruction in such subjects as applied mechanics, mathematics, machine-drawing, geometry, chemistry, &c., or of the valuable rewards given for proficiency.

THE MASTERS AND WORKMEN ACT.—An important case under the Masters and Workmen Act of 1867 was heard recently at the county magistrates' office in Liverpool. Messrs. J. G. & Robert Martin, builders, complained by information that two hod-carriers, named Stephen Wood and James Dignan, whom they had employed at 92s. per week, had struck work about one o'clock on Thursday, the 20th August, at some houses in course of erection in Edge-lane, and so brought to a stand the bricklayers engaged in building the houses. The bench ordered the prisoners to pay respectively 8s. and 7s. as their share of the loss thus sustained by their employers, in having to pay men who were standing idle—trade rules not allowing any one but recognised hod-carriers to carry bricks to the "setters"—and to forfeit half their week's wages. The judgment was designated a lenient one for the sake of example, and to show workmen the power of the new Act in compelling them to fulfil their labour contract.

TRAMWAY RAILS.—A report from the Liverpool borough engineer to the Health Committee of the town council, on models of sections of the rails proposed to be laid down by the Tramway Company, has been made. The reporter describes the crescent rail and the corrugated rail. A crescent rail was laid in Castle-street, and remained there nearly two years. This rail was only 3 in. wide, and was not considered to be of the best form to insure safety and prevent obstruction. The corrugated rail was then submitted to the committee. This rail was also only 3 in. wide, and was 'consequently deficient in stability. It was, however, a decided improvement on the crescent rail, and the engineer recommends it on condition that it be broadened to 4 in.; and the top of the groove eased by being rounded, so as to prevent its becoming dangerous to horses. This rail, if thus altered, he considers, would be superior to any yet in use. It is 1 in. wider than that submitted to and approved of by Parliament. The object of the increase in width is to admit of the use of sleepers strong enough for stability and for the security of the rail fastenings, and to be so covered by the rail that the paving may abut closely upon it on each side.

LIVERPOOL SEWAGE UTILIZATION COMPANY.—At the half-yearly meeting, held in the Town-hall, Liverpool, Mr. Robert Nelson, presiding, the report stated that the requisite amount of subscriptions for the work had been paid; that arrangements had been made at Blundellsands, north of Liverpool, for arable and other land on which to apply the sewage; that a contract had been entered into by Mr. English for the supply of steam pumping apparatus capable of lifting 500,000 gallons per day; and that plans had been adopted for the construction of the intercepting sewer. The report was adopted.

TENDERS.

For rebuilding warehouse, Bury-street, St. Mary-axe.
Mr. H. H. Collins, architect.
King & Sons £1,015 0 0
Henshaw 942 0 0
Gaves 850 0 0
Wall & Russell 822 0 0
Stuart & Bennett 670 0 0

For pair of villa residences at Ealing, for Mr. Bowden.
Mr. Marks, architect.
Keeble £2,179 0 0
Foxley 2,100 0 0
Hyde 2,685 10 0

For completing four houses in Nutfield-road, East Dulwich, for Mr. Manning. Mr. Edgar Aldous, architect.
Quantities not supplied:—
Rigg (accepted) £355 0 0

For completing a pair of houses at Croydon, for Miss Banks. Mr. Edgar Aldous, architect. Quantities supplied by the architect:—
Dennis (accepted) £485 0 0

For roads and sewers on the estate of the Land Company of London, Limited, at Sheep-hill-lane, Hampstead, Mr. H. G. Haywood, surveyor. Quantities supplied:—
Eunor £3,915 0 0
Mowlem & Co. 2,110 0 0
Hill, Keddel, & Waldram 3,707 0 0
Nicholson 3,470 0 0
Foard 3,410 0 0
Blomfield 3,145 0 0
Clark 3,087 0 0
Porter (accepted) 2,700 0 0

For the erection of a detached residence at Faversham, Kent, for Mr. J. A. Anderson. Mr. B. Adkins, architect. Quantities not supplied:—
Whiting £2,393 0 0
Solihit (accepted) 2,175 0 0
Shrubsole (withdrawn) 1,938 0 0

For a pair of semi-detached residences at Hounslow, for Mr. Cooper. Quantities not supplied:—
Phillips £893 0 0
Nias 878 0 0
Hanson 860 0 0

For pulling down and rebuilding shop and warehouses for Mr. J. B. Hopkins, Angel-street, Cardiff. Mr. J. Hartland, architect. Quantities supplied:—
Price £269 0 0
Michelmore 949 0 0
Shepton 940 0 0
Jones Brown 875 0 0
Lock 859 0 0
Seager 800 0 0

For additional factories in Lower Kennington-lane, for the Patent Silvering Company, Limited. Mr. A. Nickerson, architect:—
Ellis £1,970 0 0
Clemence 1,644 0 0
Henshaw 1,613 0 0
Newman & Mann 1,550 0 0
Macey (accepted) 1,477 0 0

For first portion of new buildings and alterations to Paddington Workhouse. Mr. Thos. R. Parker, architect. Quantities supplied:—
Adams £4,386 0 0
Lovett 4,280 0 0
Wigmore 4,150 0 0
Temple & Forester 3,100 0 0
Nutt & Co. 4,100 0 0
Butt & Son 4,000 0 0
Crockett 4,038 0 0
Hill 3,947 0 0
Lee & Gregory 3,892 0 0
Ellis & Son 3,892 0 0
Wells & Baggs 3,857 0 0
Mann 3,765 0 0
Higgs 3,774 0 0
Cooper & Cullum 3,590 0 0
Merrit & Ashby 3,563 0 0
Palmer 3,500 0 0
Foale 3,400 0 0

For Catharham Asylum. Messrs. John Giles & Biven, architects:—
Wigmore £35,000 0 0
Webster 65,000 0 0
Webb & Sons 62,253 0 0
Myers & Sons 92,700 0 0
Hill, Keddel, & Waldram 90,765 0 0
Pollard 80,265 0 0
Kirk 87,758 0 0
Blackmore & Morley 89,500 0 0
Ancombe 80,200 0 0
Fuller & Langley 81,150 0 0
Ryder & Son 84,410 0 0
Gammon & Sons 87,587 0 0
Kirk & Parry 87,610 0 0
Howard 85,900 0 0
Chappell 83,677 0 0
Shearburn 81,729 0 0
Knight 79,645 0 0

TO IRONMONGERS, BUILDERS, AND OTHERS. WANTED, a SITUATION as GENERAL SMITH and HOT-WATER FITTER.—Address, C. M. H. 1, Bedford-court, Covent Garden, W.C.

TO PLUMBERS AND BUILDERS. WANTED, by the Advertiser, who is a first-class PLUMBER, a SITUATION or JOB. No objection to fill up time painting or glazing. Good references if required.—Address, J. W. 2, Green-lane, High-street, Camberwell.

TO ARCHITECTS, CONTRACTORS, &c. WANTED, by a London BUILDER (who has relinquished the business of his well known responsible APPOINTMENT AS MANAGER, AGENT, or INSPECTOR OF WORKING, BUILDING, or THROTTLE-ROADS.

WANTED, by a practical and experienced ENGINEER and MILLWRIGHT, a SITUATION as FOREMAN or MANAGER in Engineering Works or Mills. Has been engaged the last twelve years in manufacturing powerful cotton presses and steam machinery. First-class & eminently so to ability, character, &c.—Address, C. T. C. 5, John-street, Fentonville-hill, N.

TO PLUMBERS BUILDERS, AND OTHERS. WANTED, by the Advertiser, a constant SITUATION, a Job, or Take Charge of Work, as PLUMBER, Plain Zinc Worker, Gas and Hot-water Fitter. A little painting not objected to. Thoroughly understands all the plumbing branches. Good references. No objection to take term.—Address, PLUMBER, 63, Nodder-street, Hoxton, N.

WANTED, by the Advertiser, aged 34, a constant SITUATION. In a first-class paperhanging and clerical, willing to fill up time at painting. First-class references to ability if required.—Address, W. T. 4, Warden-place, Clerkwell, Clerkenwell.

WANTED, by a Young Man, a constant SITUATION as PLUMBER, GLAZIER, and PAINTER. Town or country.—Address, "The Builder."

TO BRICK MAKERS and RAILWAY CONTRACTORS. WANTED, by a thoroughly practical BRICKMAKER, a SITUATION as MANAGER or FOREMAN. Has had the entire management of extensive works for some fourteen years in the London market, also for contractors. Age 45. Good references.—Address, C. Y. care of Mr. Osborn, Cucumber-street, 74, Whitechapel-road, Finsbury, E.

TO BUILDERS, CONTRACTORS, AND OTHERS. WANTED, by a Young Man, aged 20, EMPLOYMENT as IMPROVER at the bench, and can draw a "half."—Address, Y. care of Mr. S. H. H. Lumber, Silwood-street, Brighton, Sussex.

TO STAIRCASE BUILDERS. WANTED, by the Advertiser, TWELVE or EIGHTEEN MONTHS WORK as IMPROVER to the STAIRCASE and HANDRAIL WORK. Wages not so much as object a first-class work.—Address, J. HALL, Jun. 11, to be read, Bates, Bury.

WANTED, by an energetic Man, a RE-ENGAGEMENT as FOREMAN of BRICKLAYERS. Well up in measuring and setting out work.—Address, J. W. Postoffice, Malton, Essex.

TO BUILDERS. WANTED, by the Advertiser, a SITUATION as TIMEKEEPER and CLERK. Fill up time at bench. Five years' experience. Town or country.—Address, W. P. C. "The Builder," High Town, Luton.

WANTED, a RE-ENGAGEMENT as CLERK of WORKS, or General Foreman, or to Take Charge of a Job, in Town or country. Joiner by trade. Aged 40. Good references.—Address, P. W. care of Mr. Watts, Stationers, 3, 3, Norfolk-street, Finsbury, E.

TO BUILDERS AND OTHERS. WANTED, by the Advertiser, a quantity of FRAMEWORK of Painting, Glazing, Graining, Paper-hanging, &c. No objection to Town or country.—Address, THOMAS STARK, 5, Pond-square, Highgate, N.

WANTED, an ENGAGEMENT as FOREMAN of MASONRY over Docks, Sea-wall, and Bridges, or Inspector of Works. Age 35. Has had fifteen years' practical experience. Can make working and detail drawings.—Address, 5, 5, 5, Office of "The Builder."

TO BUILDERS AND CONTRACTORS. WANTED, by the Advertiser, a constant SITUATION in a Country Place, as a first-class WRITER, GRABNER, and HOUSE DECORATOR, or in Charge of Job. Good references.—Address, 44, Office of "The Builder."

TO BUILDERS AND CONTRACTORS. WANTED, a RE-ENGAGEMENT, by a practical OUTDOOR FOREMAN, carpenter and joiner by trade. Good references from London builders. Aged 32.—Address, R. 74, Baxter-road, Brixton, Brompton.

TO ARCHITECTS and SURVEYORS. WANTED, by a good general ASSISTANT, a RE-ENGAGEMENT. Good reference.—Address, E. I. 40, Foleystreet, Portland place, W.

TO BUILDERS, ROAD MAKERS, and CONTRACTORS. WANTED, by a first-class practical Man, a Cart-way Follower, Street Mason, Granite Dresser (good bricks, Dutch clinker, or tiles), to TAKE WORK by the PIECE. Labour only. Good testimonials and references.—Address, JAMES CUNNINGHAM, 7, James-place, North-street, Poplar.

WANTED, HAND-RAILING or STAIRS, by the PIECE; with or without cast-iron.—E. RYAN, 3, Alma-street, New North-road, east of Messrs. Henrich's, Bulwer, City-road.

WANTED, a RE-ENGAGEMENT, by an efficient BUILDERS' CLERK, aged 24, accustomed to a general routine of a country office. Can be well recommended to moderate. No objection to the country.—Address, R. 10, Malvern-road, Dalston, N.E.

TO BUILDERS AND CONTRACTORS. WANTED, a RE-ENGAGEMENT, as GENERAL FOREMAN, to take charge of a good job. References to firm just left.—Address, BUILDERS' FOREMAN, Pacific-street, Highgate, N.

TO BUILDERS AND OTHERS. WANTED, by an experienced Carpenter and Joiner, as CARPENTER to FINSBY, or other Piece work. Labour only.—Address, A. H. 10, Newark-village, Upton-road, Kewland, N.

WANTED, a RE-ENGAGEMENT, by a first-class FOREMAN of MASONRY. Well up in Gothic and all the elements of restoration. First-class testimonials.—Apply, F. A. Post-office, Canterbury, Kent.

WANTED, a RE-ENGAGEMENT as CLERK of WORKS, BOOK, TIME, or STORE KEEPER, by an energetic Young Man (aged 25 of thirty years' experience). Good knowledge of accounts and public works generally. Can be well recommended.—Address, E. F. 35, Great Bedford-street, Borough, S.E.

TO PLUMBERS BUILDERS, &c. WANTED, EMPLOYMENT, by a competent PLUMBER, with thorough practical knowledge of hot-water work, &c.; or to do the Repair, &c. on a Nollens's Kingsland road, N.E.

TO BUILDERS. WANTED, by a respectable Young, aged 17, a SITUATION as IMPROVER to the BRICKLAYING. Has had some experience. Was not so much an object a suitable situation.—Address, A. 3, 170, Drury-lane, W.

WANTED, by the Advertiser, a SITUATION TO WORK PLANING or MOULDING MACHINE, or General Joiner, and fill up time at bench.—Address, W. R. 8, Great Cambridge-street, Hackney-road, N.E.

TO MANUFACTURERS. WANTED, an ENGAGEMENT, by a practical Man, who has a good knowledge of stoves and ranges, FURNISHING, hot-water apparatus, job work, and plumbers' work, also a correct bookkeeper and draughtsman.—Address, C. D. 54, Murray-street, City-road, K.C.

TO PLUMBERS AND BUILDERS. WANTED, by a thorough, good Plumber, a SITUATION as PLUMBER and GAS-FITTER. Can do hot-water work, well up in both and outside work. A good jobbing shop preferred.—Apply H. C. 59, Great-bury-road, Kilburn Park, near the Park, N.

TO PLUMBERS AND BUILDERS. WANTED, by the Advertiser, aged 34, a SITUATION as PLUMBER, Gas-fitter, and Plain Zinc-worker.—Address, PLUMBER, No. 30, Radnor-street, Kings-road, Chelsea, S.W.

WANTED, by two JOINERS, just completing a job, to TAKE WORK by the PIECE, Labour only. Good references.—Address, V. 2, 20, Clarendon-street, Harrow-road, Paddington.

WANTED, by the Advertiser, a SITUATION as CLERK, or to Manage a Business. Has been five years in a builder's and contractor's office.—Address, C. R. E. 3, Chertsey-street, St. John's Wood, London, N.W.

TO BUILDERS AND CONTRACTORS. WANTED, a RE-ENGAGEMENT as TIMEKEEPER and BOOKKEEPER, by a Man who has just completed his services at a large country job. First class testimonials.—Address, A. R. 20, 5, Park-street, Mitham, London.

WANTED, a RE-ENGAGEMENT by a good and competent EIGHTH-MAN, in an Architect's or Builder's Office. In well up in all the details of building, specifications, surveys, and quantities.—Address, M. S. P. Post-office, York-road, King's cross.

TO BRICKMAKERS and OTHERS. WANTED, by a Man, of many years' practical experience, a SITUATION as MANAGER of a BRICKFIELD, or to take in per hour.—Address, H. M. care of Mr. Tully, Baker, Southwark-place, Southwark, Thornton Heath, Croydon.

TO PLUMBERS, LANDLORDS, AGENTS, &c. WANTED, by an experienced JOBBING PLUMBER, PAINTER, &c. or as a Three-branch Hand, married, well conversant, a constant SITUATION to do the GENERAL REPAIRS of an ESTATE or House Property. Has had a similar situation. The exceptional reference.—Address, G. L. A. North-street, Beckenham, St. George-in-the-East.

TO BUILDERS and SURVEYORS. WANTED, by a practical Builder, aged 33, a SITUATION, as a MANAGER or ASSISTANT. Has carried out extensive contracts, and is thoroughly experienced in every branch of the trade, and can design, prepare drawings, and estimate.—Address, A. B. 25, Allon-square, Dalston.

TO BUILDERS AND CONTRACTORS. WANTED, by a CLERK, who has just finished his article, an ENGAGEMENT. Highest references as to competency and respectability.—Address, A. 2, 26, Warwick-street, Piccadilly, S.W.

TO BUILDERS and PLUMBERS. WANTED, by a respectable Man, a SITUATION as good PLUMBER. Has no objection to fill up his time in gasfitter or painting if required.—Address, N. 4, 8, Abbey-street, Brompton.

TO BUILDERS. WANTED, by an experienced, good tradesman (General by trade), a RE-ENGAGEMENT as a SHOP, GENERAL or WALKING FOREMAN, or in Charge of a good job, in town or country. The exceptional references from last employer, and Surveyors.—Address, 121, Wadsworth-street, Gifford-street, W.

WANTED, by a thoroughly Practical Man, FOREMAN by trade, a RE-ENGAGEMENT as GENERAL FOREMAN or CLERK of WORKS. Twelve years' experience, with good references from last employer. Aged 35 years.—Address, E. B. 6, Balesgate Park-terrace.

TO ENGINEERS. WANTED, a SITUATION by a Young Man, aged 24, good turner and fitter, to look after Engines and do Boilers. Well up in his work.—Address, G. F. 14, Strand-road, Peckham, London.

THE Advertiser, who is a first-class Draughtsman, desires EMPLOYMENT, permanent or temporary. Salary required very moderate.—Address, A. F. B. 70, Oxford-road, St. Pancras, N.

TO ENGINEERS, RAILWAY CONTRACTORS, BUILDERS, &c. THE Advertiser, a practical PAVIOR, late foreman for fifteen years to the Vestry of St. Marylebone who has taken FOOT and CARRIAGE PAVING and STINK DRESSING by the PIECE, labour only, at reasonable charges. Instructions to the references given.—Apply by letter to R. FRANK, 2, Hart-court-street, St. Marylebone.

THE Advertiser, accustomed to prepare General, Detail, and Perspective Drawings, Bills of Estimates, and accompanied with Land Surveying, desires a SITUATION in a good office.—Address, H. B. D. 1, Wilton-road, Dalston, N.E.

THE Advertiser, aged 25, requires an ENGAGEMENT, to an Architect's Office. Is a first-class draughtsman, has had experience in an architect's office, and at the bench. Will accept any situation where particulars may be advanced.—Address, 104, Office of "The Builder."

IMPORTANT TO INVENTORS, ENGINEERS, AND MANUFACTURERS. THE Advertiser, who is practically acquainted with the construction of machinery, and has a thorough knowledge of mechanical principles, is anxious to obtain engagements, where his great experience in preparing drawings and working out the details for original machinery would render his services most valuable to inventors, engineers, and manufacturers. References extending over many years.—Apply, by letter, to R. F. care of Hobb, Hart, & Co. 75, Chesham-road, London, E.C.

TO ARCHITECTS. THE Advertiser, having just completed a provincial engagement is desirous of obtaining a RE-ENGAGEMENT. Next Draughtsman (perspective and detail).—Address, 5, 5, 5, Office of "The Builder."

TO MASTER BUILDERS. THE Advertiser, having just completed a large job in town, is open to a RE-ENGAGEMENT as FOREMAN, or the Job of Walking Carpenter by trade. Satisfactory references.—Address, W. F. R. Mr. Koster's, Hatley's Marble Works, Popsgrove, Westminster.

TO ARCHITECTS and SURVEYORS. THE Advertiser is desirous of meeting with an ARCHITECT who requires a JUNIOR PARTNER to assist him in his practice. Highest references given and required.—Address, 108, Office of "The Builder."

TO ARCHITECTS and BUILDERS. WANTED, Piece-work, by a thoroughly practical Man of great experience, or a Situation as WORKING DRAWING OFFICER.—Address, Mr. H. Postoffice, Clapham Old Town.

PAINTER, GLAZIER, OAK GRAINER, &c. by a Young Man.—Address, S. R. Mr. Harrell, Printer, Clare, Suffolk.

HOTEL MANAGER.—WANTED, by a thoroughly practical and business man, of great experience, a SITUATION as HOTEL MANAGER in a first-class establishment. References of the highest standing.—Address, COMPASS, 35, Regent-street, W.

TO ARCHITECTS. ENGAGEMENT required by the Advertiser, who has served three years with an architect and four years practically with a builder. Aged 21. Excellent references.—Address, 22, 22, 22, Finsbury-square, Finsbury, E.

CLERKSHIP (Timber-yard) WANTED, by a Young Man, with eight years' experience.—Address, J. O. Office of "The Builder."

TO BUILDERS.—W. SELLS, BRICKWORK POINTED, by Contract or otherwise, in town or country, on the lowest terms, 16, Hope-street, George-road, Holloway, N.

A GENTLEMAN, well educated, a good draughtsman, and nine years in the building trade, desires a SITUATION as CLERK of the WORKS. 24 years old.—Address, TAMIAS, 454 Old Kent-road.

TO BUILDERS. A YOUNG MAN (ARCHITECT) by profession is desirous of meeting with a SITUATION in the Office of a London Building Firm. Would pay 20% premium.—Address, C. G. 6, 4, York-road, Waterloo Bridge.

A FIRST-RATE BUILDER'S SURVEYOR would be glad of occasional EMPLOYMENT in QUANTIFYING, ESTIMATING, or ACCOUNTING, on moderate terms.—Address, W. R. A. Bittell-road, Marylebone, W.

TO BUILDERS OF MASTER PLUMBERS. A THOROUGH GOOD PLUMBER wishes to meet with a JOB or constant SITUATION. Can be highly recommended from his late employers, and can turn his hand to other work.—Address, W. 26, South-street, Upper Westbourne Park, Kensal-road, W.

TO ARCHITECTS. AN efficient ASSISTANT will be DIS-ENGAGED in a few days.—Address, J. P. care of Mr. James Williams, 25, Charlotte-street, Fort-street, W.

TO PLUMBERS, &c. A YOUNG MAN is in want of a SITUATION as IMPROVER. Has been five years in the trade.—Address, A. B. 30, Bishopton-street, Chelsea.

TO ARCHITECTS. AN efficient ASSISTANT, accustomed to town and country work, as a DRAWING OFFICER, Surveyor, &c. per week. First-class references.—Address, J. G. E. Bradford, Derby.

TO RAILWAY CONTRACTORS, &c. A RESPECTABLE Young Man, aged 27, is in want of a SITUATION as a RAILWAY, as FINDER, KEEPER, or anything where trust and confidence would be required. Is a good penman and quick at figures. Would not object to go abroad.—Address, H. M. 21, Brompton-road, New-bath-street, Finsbury.

TO ARCHITECTS and SURVEYORS. A THOROUGHLY competent GENERAL ASSISTANT of 16 years' experience requires a RE-ENGAGEMENT. Would take the management of an office if required. High references.—Address, J. Y. Z. Trimmer's Library, Camden-road, N.W.

AN ARCHITECTURAL ASSISTANT well up in construction, working, detail, and perspective drawing, and has also a knowledge of taking out quantities, wishes an ENGAGEMENT.—Address, No. 54, Old-street, W.

A RESPECTABLE Young Man desires an ENGAGEMENT as IMPROVER in a good Joiner's Shop. Aged 18 years.—Address, F. 6, care of Mr. Woodward, Upper Clapton, N.E.

TO ARCHITECTS. AN ASSISTANT requires a RE-ENGAGEMENT. Good and neat draughtsman, &c.—Address, 5, 5, 5, Office of "The Builder."

TO CARPENTERS and BUILDERS. A RESPECTABLE Young Man, aged 22, wishes to OFFER himself for a term of three or four years, to LEARN the CARPENTER and JOINER TRADE. A good premium paid. With good references. Country preferred.—Address, A. C. P. Postoffice, Clapham Old Town.

TO BUILDERS and PLUMBERS. A YOUNG MAN, a practical PLUMBER, CARPENTER, &c. is in want of a constant SHOP.—Address, A. E. J. MENAON, 10, Church-lane, Clapton, E.

TO CARPENTERS, BUILDERS, &c. A YOUNG MAN, accustomed to the Bench and Jobbing, is in want of EMPLOYMENT. Terms moderate.—Address, J. B. H. Little Clapton-street, Edgware-road.

The Builder.

VOL XXVI.—No. 1336.



Derbyshire.*

GAN assure you," wrote Lord Byron, "there are things in Derbyshire as noble as Greece or Switzerland." And "He that has seen Dovedale has no need to visit the Highlands," said Dr. Johnson, rapturously. There would be no need to indorse these opinions if they related to unknown land, and there must be still less occasion when they are expressed in relation to places the artist's pencil, the engraver's burin, and the pen of the ready writer, have made familiar to every one. We have, moreover, only recently, given our readers a series of "Out and About" sketches of the principal places of interest in Derbyshire.†

But we have now to notice two new guides, one of which sets out to conduct us through four counties, and the other limits our wanderings to a radius of a few miles round Matlock Bath; and in the course of this pleasant task we may have to go over the ground concerning which Byron and Johnson wrote in these glowing terms. We do not intend to follow our Murray through Derbyshire, Notts, Leicester, and Stafford, but rather to walk through the principal seats in the first-mentioned county with the two guides in hand, comparing one with the other.

We take Chatsworth first. Bright and sparkling it rises before us, a white stone palace with chimneys and towers and terraces on a green smooth site of award. This same sward is part of a fine deer park some eleven miles in circumference, and through it, at a little distance before the palace, winds the river Derwent. The first view is so peaceful that it is difficult to realise there could have been a "year of sorrow" here, though we know, in truth, there has been, and more than one. We pass swiftly through the corridor that leads to the great hall, abiding with polished Derbyshire marbles, and thence to the chapel, where are some of the best wood carvings that are never to be forgotten by those who have once seen them. We come to a standstill here, because we wish to ask Mr. Murray why he ascribes these carvings to Grinling Gibbons, without, however, bringing forward any proof that they are his work. In this matter he simply follows Walpole, repeating the paragraph from his "Anecdotes of Painting" that have misled so many. Mr. Hicklin, the author of the more strictly local guide, properly assigns the work to Samuel Watson, who, jointly with Lobb and Davies, was engaged

to execute the ornaments of the state apartments. We cannot reject the testimony of the epitaph in Heonor Church, which would never have claimed the carvings at Chatsworth as the work of Watson if they had been executed by Gibbons:—

"Watson is gone, whose skillful art display'd
To the very life whatever nature made:
View but his wondrous works in Chatsworth Hall,
Which are so gazed at and admired by all.
You'll say 'tis pity he should hide in obscurity,
And nothing said to revive his memory.
My mournful friends, forbear your tears,
For I shall rise when Christ appears."

Honor to whom honour is due. Mr. Hicklin says further:—

"Lord Orford was misinformed when he spoke of Watson as a pupil of Gibbons, who assisted him chiefly at Chatsworth. It appears that he worked under Young, and afterwards on his own account; his price for daywork was 3s. 10d. a day. It is on record that his grandson, Mr. White Watson, of Bakewell, stated that he was a pupil of Mr. Charles Oakley, carrier in the parish of St. Martin-in-the-fields, London. There is some of his work in that portion of the State apartments at Chatsworth, for which he was paid, in 1703, 1744, for ornaments of the great frieze over the doors, cyphers, coronets, &c. He carved also twenty-two heads, for the galleries in the inner court; and for which, and six vases, he was paid 1077. 10s.; in 1704 he was paid 1122. 16s. for similar work."

The auditor's accounts show that some cases of carved work, statues, and pictures came from London during the progress of the works, the carriage of which cost 141. 15s.; but there is no other entry on them that can possibly be construed into any indication that Gibbons was employed. We quote Mr. Hicklin again:—

"The name of Thomas Young, who was certainly during three years the principal carver in wood, is not mentioned by Lord Orford, nor those of Lobb, Davies, or Lanseroun; the latter, or a person of that name, is mentioned as a painter. The slight mention that is made of Watson is erroneous. It is remarkable that no writer, before Lord Orford published his 'Anecdotes of Painting,' ever spoke of the works of Gibbons at Chatsworth. Dr. Leigh, who gave a particular description of Chatsworth in 1770, 3000 after all the principal apartments were finished, speaks of the works of Verrio, but makes no mention of Gibbons; nor does Dr. Kennet, when describing Chatsworth in his 'Memoirs of the Family of Cavendish.' J. Mackay, who published 'A Tour through England' (the result of actual observation) in 1724, quotes Leigh, and makes no mention of Gibbons, which seems to intimate that the carving was not then shown as his work."

Until there is evidence that the auditor has curiously overlooked Gibbons, from the fact, perhaps, that his work may have been included in some contractor's estimate, or that the cases mentioned above actually contained work from his hand, we must conclude that it was the imagination of Lord Orford that brought him to Chatsworth, and transferred to him the credit that is due to Young, Watson, and other members of the same staff. We must add, that Mr. Murray quotes the epitaph on Watson in his notice of Heonor Church.

We turn to Haddon Hall. All is grey and quiet here. There is a river flowing through the meads around, but it is not the same stream that Chatsworth looks upon. It is the Wye. Grey, sad, full of shadows, but sunshiny withal, is the deserted hall of the Vernons. An impression of enchantment pervades the place. The gazer feels, as the guide conducts him from chamber to chamber, that the opening of the next door may usher him into the presence of the company that thronged the place three centuries ago. But there are no footfalls, no voices, no clattering of horses' hoofs in the courts without, no baying of dogs: all is still; although there are the antique pewter-platters looking as though they were only used yesterday. Hanging on the wall, in the first room entered, are huge jackboots, spurs, a leather doublet, a hunting-born, a matchlock, as though their owner were close at hand; and here is the oaken cradle in which once lay and crowded the first Duke of Rutland. Nothing is stirring save the foliage without; nothing altering its outlines but the slow shadows. Mr. Hicklin mentions, on the authority of rumour only, we perceive, that Mrs. Radcliffe frequently spent the night here when writing her "Mysteries of Udolpho," and desirous of intensifying her powers of descriptive romance. Both guides take us through the building in the same way as that pursued by the custodian of the keys. Here are

the low entrance-gates, with their well-worn steps, the oblain's room, and the chapel, with its open timber roof, music-gallery, and long oaken benches. Coming back into the grey courtyard again, we are ushered into the banqueting-hall, where we may see how a great dinner was served and partaken of in the days of yore; see the raised floor where the lord sat, with his principal guests above the salt, while his dependants ranged themselves on either side of the table below the salt; the iron book in the wall to which a man's wrist was tied, while cold water was poured down his sleeve, if he would not conform to the rules of the house; the hatch through which the trenchers were handed; the broad shelf on the half-door or hatch of the kitchen close by, on which the cooks placed their dishes, whence the serving-men could carry them up a sloping passage to the hall, and place them on the table. Further on, opening out of a passage from the banqueting-hall, is the oak-panelled dining-room, some of the knotted carvings of which we figured in these pages, with its chimney-piece inscribed "Died: God and honor the King," and fine oriel; and after ascending the grand staircase we are shown the large, light, empty drawing-room above this, which is hung with tapestry, though otherwise unfurnished; and the long oak-panelled and oak-floored gallery, which extends along the south front of the hall for 109 ft. 9 in., and has a recess, as large as a modern chamber, 15 ft. by 12 ft., in the centre of the south side; whence to the ante-room of the state bedchamber, where behind the tapestry are folding-doors opening on the steps of the upper garden terrace, and then into the chief sleeping-apartment, the walls of which are also covered with tapestry, and in which stands the state-bed, the green velvet curtains of which are believed to have been embroidered by the wife of Sir Robert Mansers, in the reign of Henry VI.

At Hardwick we lose one of our guides. Mr. Murray alone shows us through the great glazed hall the Countess of Shrewsbury built. He says, without much enthusiasm for its Elizabethan character, "it is still habitable, but destitute of all comfort, and very little suited for a dwelling of the present time, though the duke now and then stays here." Walpole has served again for an opinion and description of this wondrous place, and it comes off but poorly under the hands of the new guide. Especially among the very interesting and historically valuable portraits, we missed mention of Holbein's great drawing of Henry VIII. Fuller has said that "an ounce of mirth, with the same degree of grace, will serve God more than a pound of sorrow." In the same spirit we feel an ounce of appreciation in the art-world, with the same degree of discrimination, is of more service than a pound of cool description.

Mr. Murray has introduced into his volume the local sayings and customs of the counties he describes. Some of these are quaint, others humorous; all are curious. Among the sayings we may quote that of the people of Market Harborough. This town has no lands appertaining to it, a circumstance the residents indicate by saying, "A goose will eat all the grass that grows in Harborough Field." The fictitious common in question is also used as a terror for children:—"I'll throw you into Harborough field." At Groby, where the Queen of Edward IV. lived happily as the wife of Sir John Grey, there is a mere of 40 acres extending beyond the old house, called Stewardsbury. There are two sayings relating to this pool. If great improbability is to be expressed, it is common to say, "Then, I'll bathe Groby Pool with pancakes;" and if a death has taken place, that no one regrets, people say "There is many a wet eye in Groby Pool" for it. In the neighbourhood of Belvoir Castle, there is a weather-saying that runs, "If Bever hath a cap, you curls of the

* "Handbook for Travellers in Derbyshire, Nottinghamshire, Leicestershire, and Staffordshire." London: W. Murray, Abchurch-lane-street, 1868.
† "Barnes's Guide to Matlock, Bakewell, Chatsworth, Haddon Hall, &c." By John Hicklin. London: Bennet & Sons, 21, Paternoster-row; Froughton, Derby; and Blake Library, Matlock.
† Vol. xxiii. pp. 617, 637, 659, and 669.

vale look to this." At Sibley there is a legend of a giant who took three tremendous leaps, which resulted in his death. Starting at Mount Sorrel, where he is supposed to have mounted his sorrel-horse, he leapt to a place called Wanlip (one leap). He then leapt a second mile, coming to the earth with so much force as to burst himself and his horse, at a place called Birstall; and after that misfortune, contrived to take a third leap, the spot at which he alighted being his burial-place, Begrave. This tradition is alluded to in the saying, "He leaps like the Bell-giant or Devil of Mount Sorrel." At Lockington, which is at the extreme of the northern angle of the shire, when it is desirable to get rid of any important person, it is common to say, "Put up your pipes, and go to Lockington Wake." At Billesdon, which is a small irregularly-built Leicestershire village, there is a saying, "In and out like Billesdon." Derbyshire has a geographical saying too. Codnor Park, now celebrated for its iron-works, was once the ancient seat of the family of Zouches. The ruins of their castle consisting of some of the round towers that fortified the courtyard, with fragments of walling, pierced with windows and doorways, are still standing. There was a moat, and there is still a pond in front of the relic, concerning which it is said,—

"When Codnor's pond runs dry,
The lordes may say good bye."

Among the local curious customs is that which was kept up for 140 years at Hilton Hall. On the first day of the year the lord of the manor of Esington brought a goose to the hall and drove it three times round the fire, after which he carried it to the table and received a dish of it for his own use. This droll proceeding was only discontinued when the manors came under one lord. At Walsall, there is an annual adult scramble; for here a custom exists of throwing out apples and nuts from the Town-hall, on St. Clement's day, to be scrambled for by the people. Happy are the boys that are horn in Walsall! At Wichnor, the same custom that has prevailed at Dunmow was once in use, and a wooden fitch of bacon still hangs in the hall. In this case it was John of Gaunt who instituted the custom by arranging that the owner of the hall should hold the tenure in virtue of his keeping a fitch of bacon always ready for any married pair who had been married a year and a day and would take the following oath:—"Hear ye, Sir Philip de Somerville, lord of Wichenor, mayntennor and gyver of this baronnie, I, A. B., sith I wedded my wife, and sith I had her in my keepyng and at my wyll by a year and a day for our marriage, I would not have changed for none other, fairer no fouler, richer no poorer, &c. And if the said B. were sole and I sole, I would take her to be my wyfe before all the women of the world. So help me God and all fleshes!" Before the bacon was conferred upon the happy man, it was carried a journey out of the county of Stafford, with some further ceremonial. At Ashford, besides the custom of ringing the curfew, they keep up the much rarer one of ringing the pancake-bell on Shrove-Tuesday. At Lyme Hall, the property of one family for upwards of five centuries, there was a custom once observed of driving all the deer in the park to the front of the hall and then causing them all to take to the water in one body. In this park are preserved a herd of the wild white cattle considered indigenous. In the hall, which is an antique place cased with a modern exterior, we may add, there is a curious bedstead with a canopy of carved black wood, which is shown as that in which the Black Prince slept when on a visit to Lyme. The Tissington custom of wall-dressing with flowers arranged in devices has been before mentioned in these pages, as well as that of hanging paper garlands in churches in memory of young people, venerated by the Swan of Lichfield:—

"Now, the low beams with paper garlands hung,
In memory of some village youth or maid,
Draw the soft tear, from thrill'd remembrance
spring;
How oft my childhood mark'd that tribute paid!"

But there is a less-known custom in vogue at Casleton, where it is usual for the ringers to hang a garland on one of the pinnacles of the tower of the church on the 25th day of May, and leave it there for the year.

There is a remarkable case of longevity chronicled in the Hand-book as having occurred at King's Bromley, where there was an old woman who saw six generations before she died, all living at once; and so could say, "Rise, daughter, and go to thy daughter, for thy

daughter's daughter hath got a daughter." Another natural curiosity we must pick out for mention out of this region of curiosities of a different character. At Roche Abbey there was in former times the form of a crucifix roughly indicated by nature on a limestone rock. This is thus mentioned by Hunter:—"A natural phenomenon, heightened possibly by art, might contribute to induce the monks to make choice of this spot. Among the fantastic forms of the limestone rock was discovered something which bore the resemblance of our Saviour on the cross. This natural image was held in high reverence, and devotees came on pilgrimage to our Saviour of the Rock. This fact is mentioned in the return made by Cromwell's visitors of the religious houses preparatory to their dissolution." The neighbourhood of Buxton, Matlock Bath, and the Peak is the grand region for natural curiosities, in the shape of waters, wells, and caverns. The fame of its waters brought visitors to Buxton as early as the reign of Queen Elizabeth. Four times was Mary Queen of Scots taken there by her custodian, the Earl of Shrewsbury; and thither went the Earl of Leicester and Lord Burleigh. Macaulay tells us, "England, however, was not in the seventeenth century destitute of watering-places. The gentry of Derbyshire and of the neighbouring counties repaired to Buxton, where they were crowded into low wooden sheds, and regaled with oxtake and with a viand which the hosts called mutton, but which the guests strongly suspected to be dog." The accommodation for the goodly company is thus differently described by the Elizabethan physician, Dr. Jones, who published a treatise upon the Well of Buckston, in 1572:—

"Joinyng to the chiefe springe betwene the river and the bathe, is a very goodly house, foure square, foure stories hie, so well compact with houses of office beneath the amynt wyre; and chimneyes for fyre, to drye your garments in the bathes syde, and other necessaryes most decent."

The unfortunate Mary may have been a patient of Dr. Jones's, for she was at Buxton, with the chary leave of Elizabeth, in 1573, 1576, and 1580. In this last-mentioned visit she met with an accident. The Earl of Shrewsbury, writing to Lord Burleigh at that date, says:—

"I cam beddar to Buxtons w^{ch} my charge the 23 of July. She had a harde byegynne of her journey for when she shuld have taken her horse, he started awaye, and therewith she fell and hurt her hake, w^{ch} she still complains off, notwithstanding she applies the bathe one or twise a daye. I doe strictly observe her mast com^{mand}ments, writen to me by y^r L. in restreynyng all resorts to this place; neither doth she see nor gett to any more than to her owne pepell and such as I appoynt to attende."

The last time the earl's royal charge visited Buxton was in 1582.

Among the minor architectural curiosities of this part of England pointed out are the Saxon crypt at Repton; a curious oak pav on Breedon Church, shut in at the top and sides so as to seclude its occupants from the rest of the congregation; a monument in Denby Church, of mosaic work, inlaid with gold; the crooked spire of Chesterfield; the octagonal church at Stoney Middleton, where is the lover's leap, of 100 ft. depth, taken by a young woman "crossed in love," who was not killed, as it is supposed she wished to be, but miserably lamed for life; many inscribed bells, as that at Eyan, on which is written, "Jesus has cutt spede;" some stained glass; several articles of ancient furniture, preserved at different seats, as state-beds; the dose-doe figures on the marble monument in Kellam Church; and similar notable objects, nearly as vexatious to miss as some of the ancient seats and churches.

The sanitary experiment at Clipstone is described as worth visiting. We quote the condensed account of it:—

"A road on the right leads to Clipstone, 3 miles from Mansfield, an estate of the Duke of Portland. It runs by the side of a canal of irrigation, formed by the duke at an expense of 80,000*l.*, and called the Duke's Flood Dyke, by which the stream of the moor, augmented by the sewerage [sewage] and washings of the town of Mansfield, is distributed by minor cuts, tiled drains, and sluice-gates, along the slopes below it, and has converted a previously barren valley, whose sides were a rabbit warren, overgrown with heath and gorse, and its bottom a swamp, producing barbedocks and rushes, into a most productive tract of meadow and pasture land, yielding three crops of grass annually. The river is diverted near the vale head and along the hill side, and the bottom has been drained. The canal extends to near Olterton, about 7 miles from Mansfield, the latter portion being applied to the lands of Earl Mansvers. These famous meadows have been often quoted, toge-

ther with those near Edinburgh, in sanitary and agricultural discussions. The canal water, after depositing all its more valuable contents upon the land, runs off through the bottom of the valley in a stream as clear as crystal and full of trout, though angling is forbidden. The domain of Clipstone exhibits a specimen of good farming, and is well worth a visit from all who are interested in agricultural improvements."

There is a group of attractions near this place, all duly pointed out in the Hand-book, and which should be borne in mind. It comprises the "Beautiful Gothic archway, called the Duke's Folly," serving for a school, and adorned with statues of the geni of the neighbouring forest; Robin Hood, Little John, Misd Marian, Allen & Dale, Friar Tuck, Cour de Lion, and King John; Birkland Forest, where the partridge has been hunted with the hawk within the memory of man; the Major Oak, 30 ft. in circumference, in which seven people have dined at once; Robin Hood's Larder, a hollow tree, in which a dozen people can stand upright, and in which a noted sheep-stealer used to hang up the carcasses of the sheep; the rubble remains of King John's Palace; the Parliament Oak under which Edward I. held a great council in 1292; and the picturesque forest-village and church of Edwinstowe.

THE CATHEDRAL OF TROYES.

THE Emperor has put Troyes into men's mouths, and tourists and travellers who are turning their faces homewards, either from Switzerland or from beyond the Alps, with still a reserve of time for the intermediate "few days at Paris," will do wisely to trench on their reserve for an intermediate day or two at that same Troyes. There is no city on the line of that long day's journey from Basle to Paris that will so well reward the lover of architecture, the student of its development, or the votary of the general arts, to each and all of whom architecture is almost equally welcome, whether good, bad, or indifferent, in progress or in decay, simple or sophisticated, provided it interests, as it may under any one of these conditions,—as it does under each in turn at Troyes,—to picturesque effect. There is interest at Belfort, there is instruction to be found at Langres, where the cathedral alone repays a halt; but a first halt at Troyes is likely to induce a resolution to make a second. So numerous are its churches, and happily most of them may be found just at this present time,—and even the cathedral to a great extent,—with all the testimonies of their history uneffaced by restoration, either in the best taste or the worst.

The history is much the same here as elsewhere, if here its annals in some chapters seem to be written a little more distinctly than usual. In general summary it may seem but a very old story indeed. Designs overmatched in daring the means of complete execution within reasonable time; fashion changed meanwhile or the directing influence was transferred to other hands. The self-assertion of each successor was as merciless here as elsewhere, and work was carried on according to the new taste, and often enough in an unparading disregard of the congenous. Where the transitions are less violent, and especially when they are towards improvement, we may designate them honorably as developments, albeit it may seem that a structure completed in a single though inferior style were better than a hybrid, whereof one-half is insulted by contemptuous disregard and the other only notably disgraced by unworthy association. Here at Troyes the story of transitions is continued well down to the days of the Renaissance, and the architectural *catena* is so unbroken that it seems clear enough that the men who put Roman façades to Gothic churches were no foreign intruders, but true and native sons of the fathers who had attached Gothic façades to Romanesque naves. It was clearly open to these later men to cite the precedent, and claim to be at least as good—if they had not the Stouenale confidence to "boast to be far better than their sires." They scarcely justified either pretension,—these later men,—certainly not at Troyes, only approximately elsewhere in France. But of the pretension itself they left no doubt. They turned to work in a revived style indeed, but with a resolution, while so working, to produce results similar to nothing that had ever existed before; and in this at least they succeeded where there was, perchance a little too often, no other success to boast of. Few nations can rival the French, it may be safely said, in the arts of peace, no less than of war, in conciliating large-

ness of design with a taste for detail : daring is the attempt to combine qualifications that seem so often hopelessly incompatible. The greatest results are only to be obtained by forcing them into union, and there is glory even in a splendid failure—"Magnis tamen cecidit ausis,"—but woe to him who can do no more than overwhelm elegant and ingenious detail by clumsiness of general mass, or who degrades nobility of magnitude and generosity of scale into a mere acrobatic and paltriness. The architects who built at Troyes just at the crisis when the revolution of taste came on, could not but prove themselves the sons of their immediate fathers. The tendency to the overdone and the fantastic that was rapidly choking the genius of the traditional style could not but reappear in the new adoption, and very extraordinary indeed are some of the new productions in which its survival is exhibited. The traveller who cares not to tarry may see an example close to the railway station, of a Renaissance façade applied to an elder Gothic church; elsewhere within the city we find works still more portentous; occasionally Gothic tracery has been removed from windows that are refilled with combinations of pilasters and dwarfed entablatures and flattened circles. In the façade of the cathedral itself, Gothic and Renaissance work were going on concurrently, and even low down about the piers of towers and doorways it is impossible to divide the schools and epochs by any horizontal line, or clear vertical section; if the right hand supplied the Gothic frame, the left seems to have been ready to fill it in with Classic details; and the cusps and foils of the panels have but the same relief as the sculptured grotesques of mingled foliage and mythological forms, that are niched within and below them. Better than this it was that the new style should strike for entire independence: it was not long in doing so; and at the little village of St. André, near Troyes, the church of the patron saint has an elaborate double portal, in which the self-assertion of the intrusive style is complete.

At this moment, however, we are concerned to point out the interest that lies in tracing the history of the transition to Classicism in architecture, and the seat of a fund of materials for the history at Troyes. The subject has many analogies to the investigation—so interesting, and yet of such tantalizing difficulty—of the more immediate stages of transition between one otherwise well-marked geological period and another: the architect has probably a better hope of completing his theory than the geologist, but only on the condition of taking timely note of monumental records that are liable to increasingly rapid obliteration year by year.

The transition—the impulse to transition—came forth from the country which abounded most in classical remains. Its course was moulded there by individual genius; and in passing to neighboring countries there was the additional influence of the circumstances of transport, and those of reception. History is here caught, or seems to be caught, copying her old exercises—repeating herself.

It is now well understood that the Gothic Church is a Romanesque Church translated into a new architectural dialect in which the expressions of pointed arches supersede the round. Reaction came on some three or four centuries after: the Pointed style—wonderfully developed since its first emancipation from a Round style—was even destined to be translated back into a round style. There was a more vigorous formative energy at work in the first case than in the second. There are incongruous mixtures, doubtless, of the Round and the Pointed in abundance, variously superposed and interposed, as of even transmutation with renovation; but the spirit of innovation was uncompromising and unhampered: it had no prejudices of its own—at least at first—and had no mercy on those of its predecessor. There was thus no detail in the old style that was not held to be open to most searching modification, and every novel exigence was met, for the most part, by novel adjustment, not by an evasion out of tenderness for the capacities of an imposed system. And so it was that this earlier transition had such a healthy development, and that the architecture that resulted was to its antecedent in the relation that a highly bred racer is to a well-conditioned roadster. The identity of species is unquestionable, but the breed and the training of generations have introduced differences before which even such an identity becomes of secondary importance. But when the time came that the transformed Romanesque was to be retransformed into

Roman, the reconquering Roman appeared with an authority that hampered both adjustment and invention, even when they seemed to be most free. The idea of the Order and its elements had an imposing dignity that was not to be trifled with. The changes that even men of decided genius ventured to make in these were but slight and inorganic as compared with the entire recasting by which a Romanesque was converted into a Gothic archivolts—a pilaster into a buttress. Roman architecture, at its very best, was an attempt to unite Italian architecture with the trabecative principle of Greece; an attempt which never was organically completed,—a cradling to the last, and falling as rotting on the bough rather than an over-ripe, or ripe, in any sense. The more truly artistic genius of the Goth succeeded where the Roman failed, and showed by what mutual adaptations the two systems could alone be, and might most happily be, co-operative and harmonious: the revision to the Roman system involved a liability to forfeit all the advantages of a solution already obtained, to resume an abandoned yoke. Architectural invention was owed by the habit of the time that ranged the dicta of Vitruvius with the renown of Cicero, and, in awe of the rediscovered genius of antiquity, had still to learn to distinguish the degrees of its hierarchy.

So it is that the tyranny of Rome, of which the architectural, even as the political type, is the Roman triumphal arch, came back upon us, and oppresses us to this day, but never was heavier than in the earliest generations of its revival. Palladio then took the outline of the façade of Lombard churches, and gained glory from men by changing what was in itself harmonious and original composition into one that was original only, and, as men should all have seen, neither harmonious in itself, nor even in the lower sense of being in accordance with ancient art, unless in the adoption of its faults.

In many of the Renaissance palaces of Venice we see the same manifest principle of substituting Classic details for Medieval, while the Medieval distribution of elevation as well as of interior is, in all the most important respects, unchanged. The transition in this form often commands considerable admiration in Paris, though as a whole it can scarcely effect more than dignity in palpable masquerade.

The proportion of Medieval mind that still survives unsoftened below this unnatural skin varies very considerably. Thus, to the west of the Alps the force of innovation was constantly checked by traditional attachment to the big-pitched roof as a beauty, if it were not, indeed, by traditional belief that, having been so universal and so customary, it must be a necessity; and thus the Palatial, and even the ordinary Domestic, architecture of France, from the time of Francis I. downwards, retained above its Classic details a feature that, more than any other allowed by the Gothic, is at odds with the genius as with the practice of the ancients.

At Troyes instances occur of that most uncleanly form of transition, when new features and details are intermixed incongruously with the old, or when new profiles are applied to old proportions; shafts, for example, being turned into abnormal Ionic columns, and a member is thus produced that is neither new nor old, proscribed both in the under and the upper world.

Matters mend somewhat when the ancient model is still the basis of design, with only so much adjustment applied to it,—it would usually be correct to say only so much violence done to it,—as enables it to be clothed with a tolerably self-consistent drapery of classicism. The process, if carried out with bold and inventive genius, might result in something so truly effective, expressive, and self-consistent as to disdain the qualifying term Transition, and be a term of transition in a better sense, a conclusive and proper Style.

Should failure ensue instead, there remains an impending punishment, and this comes with the accession of the dynasty of fastidious purity. The demand under such a dispensation is for copies pure and simple, literal repetitions of things once right, but only when left in their right places, and that even apart from transference of local relations, can impossibly be literally exact, while they are under penalty to be at least not better. Of this form of the revival there is at least nothing to be seen at Troyes, and it is not here that we recognize as we pass along her ancient streets reproductions of portals or porticoes from "the hooks," not even of a single column that would be acknowledged in

schemes of the five orders. The enormous tower added in the sixteenth century to the church of St. Madeleine is a most portentous, and yet in some respects historically, and as a warning artistically, instructive example. A more monstrous hybrid was surely scarcely ever compounded than has been born of this graft of classicism upon Gothic design; badly designed columns, neither pure as revivals nor desirable as novelties and variations, standing tier above tier on stages of buttresses, but "Talk we not of it,—look and pass along;" and pass we scarce can better than to the better and antique Gothic church to which has been added such strange disfigurement.

The Church of St. Urbain usually engrosses whatever attention can be bestowed on the smaller churches of Troyes; but after repeated visits to both it is La Madeleine that proved to have the strongest hold on the feelings. St. Urbain is dated 1262; the enrichments of its style are lavished on the exterior, while the interior is comparatively plain, and, sooth to say, and not merely by contrast, a little cold. La Madeleine includes whatever is most ancient in the ecclesiastical architecture of this ancient city, from pure Romanesque to the developed Gothic that corresponds, if it may not rather be called identical with, our Early English, and, indeed, in several stages of its development. Here the exterior architecture is comparatively uncareful and uninteresting. The eastern end was reconstructed in a still later style, but is not so unsparsingly out of harmony as the celebrated *jubb* or rood-screen of 1508-17, beautiful as it is. This is well engraved by Ferguson (109), but the figure introduced somewhat exaggerates its scale.

The nave is remarkably short, consisting but of a single system of separate vaulting precisely like the transeps. The western wall seems certainly original, and to preclude the supposition that the design is in this respect incomplete. The plan represents probably an earlier Romanesque church, of which the remains are seen in several piers and columns, with capitals rude enough in execution, but that from technical accuracy in distribution have claim to be called, if not Corinthian, Corinthianesque. The nave has double aisles opening into the pair of arches of the transept; and much as the various piers have been altered, usually to a very bad style, there are remains enough to prove that this distribution also was original.

The north transept, with the crossing, is the most unaltered portion of all of the church in its original Gothic state. A triforium arcade surmounts a string-course that is only slightly separated from the moulding of the large pointed arch below, and is included under another more important string-course that runs fairly into union with the capitals of the shafts that carry vaulting ribs and archivolts of the crossing. This is so far consistent with Early English practice, as we see it at Lincoln or Lichfield; but the tendency to loftiness could not be so prematurely checked in France, and the aspiring energy which presently carried the vaulting shafts as high as the shaft capitals of clearstory windows, asserts itself here, though in less conclusive fashion. Tall lancet-headed clearstory windows rise upon the string-course—a group of five, graduated from the higher central one at the north end,—and the main archivolts and the transverse ribs are stilled before they turn, almost as high as to the level of the springing of the lancet-arches. There are various indications of the extent to which the combination of vaulting and window arches was tentative, in want of correspondence between corresponding compartments. The diagonal vaulting rib of the north transept springs from a shaftlet superposed upon the tall shaft in the angle rising from floor to clearstory base, and takes a curve that has much appearance of being a true semicircle; to harmonize the transverse ribs of smaller span with an arch of such height was a necessity that thus early leads before our eyes to the invention of something much resembling the four-centred arch of latest Gothic. This was a great advance upon the unrefined form of a blunt oval which is given to the line of nook moulding over the clearstory windows on the north side of transept. Simplicity and dignity, too, were no doubt advanced by the change that so soon became universal to quadripartite vaulting; but a little longer perseverance in the earlier system might not have been unfavourable to richness and multiplicity of exercised embellishment.

On the northern wall of this transept the tri-

forum,—the blind-story arcade,—consists of a series of round arches against the wall divided by a group of imperforate shafts carrying the roll mouldings of pointed arches. The clear-story lancets descend on shafts sufficiently detached to admit of passage.

Only the first bay east of the crossing remains unaltered; the clear-story window here has a bold splayed arch filling the groin; a roll nook moulding springing from a slim Corinthian pilaret; the abacus of the pilaret is enriched with that dog-tooth moulding to which the heart of the lover of Early English always warms; it is returned horizontally across the splay, where it rises in the nook till it crosses the face of the wall again horizontally to the point of spring of the lancet roll moulding.

Very happy feeling for gradation is shown in the clustered shafts and the archivolts and diagonal ribs that spring from them at the great crossing. In their general abacus we have examples of those processes of modification that seem to have gone on concurrently at every architectural centre. The angular abacus that receives a diagonal rib, is turned from a feeling of harmony, in the diagonal direction; but only to substitute other discords by its acute and awkward angles with the sides of the adjoining abacus that are left parallel to a transverse springing. In one instance, at least, this difficulty also is corrected, the angles of the abacus being cut off, to the great gain of sweetness of transition. This was one of those cardinal changes that when fully appreciated—it begins sometimes with abacus, sometimes in the group of pilinths—carried forward a style to its correctest form, if sometimes also on its way to sophistication. It marks the great line of transition in the series of bays of Westminster Abbey.

Beyond the first bay of the choir we come upon absolute reconstruction, and here ensues a change of the same intention that governed so many alterations of the older cathedrals. In the interest of masculine expression the necessity was recognized of conferring very decided predominance upon one division of a bay over either of the other two, and, indeed, over the other two together. The transformation of our Norman cathedrals was effected on this plan. In the Madeleine at Troyes, as at Winchester, the later architect obliterated the triforium in order to give a larger share of the unchangeable total height to the pier arches. It is true that at Winchester a certain trace of triforium is left, but the mouldings of the clear-story window are so carried down as in effect to absorb it. The pier arch now becomes a term of sufficient importance to follow in the harmonious sequence of gradation that links the proportions of arches of nave, of transept, of severity, of pier, of window openings. The loftier arches of choir and apse are thus undoubted improvements,—beautiful as was the sacrificed triforium,—and nothing can be better than the vista that is managed to the magnificent painted windows beyond; but the mouldings of these loftier arches are not good, and they die poorly into the plain cylindrical piers without abacus or capital.

The *vitrains* of the Madeleine,—nine or ten large painted glass windows, in perfect preservation,—the church is enclosed towards the east—date in the fifteenth and sixteenth century. They will attract and detain long the attention even of those who may not be without awe of authority or unapprehensive of manifest interest and admiration that would get them into trouble with critics of the specialty. Let the quaintness but not the beauty of the subject of the Creation be inferred from the inscription written below it:—

"Comment après ciel et terre,
Et tout mi en son maylien [sic]
Fust fait nostre premier père
En bel image [sic] de dieu,
Comment il le faut refaire
Trompe de malin esprit
Par sacrifice et prière
De nostre seigneur Jesus Christ."

Finally, then, as regards the architecture of this really beautiful,—I speak of the interior,—interesting, and venerable structure. The style of its early Gothic appears in a remarkably unsettled state, and its tentative deviations for good and ill are as noteworthy as numerous. There is inconsistency, incoherence enough in the older portions, not only in the attachment of the Gothic to the earlier Romanesque, but even later, beyond even what may be palliated as due to the free manipulation of a confessedly elastic style; but the germs of dignified development

are strong around us,—in the masterly application of the dog-tooth moulding in various scales and modifications, the firm yet flexible treatment of the vaulting, the free modification of ribs in section, and of the abacus both in section and plan, of the capital both in proportion and ornament.

Hoardings and enclosures indicate that care is being taken of some portions that are in more or less of jeopardy from age or failure, and repairment will probably ensue. The condition of the building, however, is at present most favourable for pursuing into further particulars that study of its history that is due to its artistic excellence no less than to its antiquity.

GENERALISATION IN ART.

THE celebrated dictum of Hobbes, that "words are the counters of wise men, but the money of fools," has a double force in its first statement; for, while no wise man would accept any word as more than the symbol or concentrated expression of a fact or an idea; on the other hand, no one who thinks at all can be blind to the remarkable significance often attaching to a single word, especially when such word is either absolutely new, or has been brought into use to an unprecedented extent. Among such words, which may be said to stand as landmarks of the advance of the tide of human thought, there is none more noteworthy at present, and none certainly which represents a larger and more important modification of thought and association than that somewhat clumsy polysyllabic "generalisation." This word, along with its verbal compounds, meets us constantly in the pages of the foremost thinkers of the day, more particularly in those works which are devoted to, or connected with, natural science—from political economy to the Darwinian theory: everywhere we are exhorted to generalise our ideas, to generalise our information, &c., and the most important of recent historical works (that of Buckle) was nothing but an attempt to comprise under one vast generalisation the whole history and theory of art, science, and literature. There must be a reason for the constant use of a word which a little while ago was rarely met with in books; it must evidently stand for some general way of viewing things; and it may be worth while for those to whom art is something more than a mere plaything, or than a means of making a living, to consider for a moment what it is which this word generalisation symbolises, and what is its bearing both on the theory of art in general, and on the practice of the particular branch of art which they are interested in cultivating or encouraging.

The word "generalisation," then, seems to be the concrete expression for a remarkable and unmistakable tendency, among thinking minds of the present day, to regard every fact and study every phenomenon, not merely in itself, but in its relation to larger groups of facts, and, finally, to one great law imagined as pervading all nature, and of which isolated facts are merely so many different expressions. Of course the principle of this is nothing new; for the very process of reasoning consists, as all logicians know, of the reference of any particular statement to a general one, with which it does or does not agree. But the tendency to this broad view of facts in their relation to a general law certainly has possessed the minds of men in this generation to a greater extent than it has ever done before; and there can be little doubt that this is in the main the result of the scientific theories and discoveries of the day. Sciences which, when in their infancy, were only groping after elementary facts peculiar to each, and having apparently no connexion with one another, have gradually widened their borders till they have overlapped each other; and it has become evident that what were formerly supposed to be totally distinct branches of study, are, in fact, so much interdependent, that the one cannot be adequately comprehended without some knowledge of the other; and thus, while science was formerly, and in her elementary studies is still, concerned, mainly in studying the differences of things, in her higher forms she is almost entirely concerned with their resemblances and with the capability which they possess of resolving themselves into expressions of a single law.

Although the steps by which this comparatively commanding position of modern science

has been attained are inaccessible to the majority, it is impossible that such views can exist, and be constantly before the minds of those who write our best and most thoughtful books, without in the end influencing a great number of their readers; indeed, there are probably many whose tone of mind and habit of thought have been modified, even without such ideas in their passage through life; and which it cannot be denied that some of the leading apostles of generalisation (as Buckle, and in a lesser degree Comte) have been carried away by the splendid prospect which it seemed to open to them, into speculations baseless and visionary when regarded from our present standpoint, and that their theories would lead to an undue neglect of the claim of individual lives on our sympathy and attention; yet it is evident that this spirit of modern science, as it becomes diffused in society, must have the tendency to widen and enlarge men's ideas, to break down class and sectarian barriers, and, above all, to give to each man a more due idea of the relative value of his own particular occupation or pursuit, as a part of the great work of the world.

It is chiefly, perhaps, we may say only, in this last-mentioned view of the subject that we discern its significance in relation to the art-development of the present day; a significance to which it is all the more important to insist upon because just now art seems, of all the occupations which are engaging modern intellect, to be the one least penetrated or touched by this enlarged and comprehensive spirit,—to be, in fact, in opposition (in its popular forms at least) to the genuine feeling of the age, as exhibited in the ranks of the foremost intellect of our time. This is the more remarkable, since the history of the great artistic epochs of the world shows us art or poetry as pre-eminently the generalising influence,—the power which deals not with parts but with wholes, which concerns itself with those broad associations of ideas and feelings which can only have full play when the disturbing influences of minor details and facts are left out of consideration. At periods when geology and social science were unimagined, and before astronomy had emerged from what Comte would call its theological stage, the Greeks were generalising all the principles of beauty discernible in nature into those types of architectural and sculptural design, which have been surpassed certainly in intensity of expression, but never in perfection and completeness; and under the hands of Raffaele and some of his compeers arose the same broad and simple style of artistic expression, seizing upon the essential points which connect pictorial imagery with mental ideas, content to neglect all those minutia which, because they did not further, would on that account probably detract from, the main expression of the work; so that in their period art seems to stand as the one clear and comprehensible light, in a time shadowed by much moral, social, and scientific anomaly. In the present day the reverse seems to be the case; art and science have changed places. While we are gaining year by year those clearer lights on scientific and social subjects which enable us to connect the former with the latter, and to regard them as in a great degree different aspects of the working of one great law; there has certainly been no period when so much attention has been directed to, and so much energy expended in, artistic production of one kind or another, combined with such a want of certainty as to the object to be attained or the means of attaining it, and such a want of perception of the coherence of the various forms of art, and of the existence of broad principles which are common to them all. Take, for instance, painting, the most popular branch of art just now, and the one whose results are most easily compared side by side. The walls of our exhibitions are covered with what seem the productions of a dozen different periods and countries; so little evidence is there of any unity of purpose or principle, or any concurrence of opinion as to what art really is or what is required of it. And this want of generalisation is for the most part as apparent in single pictures as in the contemplation of the whole as a collection. For what is called generalisation in science is in the main the same thing, or at least springs from the same general causes as those which induce what is called "breadth" in art,—a quality which can scarcely be otherwise defined, but which was once well understood,

the main characteristic thereof being the recognition of a leading motive in a work of art, and the subordination of all details in the execution to the one end of emphasizing and clearly expressing that motive. This, it will readily be seen, is completely analogous to that peculiarity of modern scientific investigation and thought before described. But the majority of artists at present seem absorbed entirely in painting detail; detail of clothing, detail of anatomy, detail of flowers, trees, or still life, with much labour and accuracy, but in a mechanical purposeless manner—a state of things which is exactly reflected in the greater part, indeed almost the whole, of the poetical and architectural art of the day, if indeed these latter deserve the name of art. So that it has come to pass that art in our day is not, what in its two greatest epochs, those of the Greek sculptors and the Renaissance painters, it certainly was, the expression of the highest intellect of the day. On the contrary, the greatest minds now and recently amongst us, immersed in the great studies and results to which modern science, with her broad and coherent methods, has been leading them, have rather turned their backs upon modern art, even as Horatius turned from the Tuscan army, "as not deigning" to bestow serious regard on studies which seem to move by no rule and to be directed to no fixed goal.

These considerations may the more fitly be dwelt upon in these pages, since the conditions of architecture in a peculiar degree demand that, in its highest forms of expression, it should be the result of a wide and thoughtful generalisation; both from the peculiar position which it holds with regard to the other arts, and from the nature of the resources from which its own individual power is derived. Viewed in relation to the others, architecture may be called emphatically the generalising art. Its possibility of connexion with the other plastic arts, which are all susceptible of being used as attendants upon it, giving definite expression to its various parts, renders it absolutely necessary that architecture should be in harmony with, and form a kind of concentrated expression of, the artistic feeling and principles of its time (supposing these to have a definite and ascertained direction), in order to produce a harmonious unity of expression, and to appear as the natural centre round which the other plastic arts range themselves, and to which they owe their appearance of connexion and union for one grand end. And architecture being thus connected on all hands with other more definite though narrower forms of artistic expression, it is evident how necessary to its practitioners is that comprehensive view of the general art-principles and practice of their day, which will enable them to meet the practitioners of the other branches of art on common ground, and so to design the great monuments of their own art that these latter may appear as the proper and fitting background for the sculpture and painting which will always form their best decoration, and that such added decorations may appear to be only the more concentrated expression in detail of the same feeling which has been shadowed forth more broadly, though indefinitely, by the building itself.

But if we come to consider the problem of architectural design, *per se*, apart from any consideration of relation to the arts which accompany it, it is still more evident how necessary to its successful accomplishment is the study of general principles of beauty, as distinguished from the mere selection and reproduction of beautiful forms from nature. Much of the merit of the painter and sculptor consists in the fidelity with which they reproduce and copy in their respective materials the colour and forms of natural objects; and though no small industry and labour, combined with natural aptitude of hand and eye, are necessary to arrive at any real success even in this mechanical branch of the art, still it is a result which (given the requisite aptitude) can be attained by labour, without any great mental exercise or power of thought; and while it is admitted that no picture or statue can take rank as very high art which exhibits merely successful imitation unaccompanied by intellectual expression, yet even the successful imitation of nature is a power in itself, productive of pleasure to the beholder; while the fact that the sculptor or painter has to express his feelings through the medium of forms already made to his hand, no departure from which can be tolerated, certainly simplifies his path very much, and stands

him instead of a great deal of philosophising as to the true principles of beauty in form and colour.

But with the architect such philosophising would seem to be almost a necessity, if he would penetrate the mystery of his art, and give to it all the expression and power of which it is in reality, in its highest forms, capable. He has no "life" class to attend to, no model from which to copy direct, no forms of beauty around him, the mere faithful transcript of which will be sufficient to make his name honourably known among his brethren. He cannot, like the landscape-painter, collect during a summer tour boundless resources of colour and effect from the mere woods, and hills, and streams before him, which seem waiting there to yield their beauty up to the ready canvas and the practised pencil; the most that he can do in this way is to make a sketching-tour among the ruins of buildings erected long ago for different purposes from those which his own day require of him, and by workmen possessed of ideas of beauty quite distinct from those which would recommend themselves to the leading intellects now around him, even as their knowledge of construction and economy of material was based upon considerations widely different from the careful calculations of the modern engineer. This, however, is left him, and to this resource he commonly betakes himself, for it is the last harrier which divides him from the labour of original thought. It is well if he have a mind sufficiently educated to enable him to trace the principles which are exhibited in the works before him, to perceive the relation between the end aimed at and the means used to attain to it, and thus to read the works of his ancestors even as characters in history should be read, not merely with regard to what they actually did in the circumstances in which they were placed, but with regard also to what they, being the same men, would do under present circumstances, could they have experienced thereof. But the probability is, that there is little enough of this spirit in the architectural tourist, and that he comes back with his note-book filled with incoherently collected details, which are forthwith reproduced, with little alteration, in his works, where they tell the tale of his recent wanderings, and indicate what region of architectural remains he has last been groping amongst. What is really necessary to deliver him from this Slough of Despond is that education of mind which will lead to the habit of thought which we have called generalisation. The architect, having no definite forms to copy from, even in ornamenting his building (unless he commit the absurdity of reproducing in rigid stone or iron forms of which every line tells that they were originally created in a soft and yielding material), much less in its general aspect and plan, is called upon to generalise from the natural facts and incidents of beauty around him; to observe what one quality is common to a number of beautiful impressions, either in Nature or in the sister arts, and then to produce a design displaying that essential quality in a form suited to the material with which he has to deal; to give the essence of beauty, so to speak, without its accidents; so that where, for instance, a floral ornament may seem a proper and desirable accessory to the expression of a building, we may see there no partial attempt at copying the vegetable productions of nature, but rather a well-considered form, efficiently rigid not to appear in danger of being crushed by the superstructure, not out of keeping with the necessarily rigid lines of the building, and exhibiting not the accidental form of one particular growth of nature, but recalling the principle of growth which runs through all. So a column or support (as in that splendid instance of generalisation, the Greek Doric column), while free from all such absurdity as the copying of the limb of man or animal, will yet exhibit the same principle of form and balance which is exhibited in nature whenever strength is required. These are but isolated instances of the principle which should govern all relations between natural objects and architectural design; but even to rightly comprehend this principle, much more to rightly practise it, an intellectual education is required very different and very much beyond that which is attainable, and is considered sufficient, by most architectural students in the present day; and we propose in continuing the subject, to consider what are the defects in our architectural education suggested by this view of the necessity of generalisation in architecture, and how such defects may be in any degree remedied.

THE LAUNCH OF THE "BERMUDA."

The Talmud has preserved a tradition that the giants, who watched the shipwright labours of the patriarch Noah with the same incredulous dislike with which they received his oral warnings, were wont to ask, with jibes and scoffs, how the great ship was to be brought to the water. The world may have grown wiser during the 4,500 years, or more, that have elapsed since the date so memorable as an era to the builder, but it has not become so absolutely wise but that the questions, and even the lamore than one echo within the last dozen years. The refusal, on the first day's trial, of the floating-dock *Bermuda* to float, or to stir from the spot on which the enormous mass of 9,000 tons of iron plate has been riveted together, shows that our constructors have failed fully to profit by the lessons of the *Northumberland* or the *Great Eastern*, to say nothing of the humbler voice of counsel and of warning which has sounded from our own pages.

The last century has witnessed so signal an advance in the condition of the country, in so far as that condition can be affected by the knowledge and by the labours of the engineer, that we are apt to overlook our failures, or to count the cost of that habitual procedure by rule of thumb which may, without exaggeration, be said to have increased the expense of our public works by at least 30 per cent. It has been in works carried on avowedly at the public cost that this waste has been most enormous, attaining its evil maximum in the management, or rather the mismanagement, of our dockyards. But in all instances where the money of shareholders, or of sleeping partners of any kind, has to be expended, we are apt to find wasteful, or ill-considered, expenditure rather the rule than the exception.

When we consider the state of England a century since, we are entitled to take an honest pride in the results of the subsequent labours of our self-taught engineers. Our roads may be said to date from 1745. The reclamation of our fens, the erection of lighthouses, the formation of docks and harbours, the canal system, the railway system, all date within three generations. Since the days of our great-grandfathers we have not only covered our island and its coasts with these noble and useful works, but, which is more, we have produced the men who have not only carried them out, but have originated them.

It is only a thing of yesterday that engineering should so far take its station among practical sciences as that an expensive and highly-cultured education should be thought requisite for the engineer; and even at the moment it is rather for the military, than for the civil, engineer that such a training is viewed as absolutely essential. But the men to whom we owe the origination of English engineering (since the skill which moved the mighty blocks of Avelry and of Stonehenge has passed away, leaving no record but that of the blocks themselves) were not, for the most part, educated men. Rennie, the architect and builder of London Bridge, of Southwark Bridge, of Waterloo Bridge, was a self-taught millwright. Smeaton, the builder of the Eddystone Lighthouse, commenced life as a maker of mathematical instruments. Telford, author of the Menai Suspension Bridge, and of the Chester and Holyhead road, was a working mason. George Stephenson was a colliery labourer.

One marked distinction has very generally obtained between the works of these self-formed engineers, and those of the more cultured and highly-educated men who have replaced them. The workmen have advanced step by step. They have foreseen practical difficulties, and they have provided for those temporary stages of the work which the theoretic engineer is sometimes too apt to overlook. Thus, in the designs of Rennie for his great bridges, the construction of the centring appears to have occupied as much of the care of the designer as the elevation of the structure itself. The engineer of the London and Birmingham, and of the Great Western Railway, when they issued their drawings and specifications for public tender, left the centres of their bridges entirely undescribed. They were to be at the risk, and after the designs, of the contractors.

This neglect of minute attention to any detail, even to those of temporary and subsidiary work, has been illustrated by not a few great engineering mishaps. It is hardly fair to the memory of Mr. Brunel to class the launch of the

Great Eastern with that of the *Northumberland*. Those who had the advantage of personal intimacy with the engineer of the *Great Eastern* ship are aware of the remarkable and untiring patience with which he was accustomed to ponder over every step of his hold and original projects. This care had not been wanting in planning the launch of the *Great Eastern*. The enormous length of the vessel, as compared with the width of the river, led the great engineer to decide on a sideways launch. The displacement of so great a mass in a lateral direction, is attended by less impetus than the vessel naturally acquires in running headlong down sloping "ways," and, where there is not room for the full swing of the floating body, the motion in the river, in the former case, would be more under the control of the engineer. At the same time there arose danger from the want of experience as to this method of launch. It was this very want of experience with which the profound meditation of Brunel enabled him in so many instances to dispense. Nor is there any reason to doubt that the launch of the *Great Eastern* would have been a perfect success, but for a circumstance almost entirely independent of the mechanical conditions of the problem. It was not the mechanic who was at fault: it was the policeman. The river, at the time fixed for the launch, was covered with boats of every size. All attempts to keep the public at such a distance as regard for their safety demanded were set at naught, and the full surge that would have attended the unchecked launch would have caused the submergence of many of these foolhardy trespassers, and, very possibly, would have involved a great loss of life. It was to prevent this that Mr. Brunel, when the great mass was, in accordance with his provision, fairly under way, gave orders to check its accelerating speed. The check acted as a terrible blow on the whole of the subjacent structure. The inclination of the "ways" was disturbed, for the mass of the vessel was driven upon the piling as if by a gigantic fall. The result was natural and unavoidable, but it is to be attributed to Brunel's care for the careless spectators, and not to any miscalculation as to the mode of launch, or the power requisite to start the enormous fabric over the "ways."

In the *Northumberland* the case was entirely different. A mechanical error of great magnitude was committed, as we pointed out at the time, in the structure of the ways. Two separate inclinations were adopted, the result being the interpolation of an angle, or in fact a hill, in the line of descent of the vessel, the consequence of which it might have been easy to foresee.

In the present case the failure which threatened to be even more complete, is happily overcome. The vessel which did not move at all on the first day has been safely launched on the second. It is always unpleasant to be compelled to add one's voice to the chorus of discontent and of blame which misfortune is certain to raise; and it is a pleasure when the warning voice of the public writer has to dwell on what might have been, rather than on what actually was, a great misfortune. Still the failure to start in the first instance the great weight of the *Bermuda* is in itself highly suggestive.

An inference of especial interest, not to marine but to terrestrial builders, is deducible from former failures, as well as from the recent hitch. The Thames is not the best locality for building enormous iron ships. We say nothing for the moment of the labour question, of the slight which the shortsighted selfishness of the shipwrights has brought upon East London, of the wasteful absurdity of dividing our Government dockyards into so many disjoint and distant fractions. But the point to which we refer is the fact that, in this great haven and highway of commerce there is no room for the requirements of the builder of a leviathan fleet.

There can be no doubt that the launch of an iron vessel of the size of the *Great Eastern* or of the *Bermuda*, even if conducted on the most well-ordered design and with the most uninterrupted success, is an operation of great cost as well as of considerable risk. To some extent, indeed, cost and risk may be considered as counterbalancing one another, and such an arrangement as puts risk out of the question must be attended by an original outlay of a very heavy character. It is true that the steps taken to avoid it; but, leaving this out of the question, the provision of proper "ways" and the whole expense of the launch

form no trifling item in the total cost of the vessels of which we speak.

There is no adequate reason why this cost or this risk should be encountered. In the crowded Thames it is difficult—perhaps it is impossible—to avoid the necessity; but remove the scene of the labours of the ship-builder, and the difficulty entirely vanishes. There is no reason why a large iron vessel should have to be launched at all. The *Great Eastern* or the *Bermuda* might each have been at this moment afloat without undergoing that costly and hazardous process; and if either of them had been designed by a man of the patient forethought of a practical man like Rennie, it is probable that the difficulty would have been eluded.

In the case of the *Great Eastern* it is within our knowledge that a proposition was made to Mr. Brunel which would have entirely avoided the trouble and cost of the launch. It was considered by him for more than a fortnight, and was then declined on the sole ground that he wished to be able to give such constant personal attention to the construction of his favourite vessel as he could do only if she were built within a short distance of London. The proposition made was to build her in Milford Haven, which, at that time, had just been linked to the capital by the South Wales Railway.

In Milford Haven is to be found a vast natural dock, adequate to contain the navies of the world. Sheltered nooks, with deep water close in shore, tempt the builder of a *Leviathan* to establish his forge on the banks. Nothing would be more simple than to construct such a vessel afloat, either by launching the bottom, when the sides had been carried only so high as to secure flotation, or by constructing the entire work on a properly prepared cradle. The bottom once buoyant, the raising of the sides would be a simple and easy task, and the vessel, thus built afloat, would never have to be launched. The money value of the suggestion is not its only merit. Certitude would, by this means, be substituted for enormous hazard, and the influence of high tides would no longer have to be depended on.

The subject is eminently practical; so are our remarks. It is not the education or the ability of any individual engineer or ship-builder with which we have to do; it is the protection of the public against that needless loss of money which has converted so many of our public works into private misfortunes, instead of unmingled benefits. The writer in pages like our own occupies a position entirely different from that of the political journalist. The latter is an essayist, of more or less learning and ability, on the topics of the day, whose task it is to treat of each as it arises from a special point of view. Amongst politicians, men of the tongue or of the pen, he lives and acts as a politician. He engages in the current warfare, as if from a border fortress, or conspicuous watch-tower, but as one taking no interested part in the fray. With the writer on scientific or on practical subjects, the case is different. His aim is truth. He may, as all men are liable to self-deception, be turned from his course by crochets, by imperfect knowledge of his subject, or even, perhaps, by personal dislike of those of whom he criticises, not the character, but the works. But any such aberration must be the exception rather than the rule. The common elements of disturbance, from personal causes, that affect the political writer, are all but unknown to the scientific journalist. He does not take up the pen to comment on Mr. A.'s speech, or Mr. B.'s pamphlet, or fill his columns by endorsement of the arguments of his friends, or demolition of those of his foes. His writings ought to be, and often are, rather the reports of a consulting engineer on some subject of current importance, than the explanation of the lecturer, or the pleading of the advocate.

But the more fully the scientific writer attains to the fulfilment of his self-imposed task, the more disquiet does he feel that his labours too often miss that direct mark of recognition that would await them if they assumed the form of a professional report. They reach, it is true, a far more extended audience than does the former production. Not only a large number of our own readers, but those of the principal daily papers, for example, had under their eyes our former remarks on the misfortune of the *Northumberland*. That which we are anxious to make clear is, the grave responsibility that must attach to all professional men who are deaf both to the teaching of experience and to the voice of educated warning. We hope to see many more iron vessels of great size and weight constructed.

For a time, but we believe for a limited time only, we shall be building heavily-plated ships of war. The epoch of enormous merchant-vessels is only at its dawn. The *Great Eastern* was intended but as a feeler towards the construction of vessels of a thousand feet in length, or even more. Anything like a return of public confidence will be sure to warm into life a project for an enormous Channel ferry-boat, in the first-class carriage run easily on board of which the traveller may pass from England to France in unbroken slumber, contemptuous of seasickness. In all cases where enormous weights are to be set afloat, we call upon the designers to remember the lessons for which England, publicly or privately, has already paid so dear. We hold that the next engineer who shall fail to slide harmlessly and cheaply into the water 3,000 tons of iron which he has had such costly lessons not to pile together on dry land, will be responsible for the damage. What is it to lay down the finest lines, to calculate most exactly the displacement, to proportion the engine power to the intended speed, to carry into iron existence the creations of the drawing-board, if the step between the arsenal and the ocean has to be bridged at a cost of a tenth or of a fifth of the vessel? Why should the certainty of an outlay of thousands of pounds, and the risk of ten times the amount, be blindly and obstinately encountered?

It is possible that the vested interests of the owners of large ship-building yards may appear to be endangered by this view. We do not think this is the case. We have ample experience in similar matters. All such experience tells us that those who shut their eyes to the importance of admitted scientific truth will ultimately come by the worst. In any invention that has diminished human labour, there has been a division of interest between those who expected to be in some way inconvenienced by the change, and those who took the tide at the flow. It was thus on the one hand that the most enterprising coach-owners came to the front in early railway enterprise. It is thus, on the other hand, that the farmer who depends on horse culture, is distanced by his neighbour who uses the steam plough.

Those ship-builders who hold that, in order to avail themselves without further trouble of the costly conveniences of their own yards, they will run the risk of having to push into the water nine or ten thousand tons of iron in the lump, which they might have floated a ton at a time, will find themselves distanced by those who calculate betimes that it will pay them better to erect a temporary, or even a permanent establishment, on the shore of some available creek; and who, after their first proof of success, will find future work accumulate on them unsought. But engineers should not wait for the education of ship-builders; they should insist on the construction of vessels afloat. Considerations of individual convenience should not be allowed to weigh in such matters, against adherence to the laws of mechanics. We are said to have passed the days of miracle, although the wonderful works of contemporary science are such as to dwarf many of those labours which the superstition of the past attributed to a supernatural origin. But our ship-builders have no right to follow, in this respect, the example of the diluvian patriarch. If they persist, after this third warning, in building floating iron castles on dry land, they will deserve the satire of the lookers on. And if this satire be expressed in legal phraseology, and its point be impressed on the subjects of the joke by the officers of the law, the general comment on the judgment will be the memorable verdict, "Served him right."

While the builder of the *Bermuda* is entitled to adduce, in reply to any criticisms on his plans for launching his noble work, the fact that she is actually afloat, he deserves more unqualified praise for the skilful application of the method of weighting by water ballast, the introduction of which by Mr. Brunel into the double shell of the *Great Eastern* provoked the comment that the engineer had emulated an organic structure. The combination of an outer and an inner iron skin, a series of cellular compartments, and an apparatus for introducing or extracting air or water, is one capable of a very high degree of delicacy and efficiency. It may be noted that the plan of pumping water into the upper compartments, and at the same time admitting the access of the external water into the lower ones by gravitation, would give a double efficacy to every stroke of the pistons. The extraction of air, however, coupled with the

admission of water, will probably prove the most available means of dealing with the distribution of water ballast. The idea of building a large ship to serve as a dock for smaller vessels, a dock to be constructed in our own waters, and tugged to her destination in dependencies where labour is costly and scarce, is one of no small merit. We wish God speed to the *Bermuda*, and a safe arrival at her destination.

BRISTOL AND CLIFTON.

THE first of the new roadways to be constructed by the Bristol Board of Health,—namely, one running from Mauldin-street to Park-row,—has been opened by the mayor. It is called Perry-road after the name of the Chairman of the Streets' Improvement Committee, to whom the carrying out of this and other intended improvements in the means of communication has been referred. At an entertainment given afterwards by Mr. Perry to those who were concerned, that gentleman said the new road they had passed over that day, though it would be one of the greatest boons to the city, by reason of the easy access it would give to Clifton, would be done at this cost.—a man rated at 100*l.* would have to pay something like 2*s.* 6*d.*, while the poor man, rated at 10*l.*, would pay about 3*d.* a year, for the next thirty years. He did think that no one, be he poor or rich, would begrudge paying that amount for so great an advantage. The improvement, as they saw, was quite in its infancy; it was but part of a great scheme. Park-row would be widened, to the same width as the new road, from the new thoroughfare to the Drill-hall; and Mauldin-street would be widened to the same extent from the entrance to the new road to the Infirmary; and ultimately the thoroughfare would be carried through, though not at the same width, to Stoke's-croft, so that the inhabitants of the east end of Bristol would be able to ascend to the heights of Clifton by a very easy access. There were many other matters contemplated: the committee had not confined themselves to the improvement of one locality.

Mr. Alderman Proctor, in replying for the Improvement Committee, incidentally contrasted the new road with Steep-street, which was once the main road to the city. The house there which now stood back was cut away to let coaches pass when they were first introduced.

The City Hotel, which is being erected on the site of the old "White Lion" and "White Hart," in Broad-street, is making rapid progress. The builders are to have an extra 500*l.* if the building be ready for the furniture by the 31st of October. The hotel has a frontage of 110 ft., and it runs back a distance of 136 ft. The front entrance steps, in Broad-street, lead to the vestibule or lobby, 28 ft. by 11 ft., and from this an arched hall runs the extent of the building to the billiard-room. To the left of the hall, after entering, is the commercial-room, 50½ ft. by 27 ft. Opposite this, to the right of the hall, are the coffee-room and club-room, 42 ft. by 27 ft., and 36 ft. by 22 ft. respectively. Up-stairs there are upwards of 100 sitting-rooms and bed-rooms. There will be a range of shops, one story high, in front of the building in Broad-street, with kitchen beneath each. The shops will be covered in with iron and glass. Character is given to the upper part of the main building by a held cornice, the soffit of which is slightly relieved with colour, having beneath it a loggia or open gallery, the front of which is formed with freestone pillars and carved capitals.

New buildings are being carried up in Clifton with marvellous rapidity; in some cases indeed with so much rapidity that they do not get strength enough in their progress to remain up, notwithstanding the bracing air of the downs. Walkers in Clyde-road, Woolcut Park, on the 1st of this month saw a pair of what are called semi-detached villas partly roofed in, with low windows and everything pretty, but when they passed next morning they found in their place only a heap of dusty rubbish,—gold pieces today and only dried leaves to-morrow, as in the fairy tale. It seems that the front wall of the left-hand house fell first, then the front of the adjoining house, and then the flank walls of both as far as the partition wall dividing the front rooms from the back. A local paper gives as the most feasible reason for the fall that the stone was dug on the spot in close proximity

to the walls, and that there was a good deal of heavy blasting to get out stone on the previous day. Judging, however, from the walls that can still be seen, we should say that very heavy blasting was not requisite to produce the disaster; the workmanship is very bad. Moreover, the how-window of one house adjoined the how-window of the next, and they ran in so closely to the party-wall that there was probably but little strength at the junction to carry the bressumer which supported the wall above. As to the party-wall itself, it did not run through on the upper floors, but appears to have luted against the half-brick partition wall that goes from side to side through the two houses. When we add that this half-brick wall is made to carry the floor-joists of the back rooms, and is hulged and twisted in all directions, we shall have said enough to show that the parts of the houses which remain should be carefully examined, if not taken down. We know the difficulties that officers find in the discharge of their duties, or we might, in the interest of the public, have something sharp to say to the district surveyor. Had the fall taken place in the daytime, instead of at night, there would probably have been loss of life to deplore.

COMPLETION OF THE INDIAN COURT.

IN the *Builder* of October 26th, 1867, an illustrated description was given of the inner quadrangle at the New India Offices, Westminster. The reader might have noticed incidentally the remarkable variety of materials employed in the building for decorative purposes, a variety unknown in practice comparatively few years ago. The floor of the court is of tiles, laid to a pattern, and has parapets of Portland stone.

The main portion of the walling, plain and decorative, is of Portland stone. The Doric columns which face the piers dividing the bays of the ground story and first story are of Peterhead red granite, with red Mansfield capitals. The dividing columns of the second floor are of dark grey Aberdeen granite (now, we believe, worked out), with dark grey Dean Forest stone capitals. In addition to these materials there are majolica and mosaic friezes and pateras, and tessellated floors and ceilings in the loggias. In our notice we remarked that the Indian Court had served an important use in connexion with the reception of the Sultan. The result suggested the idea that it might be well to roof in the quadrangle, which has now been done with success.

The view given in the number of the *Builder* above referred to showed the finish according to the original design, by a balustrade round the four sides of the quadrangle at the top, leaving the entire area open to the sky. The after-thought to cover the court by a permanent roof presented a somewhat difficult problem. The whole of the daylight to be obtained had to be received from the sky-opening, which is 80 ft. above the floor of the yard; it was therefore essential that the minimum of opaque surface should be presented, and to this end iron as the hearing agent, and glass as the medium for light, were the only materials that commended themselves for use. The covering of an area 115 ft. long, with a span of 60 ft., would have necessitated the use, had the roof been constructed of timber, of a large aggregate of light-obscuring surface, and divers broad stripes of shadow, which the use of iron obviates.

The roof consists of principals springing from above the tops of the columns in the interior, which are carried up from the basement to the crowning balustrade. It is ironed, and has six laps on each side, each about 8 in. open for ventilation, with 18 in. of lap. The space between the principals is filled in with iron astragals placed at 18 in. between centres, and resting on horizontal angle irons at top and bottom. The ends of the roof are finished with pavilions, the eaves of which only descend to about half the depth of the sides. To compensate for the shorter slope of the roof and to complete the finish at the ends of the court, Mr. Digby Wyatt, under whom the work has been done, has designed a pair of truncated screens, in the Renaissance style, in Ranome's patent concrete stone. These screens, which are highly enriched, are probably the best specimens of their productions that the company has as yet turned out, not excepting the great capitals for the University of Calcutta, which were some 4½ ft. in diameter, and as much in height; or the capitals, finials, and

trusses of the Nawab Nizam's palace at Moorshedabad. The screens are each about 67 ft. long, and in the central or highest part about 7 ft. high. Their mean thickness is about 6 in.

Reverting to the roof and the management displayed in its construction, it should be stated that the cope of the balustrade, which was the original finish at the top, was inadequate to bear the weight of the superstructure that had to be erected. Mr. Wyatt served two purposes, to give extra strength and also finish by the expedient he employed of erecting a strong cast-iron framework behind the balustrade, and resting upon the top of the solid wall. This raised iron wall plate, which furnishes a base for the roof, stands 20 in. above the finished stonework. This contrivance enabled the workmen to construct the roof by travelling scaffolding, without the necessity for poles raised from below, excepting at the ends, at which the terraces afforded ready facilities, furnishing as they do a solid floor from the top of the second story to the roof.

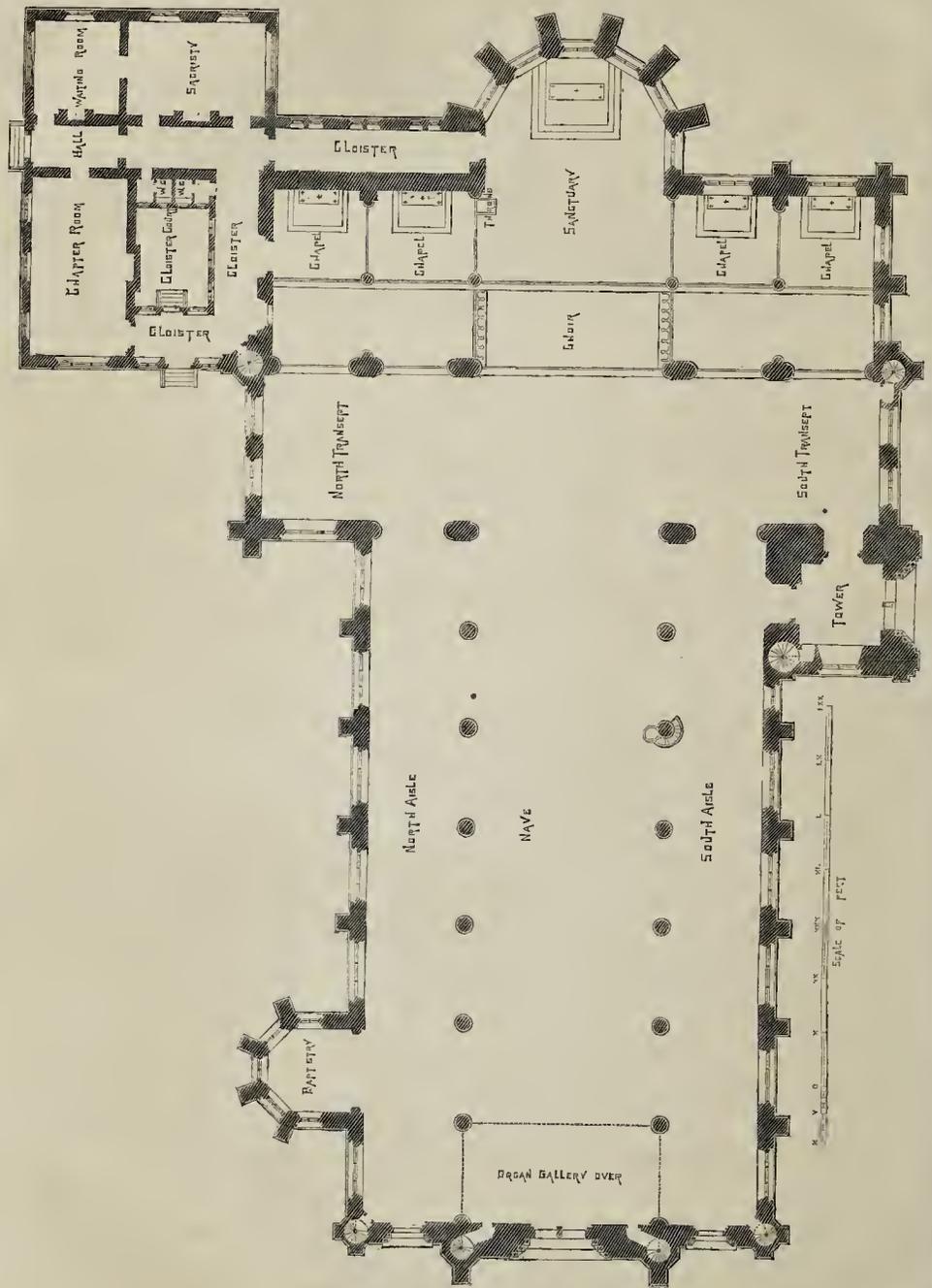
The double ties that connect the feet of the principals of the roof are covered with cast-iron perforated plates of ornamental design, with turned up edges showing about 1½ in. thick. The rolled plates of the principals—the real binders—are 4½ in. deep. The upper plates project over these at each side about 3 in., and the whole produces a good effect in giving the idea of a bound ceiling, the panels being as many skylights, instead of plaster as in an ordinary ceiling.

The colouring of the metal is pale blue, cream colour, dark red, and flat gold, and with the neutral or air tint, in which the metal work above the ceiling is coloured, which does not in any degree attract the eye, produces exactly the result designed. The framing, so to speak, of this great panelled ceiling corresponds, longitudinally and laterally, with the dividing columns and bays in the interior of the court, the decorated girders being carried over from column to column in each direction, single, or coupled as the case may be, in the corresponding girders and columns. Trusses of open iron work, and designed in harmony with the other portions of the ceiling, fill the spaces between the top of the balustrades and the girders above. Large pendants, also of open iron work, are suspended at the intersections of the girders, and the alternate panels have centre ornaments fixed upon rods crossed diagonally in the spaces. The angles at the intersections are enriched throughout with open iron ornaments.

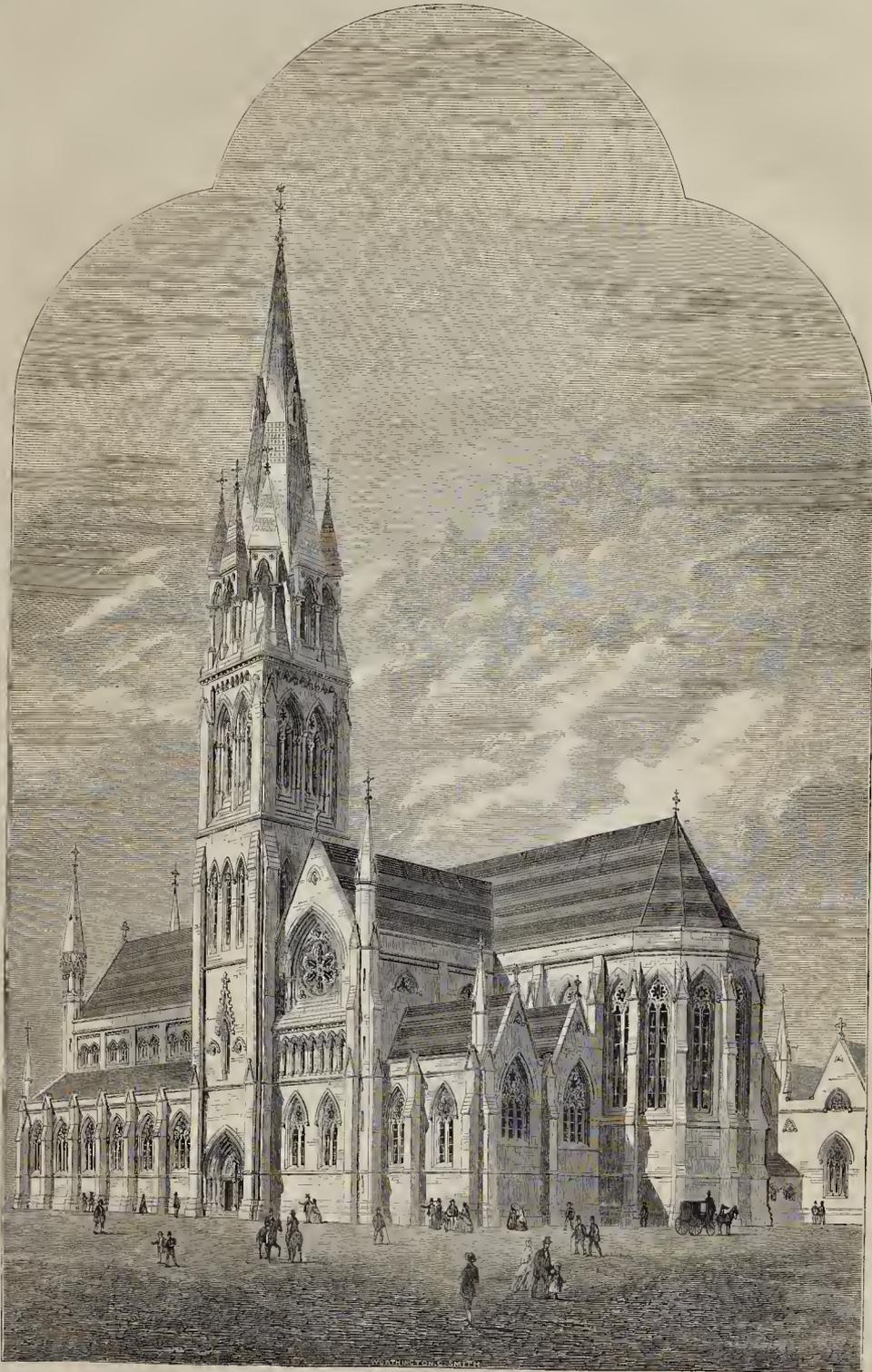
THE (R.C.) CATHEDRAL OF ST. MAC CARTHAIN, MONAGHAN.

THE ancient diocese of Clogher was founded in the fifth century by St. Patrick, who appointed his disciple, St. Mac Carthain, its first bishop. Clogher was chosen, say the antiquaries, by the national apostle, in order that "the disciple might not be too near the metropolitan see of Armagh for familiarity, nor too distant for friendly intercourse." During several centuries the now comparatively obscure town of Clogher, in the county of Tyrone, maintained the dignity of an episcopal city. By the Act of Parliament which suppressed ten bishopricks in 1838, the see of Clogher became united to that of Armagh in the ecclesiastical government of the Established Church. Other circumstances caused the removal of the residence of the Roman Catholic bishop to the more populous town of Monaghan, the capital of the county of the same name. Here the late Bishop Mac Nally commenced, in 1862, the cathedral of which the annexed illustrations show the plan and south-east view. Dr. Mac Nally did little more than lay the foundations. His successor, Bishop Donnelly, has continued the work with unabated zeal. The material of which the cathedral is built is hard grey sandstone from the immediate neighbourhood, relieved by dressings, mullions, and tracery of sandstone of a warmer tone. The building is carried out from the designs and under the superintendence of Mr. J. J. McCarthy, R.H.A., architect, by Mr. John Farrell, clerk of the works.

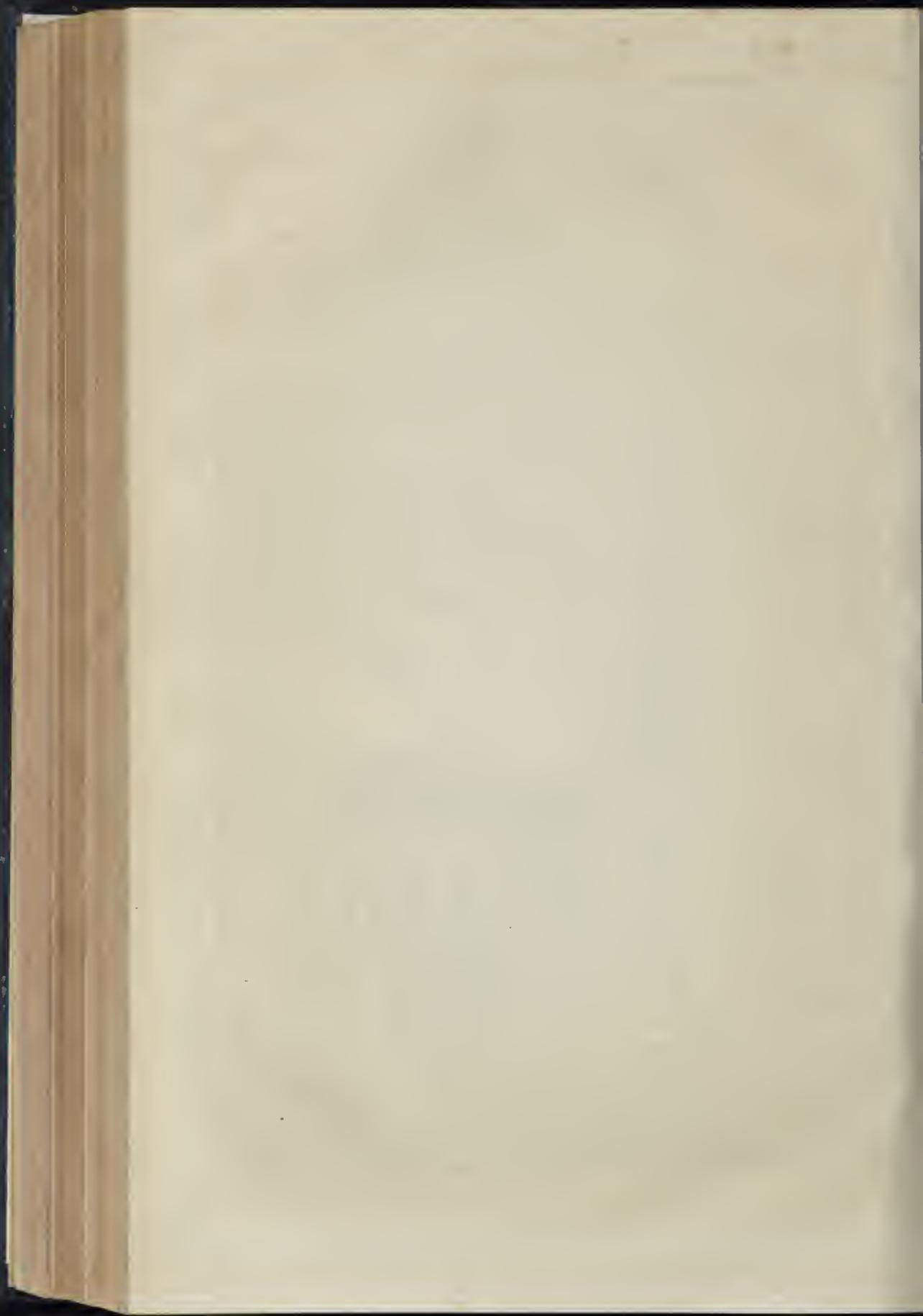
INCREASED PARK EXPENDITURE IN LIVERPOOL. At the last meeting of the Liverpool Town Council, it was resolved that an additional sum of 150,000*l.*, as provided by the Act of 1865, should be borrowed, for the purpose of improving the public parks of Liverpool.



THE CATHEDRAL OF ST. MAC CARTHAIN, MONAGHAN.—Plan.



THE CATHEDRAL OF ST. MAC CARTHAIN, MONAGHAN, IRELAND.—Mr. J. J. MCCARTHY, ARCHITECT.



THE FIFTEENTH CONGRESS OF GERMAN ARCHITECTS AND ENGINEERS.

In our last number we gave the programme of the annual meeting of architects and engineers, which, as we stated, was to take place this year at Hamburg. A temporary tastily-decorated pavilion* had been erected on piles in the centre of the handsome ornamental piece of water, the "Inner Alster," and this was the general rendezvous of about 2,000 architects and engineers on the evening of the 31st of August. Of course much small-beer was consumed on the occasion, but it must have proved an interesting evening to those who had—aa most of these gentlemen have—studied at the Polytechnic schools of Berlin, Hanover, Karlsruhe, Munich, and Stuttgart, to see faces again which they had probably not met since the days when, arrayed in diverse-coloured "coats" caps, they used to hear the same lectures, or went on skeltoning tours under the same professor. The following morning the first general meeting was opened by the president, Mr. F. G. Stammann, architect, of Hamburg. He welcomed the strangers to his ancient Hanse Town, and regretted the unavoidable absence of several leading men of the council, such as Director Karmarsch from Hanover, Mr. Engert, Mr. Theophilus Hansen, and Mr. Fr. Schmidt of Vienna, Mr. G. Semper of Zurich, and Messrs. Wiebe and H. Strack of Berlin. He then read the list of members of the council deceased since their last meeting, all standing up whilst the short list was being read. They were Maack of Hamburg, Siccard von Siccardenburg of Vienna, and Stüler of Berlin. This and other business closed the first general meeting, and the visitors then dispersed in order to visit the various sights of the city. The quays in progress of construction at the harbour and the preliminary works for the new railway bridge across the Elbe attracted considerable attention. The evening again brought all the members together at a special representation at one of the theatres.

The second day, September 2nd, after breakfast at the Zoological Gardens, was chiefly devoted to the reading of papers, followed by discussions, in which many of the leading men of Germany took part. The discussions in the architectural sections included a paper by Dr. Heinzeling, "On Aesthetic Design," and one by Professor von Rügen, "On the Wartburg in the Thuringian Forest," lately restored by him, with discussions on both subjects. Two important subjects were referred to committees to be reported upon, namely, "Professional charges" and "Competitions." To the former of these we propose to return another day; the latter was decided as follows: that the Institute of Architects at Berlin should be requested to publish all *bona-fide* competitions, and that advertisements emanating from other sources should be disregarded. This is a decision which we in England might reflect on with advantage.

The following gentlemen read papers in the sections for civil engineers:—Mr. Hoffmann, C.E., "On Economical Construction of Railway Bridges;" Professor Baumeister, of Karlsruhe, on the History of Bridges and Aqueducts;" Mr. Kúpeke, C.E., also, "On Bridge Construction;" Mr. Haack, C.E., "On the Quays and Works connected with the new Harbour at Hamburg;" Mr. Plath, of Hamburg, on what he calls "The Water Plague," or infusoria clinging to ships.

For the 3rd of September an excursion had been arranged to the interesting old city of Lübeck, which was reached by tea a.m. Tickets of four different colours had been issued to the members, and, on arrival, they mustered under small flags corresponding in colour with their tickets. By this simple contrivance, the otherwise unwieldy number of eight-seers was sub-divided, and visited every point of interest, but in different order, so that they never met, and therefore never obstructed each other. To describe what they saw would be to transcribe from Murray or Bradshaw. Lübeck, as well as Bremen, has its "Bethlehämeller," with the twelve Apostles, or huge variety of Rhenish wine, some so old that both taste and colour have departed long ago; and we are especially told that this, not the least crions of the sights of Lübeck, was by no means forgotten.

* This pavilion was built with consent of the authorities, on condition that it should be removed immediately after the Congress. It is now to remain until after the festivities in honour of the King of Prussia, who is expected to visit Hamburg, on his return from a tour in the Holstein and other new provinces of his extended dominions.

The 4th of September was the last day of the congress, and was chiefly occupied in committee meetings and in the final general meeting, in which Dr. Stammann reviewed the proceedings, of the various sections, and then brought the business part of the congress to a close. In the evening a *conversazione* united all for the last time; and although it was announced that pleasure trips to Heligoland and to Kiel had been arranged for those who could or would remain a few days longer, the great majority left the next day for their various homes.

NOTES FROM SIENA.

It is satisfactory to find that, notwithstanding the present somewhat anti-ecclesiastical tendencies dominant in the political and social temper of Italy, all due care is taken for the dignity, decorum, and restoration of great religious monuments. A sojourn at Siena has afforded the writer the opportunity of inspecting and admiring works now in progress; for the most esteemed local sculptors have been engaged in this fine old city, still so decidedly Medieval. On the façade of the glorious Duomo, the statues of prophets, by Jacopo della Quercia (his first works executed in marble), are now being, or have already been, restored by two native artists—Sarrocci, a pupil of Dupre, and Maccari. Other statues and emblems, by three pupils of Niccolò Pisano, named Goro, Donato, and Lapo, are, so far as restoration is required, to be in the same manner retouched; and a half-length statue of an ancient king is now in the studio of Sarrocci, to be renewed for the same church-front. Two of the emblems of confederate cities are already finished, the one (an ox) completely renewed, the other (a horse) renovated on the antique original. Della Quercia's majestic statues, on the summits of the two pilasters flanking the chief portal, are, we are glad to see, still preserved in their integrity, though somewhat worn and much discoloured. For the upper parts of the façade, around and above the great circular window, have been commissioned to the same Sienese artists, twenty-four statues, in full or half lengths, of the saints and kings of the Old Testament. The celebrated intarsio pavement of the interior is never shown to the public, in those portions the most prized, except on a few high feast days; but private views are obtainable, when, for a cicerone's fee, the boarding that protects those admirable specimens of inlaid marble work will be removed. We had the pleasure of seeing everything, in this way, and have only to regret the much damaged condition of several among these beautiful *intarsi*, especially those on the landing-places of the stairs external to the Duomo and the Baptistery, or *San Giovanni*, and the two that strikingly illustrate, in groups, the parables of "The Blind leading the Blind," and "The Mote and the Beam," both of date about 1433; also the "Seven Ages," small but admirable figures, by Antonio Federighi, 1475; and the "Death of Absalom," by Pietro del Minella, 1447,—all more or less injured. The ten sibyls, in the aisles, a series commenced 1481, each figure by a different artist, three are now being restored, and, so far as we could judge from what is already done, with intelligence. We understand that it is the intention to accomplish much more for the benefit of this noble church, both inside and outside, where repairs may be found requisite and means are not wanting. There is, happily, no occasion for any modern touches to the sculptures of the famous pulpit, by Niccolò Pisano (1266), which stands in its rich originality and exquisite elaboration intact, revered by time, as by man, to this day.

The total renovation of the *Fonte Gaia*, on the principal piazza of Siena, has been going on for several years, and is now so near to completion that nothing but the figures of the emblematic wife (representing this city) to be placed on different pedestals, advancing into the water, are still wanting. It is well known that the sculptures on this fountain, commenced in 1419, gave a new name to the successful artist, so that thenceforth Jacopo della Quercia became locally celebrated as "Jacopo della Fontana." But time and rigours of climate have dealt hardly with his admirable *chef d'œuvre*. It has been necessary to remove all the marble panels on which his reliefs are executed; and the above-named artist, Sarrocci, has had the commission for copying the entire series,—the Virgin and Child, enthroned

in the central compartment, eight personified Virtues, all being female figures seated, under arched niches, and on the wings that project laterally, the Creation of Adam and the Expulsion from Paradise. In careful execution the copies seem to us praiseworthy; the *ornate* details or pilasters between the niches, graceful; but, in the state in which we have seen the originals, we find it scarcely possible, without opportunity of immediately confronting them with Sarrocci's works, to decide as to the modern artist's fidelity to the spirit or style of the great master, Siena's pride in the fifteenth century. It is consolatory to know that, in their sadly-mutilated condition, his reliefs for the fountain will be, at all events, preserved for posterity, being now deposited in the Communal Palace, there, we understand, to remain. Judging from what we have seen on the piazza, we might observe the inequality of merit in these sculptures, the somewhat heavy, though dignified character of the Madonna's form, and the comparative coarseness of the Adam and Eve, both too fleshy for grace, in the group of the Expulsion. Other things noticeable in the achievements of modern art, within or near to this city, might well repay the visitor for stopping to inspect them.

PAY IN THE PUBLIC WORKS DEPARTMENT, INDIA.

The civil engineers in the employ of the Government of India have just now, we believe, for the second time, tendered a memorial to the Governor-General regarding the smaller rates of pay they receive when holding places of exactly the same responsibility as military officers. To understand the question, it is necessary to go back awhile, and look into the history of the Indian Public Works Department. In the early days of the East-India Company frequent wars left little funds for the improvement of the country. Roads were made to facilitate the movements of troops; barracks were the chief public buildings; all such works were under the Military Board, as it was termed,—a body of four members, consisting of the chief engineer, the commandant of artillery, the commissary-general of the army, a stipendiary member with a secretary. These, besides attending to the public works, had to control the commissariat stud and other departments of the army; and this continued till the business to be done became so extensive that the arrears broke down the system. Thus up to about 1853 the public works were a purely military department, about half the officers composing it being trained military engineers, and the other half officers taken from the cavalry or the line regiments with or without an examination in surveying and the native languages. The departmental rules they followed were those of a compilation entitled the "Barrack Master's Assistant." When Lord Dalhousie commenced civil works on a large scale it was clearly seen that the Military Board was an ineffective means of direction, and its powers were transferred to the Secretariat, whilst the entire organization of the Public Works Department was remodelled. But it still continued to be supplied exclusively from military sources with engineers. India has all along had a civil service, and the civilians, as they are termed, have filled almost every description of office,—judge, magistrate, opium agent, collector of the revenue,—but none of the scientific ones. The reason is obvious enough. The latter have always had small salaries attached to them, and therefore offered no very attractive career as far as emoluments were concerned. Why science should of necessity be rated so low is a matter not easily justified. The effect was to throw them into the hands of the army. The company used to maintain for each native regiment an establishment of some twenty-three officers, whilst the duties of the service in time of peace could in reality be carried on by half that number. The remainder were encouraged to acquire Hindustani or some other of the vernacular languages, and leave their regiments for civil employment; in fact, it was the prospect of obtaining this transfer that led young men of any ability into the Native Military Service at all. For in itself the purely regimental life in time of peace was monotonous, and to an active mind disgusting to the last degree. Everything was settled by regulation, and if not fond of sport or of idleness, there was nothing to be done but drag out existence, creeping out of doors late in

the evening, and indoors early in the forenoon, keeping well out of the way of the sun, and longing for the coming round of leave time or retirement. Promotion was by seniority and excessively slow. A captaincy had often to be awaited fifteen years, and meantime the lieutenant was drawing what his brother civilian, now a collector or nearly 3,000 rupees a year, got when studying the languages upon first coming out to this country, or something like 300*l.* a year. It was, in consequence, a great matter to escape from the insipid and unprofitable life of a native garrison to situations of responsibility and independence. No one could quit his regiment without passing an examination in languages; but once through this, it was seldom any further qualification was exacted. But to secure the most eligible and best-paid appointments it was necessary to have what was called "interest;" that is, to be related or known to men in power. Officers who had interest would never go into such a department as the public works, so the selection was thus far narrowed; and as it was in no way better paid than departments in which the work was lighter, it is unlikely to have had the pick. The corps of engineers having no option, were employed as a matter of course, and seldom or never allowed to select another line. The rest of the department was filled, it may be presumed, chiefly from the cavalry and infantry officers, who could not get in elsewhere. There was one great principle adhered to in remunerating officers withdrawn from regiments for civil duty. They received a civil salary in addition to the pay of their rank. When military promotion was very slow, this enabled the company to secure the services of good men at a most moderate figure. A consolidated salary of the same amount would never have had the appearance of a staff salary, these terms being respectively used in India to denote whether a salary takes regard or not of military rank and pay. But a staff salary was readily sought. That mode of payment, however, was hard on rising merit. A young officer of ability, had he been in the civil service, might mount the ladder very quickly, and be as well off as men of twice his standing in seniority; but it could not be so with the recipient of a staff salary, for his deserts could not accelerate his military advancement, and what he could add to his salary by them was trifling. In 1861 the whole scheme of military promotion in the company's army was altered. Instead of attaining higher military rank by seniority, it was reached by length of service. A lieutenant of twelve years' service became captain, and a captain twenty years in the army became major. The alteration vastly increased the number of officers of field rank, and many who would have been captains for years found themselves majors and colonels. The change told seriously on the Public Works Department. Qualifications are by necessity more attended to than seniority in posting to the different grades, and a captain who is a talented and experienced engineer may be chief engineer while an infantry colonel may be in the lowest grade of executive engineer. Yet the subordinate would receive the most pay of the two under the regulations formerly in force. This was an inequality too glaring to be passed over, and in 1865 a maximum scale was fixed, and above this no military officer, whatever his rank, could draw.

The staff salary principle was, as far as possible, retained, and officers of no particular army standing might draw less than the maximum. The subject of complaint by the civil engineers may now be easily comprehended, if we give the maximum salaries fixed for military officers side by side with the maximum salaries given to civil engineers holding exactly the same appointments and performing precisely the same duties:—

Engineer.	Military.	Civil.
Chief, 1st class	Rs. 2,500	Rs. 2,500
" 2nd	2,000	2,000
" 3rd	1,850	1,750
Superintending, 1st class 1st grade	1,800	1,800
" 2nd	1,650	1,400
" 2nd	1,550	1,200
" 2nd	1,350	1,000
Executive, 1st grade	1,250	900
" 2nd	900	750
" 3rd	750	600
4th	600	500
Assistant, 1st	500	400
" 2nd	450	300
" 3rd	450	200

The memorial does not confine itself to this disparity, but enters into questions of military rank, still further influencing the maximum scale, which would be too much complicating

the matter to consider at present. In a general way there seems no reason for the two classes of chief engineer to receive the same, and the civil executive engineer to receive 25 per cent. less than the military executive engineer. The higher, or military scale, does not appear an excessively liberal one. If 2,500 rupees a month be divided by two, since a rupee and a shilling are in their respective countries practically synonymous—they change rupees for shillings in the shops in the presidency towns of India—1,500*l.* a year is not a great deal for the few at the very head of their profession. Nor is a salary of 1,250 rupees in the same way to be taken as representing an income of 750*l.* a year more than enough for an executive engineer who has been long enough in the service to rise to the first grade of executive engineer, and so on down the list. The Government of India could end the whole business by merely declaring the maximum for military officers to be that for civil engineers. To do so would only be to adequately remunerate a body equally meritorious with the civil service. But the Indian Government is still ruled by prejudices of long standing, and, on grounds it does not relish very much making public, will probably do its utmost to maintain the difference. That the way officials in India are classed and paid is arbitrary in the extreme is sufficiently well known to those connected with the East. The civil service proper, styled the Covenanted Service, has all its leave and pension rules on the most liberal possible footing. The Uncovenanted Service, comprising judges of the High Courts of Justice, educational inspectors, engineers, legal functionaries, surveyors, and others, are mostly under rules framed to suit the native Indians, working in their own country and a congenial climate, which read as harsh to a European as those of the Covenanted Service read generous. Of civil engineers there are two divisions also—the never-ending covenanted and uncovenanted—and the covenanted are not allowed the benefit of covenanted, but are related to the harshness of the uncovenanted rules in all points not provided for in their covenants. If the Government of India will not do away with such anomalous distinctions, it should explain to the public satisfaction why it is they are expedient.

THE SCIENCE OF COLOUR.

I AM sorry that my attempts to define and defend what I believe to be the true theory of colour have been unsuccessful with Mr. Colling. Part of the mystification he complains of seems to arise from his not distinguishing three things that are different,—namely (1), the colour which is the sum of two given colours; (2) the colour which is the mean of two given colours; (3) the colour which is common to both of two given colours.

The sum of two colours is obtained when we add together the whole of the two coloured lights; as, for instance, when we collect all the rays of the red and green portions of the spectrum, without any of the blue rays, and obtain thereby the brightest yellow which it is possible to obtain. This may be done by throwing together the red and green portions of a sunbeam which has passed through a prism upon a white screen, which will reflect them together to the eye; but the experiment requires the aid of some optical appliances, and is not easy for an unskilled observer to perform. The same thing is much more easily done in the method pointed out in my last letter, the rationale of which I there fully explained, as it is not apparent at first sight. If Mr. Colling will give himself the trouble of a little more study he cannot fail to see that the modification of the experiment which he suggests gives no other result than what I stated. It is not correct to say that the green is formed by allowing the yellow to approach the blue ray; the truth is that the yellow disappears where the red rays are not added to the green. He must remember that the purer the spectrum (the narrower the line of white from which it is made) the deeper is the green, and the less conspicuous the yellow; while the bright yellow only appears where the white space is so wide that its red spectrum overlaps its green; and that if it is made still wider, or, which is the same thing, brought nearer to the prism, white appears where the same overlaps the blue spectrum also. When these things are seen it will not be thought ridiculous to say that green added to red makes

yellow, and that by adding blue yellow is converted to white. It is the simple truth of nature, and so clear that if after this Mr. Colling writes any more to the contrary, I shall be tempted to think, in return, that if he is an earnest student in the science of colour, he must be but a dull one.

The mean of two given colours, or that proper to the sum of half the two coloured lights, we may correctly obtain by the method of rotation, or by using a piece of glass as recommended in my treatise and former letters. Let the colours be those of the best pigments, and I do not think better can be found than scarlet vermilion, emerald green, king's yellow, and the powder of cobalt blue, laid on with the least quantity of gum in the water, that will make it adhere to the paper. The results perfectly agree with those obtained by adding the prismatic rays; that is, the vermilion and emerald green give a shade of yellow, of the mean brightness of those pigments, and the king's yellow and cobalt blue give a shade of white of their mean brightness, or a neutral grey, about half way between black and white. If Mr. Colling has a piece of Iceland spar, which gives two images of an object each half its proper brightness, and will lay small round spots of the colours to be mixed side by side on a neutral ground, and view them through the spar in such a position that one image of each shall overlap and be seen together, he will see the same result.

The third point, the colour common to two given colours, is found by the mixture of two transparent pigments; or the superposition of coloured glasses or solutions, against white; and this, in the usual erroneous theory of colours, seems to be regarded in general as the sum, or at least as the mean, of the two colours. I had thought this mistake too well known, and too generally admitted, to need explanation even in a popular treatise; but Mr. Colling's endeavour to explain the production of sky-green by the blue sky being seen through a yellow medium, and of the green of leaves by the mixture of blue and yellow colouring matters, and then to defend the usual theory by such illustrations, proves that he is not aware of the fallacy involved, or quite overlooks the fact that his illustrations (even if the enposed cases are admitted), are but other instances of what is better seen when washes of gamboge and Prussian blue are laid on white paper. The yellow pigment most powerfully absorbs or extinguishes the blue rays, and very freely admits the passage of the red and of the green, as may be seen by analysing its colour by the prism: the blue, especially if it be of a sea-greenish hue, like a moderately thick indigo or Prussian blue, most powerfully extinguishes the red, and admits a considerable quantity of the green rays. Thus the green rays penetrate both pigments together, down to the reflecting surface below and back again, more freely than the rest, and reaching the eye, excite their proper sensation without complication with the red and blue rays which overpowered them in the separate pigments. Thus the green, supposed to be created by the mixture of blue and yellow, is in reality merely filtered out; and the purer the colour of the blue pigment is, the less is the residuum, and the darker the resulting green. When a surface, blue by daylight, is viewed by candle-light, which is deficient in blue rays, its colour is of course modified in like manner on the same principles.

I hope I have made my meaning sufficiently clear; but unless Mr. Colling patiently experiment for himself, and study the subject till he clearly understands the results of the experiments, I have no hope of convincing him. He has wrapped the veil of a false theory about his eyes, and holds it fast at present; and this makes him suppose that a fallacy, obvious to an unprejudiced mind, is a self-evident truth which it is as absurd to deny as "that two and two make one."

One remark I would make on the last sentence of Mr. Colling's letter.—"It is a question whether what we call white light exists at all; probably the term is only comparative, and that we view everything more or less through a coloured medium, according to circumstances." Assuredly no simple or homogeneous light exists which produces the sensation of white; but when we look at a piece of chalk illuminated by the common light of day, and in the normal state of the eye, we can hardly question that the sensation of white we receive is excited by a certain mixture of rays which may therefore be correctly called white light, even though the same

object illuminated by the yellow light of a candle, or seen by an eye which is affected by a predominance of some non-white combination of luminous rays, may not then appear white. In truth, white in all its shades is more easily and correctly determined by the eye than any other colour, probably because, all the three simple sensations being equally excited in it, the eye is not distracted in viewing a white surface by a greater sensibility for one of those sensations than for another.

W. BENSON.

Few of your readers can have failed to see with interest your notice of Mr. Benson's investigations on this subject, the animated controversy of which it has been the occasion, and the author's calm and logical defence of views that seem to some too heretical to deserve patient and candid examination.

I have little desire to enter into the contest, and shall, therefore, not trouble you with any expression of my own opinion on a matter which is purely one of experiment and induction; but I think such of your readers as may be disposed to look at a new theory in your own impartial spirit, may like to see the enclosed extract from Sir John Herschell's "Familiar Lectures on Scientific Subjects," as showing the conclusions of that eminent observer.

CHAS. E. CONDER.

"The consideration of these facts has given rise to a speculation which, if not demonstrable, has at least a high degree of plausibility, and which, at all events, has never yet been disproved,—viz., that there is no real connection between colour and refrangibility, but that there exist three inherently distinct species of light, each competent *per se* to excite the sensation of one of three primary colours, by whose mixture all compound tints are produced, white consisting of their totality, and black being the exponent of their entire absence; that, moreover, each of them has a spectrum of its own, over the whole length of which it is distributed according to its own peculiar law of intensity, and from whose superposition on the same ground results the prismatic spectrum, coloured as we see it."

"In this view of the subject, the prismatic colours, with the exception of the extreme red, are all more or less mixed tints; and this agrees well with its general aspect, in which the red and indigo-blue are the only full and pure tints, the green being by no means a saturated or full green, and the violet having a strong dash of purplish red in it."

The three primary colours assumed in the above figure are red, green, and blue, each in its highest degree of purity and saturation; for it will be readily apprehended that while the admixture of any one, in however small a proportion, will produce a rich though a mixed tint, that of both the others tends to dilution. The only three colours which answer all the experimental conditions, are these three. This may seem contrary to the experience of the artist, who, from his habitual practice in mixing the colours he uses (all of them without exception compound tints) would name yellow, in place of green, as the intermediate primary. The reason is obvious. In all the yellows which he sees there is a large admixture of red with green, and in all his blues more or less green. When mixed, then, there is sure to be a preponderance of green, while the red goes to neutralize a portion of the other two, and so to dilute the outstanding green. On the other hand, the direct mixture of the prismatic yellow and blue, in water proportions, can never be made to produce green, as Professor Maxwell's, M. Helmholtz's, and my own experiments have distinctly proved; while that of the prismatic green and red does produce yellow."

LOCKING RAILWAY CARRIAGE DOORS.

This practice generally conduces to the safety of passengers, that is, if one door only of each compartment is locked, the door on the "six foot" (or middle of the line) side. But of course there are occasions, and the Abergele catastrophe was one of them, when the power immediately to open the locked door is all-important. Allow me to suggest that in each compartment of all passenger carriages, a door-key should be hung up in a glass locked case. On an extreme emergency the glass could be broken, and the key taken out and used. But it should be a criminal offence to break this glass without sufficient excuse.

PASSENGER.

MARGATE AND RAMSGATE.

PERMIT me to inquire again through your columns whether the town councils of these places have had a return of the number of houses in which cesspools, or fever-pits, exist; and the number to which there are proper drains and water-supply. It is my belief that a much more intimate connexion exists between the one of them, when the other is absent, than that is at all desirable. Until the whole system of drainage and water supply has been completely remodelled, neither place can be deemed to fulfil sanitary conditions.

A SURVEYOR,

Holding a Public Appointment.

"JOSEPH NOT A CARPENTER."

SIR,—In your paper of 29th ult. it is stated in a paragraph under the above heading that "when the British Archaeological Association were inspecting the gallery of paintings at Charlton House, attention being called to the picture of Joseph working as a carpenter, assisted by the child Jesus, Mr. Black said he wished that Joseph had been represented in his proper business as a mason, the original term used signifying architect, builder, or mason, and not carpenter. The term carpenter, he argued, was undoubtedly an error, as in the climes where Joseph dwelt no wood was used in the erection of the structures of their houses, but stone only."

Now, without in any way calling in question the merits of Mr. Black as a Greek scholar, I am inclined to believe that in the present instance the authorised version of the New Testament gives the proper translation of the word in question, it being a fact, as well authenticated as any fact connected with the history of Jesus and His relatives can really be held to be, that Joseph was not a mason, but a worker in wood, and that he had nothing to do with building operations.

Justin Martyr says that Joseph was a carpenter, and that Jesus assisted him in his business, which consisted in "making ploughs and yokes for oxen" while the "Gospel of the Infancy of our Saviour" says that "Joseph took Him [Jesus] along with him to all the places where he was sent for to do business, to make gates, and milk-pails, and sieves, and trunks."

W. M.

LIGHT WANTED!

SIR,—Why did not the authorities place the new lamp in Holborn, 3 ft. to the eastward of its present situation, to throw the light up Gray's-inn-road? Why do guardians of the poor, after erecting schools for the children, employ pauper attendants, for the sake of a miserable and short-sighted economy? B.

DAMP DRIVING THROUGH BRICK WALLS IN EXPOSED SITUATIONS.

SIR,—I have found two coats of raw linseed oil a perfect remedy against the above. See that the pointing is good. Apply the oil when the walls are dry. A little Venetian red, in dry powder, added to the oil, improves the colour of the bricks. Cost, about 3d. per yard.

T. R. Y.

WHITEWASH ON STONE.

SIR,—Will any of your readers kindly inform me of a method of freeing a rubble stone wall from many coatings of whitewash otherwise than by the tedious and very inefficient process of scraping? I. H. S.

HERNE BAY.

PERHAPS it would be difficult to name a place where by judicious expenditure of capital so much could be accomplished. The town is half a ruin; houses incompletely—never finished; skeleton frames of houses,—in fact, some are dangerous from the timber supports having perished, and this is a matter requiring the attention of the local board. A number of sheltered retreats want constructing towards the railway; a bend-house, similar to that in Regent's Park; a reading-room; and, above all, a market-place. Everything is very dear; fish supply nil; and Whitstable and Faversham are the depots from which supplies are drawn. The water supply is very defective and scanty.

Surely the *on dit* is not true that the ruinous pier is to be allowed to remain for two years as at present, and that then the London, Chatham, and Dover Railway Company either pull down or rebuild? NEMO.

CHURCH POLYCHROMY.

CONSTRVING a letter in your columns signed "R. C. H.," and asking for information on polychromy, as an effective and cheap way of imparting a warm and cheerful tone to church-walls, I beg to say that I have just had some work of that kind executed in my church, at a very moderate cost, and with extremely satisfactory results. I have had a reredos painted in distemper, with an effect very similar to that of Minton's richest encaustic tiles, and my walls decorated with a dozen boldly-written texts, the whole for the cost of 15*l.* My texts are written in very legible characters, 6 in. in height; and, with the addition of a tall border of a simple pattern, they constitute an ornamental, as well as an edifying, addition to the fabric. JAMES FRASER, *Upton Rectory, Reading.*

ELECTRICAL PIANO.

M. SPEISS, electrical instrument maker at Sumiswald, Switzerland, has invented an excellent combined electric piano, which can be set in movement either in the ordinary way or by means of a battery, giving a current of electricity which acts upon a most ingenious mechanical arrangement. Thus any airs can be played automatically. They are written by means of a contrivance on a hand of paper similar to those on a Jacquart loom.

The apparatus as it stands consists of two different sections, which can be separated from each other at a considerable distance. The first portion or controlling agent is a mechanism of clock-work, the uniform motion of which can be modified at will, which passes a roll of strong paper from one cylinder to another. Between these two the paper is stretched against a brass roller put in contact with one of the wires of an electric battery. Above these three rollers there is a small key-board, the hammers of which, of very thin brass, are in communication with the other pole of the electric battery. The hand of paper prevents the passage of the electricity except where it is pierced with holes of different lengths corresponding to the notes of the air to be played on the piano; the neatness of execution, and the rapid "fingering," are most astonishing; although the battery which performed before our eyes and ears was only composed of thirty-six elements of Daniell's, the force of the piano was fully equal to that exerted by a good player.

Each of the hammers of the piano can be set in movement in two different ways; one, by means of the ordinary touch of the pianist; another, by a small vertical rod of wood, which can lift the lever and strike the note when it is lifted upwards. In the execution of the music this traction is effected by electro-magnets, equal in number to the notes, which are set in motion as soon as the small copper or brass hammers connected with them come opposite to the holes in the governing paper-roll, and establish a current. Thus, every note marked by a hole in the paper-roll sets to work and animates an electro-magnetic coil, which raises the wooden lever and makes the note speak. Other details of contrivance work the pedals; and implies so as to give the necessary intonation to the instrument have been adapted.

THE NORTH OXFORDSHIRE ARCHÆOLOGICAL SOCIETY.

THIS Society had, on the 24th ult., another of their pleasant gatherings. The churches visited were St. Leonard's, Ensham; St. Michael's, Stanton Harcourt; St. Mary's, Cogges; St. Mary's, Witney; and St. Kenelm's, Minster Lovell; three of these cruciform, with a tower in the centre; the other two without transepts, but not without aisles, and with a tower at the east end of north aisle. The party were met at Ensham by the vicar, the Rev. W. G. Bricknell, and at once led to the church, and thence to the old abbey, the vicar being the leader of the party. Stanton Harcourt was next visited, and the incumbent was the guide through the church and the old manor-house. Thence the party went to Witney and afterwards to Cogges, through the fields, receiving attention from the incumbent and his family. Returning to Witney, and having lunched, the party visited the church, after which they proceeded to Minster Lovell Church and the priory ruins. Returning to Witney, a visit was paid to the Museum, under the guidance of Mr. Perdue and a clergyman.

THE FAIRFORD WINDOWS COMMITTEE.

At a special council of the British Archaeological Association on Thursday, the 3rd, Mr. Godwin, V.P., presiding, the following were appointed a committee for ensuring the illustration and preservation of these windows:—Earl Bathurst, president of the association; the vice-presidents, officers, and council of the association; the Rev. D. T. Rice, M.A., vicar of Fairford; the Ven. T. Thorpe, archdeacon of Bristol; the Rev. Canon Powell, vicar of Cirencester; the Rev. Canon Howman; Mr. Tom Taylor; Mr. B. B. Woodward, F.S.A., librarian to the Queen at Windsor; Mr. G. W. Reid, print department British Museum; and Mr. J. D. T.

Niblett, M.A., F.S.A.,—all of whom have consented to act. It was resolved to invite other persons distinguished in art to join the committee, including the presidents of the Royal Academy, Society of Antiquaries, Institute of Architects, and the Archaeological Institute. A "Fairford window account" has been opened at the National Bank, Charing-cross, and some subscriptions are already paid. The honorary secretaries of the association—Mr. F. Leven, M.A., F.S.A., and Mr. E. Roberts, F.S.A.—act as honorary secretaries to the committee. The first work of the committee will be to obtain careful tracings of the whole of the windows with a view to the exchange of portions wrongly placed.

FROM SCOTLAND.

Crief.—The new bridge across the Earn at Crief has now been finished at a cost of several thousand pounds. The building, which was erected under the superintendence of Mr. Alexander Haig, of Edinburgh, will afford accommodation for all descriptions of vehicles, besides a broad footway on the east side for pedestrians. It contains four arches extending to a span of 42 ft. each, and the parapets are fully 100 yards in length.—It appears that efforts are being made for the erection of a new hospital in Crief for the benefit of the poorer classes.

CHURCH-BUILDING NEWS.

Brompton.—The old church, Brompton, has been restored and re-opened. The roofs of the nave and south aisles were unsafe from decay, as well as the walls of the clearstories, owing to the original stone pillars and arches on each side of the nave having been taken out and substituted by elliptical arches of wide span and inferior material. The whole of these and the chancel arch have been restored, together with the clearstory and south aisle windows, which were divested of their mullions and tracery heads, and converted into square elongated openings to afford light to the galleries, of which needless encumbrances the church contained four. The whole of the windows have been glazed with cathedral tinted glass, the floor of the church lowered to its original level, and fitted with benches instead of the wooden box pews. The tower has been thrown open to the church, and is now provided with seats for children; the belfry staircase has been built outside as originally, and all the masonry inside the church has been repaired and cleaned. The outside walls of the church and tower have been pointed, and a new vestry built; and the church has been warmed by hot water by Messrs. Oliver & Co., Chesterfield. It is the intention of the Duke of Devonshire to restore the chancel. The cost of the restorations is about 1,600*l.* The works have been executed by Mr. Marriott, of Staveley, builder. Mr. S. Rollinson, of Chesterfield, was the architect employed.

Llanfair Caerlwinion, Welshpool.—The new church here, which has been rebuilt as far as possible upon the old foundations, consists of nave and chancel, north aisle, vestry, and south porch; and, when the tower (the base of which alone remains) is carried up and thrown open to the church, will provide accommodation in open seats for 427 persons, including children. Every interesting feature from the old church has been carefully preserved. The Transitional south doorway has been restored and re-set; the font repaired and provided with a cover; and the recumbent figure of Einion replaced in the chancel. The old oak roof, having been repaired, is now refixed over the nave and chancel. The north aisle and vestry roofs are new. The chancel is marked internally by a low stone screen, and provided with prayer desk and stalls. The pulpit of stone, with marble panels, &c., stands on the south side. The floor within the altar rails is laid with encaustic tiles from Maw & Co.; the slab at the back of the altar table is also inlaid with majolica and other tiles. The windows, with the exception of that next the pulpit, which is filled with Messrs. Heston & Co.'s glass, are glazed with thick green cathedral glass (the east window being arranged in geometrical patterns, &c.) by Messrs. Dove & Davies, of Shrewsbury. Local blue stone is used for the walling, and red Shelooke for dressings to windows, &c. The work has been carried out at the cost of about 1,900*l.*, by Mr. B. Lloyd, builder, Welshpool,

under the direction of the architect, Mr. E. Haycock, junior, of Shrewsbury.

Llandysilio.—The new church at Llandysilio has been consecrated. By the time the edifice is quite completed it will have cost 2,220*l.*, the contract for the building itself being 1,775*l.*, the residue being required for extras, and nearly the whole amount has been subscribed. The church, which is a Gothic structure, built of Welshpool stone, with Cefn stones for dressings, is erected on the site of the old church, the area being extended. The bell-tower and steeple are at the west end; the steeple rises on a number of Gothic arches from the tower itself. The church is lighted by fifteen windows, full of tracery, the glass being of cathedral tint. On the south side there is an oak Gothic porch-entrance, supported on stone pillars, and seats. The buttresses around have Cefn stone dressings. The interior consists of a principal nave, 20 ft. wide by 80 ft. long, and a north aisle, 16 ft. wide by 80 ft. long. The chancel is approached by five steps, with an additional one to the altar. The reredos is of Caen stone, by Mr. Earp, of London. The choir is divided from the chancel by a stone screen. The seats are open. They are made of Baltic timber, varnished, and are capable of accommodating 300 persons, partly free. The roof is open, and is composed of Baltic timber, but not varnished. In the east end is a painted glass memorial window, by Messrs. Clayton & Bell, of London, the gift of Mr. J. J. Turner, and representing "The Resurrection and the Life." In the centre is "Our Lord and the Clergy," and the other portion "The Perpetual Intercession of our Lord." The arcade is composed of four stone pillars and arches of Cefn stone. The church has taken about eighteen months in the erection, and was built by Mr. J. Potter, of Welshpool, from plans of Mr. J. E. Street; and Mr. W. James, of London, was the clerk of the works.

St. Anthony's (Diocese of Durham).—The church recently erected at St. Anthony's, has been consecrated. The edifice, as at present built, consists of a chancel, 30 ft. by 22 ft.; a nave, 63 ft. by 24 ft. 6 in.; with a south aisle, 10 ft. wide; and an organ chamber and vestry. The arches for a north aisle, to be hereafter erected, are built complete, and a temporary wall encloses them within the church. The accommodation at present provided is for 360 persons. It is intended to build a steeple above the organ chamber as soon as the funds will permit; the foundations having been specially prepared to support this additional weight. The architects, Messrs. Anstn & Johnson, of Newcastle, have designed the building in the Early Pointed style of architecture, and it is constructed, both outside and inside, of red bricks, with some bands of darker bricks internally, with some bands covered with sea-green Westmoreland slates. The choice of the materials was influenced a good deal by the locality, as it was felt that the ordinary local stone so soon becomes black and unpleasing in appearance, and that the common Welsh slates are open to the same objection. The east window of three lights is placed very high in the wall, and below it there is a reredos of Caen stone and tiles. The chancel has a pavement of encaustic tiles, by Maw & Co. The chancel arch, and the arches separating the nave from the aisles, are acutely pointed, and spring from the pillars without any capitals—a local peculiarity observable in St. Nicholas and other of the Newcastle churches. In the west end of the church there are two two-light windows, with a rose window in the gable above them. The seats throughout are low and open, and of Vancouver's Island deal. The church is heated by hot water, and lighted by gas standards and a corona in the chancel. These fittings are the work of Mr. John Davy, of Manchester. The other contractors are Messrs. Potts & Moat, masons; John Irving, joiner; E. Beck, slater; H. Watson, plumber; and Wilson & Romants, painters. All these tradesmen are Newcastle men.

Hastings and St. Leonard's.—St. Paul's Church, for the north-eastern part of St. Mary Magdalen, has been opened for divine service. The contract price for walls and roof exceeds 12,000*l.* The character of the interior fittings is said to warrant the assertion that the expenditure cannot be less than 20,000*l.*; and there is yet a lofty spire to be added to the tower of 82 ft. The style adopted is fourteenth-century Gothic. There are a nave, north and south aisles, chancel, chancel aisle, and chancel apse; also north and south porches,—the former being the principal entrance. Arcades of four arches divide the

nave from the aisle. The columns are of Tinos and Devonshire marble, alternately arranged. Above are clearstories, with quadrupled windows, divided by columns. The chancel is a mass of ornamentation,—floor, walls, and roof each being highly decorated. The chancel floor, which rises considerably above the ground-level of the nave, is laid in encaustic tiles. In the centre is a line of medallions, representing the Slaying of the Innocents; the Stoning of Stephen; the Beheading of St. Paul and St. James; and the Crucifixion of St. Peter. Within the communion are five other designs, of an allegorical character, connected with the Crucifixion, representing the lash, the ladder and rope, the lantern, nails, and hammer; the spear; and the heart, hands, and feet. The floor is entirely covered with coloured encaustic tiles, in various designs. The sedilia, in the southern wall, is in carved Caen stone, with shafts of Derby fossil. The different columns throughout the apse and chancel are of marble, either from the Isle of Tinos (Crece) or from Devonshire. The reredos is also of marble; and the side panels are inlaid with alabaster marble, in patterns. The apse windows are filled in with stained glass, by Messrs. Clayton & Bell, the central subject being the Crucifixion. The other compartments represent the Last Supper and other incidents in the life of the Saviour. The roof is groined, in brick and stone bands. The arches of the transept, sacarium, &c., are moulded, and exhibit some carved angels' heads. The pulpit is constructed in alabaster, with green marble panels, divided by columns and capitals. Some inlaid work and carving are also shown. The organ is one by Mr. C. M. Haldich, of London. It is placed in the north chancel aisle. The walls internally are of dark red brick, with bands of tile work at intervals. The aisles, as high as the dado, to a level with the top of the seats, are lined with encaustic and plain tiles, in various patterns. The stalls for the choir (carved), and the sittings throughout, are of wainscot oak. The roof of the nave is of open timber work, stained. Under the western window is a tablet to the memory of the late Mr. William Gilliat, of East Hoathly, through whom the new church was principally erected. Sittings are provided for about 700 persons. Externally the walls are built of local blue-stone, with Bath stone dressings. The tower will form a prominent landmark. The architect of the new church is Mr. John Newton, of London. He has been represented by Mr. Geo. Walters, clerk of the works. The builders are Messrs. Jackson & Shaw, of London.

Blakenham.—The church of Little Blakenham has been restored. Both roof and walls were in a dilapidated condition. The edifice was filled with square pews, and the pulpit and reading-desk were both badly placed against the north wall. These defects have now been remedied, the pews replaced by benches. The south porch has been renewed, and a new oak door provided. In place of the old ceiling roof is a stained wooden roof. The east window, like the rest of the church, is very simple; it consists of three lights, and is wholly without ornamental tracery; on either side, however, of the window, is a recess, and on these more decoration has been laid than on any other part of the church. In each is a fresco, that in the southern recess being a *fac simile* of the painting, evidently hundreds of years of age, which occupied it previously to the restoration, but which it was necessary to obliterate in order to carry out the repairs. This represents St. John the Baptist holding in his left hand a book, with the lamb, &c., in his right, and on the scroll is written *Eccc Agnus Dei*. The style is quaint, and the old painting is reproduced. In the northern recess it was considered desirable to substitute a new subject for that which existed before the restoration, and the altar-piece of Magdalen College, Cambridge, has been copied, in style resembling the companion fresco on the opposite side, the subject being our Saviour bearing the cross, and on the scroll is inscribed *Eccc homo*. There is a similar picture on the sides of the easternmost window in the north chancel wall, and here the subject is supposed to be St. John receiving the bride. The alterations were carried out from plans prepared by Mr. F. Josselyn by Mr. Hewitt, of Ipswich.

Stoke.—Christ Church, Stoke, has been consecrated. The building was commenced in July, 1867, from a design by Mr. E. Christian, of London, the builders being Messrs. Swayne & Sons, Cuildford. The total cost of the structure when

completes will be about 2,300. The side walls are temporary, it being intended, when sufficient funds are raised, to have additional aisles at each side, with steeple, chancel, &c. The design is in the Pointed style. The church at present consists only of nave. The columns which carry the side arches are of polished Devonshire marble from Torquay. The caps are in Bath stone, carved. The arches consist of alternate layers of brick and Bath stone. The church is paved with 6 in. Staffordshire tiles, red and black. The sittings are open, of Oregon pine, varnished. The roof is of Memel fir, with tie-beams and king-posts. The ceiling is wagon-headed, in panels. The doors are of English oak, with scroll hinges. The western end of the building is finished with Bargate and Bath stone. The west-end gable is surmounted by a cross. The tiling of the roof alternates six courses of new and two of old plain tiles, with a crested ridge. The building is fitted with gas, with corona lights, the fittings being attached to the pillars.

Raglan.—Raglan Church, Monmouthshire, has been re-opened after restoration. The Duke of Beaufort gave a donation of 600l., and also a piece of land for enlarging the churchyard; and the Duchess gave the pulpit, of carved oak. The chapel has been restored as nearly as possible to its former character. The cost of the whole restoration was 2,600l.

South Petherton.—The new cemetery belonging to this parish has been consecrated. The site was known as the Chapel Field, adjoining the road leading from Ilminster to Yeovil. Mr. J. M. Allen, architect, of Crewkerne, prepared the plans. The cost of the two chapels and a lodge, together with the laying-out of the grounds, was estimated at 1,500l. The land cost 200l. per acre—400l.; and the inhabitants voted the required sum, 1,900l., to be raised by rate. Mr. Bartlett undertook the carpentering, and Messrs. Gould & Hallett the masonry. The chapels are not exactly alike. That belonging to the church has a bell-turret and an octagon vestry. The windows are also somewhat different. Both chapels are built of local stone, with Ham stone facings, and have open roofs of stained deal. The floorings are tiled, and the fittings are of stained deal. The windows are filled with stained glass. The cemetery is enclosed by a wall of local stone, the pillars supporting the entrance-gates being of Ham-hill stone. A path of 4 ft. divides the consecrated from the unconsecrated portion. The ground has been levelled and trenched, and several fir trees have been planted. The banks close to the walls are stocked with lambs.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

Staines.—The first stone of the proposed Church of St. Ignatius, at Sunbury, has been laid by the Roman Catholic Archbishop of Westminster, in the presence of a numerous assemblage of the laity, including many from London. A site of half an acre of freehold land has been given for the new church. Mr. Charles Buckler is the architect, and the builders are Messrs. Castle, of Sunbury, and Whitte, of Twickenham. The entire length, including the chancel, is 84 ft., and the width 24 ft. The style is Gothic.

STAINED GLASS.

Defthick Church.—The east window of the parish church of Defthick, co. Derby, has been filled with painted glass. The style of the church is Early English, and the window is composed of three lancet lights and tracery openings. The central light is occupied by the Crucifixion enclosed within a canopy, above which is seated our Lord in sovereignty surrounded by cherubim, and enclosed by conventional foliage and canopies. The side openings are filled respectively with Abraham's sacrifice and Moses lifting up the brazen serpent; these are enclosed within canopies, over which are angels holding scrolls with texts. A base of mosaic work, with inscription, forms the base of the general design. The window is from the works of R. B. Edmundson & Son, Manchester.

Whitchurch Church (Shropshire).—Messrs. Ward & Hughes, of London, have recently completed a stained glass window in this church. The architecture of the old fabric is of the Roman

type; and it is a semi-circular-headed window measuring 22 ft. 6 in. by 8 ft., on the south side that has been filled with painted glass of the sixteenth century character, treated with large sized figures, the costumes of which are executed with a view of representing the Biblical period. There are two subjects—that above the gallery is the meeting of Jacob and Joseph in Egypt. The subject below is the death-bed of Jacob. The ornamental portion is characteristic, and a jewelled border surrounds the whole.

The Brunel Window in Westminster Abbey.—One of the windows in the north aisle of Westminster Abbey has just been filled with stained glass, manufactured by Messrs. Heaton, Bayne & Butler, from the designs of Mr. Henry Holiday. It is placed there as a memorial of the late Sir Isambard Brunel, who died in 1859. The architectural framework consists of two tall lancet arches, surmounted by a quatrefoil opening in the head of the principal arch. The artist has filled the quatrefoil head with a Christ in glory, surrounded with hovering angels with censers. Each of the lower lights contains three subjects from the history of the Jewish Temple, and the lowest portion of each is occupied by two allegorical figures, those on the western side representing Fortitude and Justice, those towards the east Faith and Charity.

St. Saviour's, Eastbourne.—A stained glass window has just been erected in the chancel of St. Saviour's Church, to the memory of Benjamin and Mary Backhouse. It has been erected at a cost of about 200l. The subjects represented are from the closing scenes in our Saviour's life. The work has been executed by Messrs. Clayton & Bell, of London.

Books Received.

Sussex Archaeological Collections relating to the History and Antiquities of the County, published by the Sussex Archaeological Society. Vol. xx. (Vol. viii. of Second Series). George P. Bacon, Lewes. 1868.

The active and prosperous Sussex Archaeological Society have issued another of their interesting and well-edited volumes. It contains papers on Midhurst, Glynde, Cowden, and East Grinstead; on the Buckhall at Cowdray; on Mural Paintings in Pimpton Church; Memorials of the "Lady Percy" of Shakespeare, and her husbands, Hotspur and Camoys; and a variety of others.

VARIORUM.

"The History of the Borough, Castle, and Barony of Alnwick," with numerous illustrations. By George Tait, F.G.S., &c. Alnwick: Blair. 1868. Vol. II. Part I. We have already favorably noticed the issue of this History of Alnwick. The author is a distinguished local antiquary and archaeologist, and the chief discoverer of those curious rock sculptures of Northumberland of which the readers of the *Builder* have before heard. The present part of Mr. Tait's history contains full historical accounts of Alnwick Abbey, Holn Priory, St. Michael's Church, and various other Alnwick edifices; the Chantry of St. Mary and Grammar School, the Scientific and Mechanical Institution, &c., besides a portion of the appendix to the work, and a variety of illustrations of local edifices and antiquities.—"A Guide to the Geology of the Yorkshire Coast." By Martin Simpson, Lecturer and Curator. London: Whittaker & Co. 1868. The Yorkshire coast is a capital field for young geologists as regards the secondary strata, and the overlying drift which has so much increased in interest of late years. The Scarborough and Whitby museums are good schools of illustration also to the geological student of the Yorkshire coast. The Guide under notice is illustrated by sections of the strata, and seems to be a useful little book for local visitors with a turn for geology.

Miscellaneous.

THE PRESIDENT OF THE INSTITUTE OF ARCHITECTS.—The proposed portrait for the Institute of Mr. Tito, M.P., is to be painted by Mr. J. P. Knight, R.A. It will be uniform in size with that of the late Professor Cockerell now in their rooms.

ENGLISH CHURCH AT HOMBURG.—The Bishop of London has consecrated the new church erected for the English at Homburg. The church holds fully 600 persons.

MEMORIAL OF LEIGH HUNT.—The suggestion of Mr. S. C. Hall that a memorial of Leigh Hunt should be set up in Kensall-green Cemetery, where he is buried, is about to be carried out. A number of well-known men have agreed to act as a committee. Mr. Durham, A.R.A., has made progress with a bust of the writer which, with a fitting pedestal, will form the memorial, and a certain amount of money has been subscribed. About 70l. more are required, and some of our readers will probably be glad to assist in raising this.

THE LONDON LABOURERS' DWELLINGS SOCIETY (LIMITED).—The fourteenth half-yearly meeting of the members of this society has been held, Mr. Richard Foster in the chair. The directors presented their report for the six months ending June 30th, which was adopted, and the usual dividend, at the rate of 5 per cent. per annum, free of income-tax, was declared. The capital of the society now amounts to 33,400l. They have purchased twenty-eight small houses in Prospect-place, Rotherhithe, and commenced a block of buildings at Vauxhall.

PALACE OF FINE ARTS FOR VIENNA.—A Vienna letter gives an account of a ceremony which has just occurred in that city on laying the first stone of a Palace of the Fine Arts. The Emperor, after signing the foundation Act, fixed the first block in its place, while the Society of Orpheonists sang a chorus of Mendelssohn. His Majesty before leaving visited the Exhibition of German Art, and spent some time examining the paintings. The city of Vienna also organised a banquet in honour of the German artists, who were holding their tenth meeting.

FIRES.—In Southampton Docks the most valuable part of the Royal Mail Company's factory, and part of an adjoining sugar-house, have been destroyed by fire, originating in a carpenter's shop belonging to the factory.—An extensive cooperage in Vaudries-street, Liverpool, has been destroyed by fire.—A large farmyard at Bulley, in Gloucestershire, filled with wheat ricks, vatches, &c., a barn filled with wheat, a second filled with vatches, and outbuildings with agricultural implements and machinery, have all been destroyed by fire, originating, it is believed, in the accidental fall of the ashes of a cigar on short straw covering the dung in the yard.

PROPOSED TRADE SCHOOL FOR BIRMINGHAM.—At the request of the committee of the Birmingham Midland Institute, a conference of the principal manufacturers in the town has taken place, to consider the propriety of establishing a trade-school similar to that in Bristol. The proposal was warmly received, and on the motion of the mayor it was resolved that such a school be established in connexion with the Midland Institute. Half a dozen of the largest manufacturers have entered their names as subscribers, and their efforts are supplemented by donations from other gentlemen who always forward movements of this kind. About 250l. is the sum wanted to fit up the rooms now lying idle at the Institute, and 300l. or 400l. a year will defray the current expenses. Once established, the school may be expected to prove self-supporting.

THE NEW THEATRE ROYAL, CROYDON.—This new theatre has been opened with an equestrian entertainment. The exterior of the theatre has no pretensions to architectural beauty, the frontage being of plain red brick with stone copings. Part of the outward walls incloses a public market. The theatre proper is about 54 ft. wide by about 100 ft. deep, the proscenium being nearly midway between the walls. The stage is so constructed that it may be entirely removed when the space occupied thereby is required to be used for horsemanship or other purposes. The auditorium consists of fifteen private boxes, similarly placed to those behind the balcony stalls at the New Adelphi; 100 box seats, and 50 balcony or dress-circle seats; and a spacious pit and gallery. The decorations partake of the characteristics of the Greek order, but quite simple. In consequence of the peculiar shape of the ground, the architect (Mr. T. T. Smith) had some difficulty to contend with in the appropriation of space. The architect has been assisted in the work of decoration by Mr. Dillon; and the construction of the building has been carried out by Mr. Hutchinson.

THE INTERNATIONAL CONGRESS OF WORKMEN.—The third congress of the International Association of Workmen opened on Sunday at Brussels. The subjects of discussion were eight. Strikes and councils of arbitration being among them. The English and American workmen introduced the subject of shortening the hours of labour; the Germans asked what ought to be the attitude of workmen in case of a conflict between the great European Powers; the Belgians offered "a résumé of the special grievances of the workmen of each profession."

THE ADELPHI SCHOOLS IN SHOREDITCH.—An effort is being made to raise a fund to defray the expenses of enlarging the Adelphi Chapel Schools, in Gloucester-street, Hackney-road. The Council of Education gave notice to the managers that they should either dismiss one-third of the children or provide a more commodious building. Having sought in vain for a suitable site at a reasonable price, the managers decided on the addition of another story to the existing premises, merely providing an increased school accommodation of 50 per cent. The cost of this addition, with other necessary improvements, has been estimated at about 500*l.*, and the committee solicit the practical sympathy of friends of education and Christianity throughout the metropolis to aid them in their efforts. In the daily schools there are at present over 400 children; and in the Sunday schools the rears over 500 on the books.

SOCIAL SCIENCE CONGRESS.—The arrangements for the meeting in Birmingham, under the presidency of the Earl of Carnarvon, are proceeding satisfactorily. A guarantee fund has been subscribed, and much good spirit shown in the town. The Mayor has announced his intention of inviting the members of the Association to a *soirée* in the Town Hall, which will take place on Thursday, October 1st; and a second *soirée* will be given on Monday following, the expenses of which will be borne by the local fund. The Earl of Dudley has offered the members of the Association an opportunity of seeing the Dudley caverns, and proposes to illuminate them for that purpose. The Congress commences at Birmingham on Wednesday, the 30th inst., when the opening sermon will be preached in St. Philip's Church by the Bishop of Worcester, and the inaugural address will be delivered in the Town Hall in the evening by the Earl of Carnarvon.

THE MEMORIAL TO LORD HERBERT.—The memorial committee to whom the superintendence of the Herbert Sea-side Convalescent Home erected at Bonremont by the liberality of friends and admirers of the late Lord Herbert was entrusted, have issued their first annual report. The home has been handed over, free of debt, to the governors of the Salisbury Infirmary, the chairman of the committee, the Right Hon. T. Sotheron Estcourt having generously paid the sum of 2,000*l.*, the balance against the committee; and the expense of furnishing the home has been met by the receipt from Lady Herbert of nearly 400*l.*, the balance in hand after closing the establishment at Charnmouth. The home, which was opened for the reception of patients on the 1st of October last, has already been attended with great success, 128 patients having been admitted in ten months, and disposed of as follows:—Sent home recovered, 71; much improved, 20; too ill to be benefited, 4; transferred to hospitals, 3; died, 1; remaining in the house, 29; total, 128.

SMOKE FROM RAILWAY LOCOMOTIVES.—At Tadcaster, on Tuesday, the 1st instant, before the West Riding magistrates, a case of some public interest was mentioned. Birkbeck Forrest, a police constable, had laid an information under the 5th & 9th Vic. cap. 20, sec. 114, against the North Eastern Railway Company, for having, contrary to the section, emitted smoke from one of their locomotives on the 12th ult. The section referred to enacts that "every locomotive steam-engine to be used on the railway shall, if it use coal or similar fuel emitting smoke, be constructed on the principle of consuming, and so as to consume, its own smoke; and if any engine be not so constructed, the company or party using such engine, shall forfeit 5*l.* for every day during which such engine shall be used on the railway." Mr. Dale, of York, represented the company, but the charge was not pressed, on their undertaking that the offence should not be repeated, and agreeing to pay costs. There was a new Act passed last year with reference to this clause, which makes the act of the servant the act of the company.

MANCHESTER EXHIBITION OF WORKS OF ART.—The Exhibition of Modern Paintings and Works of Art at the Royal Manchester Institution was opened to the public on Thursday, the 10th instant.

OPENING OF THE NEW THOROUGHFARE FROM LONG-LANE TO FARRINGTON-ROAD.—On Thursday in last week the new roadway which passes in front of the new meat and poultry market was opened for traffic. The street has been lowered to suit the market level, so that in front of some four houses in Long-lane they will have to go up some two or three steps to get into their shops.

DEMOLITION OF CLEMENT'S INN.—The demolition of Clement's-inn, at one time an inn of court, but now a place of little mark, has commenced, to give room for the New Law Courts. Mr. Glasier, instructed by her Majesty's Commissioners of Works, sold by public auction all that portion of the inn which extends from the porter's lodge, just inside the gate, at the south end near the Strand, to the wall at the north end, and as soon as it was disposed of the process of demolition and removal commenced.

EXHIBITION OF HISTORIC PORTRAITS IN PARIS. A society of literary men, who hold conferences on the Boulevard des Capucines, have conceived their rooms during the off-season with a collection of portraits of notable persons of the time of the Revolution and of the Empire. The collection is not large, including only seventy-two works, and many of these of little artistic merit; but it is interesting, and the managers have set a good example. The admission is one franc, but each visitor receives a catalogue with annotations by two known writers.

THE DRINKING FOUNTAIN MOVEMENT.—A memorial drinking fountain is to be presented to Wighton by Mr. George Moore, of Whitehall. The memorial is intended to be in memory of the late Mrs. George Moore, of Whitehall. The site selected is the centre of the market-place, where three streets meet in the centre of the town. Mr. J. T. Knowles, of London, architect, attended a town meeting on the subject, and produced a plan of the proposed monument. It is square, 30 ft. in height, standing on a base of about 14½ ft. square, and will be built of various coloured granites, with sculptures in white marble on the four sides, and surmounted by a massive cross in bronze and gold. On each side are to be drinking fountains, with receptacles of water for dogs, horses, &c.

ENLARGEMENT OF THE POST-OFFICE.—The greater portion of the property required for the enlargement of the Post-office in St. Martin's-le-Grand, Bath-street, Newgate-street, and Angel-street, has now come into possession of the Postmaster General, under the provisions of the "General Post-office (Additional Site) Act, 1865," and the work of demolition has commenced. Workmen are busily engaged pulling down the houses numbered 74 and 75, Newgate-street. The Act gives power to the Postmaster-General to take properties and lands situated respectively in the parishes of Christ Church, Newgate-street; St. Anne and St. Agnes; St. Leonard, Foster-lane, Bath-street, and the intervening courts lying within the area of the block behind St. Martin's-le-Grand and Bath-street on the west.

TENDERS.

For rebuilding 5, Fashion-street, Spitafields. Mr. H. H. Collins, architect: £330 0 0

For the erection of dwarf boundary walls and entrance gate piers, Twickenham Park, for Mr. William Budd. Mr. F. Warburton Stent, surveyor to the estate:—
Gascrope £210 0 0
Hill, Keddell, & Waldram 730 0 0
Nicholson 710 0 0

For extension of County Lunatic Asylum at Brentwood, Essex. Henry Stock (county surveyor), architect. Quantities by Mr. James Marsland and Mr. F. G. Widdows:—
Brown £29,470 0 0
Hammond 29,215 0 0
Hart 19,985 0 0
Adamson 19,847 0 0
Perry & Co. 19,505 0 0
J. & F. Coleman 19,355 0 0
Ashby & Son 19,224 0 0
Wells 19,254 0 0
Brown & Robinson 19,130 0 0
Knox 19,030 0 0
Webb 18,965 0 0
Hill, Keddell, & Waldram 18,590 0 0
Rider 18,560 0 0

For main drainage for the borough of Southampton, contract No. 3, for penstocks, &c., including fixing. Mr. James Lemon, engineer:—
Barton, Sons, & Waller £392 0 0
The North Staffordshire Engine-
ing Company 390 0 0
Hodgkinson 295 0 0

For mortuary for the parish of Marylebone. Mr. E. T. Gaal Browning (chief surveyor), architect:—
Jennings £125 18 0
J. Brown 875 0 0
E. Brown 349 0 0
Crabb & Vaughan 345 0 0
Scrivenor & White 325 0 0
Stevens & Watson 334 0 0
Taveur 311 0 0
Crockett 299 0 0
Turner 277 0 0
Temple & Forster 265 0 0

For villa residence, Chertsey, for Mr. J. Madocks. Mr. T. Wonnacott, architect. Quantities supplied:—
Britton & May £2,208 0 0
Foister 2,118 0 0
Duke 2,109 0 0
Knight & Sons 2,081 0 0
Simpson 1,950 0 0
Marden 1,894 0 0
Harris 1,887 0 0
Turner 1,877 0 0
Nightingale 1,777 0 0

For the erection of a house at Barnet. Mr. F. Webb, architect:—
Hill & Sons £5,478 0 0
Ashby & Sons 5,422 0 0
Bress 5,157 0 0
Longue & Furrer 5,014 0 0
Sharpton & Cole 4,971 0 0
Turner & Sons 4,859 0 0

For finishing fifteen houses, for Mr. Jones, at Eumore Park, New Norwood Junction. Messrs. Mathews, architects:—
Slapley & Webster £1,396 0 0
Hurley 1,310 0 0
Pearso 1,220 0 0

For new coal-store roofs and works at Bankside, for the Phoenix Gas Company. Mr. Innes, engineer. Quantities by Mr. Shrubsole:—
Westwood & Bailey £1,153 0 0
Reddell 1,135 0 0
Weston 1,110 0 0
Sharpton & Cole 1,082 0 0
Weeks & Co. 1,070 0 0
Garner 1,059 0 0
Aird & Sons 1,057 0 0
Tyler 1,052 0 0
C. B. M. O. R. J. P. E. T. W. C. F. R. Y. H. K. & A. W. H. T. E. Street Lamp—L. T. W. C. T. H. P. (most consent former members of the Builder for himself)—H. M. (the Eleazar Crosses award an answer to the inquiry).
Adams 981 0 0
Till 960 0 0
Falkner 912 0 0
Nightingale 892 0 0
Baxter 915 0 0
Crabb & Vaughan 897 0 0
George 887 0 0
Merrill & Ashby 874 0 0
Cubitt & Sons 788 0 0
Wills (accepted) 784 0 0

For the erection of a coast guard station at Barton Cliff, in the county of Hampshire, for the Lords Commissioners of the Admiralty. Mr. Case, architect. Quantities supplied by Mr. Shrubsole:—
Innes (accepted) £1,938 0 0

TO CORRESPONDENTS.

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The Builder.

VOL. XXVI.—No. 1337.

Gossip in the South Kensington
Museum.



ELICS from Ahyssinia, no great things, have doubled for many weeks the usual number of visitors to the Kensington Museum; the ordinary average of 10,000 giving place to one of about 23,000. Very puzzling are these spontaneous regularities, as

we have said before. Thus in the week ending July 25th, there were 22,000 visitors; in the week after, 21,000; and then in following weeks, 20,000, 25,700, and 21,000. The number is now lessening somewhat, and then will come for weeks and weeks again a steady 10,000, little more or less. There is always something new in the Museum, and if this lead to such constant change in the arrangements that it is sometimes difficult to find what is wanted, it has the advantage of assuring visitors that they can scarcely go too often. It is to be hoped that some of our student readers sketched the carved pine-wood doorway, of the eleventh or beginning of twelfth century, from the destroyed wooden church of Sanland, in Norway, and which was in the north court for some time. It is a remarkably fine thing of its sort: the vigour of the large dragons in the spandrels, and the beauty of the curves in the foliage, are very noticeable. The wood is remarkably sound. This, together with another not in such perfect condition, and which came from the church of Fla, demolished in 1854, were lent by the Norwegian Government, and have been recently removed from the Museum. Plaster casts, however, are in their place, so coloured, that they closely resemble the originals. On another page we print a letter from a correspondent, who, looking at these doors and their surrounding framework, asks whether it can be necessary to paint deal used externally in order to preserve it, no paint or varnish, apparently, having been applied to these doors. The difference in climate would have to be considered in giving an answer, as well as the difficulty of obtaining in this country such pine-wood as the Norwegian doors were made of. Our own experience with unpainted deal doors in England, exposed to the weather, is not satisfactory.

It may be as well to add, touching the Norway work, that some similar carved early doorways from Norwegian churches,—Hitterdal, Tind, and Brand,—are illustrated in Weale's "Quarterly Papers."* The older timber churches of

Norway are very curious piles, wrought piecemeal and constructed without any skill in forming a whole; carved work being introduced by individuals here and there to lessen the original rudeness and want of design.

Carved work of another kind will be found in the very curious pulpit, or "mimbar," from a mosque in Cairo, which has been set up in the same court that holds the doorways, and which is becoming a court of fine pulpits. The mosque, built between 1412 and 1421, was pulled down not very long ago, and the Department were enabled to buy the pulpit, the date of which, according to an Arabic inscription on it, must be between the years 1468 and 1496. Its general form is excessively ugly, but the carved and inlaid work, ebony and ivory, with traces of colour, is very elegant. The surfaces are covered with star-shaped panels, formed by a moulding of triangular section; and within these panels are the carvings, which include inscriptions from the Koran. The styles, with their coarse sunk ornament, seem scarcely to agree with the panel-work.

Near the pulpit there is a table-top of fifteenth-century work, also from Cairo, which shows the same stellar forms and inlayings.

Look to the modern wrought-iron Prussian gates close by, purchased at the Paris Exhibition for 400l.—a very small sum considering the remarkable extent to which they are wrought. These materially lessen the effect of the Norwich gates now standing close to them, and of which we gave an illustration some time ago. What would a similar pair cost in England? Perhaps the Skidmore Company will tell us. The Museum, by the way, contains some capital specimens of English iron-work, especially the gates formerly in the gardens of Hampton Court Palace. These were made by Huntingdon Shaw, a native of Nottingham, about the year 1695. These gates should be carefully studied by all our smiths: it was quite right to bring them under cover.

The vicissitudes through which some of the objects now in the Museum have passed are remarkable. A cognate story occurs to us. Some little time ago, at a sale in an ancient house in inland England, the auctioneer said, "How much for the plaster cast in the hall?" and a whitewashed head in a niche over a door was knocked down for 7s. 6d. When taken down it proved, however, to be of metal, and it was at once sold for 3l. or 4l., and then went to a shop in Brighton for about double that sum, where it remained for many months, until it was purchased for something under 20l. by a well-known art-loving resident there, who thought it rather to serve the shop-keeper than to please himself. It remained in his house, and was very little cared for, until the Exhibition of Works of Art in Lewes, to which he had sent it, was opened, when a London dealer sought to buy it, but did not go the right way about it, and so failed. Up to this time it had been called at a guess Sir Thomas More; but being sent to a London friend and talked over at the Society of Antiquaries, some good eye said it was very like Henry VII., and on being taken to the chapel at Westminster it was found to be nearly identical with the bust of the recumbent effigy of the monarch. Tradition says something of a trial piece made by Torrigiano before executing the monument, and here it is thought we have it. Torrigiano seems to have been brought to England expressly to work for King Henry VIII., and according to Vasari did an infinite number of works for him now unknown. The king made an agreement with him to execute a monument for himself and Queen Katherine, and Torrigiano tried to persuade Cellini to come to England and help him in it, but through circumstances unknown it was never carried out. After the bronze bust of which we

have been speaking had been identified it was lent to the Department of Art, and the Committee of Privy Council thinking it desirable that the nation should possess it, the seven-and-sixpenny "plaster cast" was bought for the Museum for some hundred and fifty guineas, and may be found there (and a fine thing it is) not far from a cast of the Westminster effigy, so that those who are curious may compare for themselves.

The New Lecture Theatre is fast approaching completion: it will hold from 500 to 550 persons in the body of it, besides 200 in the galleries on special occasions. It is somewhat lofty: how this may interfere with its acoustical qualities will have to be seen. The tympanum externally, above the entrance, is filled with a large inlaid picture commemorating the Great Exhibition of 1851: a draped figure, probably her Majesty the Queen, is presenting wreaths to representatives of the various nations who approach on each side, a view of the building forming the back-ground. The figures are in outline, the colours being buff and blue, with a gold sky. In circular frames under the arcade, and so protected, three of the workers in mosaic now practising in England have been each enabled to put up a specimen of their art and workmanship, and with good effect.

In the new refreshment-rooms some interesting experiments in decoration are being made. Mr. E. J. Poynter, who has designed a quaint range, being entrusted with one of the dining-rooms, and Messrs. Webb, Morris, & Co., with another. We cannot say that we greatly admire the ceiling of the latter; but, as the room is at present unfinished, like the rest, it will be better to withhold judgment. The painted glass in the window here is very agreeable: the figures show the hand of Mr. E. Burne Jones, who is also, we believe, to fill some of the panels in the high wood dado round the walls. It is assuring to hear that Mr. Morris, of this firm, is the author of "Jason," and "Earthly Paradise," poems that have been well received by critics. The design for the large window on the chief staircase was obtained in competition, the jury including several members of the Royal Academy. It is by Mr. Renhen Townroe, a pupil of the late Mr. Godfrey Sykes, and has been well produced in glass by Messrs. Lavers & Barrard. The design urges "Work while it is day," and is intended to illustrate part of the 38th chapter of "Ecclesiastics," beginning, "How can we get wisdom that holdeth the plough." A series of small pictures represent suggestively the labour of the smith, the potter, and so forth. The style may be called Cinque-cento. The semicircular head is full of a debased sort of architectural ornament, and is over-fussy. The window at the foot of the stairs, illustrating "Fotile," "Architectura," and "Fabrense," was designed by Mr. Moody, and for parts deserves praise. To an eye fresh from the study of the windows in Fairford Church, it is, nevertheless, thin and poor.

Travelling to that same Fairford, by the way, the other day, we were greatly struck with the exceptional fruitfulness of the herry-bearing trees and shrubs. For at least four miles the hedges are as red as a soldier's coat. The "hips" and "haws" of the wild rose and hawthorn are in the majority, but others contribute, and are added to by unripe blackberries and occasional masses of elder-berries not yet black. The effect is quite remarkable. Shakspeare, the omniscient, describes it. Changing only one word in two lines from *Macbeth*, these heries,—

"The multitudinous trees incarnadine,
Making the green, one red."

We have been led away, however, from South Kensington, so will here end our present gossip.

* Vol. i., under the heading of "Primitive Churches of Norway."

COURTS OF CONCILIATION AND ARBITRATION.

In Plantagenet and York and Lancastrian times most of our leading trades were under the management of a knot or certain number of the "good folks" of each of them. These "good folks" made for their respective trades the regulations that governed them; and, in the city of London, at all events, were supported in their decisions in the settlements of disputes by the chief magistrate. In France, as early as 1285, there was a court of *Prud'hommes*, or prudent men, who were appointed to sit in the Civic Hall, Paris, for the purpose of advising in cases between the citizens; and, in the fifteenth century, there was a similar court established at Marseilles, for the adjustment of all disputes between fishermen and their employers, and another at Lyons for the settlement of the disputes of merchants frequenting the fairs. But where there is now a man on the ground in those days there is now a little crowd, and regulations that were seldom broken through then are quite obsolete, either scorned or forgotten, now. The French were the first to exhibit a desire to return to the old system that was found to work so well in former times and elaborated it to suit present requirements. In 1791 a court composed of masters and workmen was established at Lyons, for the settlement of differences occurring in the various trades. But it did not maintain its authority during the eventful years that followed; for, on the visit of the Emperor Napoleon, in 1806, to Lyons, the municipal leaders represented to him the great desirability of renewing its powers then in abeyance. Not only did Napoleon re-establish this court, but he resolved to found similar institutions in all the principal manufacturing towns. Up to 1844, however, Paris was not included in the list of towns and cities so benefited, on account of the apprehensions that were entertained that the numerous varieties of industries carried on there would occasion too many complications; but Louis Philippe was not appalled by the prospect of any difficulties, and created four councils of *Prud'hommes* for the department of the Seine. In 1849 there were twenty-four of these councils in France. There are now eighty. The first approach to the formation of a court in England having similar powers, was made on the present decade, when the hosiers of Nottingham established a court of conciliation and arbitration, an example that has been since followed by the joiners of Wolverhampton, and still more recently by the potters in Staffordshire.

We have before us a work written for the especial purpose of promoting the formation of courts of conciliation by placing within everybody's reach exact particulars of the steps necessary to be taken for this purpose.* The author, who is a Scottish harrister, says, "The example afforded by the success of the Nottingham Court of Conciliation and Arbitration is one which will no doubt be followed by other communities; and should the Government not at once lead, instead of being led by the people, the result will be—certainly one of a very humiliating, if not dangerous character—that the people will learn to do that for themselves which their legislators have either been unable or unwilling to do for them." He contends that the present authorities for adjudicating upon disputes between employers and employed—justices of the peace—are quite unqualified for their task, and prophesies, indeed, their abolition. In their place he would institute boards or courts of conciliation and arbitration framed on the model of the councils of the *Prud'hommes*. Accordingly, he shows us these last-mentioned courts, describes their powers and machinery; describes the French justice of the peace, or *Juge de paix*; paints their English and Scottish counterparts, and gives some of their questionable judgments; describes the civil legislation affecting masters, workmen, servants, and apprentices prior to 1824, and that which has been enacted since that period; and finally depicts the practical working of courts of conciliation and arbitration, descants upon their advantages,

* "Handbook of the Law relative to Masters, Workmen, Servants, and Apprentices, in all Trades and Occupations. With Notes of Decided Cases in England, Scotland, and Ireland; together with Forms of Proceedings and Procedure, to enable Masters and Workmen to establish Courts of Conciliation and Arbitration, and to carry on the same." By Alexander Macdonald, Solicitor, Glasgow; Member of the Faculty of Procurators, Brecknock; William MacKenzie; London, Edinburgh, Glasgow, and Dublin, 1868.

and describes the best modes of establishing and conducting them. All this is done in an impartial and earnest, though at the same time arousing, manner. He points to the facts of foreign locomotives running upon British railways; wagon-loads of doors and windows arriving ready made from Norway and Sweden; the accession of business to the forges of Crenoot; the activity of the hammers of Essen; the shuttles of Verriers, and the frames of Chemnitz; and calls upon employers and employed alike to cease the absurd system of strikes and lock-outs, which is gradually reducing the national powers of development, and organize a tribunal at which their differences may be discussed and the causes of them removed, without the extreme measures that are introducing foreign industry into the country. He says:—

"Never, perhaps, in the annals of trade has there occurred such a number of strikes in almost every branch of it, as has taken place within the last two years; and seldom have they continued in individual cases for such lengthened periods. At no time were they so likely as they are now to cause the loss of that rank and pre-eminence in the world's industry, so nobly won for us by the skill and energy of our forefathers. Thousands of workmen and their families must have suffered privations of which we can never know the extent; while many employers have doubtless sustained losses which it may take years of exertion to repair. The inveterate character of these disputes would seem in a great measure to have arisen from the want of some adequate machinery in our judicial system, by which the questions involved could be fairly determined. Employers and employed have been hitherto in the position of litigants without a forum to decide their differences."

This desired forum is to be found in the proposed extension of courts of conciliation and arbitration, the outlines of which were indicated in the bill introduced into the House of Peers by Lord St. Leonards, in February, 1867, entitled "An Act to establish Equitable Councils of Conciliation to adjust Differences between Masters and Workmen." Few of our readers need be informed that the distinguishing characteristics of these courts is the absence of professional legal men. In the French courts, upon which they are modelled, "no practitioners of the law are allowed to appear upon any pretext whatever." There are three paramount objects kept in view,—the provision of judges skilled in the matters in dispute, the inspiration of confidence in the justice of their decisions, and the conciliation of litigants; and these are deemed best managed by the selection of an equal number of representatives of capital and labour as members, and persons of standing and character in the community as judges. To make the province of the French courts clear, we cannot do better than quote the words of M. André, president of the Council of Troyes:—

"In every case the council endeavours to discover the truth,—to find out from what side the wrong comes. Sometimes by observations addressed to the masters the latter are induced to modify their demands. By remonstrances, friendly but firm, they cause the workmen to see the unreasonableness of unfounded pretensions. Both are reminded of their reciprocal duties,—the masters that they ought to forego everything tending to humiliate, to overlook a first offence, to be mild in command and moderate in reproof, and to respect the position of men whose lives are consecrated to toil. To the workmen they recommend deference to the employer, who by his wealth and enterprise furnishes them with the means of earning a comfortable subsistence; regularity and care in performing their work; and a faithful and zealous use of their master's time. It is by approaching cases in this spirit that the *prud'hommes* succeed in getting the parties to see their complaints in their proper light, to retire from the court reconciled, and disposed to resume relations which have thus been only temporarily disturbed."

Does not this calm, kind statement show us the crowded French court? We cannot turn over the page without feeling we have seen Alphonse, or Jules, or Emile, in house and belt, mustachioed and snubnurt, active, dexterous, and good-looking wital, explaining his case to a bench of men, heard also as an grave, older interest in it, and as he and, perhaps, his *chef d'atelier* embrace through their good offices and mediation, we fancy there is a little flutter in the air as though angels were rejoicing over this scene of goodwill among men. Contrast this with the dismantled room of the operative who has struck or who is locked out, his wife too ill-clad and ill-fed to have a smile or pleasant word left, his children too reduced to be anything but an agony of misery to him, and we must own that the offices of the "good folks" of yore and the "prudent men" of to-day are not without their value. The classes of disputes of most frequent occurrence in France are thus divided by M. Mollot, one of the numerous authorities consulted by Mr. Macdonald to give weight and testimony to his work:—

A master brings a complaint against one of his workmen.—

For having inflicted upon him some injury by contravening a law or regulation;

For having refused to fulfil a contract either actually entered into or implied by the custom of trade as to work, time, or price;

For having purloined or injured materials given him to work upon, or committed other offences of a like nature.

On the other hand, the workman complains—

That his master has injured him by contravening some particular law or regulation;

Or that he has dismissed him at an inopportune time, contrary either to actual agreement or established usage;

Or that he keeps back the whole or part of his wages;

Or that he refuses to give him a *compté d'aquêt*, or certificate of his having fulfilled his engagements; or to return him his *livret*, a book containing his name, age, birthplace, trade, and other particulars, which he is obliged to hand to an employer on his engagement. And though some of these are not the sort of disputes that arise among ourselves, we have few indigenous grievances that might not be settled at similar tribunals.

Mr. Macdonald gives some droll stories to light up his subject. He would show the inadequacy of Scottish justices of the peace to cope with industrial legislation, and says that the jurisdiction exercised by them should be transferred to trained and independent judges, even though the change would deprive the country squire, after the gout had destroyed his aptitude for fox-hunting, from sitting in judgment upon his natural enemy, the poacher, and should also prevent Ballo Maknamsmt from repeating the address maliciously ascribed to him when sentencing "an ill-fared lon frae the Briggrate" to thirty days, "because the offence hadna been fully proven;" but adding, with a look of ineffable wisdom and severity combined, "had it been sae, I wad hae gien ye saxty!" Again, he gives slight biographical sketches of the professional men mentioned by Boswell in his account of the action of the negro knight to maintain the freedom he believed he was entitled to by touching British land; and in that of the matter-of-fact Lord Hermand he relates that a pleader of protracted eloquence was one day stating a case before him, when his patience was quite worn out; at last the laborious pleader saw his lordship in the act of hounding up his papers, and evidently not listening to what he was saying, "But, ma lord," said Mr. Baird, in consternation, "I'm no accouted yet,"—meaning, of course, that he had not exhausted the case; to which Hermand, in a deep growl, replied, "But I am," and so closed the debate. And there are more anecdotes of legal celebrities. The most practical part of his volume, however, is that which relates to the formation of the courts he advocates. This information is as valuable as the process is simple. It was Lord Brougham's suggestion that an English harrister should visit Paris for the purpose of examining the working of the French Courts of *Prud'hommes* and then lecture upon them throughout this country, so as to prepare the public mind for them, that first drew the attention of our author to the subject. The machinery to set the formation of such a court in motion is merely this:—A meeting must be called, when a minute must be drawn up to the effect that it is convened for the purpose of forming a Board or Council of Conciliation and Arbitration between masters and workmen, and appointing a committee to prepare the necessary rules and regulations. The committee and secretary duly appointed, their names are recorded in the minutes. A second meeting must be called by the secretary to consider the rules and regulations drawn up by the committee; and these being discussed and approved, and the expenses of the court provided for, nothing remains but the drawing up and despatch of a petition to the Queen to grant a licence for the court to exercise its powers. Our author gives the proper form of the minutes and petition; and also shows the rules for regulating the carpenters' and joiners' branch of the Wolverhampton building trade, and those of the board of arbitration and conciliation of the hosier and glove trade, Nottingham, which contain material enough to serve as models for any other. It seems to us his labours will materially assist the movement that is tending to supersede the present cumbersome mode of managing industrial relations.

Mr. Macdonald extracts from the reports of the artisans selected by the Council of the Society of Arts to visit Paris and report upon their various trades such passages as relate to the Courts of the Prud'hommes. Although these reports have been before the public in various forms, they are useful to look at again in illustration of the question before us. They sing a uniform note of praise of the French plan. The sentiments of Mr. L. S. Booth, a working representative of the Coventry trade, may be selected as a sample of the rest:—

"There subsists a very friendly feeling between the manufacturers and workpeople; this has been attributed to the action of a society called Conseils des Prud'hommes, a Society of Prudent Men, formed of various trades of workpeople and masters, to adjust the differences that from time to time arise. A gentleman, occupying a responsible position in St. Etienne, assured us it was the best institution in France, and had the confidence of all the parties. It does not interfere with the price of labour or the working of contracts. It is a council of conciliation legally established, and all its decisions of not more than 200 francs are binding upon both parties; and though it often deals in matters involving a greater sum than this, appeals against those decisions are very scarce."

Mr. A. Kay, joiner, states, in plain terms, not only the well-working of the courts, but the mode in which a case is conducted. He says, the workman who considers himself aggrieved has merely to go to the court, report his wrongs, and pay a fee of 5d. A summons is then issued for the complainant and defendant to appear before the council within a day or two. If the council should fail to reconcile them, which is seldom the case, for nine cases out of ten are settled at this stage, the plaintiff pays into court two francs, and another summons is issued for a fresh appearance in the judgment-hall. This is generally appointed for an early day, as no time is lost in unnecessary delay:—

"When the parties appear in the judgment-hall, they find ten members of the Conseil des Prud'hommes seated on a raised platform, the president sitting in the centre, when they courteously and with great familiarity hear the statements each have to make. In some cases the matter is so clear and evident that the judges give their verdict without rising, and give the injured party a slip of paper to take to the officer who is appointed to carry the sentence into execution. But the case may require some consideration; the ten judges then rise and retire to the adjoining room, and then they compare the facts of the case, and decide on judgment. That judgment may not be final; the one who deems himself the injured party may appeal to the Chamber of Commerce before his case is entertained there he must deposit 400 francs to pay the expenses, and the case is not often worth that amount."

Mr. Macdonald says, however, it is not necessary to deposit the 400 francs mentioned above. He states that, when the demand does not exceed 200 francs, the judgments of the court are final; and where it is above 200 francs the court can order immediate execution of the same to the extent of 200 francs.—"That is to say, the party obtaining a decree to be put immediately in force for a sum exceeding 200 francs, must find caution or security for the surplus in case of appeal to the Tribunal of Commerce." In fine, he has gathered together much that has been said about these courts, and adds exact particulars that he has spared no pains to verify.

As incidental to his subject, our author has compiled a long list of decisions in England, Scotland, and Ireland, illustrative of statutory and common law. Most of them relate to workmen and servants of various kinds and their employers. They are useful as showing how the law has been read in these instances, and, consequently, how it may be expected to be read in others of a similar nature. A large number of them relate to persons engaged in building trades. We would refer our readers to them as concise statements of liabilities and responsibilities of general industrial interest. Here and there amidst his pages we find little scraps of history that are suggestive. Thus we learn that justices of the peace were first created in France by Edward I. of England, though, as is now constituted, they only date from 1790; that the Scottish colliers were really bound to the coal they worked, and were sold with it when a coal-seam changed hands down to the year 1775; that the whipping of females was not abolished till the reign of George IV.; and other curious facts. Take it all in all, Mr. Macdonald's work is, in many respects a fit lay sermon to the text he has chosen as a heading for it:—"Moreover, there are workmen with timber in abundance, hewers and workers of stone and timber, and all manner of cunning men for every manner of work. Of the gold, the silver, and the brass and the iron, there is no number. Arise, therefore, and do, and the Lord be with thee."

THE "BUILDER'S" PLEA FOR CABBY.

A PARTIAL insurrection, which our French or our PRANSIAN neighbours would have harshly and summarily dealt with, has been suffered to bleed itself to death in the streets of London. It has bled, happily, from no wounds but those inflicted on the pocket. These belligerents are happy who stanch such wounds before they become fatal. The cab proprietors of London, having, or pretending to have, a grievance against the railway companies, caused their drivers to strike against the public. In order to compel the railway managers to admit to their station-yards, on equal terms, those vehicles the owners of which were willing to give certain guarantees, and those not so recommended to the public, the cab-working interest had the wit to persuade their servants to refuse, in defiance of the law, to serve the general public. The ill-designed strategy had the result inseparable from ignorance of the laws of war. The aggressors had to beat a retreat, and this was happily effected before any great amount of ill-feeling had been developed on either side.

With the public, then, the victory remains, and, as far as the specific cause of complaint, and the means chosen to enforce it, rightly so. But it not infrequently happens, in social disturbance, that the immediate occasion of an outbreak is not its real cause. That may long have been smouldering beneath the surface, ready to burst forth on the slightest opportunity. Let us ask ourselves whether such may not have been the case in the present instance. The railway companies may be altogether justified in their treatment of public vehicles. Are the general mass of the inhabitants of London equally in the right?

The point to which we refer, and which belongs specially to our columns, is that of the shelter afforded to public vehicles in London. Shelter, indeed, there is none. A wealthy and luxurious people, proud of their humanity, supporting by voluntary subscriptions a society to prevent cruelty to animals, a people specially addicted to the breeding, the riding, and the driving of the horse, is content to leave all the animals which carry on the public internal communication of the metropolis without any recognised provision for shelter or for feeding-place.

That cab-horses have stables somewhere, and that their drivers may sometimes (perhaps on Sundays) retire to some other bed than that which is extemporised from the interior of their vehicle, we take, indeed, for granted. That much we love to private enterprise. Perhaps we are right in so doing. To take us through the streets, whether with the easy speed of a Hansom, or at the more deliberate grind of a four-wheeler, it is essential that the horse should have been fed, and groomed, and rested somewhere or other, within a day or two; and, though we allow feeding, and that waiting which is a substitute for rest, to be carried on in the very midst of our most crowded thoroughfares, we have not yet come to see much grooming on the stands. Evidently, therefore, there must be cab-stables somewhere, but *where* is known to none but their occupiers. In all weather, and in all seasons, by day and by night,—in summer with a temperature of 90° in the shade, in winter with the ground covered with snow and the thermometer below zero,—the horses and the drivers, on whom and on which we all depend when time is an object, are left unsheltered and uncared for. Their normal shelter is the sky.

Is this as it should be? Is it fair to a large body of hard-working, industrious, careful men? We expect very much of the London cab-driver, and not only so, but we obtain very much from him—very much more than we did ten years ago. Civility is now the rule; formerly it was the exception. Knowledge of the town, care and speed in driving, cleanliness of vehicle, and we may say of person, we demand without stint. It may often happen to a person not over familiar with town to ask direction from a policeman, and to discover, after a bout of that amusing fence in which the natives of the Emerald Isle so much delight, that he is seeking guidance of an Irish recruit, who knows less of London than himself. But how rarely do we find the cabman as faultless; and when he is, how patiently he follows up the scent! What is his pace, and what his care at crossings and corners, when you can only catch the express train by making for the station at some ten miles an hour? In all frequented streets of the metropolis, for at least twenty hours out of the twenty-four, we expect, by lifting up the finger and vociferating

"Hi!" to be accommodated with a carriage driven by a man who can tell us where we want to go when we do not exactly know ourselves.

Now, it is a great hardship that no public shelter is provided for these hardworking public servants. What we say of the men will apply with even more force to the horses, for the horses are unable to pop inside for an occasional nap. Their food is given by the painful and unsatisfactory appliance of the nose-bag. Their protection, after an hour or two of rapid driving, is a rank that enables them at leisure to fill their bellies with the east wind. No valuable horse can be exposed to the unsheltered vicissitude of a cab without almost the certainty of disease. In all this lies a great and unnecessary waste,—a cost to the owner which the public, in one form or another, must ultimately defray. To demand the constant attendance of thousands of horses, and to make no provision whatever for their protection from the weather, is a disgrace to our civilisation.

Who should provide the shelter? It may be asked. Our reply is, that we are indicating a want, but not promoting a speculation. Some co-operation should be brought to bear on the matter. Public shelter, protected sheds, in which the tired horses could feed and rest till their time came to leave the rank, ought to be provided at public expense. If this were done, it would no doubt admirably pay to attach stables and mews to the public sheds. If an association of the cab owners were formed, or any arrangement were made by which a horse that had set down his last fare at Paddington should not have to be driven to Islington or to Southwark to pass the night, the economy of labour would be its own reward. The lodging of the drivers themselves is another matter for consideration, and the men would, of course, wish to regain their own homes. But when we remember the hours which they keep, the distances which they are forced to drive empty-handed, and the constant exposure incident to their vocation, as well as that to which they are unnecessarily exposed, we cannot suppose that the drivers, as a body, would not rejoice at any step in the direction of organising their protection from needless toil.

Let us heap a few coals, then, on cabby's head. Let us tell him, and not in print only, but in brick and mortar, that we are better friends to him than he has been to himself. "You have been out of temper, my good fellow," let us say; "small blame to you for being a little vexed at times. You have a good deal to put up with. You have been hardly used. But you have made an ass of yourself, notwithstanding. It is not the railway managers of whom you should complain, but the Lord Mayor, Aldermen, and Burgesses of London; the vestrymen of Marylebone, of Southwark, of St. James's; the municipal authorities, in fact, who neglect you. Call another indignation meeting, and direct your resolutions against the fact of utter want of shelter for so large a body of the servants of the public. Ask for shelter for man and beast—for yourselves and for your cattle. Tell your great employer, the public, that it was but natural you should have made that earnest, though ill-considered, effort to take shelter under a roof of any kind. Even drangy stations are preferable to the open street. Put your shoulder to this wheel, and call on the humane, the benevolent, the prudent, for aid. Enforce the view that the reform of street vehicles depends on some better shelter being provided for them than the centre of the street. Stick to this, worthy friend, and when one, or five, or twenty years hence you rest quietly for your barn in a clean, light, airy, sheltered stand, thank us for the hint, and remember "the Builder's plea for the cabman."

VIEWS AS TO THE GREAT PYRAMID AND OTHER ANCIENT STRUCTURES.

SIR J. Y. SIMPSON has published in pamphlet form a corrected abstract of his remarks on Professor Smyth's idea of the Great Pyramid, from No. 75 of the Proceedings of the Royal Society of Edinburgh.* Some additional points, such as with reference to the concentric circles and other carvings on rocks and kists, are dwelt upon in an appendix. The communication may be called a review of a review, inasmuch as it was provoked by previous criticisms of Professor Smyth, who still maintains the metrological hypothesis.

* Is the Great Pyramid of Gizeh a Metrological Monument? By Sir J. Y. Simpson, bart. Edinburgh: A. & C. Black, 1868.

Sir James here demolishes this hypothesis with a heavy hand; and to that end he has made able use of Professor Smyth's own implements, as well as others. The Professor, it will be recollected, made a special journey to Egypt for the purpose of verifying his own idea; and it must be said for him that he appears to have given a very faithful account of the result, inasmuch as it was mostly dead against himself. This Sir James Simpson clearly and forcibly shows. The kist in "the King's Oratory," as it has been called, instead of being cut out with all that mathematical accuracy with which it was said to be cut, and which was to have been anticipated had it really been the result of inspired handwork, and destined to form a strict measure of capacity to the latest ages, was found by Professor Smyth, as he himself reports, to be of even carelessly irregular form. On this subject Sir James, after having pointed out other facts adverse to Professor Smyth's hypothesis, says:—

"But in regard to the coffin as an exquisite and marvellous standard of capacity to be revealed in these latter times, worse facts than these are divulged by the tables, &c., of measurements which Professor Smyth has recently published of this stone vessel or chest. His published measurements show that it is not at all a vessel, as was asserted a few years ago, of pure mathematical form; for externally it is in length an inch greater on one side than another; in breadth, half an inch broader at one point than at some other point; its bottom at one part is nearly a whole inch thicker than it is at some parts; and in thickness its sides vary in some points about a quarter of an inch near the top. But, Professor Smyth adds, 'if cultered lower down, it is extremely probable that a notably different thickness would have been found there. . . . Further, externally 'all the sides' (says Professor Smyth), 'were slightly hollow, excepting the east side,' and the 'two external ends,' also show some 'convexity' in form. 'The outside' (he avows) 'of the vessel was found to be by no means so perfectly accurate as many would have expected, for the length was greater on one side than the other, and different also according to the height at which the measure was made. 'The workmanship' (he elsewhere describes) 'of the inside, in as far as the outside, but yet not perfect.' For internally there is a convergence at the bottom towards the centre; both in length and in breadth the interior differs about half an inch at one point from another point; the 'extreme points also of the corners of the bottom not being perfectly worked out to the intersection of the general planes of the entire sides;' and thus its cavity seems really of a form utterly unaccountable in a correct way by mere linear measurement—the only measure yet attempted."

One would have thought that the Professor himself had thus demolished the metrological hypothesis even in his own estimation, but it seems not; and although he admits that "the coffin's precise size is the question of questions," its precise size is still undecided; for Professor Smyth has only measured what remains of the defaced kist, and his measurement is only one of twenty-six varying measurements. Nevertheless—

"This broken and damaged stone vessel is professed to be the permanent and perfect metrological standard of capacity-measure for the world for present and still future times; and (according to Mr. Taylor) that it might serve this purpose, is formed of one block of the hardest kind of material, such as porphyry granite, in order that it might not fall into decay; for 'in this porphyry coffin we have' (writes Professor Smyth in 1864) 'the very closing end and aim of the whole pyramid.'"

Sir James Simpson's own idea is that the kist was merely a sarcophagus; but, although we have already expressed our own opinion also that it was a sarcophagus, there are peculiarities about the case which induce us to believe that, like the coffin in Freemasonic rites,* it was originally "used for the living, and not for the dead," as has actually been said of "the King's Oratory" itself, in which it stands, and which was carefully and scientifically ventilated, and closely resembles a temple or chapel in sectional outline and general arrangement, with its vestibule and its stately and hall-like penetralia, divided by its screening but lifted partition, or "portentilla," of stone. The fact now adduced by Sir James Simpson, on the authority of an ancient author, Ibn Abd al Hakam, a contemporary, or nearly so, of the Caliph al Mamoon, who tunneled into the pyramid and discovered the King's Chamber, that the body of a man was found in the sarcophagus, does not settle the question any more than the discovery of the body of a man beneath a church altar would decide the question whether the edifice in which it was found was merely a sepulchral monument.

Herodotus tells us, as to the Pyramid of Belus at Babylon, that it had a shrine below and a chapel above, in which chapel there was a bed on which a priestess lay by night [entranced in "the semblance of death," as the manna have been, like "the mad prophetic Sibyl" of *Æneas*, who, "in her cave, upon a rock, by night, reclined"], while God-possessed, or visited by

the God Belus; and a golden table, on which, we may conceive, the Sibylline oracles of the God were probably written down. The shrine below, in the Babylonian pyramid, would respond to the sepulchre, indicated but not completed, in the rock below the Egyptian pyramid, while the Pharaoh's chamber or oratory above would respond to the chapel. Now, had the body of a man been recorded by some old author to have been found in the bed of the chapel of the pyramid at Babylon,—and it was not unusual in the East to have beds in sepulchres,—that might have been supposed to settle the question of its merely sepulchral nature; but this would have been quite an erroneous settlement, since Herodotus happens to have recorded the fact of a very different purpose. Yet there is nothing improbable in the supposition that a dead body might have been found there after Herodotus's time. The practice of interring the dead in edifices devoted to religious rites has been a very common one, as we all know. Moreover, as regards the religious rites of the Egyptians, they were magical, just as those of the Babylonians and other heathen nations were. So were the Mithraic rites; and the Mithraic caverns, or cells of the Cabiri, in which these very rites were practised, although they were sometimes subterranean, also, according to Faler, sometimes lay concealed in the centre of enormous buildings of the pyramidal form, or even in a temple at the top of the pyramid. The temple or chapel of Belus at Babylon stood exactly in such a position as the temple of Buddha now does in modern Chaitany in Ava and Siam. So is it with many American pyramids, their temple having been called by the aborigines, "the house of the God." New Grange, in Ireland, of which Sir James Simpson speaks, is entered, like the Egyptian pyramid, by a long narrow passage, or transe, as it might be called in Scotland,—leading to a central chamber or cell, deep in the heart of the pyramid; and the analogy, which was long since pointed out in the *Builder*, Sir James appears to consider a very strong one. Now, it is evidently of precisely such a pyramid or tumulus as that of New Grange that the Taliesin or Druidical records, quoted by Davies, to whom Sir James also refers as an authority, have thus spoken:—

"In the dales where the courses surround the circle [and the Caer] He (the god Hu—pronounced Hee) arouses who is partly covered and partly bright" [like the soul-translating Mercury of the "entrancing rite" of whose sides was dark and the other bright]. "He is now," says Davies, "in the mystic cell. 'Let the renowned, the enterprising (hero, Eiddi [Image of the God], or Amhrosus whose actions are recorded in the *Gododin*), be lulled in sleep [or 'die'] while the God' arouses 'or swakes and 'lives alternately.' . . . let Hu mildly warm him with his divine presence. The man who rushes forth [as the God does suddenly in the Oracle] . . . is the benefellow of him who rests in the narrow house, under the tumulus [as Belus was the benefellow of the priestess who rested on the bed in the chapel of the tumulus or pyramid at Babylon] . . . the victor directs 'his view over Manon, the liminary with the lofty front and the red dragon, the Budd (or Victory) of the Pharon' (or higher powers)."

In this fragmentary record of Druidical rites there is, as we see, a curious conglomeration of remarkable words suggesting those close connexions which actually did exist between Druidism, Buddhism, and Egyptian magic. "The Budd of the Pharon" is a very notable phrase in this respect, and the connexion between the Budd and the dragon suggests the curious penchant of the Chinese and other Buddhists for dragon forms. Even the Manon, or liminary with the lofty front, smacks not a little of the Memnon statue and its peculiar relationship to the rising sun.*

It is also notable, with reference to what we have said of the New Grange Pyramid, that, according to an eminent Runic scholar, Mr. Rafn, a similar tumulus, harrow, or pyramid, at Maeshowe, in Orkney, is called, in a Runic inscription within the chamber, or cavern, in the heart of the pyramid, a "sorcery hall," which name very curiously responds to what is said of the cell,

* Another of the Taliesin fragments given by Davies is as follows:—"In the sacred course, on a serene morning, when Hu sent forth his dancing beams, making this demand—'I require men to be born again [into the new life of initiation—the life of entrancement, or God-possession] in consideration of those liberal ones [those liberated or blessed [those ecstatic or entranced] ones—] they have been intoxicated and lost.' Here and in the other fragment we find that the cell or chamber within the pyramid or tumulus where the God (and hero) "lived and died" afterwards, as the coffin has in the Freemasonic mysteries, which are believed to have been identical in meaning and purpose with ancient religious mysteries, both Gentile and Christian, those under consideration inclusive.

or cavern, in the heart of enormous pyramids, where the Mithraic rites of magic or sorcery were practised.

We may here suggest, in the form of questions,—Were not the *Druids* closely related, at least in magical practice, or religion, to the northern *Draus* or *Trows*, the fairy-like *dwarfs* of the *Scalds*, who seem to have been sorcerers or spirit raisers, "most powerful at midnight," like the *Druidical* "night hags" or "children of the evening," and to have inhabited dales, caverns, and the interior of green "knowes" or hilly mounds, so that they were called "the subterranean people?" The existence of sorceric and caverned or called tumuli or pyramids,—artificial caverns in fact,—not only in Ireland, but in Orkney and Baffin's Bay, points attention in this connexion, as we have before observed, to such northern peoples as the *dwarfish* *Picts* and *Draus* of ancient times, as well as to the *Esquimaux*, and especially to that curious people the *Laps*, who are not only a "little people," or *dwarfs*, but still abound with magicians or sorcerers; and are said to be, as a people, so singularly susceptible to nervous impressions, that the sudden clapping of the hands will sometimes cause them to fall into trances. It would be interesting and important to know more of the *Laps* and *Esquimaux*, their habits and customs, than we do yet. As the present inhabitants of Norway are specially related to those of Orkney, so may the ancient inhabitants of Lapland have well been to the *Draus* and *Picts* of Scotland, especially at a time when frozen seas united the higher lands of the two partly submerged countries in the winters of the glacial and early post-glacial eras. No doubt there are traces in ancient legend and tradition allusive to the peoples of the drift, the lake, the dale, the cavern, and the tumulus, just, such as we have of the *Druids* in connexion with *celled* or *chambered tumuli* and with *dales*, as well as *lakes*, like the *Irish* *faeries*, or "little people;" and of the *Picts*, or at least the *Draus*, in connexion with *dales*, *caverns*, *mounds*, and *subterranean dwellings*. Now is the time to collect every scrap of such legendary and traditional traces, and to bring them to bear upon the great pre-historical questions at issue in geological archaeology.* Then, perhaps, we may find that the Great Pyramid, ancient as it is, forms not a link between the historical period and the pre-historical, and is of less antiquity than many of the chambered tumuli either of Western or of Eastern climes.

It is no doubt the most popular and sceptical, and hence the *safest* policy, at present, to ignore all magical practices and doctrines while attempting to unravel the mysteries of ancient chambered tumuli, or pyramids, cromlechs, &c., and ancient sculptures; but there is no better ascertained fact than that ancient and pre-Christian nations, in all parts of the world, were deeply,—intensely, and probably universally, embedded with such magical practices and doctrines; and no archaeologist who is ignorant of these, or who attempts to unravel the mystery of ancient structures and sculptures without taking them into consideration, is at all likely to be able to advance the true theory of the uses or purposes and meanings of such structures and sculptures.

Before concluding, we may refer to what Sir James Simpson says, in the appendix to his pamphlet, as to the concentric circles and other sculptures on rocks and in cells such as that of New Grange. He appears to have been much inclined to resolve many of these into mere unmeaning ornament, and perhaps he is, to a certain extent, right. Yet he admits that the concentric circles with central cup inscribed on the inside surface of the lid of a stone kist or two, to which, in a general way, he himself alludes, were, like some others, "possibly of a religious character." Still he speaks of "the probable ornamental origin of our cup and ring carvings" in a very general way. There is nothing more probable, however, than that the cup and ring, or centre and circle form, was of symbolical origin, however frequently it may have been finally used, like the *T* in Etrurian pottery, as mere ornament. This was sufficiently shown in the letters On Rock and

* The truthfulness involved, to some extent at least, in Eastern tradition or legend, with its enormous elephants and tortoises, long disbelieved in as utterly devoid of truth; and in Western as well as Eastern legend, with its dragons and its other monsters, equally disbelieved in, has been singularly corroborated and illustrated by the discoveries of geologists; and so may the truthfulness of the traditions and legends to which we have just been referring, be illustrated and confirmed by the discoveries of pre-historic archaeologists.

* See Letters on Geometrical Symbols, by J. E. Dove, in *Builder*, vols. xxi. and xxii.

other Symbols by J. E. Dove, in our columns, a few years since. There it will be seen not only what the circle and centre symbol denoted among various nations, this being an almost universal symbol; but that the concentric circle and centre forms were, in particular, an ancient Jewish symbol, named the Sephiroth, the precise meaning of each portion of which is recorded and known.

The prominence which Sir James gives to the comparatively rare occurrence of the concentric circled symbol on knots, as evidence that such symbols were "connected with the burial of the dead" gives an erroneous idea of the small evidence,—if any,—of their sepulchral character which really exists; for it is known and has been specially remarked by those versant with the localities in which such symbols are mostly found, that very few have any connexion with ancient places of the dead, while hundreds appear to have had distinct associations with the ancient haunts of the living. Nevertheless, even though they were proved to be sepulchral, that would not disprove their magical or religious character—quite the reverse.

BEDFORD CASTLE.

On the left bank of the Ouse, about 50 yards from the stream, within, but upon the eastern edge of the town, is to be found all that remains of the once-celebrated and very strong Castle of Bedford. These remains, though scanty and confined to earthworks, are very marked and of a durable character, and although the fame of the castle rests upon its adventures as a Norman fortress, there is reason to suppose that it had an earlier history, and that its present relics belong to that earlier and Saxon period.

The principal work is a motte or mound of earth, wholly artificial, placed upon the gravelly plain across which the Ouse winds its way down the broad hand of the middle colite. This mound is circular, now about 15 ft. high and 150 ft. in diameter at its summit, which is perfectly level, and has for above half a century been employed as a howling-green. The slopes are uniform and moderately steep, and planted with trees and shrubs. On the north side, or that farthest from the river, an excavation has been made for an ice-house; but this is of modern date, and does not appear to have laid open any traces of masonry below the surface of the ground.

Towards the river, and westwards towards the town bridge about a furlong above this castle, the ground is perfectly flat, and under cultivation as a garden; but, on the north and northeast it is rather higher, and here are traces of a ditch at the foot of and concentric with the mound, and no doubt a part of its defence upon this its weaker side.

The only masonry that can possibly be old is a small rectangular mass on the south side of the mound, and which now carries a modern summer-house. The ragstone of the country, of which this fragment is comprised, weathers so rapidly, that it is difficult to form an opinion upon its age; but, though possibly old, it is probably of very recent date.

Looking to the position of the mound as regards the river, and to the low and flat character of the ground about it, it is evident that the great strength of the place must have been derived from the Ouse, here deep and broad, and from banks of earth and ditches filled from and communicating with the river. The entire absence of masonry and the disappearance of all but a trace of the surrounding banks and ditches, commemorated in the Chronicles as once so high and deep, are fully accounted for by the circumstances recorded of the famous siege by Henry III.

Bedeacum, or Bedford, was well known to the Saxons, and a town probably of Saxon origin. Here, just outside the town, was buried in 796 the Saxon Offa, king of Mercia, in a chapel long since swept away by the flood waters of the Ouse. Early in the tenth century the town was attacked by a party of Danish settlers from the five burghs, who were beaten off by the townspeople, and shortly afterwards Edward the elder repaired the place, and erected what some call the snhrth of Mikesgate, and some a strong place, on the southern side of the river, possibly a cover for the "ford," which contributed towards the name of the town. Bedford was without doubt an important town

under the Saxons, and as at Tamworth, Leicester, Wareham, and Wallingford, had a citadel at one angle of the enclosure, upon the river.

The Barony, also called the Honour, of Bedford, was conferred by William Rufus upon Payn, second son but eventual heir of Hugh de Bello-campo, or Beauchamp, a companion of the Conqueror, and possibly allied to the greater family of that name, who afterwards held the earldom of Warwick. Hugh was the recipient of many manors in Buckingham, and about twenty in Bedfordshire. Payn is the reputed holder of the Norman castle, described as of great strength, with ditches and ramparts of earth, and which descended to his son Simon, steward to King Stephen. The family, however, afterwards took part against the king, who seems to have attempted to settle the barony upon the daughter of the eldest brother, married to Hugh, surnamed "Pauper," brother to the Earl of Leicester. Stephen laid siege to the castle in 1137, and after five weeks of assaige, obtained it by a compromise.

Simon de Beauchamp held the castle through the reigns of Henry II. and Richard I., until his death, about the 8th of John. It appears from the red book of the Exchequer that he held 36 and 5-10ths knight fees of the old feoffment, and 8 fees of the new, all in the barony of Bedford. In his time the castle seems to have been held against Henry II. since in the second year of that king, 1156-6, those burgesses of Bedford who were in the castle against the king were fined twenty marks, of which sum they rendered account in 1157-8. In 1190 Simon fined 100*l.* for the government of the castle.

William, son and successor of Simon, is described as lord of the strong castle of Bedford, the captain of the honour or barony. He took part with the rebel barons towards the close of John's reign, and in 1215 admitted their forces into his castle. In consequence it was attacked by the well-known Falk de Breauté, and, not being relieved, was surrendered in November, after a seven days' siege. John was himself present at Bedford thrice in that year, in all for eight days. He granted the confiscated barony to Falk.

Falk strengthened and held the castle into the reign of Henry III., and hence ravaged the country below the Chilterns. At first a supporter of the young king, he afterwards resisted his authority, and, at the instance of his opposed neighbours, Henry de Brailroc was sent to Dunstable in 8th Henry III., 1224, to try their complaints, when thirty verdicts were found against the baron, and fines of 100*l.* upon each of them imposed. In revenge, Falk kidnapped the judge and lodged him a prisoner in Bedford Castle, treating him with much indignity. His wife complained to the Parliament then at Northampton, and the king ordered him to give up the judge, but in vain. Henry was probably glad of the opportunity of crushing a very turbulent subject, and appears to have lost no time in punishing the affront. In June, 1224, commenced a series of orders, issued by the king himself, and which show the greatness of his preparations for a siege, and the vigour with which he pushed them forward. On the 22nd of June, Henry was at Bedford in person, and there remained during the siege until the 19th of August, nearly two months. The preparations were both extensive and minute, and the mandates, always described as pressing, were issued to a vast number of sheriffs and other persons as far south and west as Corfe Castle and St. Briavels. They include men, money, arrears of scutage, cord, cable, iron, steel, hides, leather for slings, twine for strings, mangonnals, petraries, halista, quarrells, stone shot, quarrymen, masons, miners, carpenters, saddlers, wagons for conveying the royal pavilions, and almonds, spice, and ginger for the royal still-room. All the smiths in Northampton who can forge quarrell bolts, or leather when forged, are to work day and night until 4,000 are ready and despatched. Large quantities of wine from the royal stores in London, at Northampton, and elsewhere, are to be forwarded with speed to Bedford. Knights performing castle guard at Lancaster are ordered up: greyhounds are sent for to sport. The sheriff of Bedfordshire is to supply quarrymen and masons with their levers, hammers, mauls, and wedges, and everything necessary for the preparation of stone shot for the mangonnals and petraries. Miners come from St. Briavels, in the Forest of Dean. Windsor supplies its master carpenter and his mates. Charlbridge sends cord and cable. Charcoal comes with the iron and steel from

Gloucester, and the adjacent Abbey of Newsham spares a large quantity of raw stone to his converted into shot.

The details of the material supplied are recorded in the close rolls of the period. The particulars of the siege itself have been preserved by the neighbouring monks of Dunstable, from whose town, and probably from whose monastery, the judge had been taken, and whose fellow-townsmen played an important part in the siege. The king brought with him the Archbishop of Canterbury and divers bishops and abbots, by whose interest was granted to him two men from every hyde of their church lands, to work the siege engines; an aid of "carriages" or a mark from each caruca or plough land of demesne, and 2*s.* from each held in tenancy, gifts which were guarded against being drawn into a precedent by special charter from the king.

Falk left his brother to abide the attack, and sought aid on the lands of the Earl of Chester, Ranulph Blundeville. The earl, however, was with the king, together with Peter de Ruphins Bishop of Winchester, William de Cantelupe, Brian de l'Isle, and Peter de Maulay. All were suspected of disaffection, and in consequence the earl and the bishop left the camp, although the earl was afterwards brought by the Bishop of Chester to his duty. Falk remained at Northampton until he fled to Wales.

The siege operations included on the east front a petrary and two mangonnels, which daily hattered the opposite tower; on the west front, two mangonnels bore upon the old tower; on the north and south fronts were two mangonnels, one on each, and each breached its opposing wall. The operations of these seven pieces of ordnance were materially aided by two large wooden turrets, tall enough to command the whole castle, and supported by other smaller turrets, all charged with archers and crossbow-men. There was also the timber covered-way known as a cat, by the aid of which miners were able to undermine the wall, while the bowmen cleared the battlements above. These works were thickly covered with hides, rendering them proof against fire; and the slingers, of whom there were many, probably kept up a general and incessant shower of pebbles upon all who dared to show themselves on the ramparts.

The works were stormed by four vigorous assaults. First the barbican was taken, with a loss of four or five of the assailants. Then entrance was effected into the outer ward. This was the work of the men of Dunstable, and was attended with severe loss. In this ward were stored most of the munitions of the place,—arms, horses and harness, cattle, bacon, and live hogs. Much forage was here burnt, with the houses and sheds in the ward.

The miners next underworked the wall next the old tower, which wall fell. The resistance here appears to have been obstinate, many lives were lost upon the breach, and ten of the most forward assailants were taken and carried into the interior of the place.

Finally, on the vigil of the Assumption, 14th August, about the hour of vespers, the miners having undermined the foundations of the old tower, fired the props. The walls split, the smoke rose, and the place being no longer tenable, the garrison hoisted the royal banner and surrendered, sending out de Brailroc with the wife of Falk, and the other women. Next morning the king took possession. William de Breauté and the garrison were put upon their trial, and he and about eighty of his men were hanged out of hand. Three were allowed to join the Templars in Palestine, and the castle chaplain was delivered over to the archbishop as the spiritual power. It appears from the records that the remainder of the garrison escaped with fines and confiscations. The spoil was considerable, in treasure, provisions, and munitions of war. Henry left for Keston (Kempston) on the 18th, but was again at Bedford on the 19th, and at Dunstable on the 26th of August. Even when flushed by success he seems not to have been severe upon those not actually implicated. Alice, widow of the executed William de Breauté, was allowed her dower-lands in Bedford and Cumberland. On the 19th and on the 22nd Margaret, wife of Falk, was allowed for her subsistence the manor of Heyford and Shridge-worth. Gilbert de Breauté also was allowed a manor; and Falk, the author of all the mischief, had twenty marks allowed for his personal expenses on his way to exile.

Immediately upon the surrender Henry broke up the siege establishment. 900 quarrells, the residue of the 4,000, were returned to North-

1st. To what extent the hydrate of lime becomes re-carbonated by exposure to air?
 2nd. What is the physical condition of the carbonate so produced? and
 3rd. Whether in this long interval the silica and lime can directly unite with each other?
 Different views on these subjects have been advanced, the prevailing opinion undoubtedly being that the lime never becomes thoroughly re-carbonated, but stops short at a point when a definite combination of hydrate and carbonate of lime is formed; and, secondly, that lime is endowed with the power of attacking sand and other forms of insoluble silica by long contact at the common temperature.*

The conclusion to which I have been led by the chemical examination of the ancient mortars from Burgh, Pevensey, and other Roman castra, is that the lime and carbonic acid are invariably united in monatomic proportions as in the original limestone rock, and that there is no evidence of the hydrate of lime having at any time exerted a power of corroding the surfaces of sand, flint, pebbles, or even of burnt clay, with which it must have been for lengthened periods in contact. Further, that the water originally combined with the lime has been entirely eliminated during this process of re-carbonation, and, this stage passed, the amorphous carbonate of lime seems to have become gradually transformed by the joint agency of water and carbonic acid into more or less perfectly crystallised deposits or concretions by virtue of which its binding properties must have been very considerably augmented. It is proper to state that Messrs. Abel and Blount assign as one of the causes of the hardening of mortars, the formation and subsequent crystallisation of the carbonate of lime.

Analysis of the Roman Mortar from S.E. Tower, Burgh. —

Sand	I.	64.50
Soluble silica	0.50	
Red brick, with some unburnt clay	18.09	
Carbonate of lime	25.75	
Sulphate of lime	0.15	
Carbonate of magnesia	0.08	
Chloride of iron	0.05	
Magnetic oxide of iron	traces	
Wood charcoal	0.92	
Water, chiefly hygroscopic	90.58	

Other Samples of Burgh Mortar. —

	II.	III.	IV.
Sand and brick, with a	72.3	71.4	67.0
Little unburnt clay	27.7	28.6	33.0
Carbonate of lime, &c. } (by difference)			

Samples II. and III. were taken from the south wall; specimen IV. from the north wall.

SUNDERLAND GASWORKS.

THE Sunderland Gas Company opened their new offices on the 9th inst. They occupy a conspicuous position at the south-west corner of Fawcett-street, and are erected from the design of Mr. G. H. Hoskins, architect, whose design obtained the first premium in a public competition in March, 1867.
 The style of the building is Gothic, and is dependent for its effect rather upon breadth of treatment of the whole than the elaboration of parts. The materials employed are red pressed bricks, with Dunhouse stone dressings. The whole of the windows and principal entrance-doors on the ground-floor have segmental-pointed heads, those of the doorways being recessed, and furnished with columns of grey Dalbattie polished granite, with carved caps of Dunhouse stone. The south front, or principal elevation, occupies a frontage of about 80 ft. towards the Borough-road, and is distinguished by an oriel window, supported by a stone buttress and shaft of grey Dalbattie polished granite, which is surrounded by a carved cap representing a group of ferns.

On the ground-floor the following accommodation is provided, viz.—public offices, 33 ft. 3 in. by 22 ft.; secretary's office, 24 ft. 4 in. by 17 ft. 3 in.; out-door manager's office, 17 ft. by 15 ft.; metre inspector's office, 14 ft. by 13 ft.; principal or director's entrance from Fawcett-street,

26 ft. 6 in. by 10 ft.; strong rooms, with iron doors, by Chubb; lavatories; water-closets; &c., &c. The first-floor comprises director's room, 33 ft. 3 in. by 22 ft.;—this room has a handsome panelled ceiling and an oak dado 3 ft. 6 in. high, the oriel window forming a good feature;—photometrical and experimental room, 17 ft. 3 in. by 13 ft.; metre warehouse, 35 ft. 1 in. by 15 ft.; book-room; lavatories; water-closets, &c.

The top floor and basement are principally devoted to the storage of materials. The principal stairs and landings are of stone, and the entrances laid with Maw & Co.'s geometrical mosaic pavement. The whole of the furniture for the director's room, and the several offices, and principal landing, is of oak. The marble chimney-pieces have been executed by Messrs. Fisher & Dyson, of Huddersfield.

The contractors for the various works have been as follows:—masonry, bricklaying, and plastering, Mr. James Young, Sunderland; plumbing, Mr. H. Tuckson, Sunderland; slating, Mr. Robert Preston, Sunderland; carving, Messrs. Farmer & Brindley, of London; carpentry and joinery, Messrs. D. & J. Rankie, Sunderland; painting and glazing, Mr. George Kirkup, Sunderland; ironwork and lamps, Messrs. W. H. Walker & Son, Newcastle-on-Tyne; oak furniture and office-fittings, Messrs. W. Jobling, Sunderland; S. Atkinson, Sunderland; Knaping & Appleby, Darlington; and Hobbie, Smith, & Whitecross, Sunderland; bellhainging, Mr. T. Heslop, Sunderland. Mr. Robert Hodgson has acted as clerk of the works.

COMPLETION OF THE BEDFORD DRAINAGE AND WATERWORKS.

THE mayor and several members of the corporation have inspected the waterworks on the Clapham-road. The storage well was also visited, and the level of the water found to be 2 ft. 3 in. above the surface of the river. Several gentlemen tasted the water and pronounced it excellent. The reservoir, a subterranean brick-built tank capable of holding 400,000 gallons, was also examined, and the party remained until the town was pumped in. The main sewers of the town were afterwards flushed, and the party drove off to the drainage works at Newnham, which were also thoroughly inspected. The storage well yields 200,000 gallons every twenty-four hours. It is 60 ft. long, 18 ft. wide, and 25 ft. deep; with this is connected a pumping-well by a heading 60 ft. long and 6 ft. wide. For raising the water there is erected a perpendicular plunger, worked by an engine of 40-horse power, of combined high and low pressure, made by Bevington & Co., of London. This engine will pump 30,000 gallons in an hour if needed. The water is lifted from the well to the reservoir on the summit of the ridge known as Foster's-hill. The perpendicular lift is 150 ft. The rising main is taken across the Clapham road direct to the hill.
 The reservoir is cut out of the dense boulder-clay which forms the eastern ridge of the Ouse valley, and as the top-water in it stands 140 ft. above the average level of the town of Bedford, there is pressure sufficient not only to supply all the houses with water, but to throw a jet to the top of the highest building when needed in case of fire. The tank is 64 ft. long and 60 ft. wide, and contains 15 ft. 6 in. of water: in round numbers, it gives an available reserve of 400,000 gallons of water, double the quantity required at present for a day's consumption. The roof is supported by columns and arches, all being covered in to ensure coolness, and prevent impurities coming into the tank.
 On the visitors leaving the hill and descending the slope to the north end of Tavistock-street, the engineer, Mr. John Lawson, explained that this was the highest portion of the system of sewerage, and gave a practical illustration of the advantage of bringing the water-works in union with it at this point, so as to flush the whole of the drains throughout the town. This can be done at any moment, and perfect cleanliness of the sewers obtained by the mere act of turning on the water at certain points. There are thirteen miles of main sewers, which are all straight, and can be seen through at the manholes when inspection is needed. There are two levels in the system, but they come to one outfall, and provision is made in the upper one for conveying sudden overflows of storm-water into the river. The main sewer on the north side is brought to the left bank of the river and passes along the margin by the premises of the Swan Hotel, and here the surface is utilized: over the main is an embankment 25 ft. wide, forming a

fine promenade. At the suburb known as Waterloo the main sewer of the south side of the town is brought in a tube under the river to the main above referred to, and the whole is conveyed straight under the roadway by the side of the river to Newnham, three-quarters of a mile. Inside the walls of the old Priory-mead a tank has been constructed which receives the sewage, which is then raised to the desired height by two horizontal 12-horse engines working centrifugal pumps. From the lift the sewage passes along by gravitation to a field of 54 acres, where it is distributed. A portion of the field is not yet brought into cultivation, but a large breadth is now bearing a fine crop of rye-grass, which has sprung up in a very short time.

The borough treasurer, Mr. James Wyatt, in writing to us on the subject of the drainage, says:—"It is very successful, and a great triumph over the 'dirty party.' I think the distribution of the sewage is a very satisfactory solution of the great question; and that Mr. Lawson deserves credit in the engineering world, as he receives commendation from the local governing body of Bedford. I say this as a disinterested person so far as concerns any connexion with the engineering profession, or with Mr. Lawson personally, although greatly interested in the success of such works everywhere."

HEALTH AND DISEASE IN ROMSEY.

OUR attention has been drawn by the surveyor of the Romsey and Winchester turnpike-roads to the fact that upwards of thirty cases of fever have occurred this season at Romsey; and to the probable cause of this. Some years since the surveyor recommended a plan whereby a constant flow of water at all times down the main sewer of the hundred was obtained, and the health of the community secured, after the removal by the railway company of the canal whereby the sewer was flushed. On the subsequent complaint, however, of a mill-owner, a hatch which had previously existed while the canal water was available, was placed on the sewer, in order to accumulate water for the use of his mill, and by way of flushing the sewer at stated times. The surveyor's plan had been in operation during the years 1863, 1865, 1866, and 1867, in none of which years was there any such fever as there has been since the hatch was replaced. The surveyor, therefore, considers that the replacement of the hatch on the sewer, and hence the cessation of the constant water-flow, are the cause of the prevalent fever. Anyhow proper inquiry is called for.

AUSTRALIAN MEAT FOR THE ENGLISH MARKET.

EXPERIMENTS in the preservation of meat still excite public interest. From New South Wales we learn that an attempt is about to be made by Mr. Mort in conveying a cargo of meat, frozen by his process, from Sydney to England. The process has been for a long time before the public. An instance of the success of the chief process carried on by the Victoria Meat Preserving Company has recently been brought under notice. Two legs of mutton cured by their process were hung in the rigging of the brig *Greyhound*, and remained there six weeks. The meat was afterwards cooked, and proved to be perfectly sound and palatable from the outside to the bone. The Victoria Company supply meat cured in this way at a cheaper price than salt beef. Besides the vacuum or tin-enclosing process, this company salt and smoke dry meat. Their rolled mutton hams are sent to India, Japan, &c. Meat biscuits are also made. The Melbourne Meat Preserving Company still carry on their operations in the preparation of tinned meat, to which they limit themselves. A satisfactory trial of this process has been made by Mr. Welch, in London, of some Australian roast mutton, cured by Mr. Ritchie before his connexion with the company. Mr. D. Medlock's process of curing joints of meat by dipping them in bisulphate of lime has been put to a public trial at Melbourne, where a number of gentlemen dined off roast and boiled legs of mutton, and roast and boiled beef, which had been subjected to the process about three weeks before. The meat was served up hot, and proved to be quite equal to fresh cuts, the gravy being

* Vide "Knapp's Technology," edited by E. Ronalds and T. Richardson, vol. ii., p. 386; and *see* General Gilmore's "Practical Treatise on Limes, Cements, and Mortars" (New York, 1863), pp. 174 and 188; Mr. G. R. Burnett's "Radiatory Treatise on Limes, Cements, and Mortars," &c., p. 49.
 † "Handbook of Chemistry," p. 236.

retained. Mr. Medlock is desirous of trying to get at the home-market, and a shipment of meat prepared by his process was sent to England by the *Lincolnshire* on her last trip. The result of the experiment cannot be known in Australia for some time to come; but, should it prove successful, a cheap way will have been found of solving the problem which has engaged so many ingenious minds. We may here add that the most convenient mode of preparing sulphurous acid for the preservation of meat on Dr. Dewar's principle is said to be by adding a few drops of sulphuric acid or oil of vitriol to sulphate of soda, the sulphurous acid gas being thus evolved in great quantities.

THE PHYSICAL COMMOTIONS THROUGHOUT THE GLOBE.

THE "BUILDER" was the first to point the attention of the public to the indications, ever and anon occurring, of some tremendous impending crisis, which the activity of volcanoes, the frequent recurrence of earthquakes, and the prevalence of hurricanes, in various parts of the world, seemed to betoken. It now appears that numerous cities in South America have been more or less completely destroyed, shipping wrecked, and twenty to forty thousand persons killed, by a series of terrible earthquake shocks. The country chiefly ravaged is Peru and Ecuador, where, along 3,000 miles of country and coast, property estimated roughly at three hundred millions of dollars has been destroyed. The shocks continued from the 13th to the 16th of August; and it may be that they were not even then over; but it is most earnestly to be hoped that the actual crisis had then come, and that the hidden force which has been so long threatening is now expended. Earthquakes have of late occurred not only in America, North as well as South, and in Europe, but in Asia, and also in Australia. The commotion is evidently cosmical: it has affected the whole globe, north and south, from Iceland to the Sandwich Isles, from Britain to Australia, and east and west, from America to Asia. Perhaps even our strangely arid season, like last year's hurricanes, has had something to do with this cosmical disturbance.

The late Mr. Hopkins, of Cambridge, calculated that the force which produced the great geological rents in the earth's crust was one operating "upwards and outwards from within." Does not such a force denote the expansion of the fluid though encrusted sphere, probably from the centrifugal force of its rotation, by which expansion it relieves itself, so preserving uniform the rate of rotary motion so long as the crust gives way to the force of expansion?

SOMERSETSHIRE ARCHÆOLOGICAL SOCIETY.

THE twentieth annual meeting of this society commenced at Williton on the 25th ult., and the weather being fine, there was a good attendance, including Sir Alexander Hood, bart., M.P., the president for the year, Sir P. P. Aoland, bart., Mr. Vanderhyl, M.P., &c. The business meeting was held at the National School-room. The report referred to the labours of Mr. Sanford, in compiling the first volume descriptive of the contents of the Somersetshire caves. Mr. Freeman described the construction of Dunster Church. The officers for the ensuing year were appointed. The meeting was attended by nearly eighty ladies and gentlemen. In the afternoon an excursion left Dunn's Hotel for Bicknoller, Halby old Manor-house, and Stogumber. In the evening an ordinary took place at the same hotel, of which nearly the same number of persons partook.

It was intended to hold the meetings for the reception of papers at the National School-room, but in consequence of the want of accommodation many persons were obliged to return home by the quarter to nine train: these papers were therefore read at the dinner-table. The Rev. Mr. Hingo read a paper on "Ina, the King of the West Saxons," and of his residing in the neighbourhood of Taunton. Mr. Parker then read a few remarks about "Old Cleeve Abbey," where they purposed to go next day.

The members did not go to Orchard Wyndham on Thursday to see Old Mother Shipton's stone,

as intended, not having time. They went direct to Combe Sydenham, once the residence of Sir F. Drake; thence to Netticombe Court House, thoroughly examining it; and thenceforth to Cleeve Abbey, where Mr. Parker again read the paper of the evening previous respecting it. Thence they went to Dunster Castle. The park-gates being thrown open, they drove to a large marquee erected by Mr. C. Luttrell, to entertain them at luncheon, where upwards of 100 sat down, and the society afterwards made an examination of the outparts of the building. On their return, Carhampton Church was visited, and thence home to Williton, where an ordinary at Dunn's awaited them, as on the preceding day.

Next morning, thirty-two members of the society proceeded to East Quantoxhead Church and manor-house, Strington-cross, Stoke Courcy Church, Fairfield (the seat of Sir P. P. Aoland, where the president, the son-in-law of this gentleman, entertained them at luncheon), whence they proceeded to the old manor-house at Doddington, the church, and old mines and marble quarries; thence to old Dousborough Camp, back to St. Audries, by way of the park, the residence of the president; and so ended the meeting.

OPENING OF THE HOP AND MALT EXCHANGE.

THE new building in Southwark-street, Borough, of which we gave a view in our volume for 1867, page 731, has just been opened for business purposes. It was not publicly inaugurated, in consequence of the unavoidable absence of one of the members of the royal family, who, however, promises that he will consent to officiate on his return to town in November. The building, as already noticed, is situated at the corner of High-street, Borough, in the immediate vicinity of the hop trade operations. It contains an exchange 80 ft. by 50 ft., a subscription-room, 40 ft. by 32 ft., a refreshment department, about 120 offices, 50 stands, $\frac{1}{2}$ acres of warehouse room, and $\frac{1}{4}$ acre of vaulted cellarage. Of the offices and stands about half are already let and tenanted, and a brisk application is being made for the remainder. Several suites of auction-rooms adjoin the exchange. The capital of the company paid up is 70,000*l.*; the land is freehold, and cost 60,000*l.*; and the building, erected under the supervision of Mr. R. H. Moore, the company's architect, has cost about 65,000*l.* The figures in the pediment and the whole of the other carvings were executed by Messrs. Frampton & Williamson.

FROM SCOTLAND.

Aberdeen.—Free Cilcomston Church has been opened for public worship. It has been built from designs prepared by Mr. William Smith, city architect. The style is Early Decorated Gothic, the walls being of hammer-hocked granite, with freestone dressings. The front to Union-street includes a main door, and wheel window over it $1\frac{1}{4}$ ft. in diameter. When finished, the height of the tower and spire will be 145 ft., and the base of the tower contains one of the gallery staircases. There are three passages along the area of the church, one in the centre, and one on each side, with a cross passage in front of the pulpit, which is at the north-east end. Easy access is afforded to every part of the church. In all, there will be six exits. The interior length, exclusive of vestibule, is 80 ft., and the width 54 ft. 6 in. Two rows of iron columns run up the full height of the building, supporting the middle roof. At the north end of the building there are provided session-house, vestry, and other necessary accommodation. The contractors were,—mason work, Messrs. P. Bisset & Son, 2,750*l.*; carpenter, Mr. Middleton, 1,546*l.*; plumbers, Messrs. R. Gordon & Co., 1,601*l.*; plasterer, Mr. Morrison, 89*l.*; Slaters, Messrs. Florence & Kemp, 101*l.* 13*s.*; iron columns, Messrs. W. McKinnon & Co. 40*l.* The total cost is upwards of 4,786*l.* 13*s.*

Jedburgh.—The new Commercial Bank now in progress is in the Italian style, and has a frontage of 52 ft., and will be three stories in height. The first story is finished, and the second is being proceeded with. At each side of the doorway are two pillars with composite capitals, from which spring two arches, an inner

and an outer. The outer arch, which has a carved male head for a key-stone, spans the whole breadth of the doorway, while the inner one is supported in the centre by another pillar similar to those at the sides, thus forming two small arches. The soffit of the doorway is carved, with representations of oak and laurel foliage. The spandrel is also filled with sculptured foliage. Above the door is a balcony, supported by two ornamented trusses or brackets, and surmounted with a balustrade. Above this again will be a two-light window, divided by a shaft with moulded base and capital. This window is also to be surmounted by a light balcony and plain balustrade. The arches of the windows are round. Along the top of the building there is to be an enriched cornice, surmounted by a balustrade and pedestals. The hewing and sculpture work has been executed under the superintendence of Mr. William Brunton, jun., of Jedburgh. The architect is Mr. Rhind, of Edinburgh.

FROM IRELAND.

Antrim.—The foundation-stone of a new Protestant hall has been laid in this town by Viscount Massereene and Ferrard. The proposed hall, which has long been much wanted, is to be erected a short distance off the road leading from the Northern Counties Railway Station to the town. The dimensions of the proposed building are,—length, 63 ft.; breadth, 42 ft.; and height, 25 ft. It will consist of two committee-rooms, and a large assembly-room, which will accommodate about a thousand people. The building, which is to be erected with block stone, will be in the Doric style, and will have an ornamental front. The plans for the building were prepared by Messrs. Young & Mackenzie, and it is being erected by Mr. William Vance, sen., builder, Antrim. It is estimated the building, when completed, will cost about 700*l.*

Dalkey.—The foundation-stone of Dalkey Harbour has been laid at the Coolmore landing-place. It will supply the want, much felt, of a comfortable landing-place, besides being adapted for the reception and unloading of vessels of small tonnage and fishing craft. Two piers, in accordance with a plan drafted by Mr. B. B. Stoney, C.E., of the Dublin Port Board, will extend, the one at the north side about 150 ft., and the other about 50 ft. into the sea, and will embrace an area of about half a mile. The cost will be about 2,000*l.* It will be built of granite, which will be obtained from excavations in the hill close by. The contractor for the work is Mr. John Cunningham, of Dalkey, who has engaged to complete them in six months. They will be superintended by Mr. Stoney, on the part of the Port Board, and by Mr. Quirk, on the part of the Dalkey Commissioners.

Sherries.—A new church has been erected in and for the parish of Holmpatrick, adjacent to Sherries, the old church having been lately found insufficient to meet the requirements of the Established Church, besides having fallen into a condition of ill repair; and the ceremonial of consecration has been performed by the Archbishop of Dublin. The site of the new church is close to the old one, and is a donation from Ion Trant Hamilton, M.P., who also contributed 700*l.* towards the building-fund. The edifice is built according to a plain Gothic design, by Mr. James Rogers, architect, Dublin. It is about 90 ft. in length by 25 ft. in breadth. This length includes that of the chancel, which is about 24 ft. by 16 ft. in breadth. The side walls are 17 ft. high, and a very pointed roof gives an elevation of at least 17 ft. more at the centre within. Close to an entrance porch rises a square tower on the north-west angle, surmounted by a broached octagonal spire. The material used in the building is chiefly limestone, from the Milverton quarries, and also from quarries at Athlora. The side walls are each pierced with one triplicate and two duplicate windows. A second external porch on the same side with the other leads to the vestry-room. The interior is plain. The seats are in the most modern style, and, as well as the roof, are of varnished deal. Opposite the chancel a gallery has been erected at the private expense of Mr. H. H. Woods. From the ceiling depend two Medieval chandeliers, supplied by Messrs. Sloane & Co., of Dublin. All the buildings and fittings have been executed by Mr. Walter Doolin, also of Dublin.

SCHOOLS OF ART.

A Swindon School.—A local committee has been formed to establish a school of art in this town, and the use of the Great Western Schoolroom has been granted for this purpose. Sir Daniel Gooch, bart., M.P., and Mr. A. L. Goddard, M.P., are patrons of the Swindon School; Mr. J. Armstrong, chairman; and Mr. Miller, the very successful master of the Cirencester School, will be the art-teacher. It is proposed to open the school on Tuesday, the 6th of October next.

The Salisbury School.—The annual distribution of prizes to the students of the Salisbury School of Science and Art has taken place at the Council-house, the mayor (Mr. S. Eldridge) being chairman on the occasion. Amongst others, the master of the school, Mr. Fraser, addressed the meeting. The school, he said, though but in its infancy, was progressing hopefully.

THE SEWAGE QUESTION.

EXPERIMENTS are now being made at Tottenham with a mode of treating sewage called "the German system," which is in practical operation at Berlin, Hamburg, and Potsdam; but is, nevertheless, appropriated by the experimenter, who declines to publish the nature of the ingredients used for the precipitation of the sewage and clarification of the water holding it in solution and suspension. Surely there could be no difficulty in obtaining the information for behoof of the public from Hamburg or Berlin.

The plan adopted is to allow the sewage to run continuously through a pit of about 50 ft. long, 20 ft. wide, and 10 ft. deep, running in at the same time one two-thousandth part by weight of the disinfecting agent; the result is said to be that almost the entire quantity of solid matter, say one and a-half thousandth by weight of the fluid sewage, is precipitated, its volatile parts fixed, and the water allowed to flow away from the farther end of the tank clear in appearance, and almost without smell. The disinfecting fluid consists of nine parts water and one part composed of three simple substances, which any one may see employed at Tottenham, but the composition of which M. Hillé, C.E., the experimenter, declines to give to the general public.

From the data supplied we understand that the solid ingredients used in this process cost about 20*l.* a ton; so that in the proportion in which they are employed, they would cost about one farthing per ton of liquid sewage dodecided, or 1*l.* 9*d.* a ton for the solid matter obtained. The effect of the agent, setting cost aside, is considered to be successful, settlement taking place with surprising rapidity, and deodorisation being almost complete.

A conference has been held at Leamington on the sewage question. The committee of the Milverton, Lillington, and Leamington Local Boards met at the townhall, to further consider what steps shall be taken for the purpose of disposing of the sewage of the three parishes. At a previous meeting the committees adopted the principle of irrigation, and now resolutions and letters were produced, showing that each Board acquiesced in the decision. The following resolution was unanimously adopted:—"That it appears to the Sewage Committee of the three Boards that it would be for the advantage of the district if the three parishes were formed into a united district for the purpose of sewage utilisation." The meeting then adjourned.

THE SUBWAYS ACT.

The new "Act to make provision respecting the use of subways constructed by the Metropolitan Board of Works in the Metropolis" (which is a "local" Act), has been referred to in several journals, but an analysis of its clauses has not yet appeared. As it is a subject of special interest to our readers, we present a carefully arranged outline.

The Act commences by reciting the construction of subways in the new streets which the Board are authorized to make; and that it is expedient, in order to prevent inconvenience to the public by the frequent breaking up of such streets, to enable the Board to require companies, when placing gas, water, and other pipes, to lay them in the subways. To effect this it is enacted that the Board may serve a

notice on any company going to lay down pipes, requiring them to lay them in the subway; and the company must do so, notwithstanding anything in any special or general Act. After the receipt of such notice the company must not break up the street. The penalty for disobedience is to be 2*l.* (without prejudice to other proceedings), and the pipe may be removed and surface made good at the expense of such company. Pipes already laid in streets under which a subway is made, must be removed into the subway; but this is to be at the cost of the Board. If, however, it seems necessary to substitute new pipes for the existing ones, the cost is to be fairly apportioned. Differences are to be settled by an arbitrator appointed by the Board of Trade. All companies or persons are to be allowed to use the subways without favour, so far as space will admit. The companies are to maintain the pipes, under the supervision of an officer appointed by the Board; and the subways are to be maintained by the Board in an efficient state of ventilation and repair, and to be free from water and other obstruction. The Board and the companies are to agree as to the pecuniary and other details connected with supervision; and in case of any difference, it is to be settled by an arbitrator appointed by the Board of Trade, on the application of either party. The powers of the Local Management Acts are to be applied to this Act. No bye-laws under this Act shall come into operation until allowed by the Board of Trade, and twenty-one days' notice of the intention to apply to the Board of Trade for the allowance of such bye-laws, shall be given to the gas and water companies supplying gas and water in the district. The Act is only to apply to subways constructed under the Covent Garden Approval and Southwark and Westminster Communication Act (1857); Victoria Park Approach Act (1855); Thames Embankment Acts (1862, 1863, 1864); Metropolis Improvement Act (1863); and the Whitechapel and Holborn Improvement Act (1865).

PARIS.

M. VIOLETTE DUC's small building, constructed at the south of Notre Dame, as a residence for the arch-priest and beadle, is terminated. It is in the style of the French "Modern" Gothic, with square-headed windows and high-pitched roof. The enormous works of restoration of the Cathedral are drawing to a close, and the iron railing surrounding it progresses rapidly. Some important experiments have been made lately for playing the new grand organ by electricity, in adapting to it the system of apparatus invented by Lanenberger & Co. of Smiswald (Switzerland), and presented to the Society of Encouragement by M. Spiess, a member of the above firm, in the shape of an electric piano. We attended by invitation at a rehearsal at Notre Dame, and had an opportunity of examining the mechanism of the apparatus. Several pieces from the "Traviata," "Trovatore," the March in "Norma," &c. were well played on the grand organ in good time, and also Handel's "Creation," the "Domine salvum fac," &c. &c. The great difficulty is to contrive a battery which will remain with closed circuit in constant action for two months without diminution of force. Daniel's battery improved by M. Bonlay, is likely to effect this, as he has one working an electric clock, which has not been disturbed for a month, and though the circuit is always closed, no weakness has been observed in the current.

The double syphon for conveying the sewage of all the south side of Paris, to join the great northern collector, discharging at Asnières, was finally sunk on the 31st ult., into its channel in the bed of the Seine, near the Pont de l'Alma, without accident. The channel receiving the tubes is 5 ft. deep; the tubes are 3 ft. 3 in. each in diameter, and rest on a layer of concrete 16 in. thick. Another layer is to cover them 19 in. deep. The syphon is 407 ft. long, and it weighs 150 tons. As soon as it was laid the sunk towing-chain in the river, which had been severed, was again united, the towage and general traffic of the river was resumed, and the fly-boats resumed their active service.

At the church of Saint-Germain-des-Près, the new "place" of that name, through which the Rue de Rennes passes, has been completely put into shape, and will measure about 30,000 square feet. A refuge has been placed in the centre. Repairs are being executed to restore the north-west corner of the old church tower, found to be, on

its being disengaged, in a sad state of degradation; the counterfort has to be entirely renewed. There were formerly three towers to the church, two placed at the angles of the choir and transept, and that standing at present. All three were capped with steeples, which gave it the nickname of the *three-steepled church*. About forty-five years ago the two towers at the transept, threatening ruin, were taken down; but the lower portions were allowed to remain as they do at present: it was deemed unsafe to remove them as they serve as counterforts.

THE TRADES MOVEMENT.

A MEETING of masters and workmen in the building trade of Nottingham and district has been held in the Exchange Hall there, for the purpose of forming a board of arbitration in connexion with the trade. A resolution was carried—"That this meeting is of opinion that it is very desirable that a board of arbitration and conciliation should be formed in connexion with the building trade of this town and district." Mr. Mundella stated that there were already 500 boards of arbitration established, and there were 200 candidates for the coming Parliament who had adopted it in their electioneering speeches, and who were going to the House of Commons on this principle; that workmen have a perfect right to combine for their own protection; and that the funds of working men ought to be protected just as effectually as the funds of life insurance or any other society which belongs to the middle and upper classes. The following were appointed on a committee in connexion with the joiners' and carpenters' branch:—Messrs. R. Dennett, Lynam, Barker, Vickers, Stevenson, and H. Marriott, sec. Workmen: Messrs. Ellis, Rowland, Martin, Hutchinson, Drury, and Hicking, sec. In reply to a vote of thanks awarded to him, Mr. Mundella said he hoped their example would be followed throughout England, and that one day he might see a rennon of boards of arbitration in Nottingham. He expressed his belief that the masons, although slow in their movements, were coming right.

At a recent meeting of the Liverpool Trade Union of Operative Bricklayers, held in the Concert-hall, Lord Nelson-street, it has been unanimously resolved to request the Master Builders' Association to join them in settling a permanent code of regulations which shall be satisfactory to all parties, through a court of arbitration, as suggested by the masters in May last. A resolution was also passed in favour of conducting the business of the society in its own offices, instead of at a public-house, as heretofore.

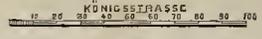
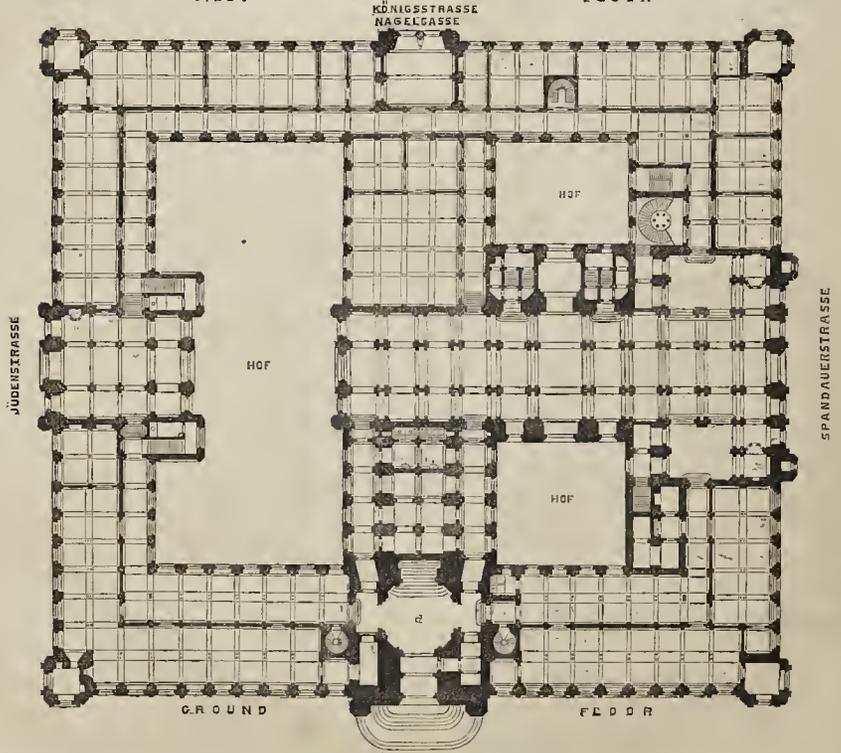
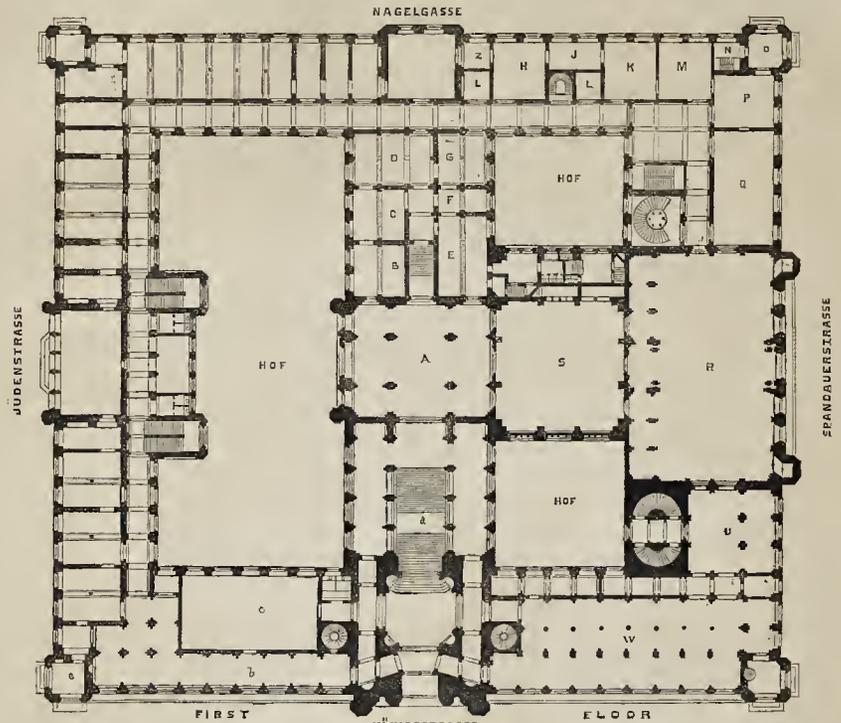
Several mill operatives at Lewiston, U.S., are building houses in their spare hours. Working in the mills nearly twelve hours per day, they manage to scrounge a little time in the morning before the bell rings and after they come out at night, which they devote to building operations. A short time ago one of these persevering men was seen shingling after eleven o'clock at night, and the next morning was at work almost before daylight.

PROVINCIAL NEWS.

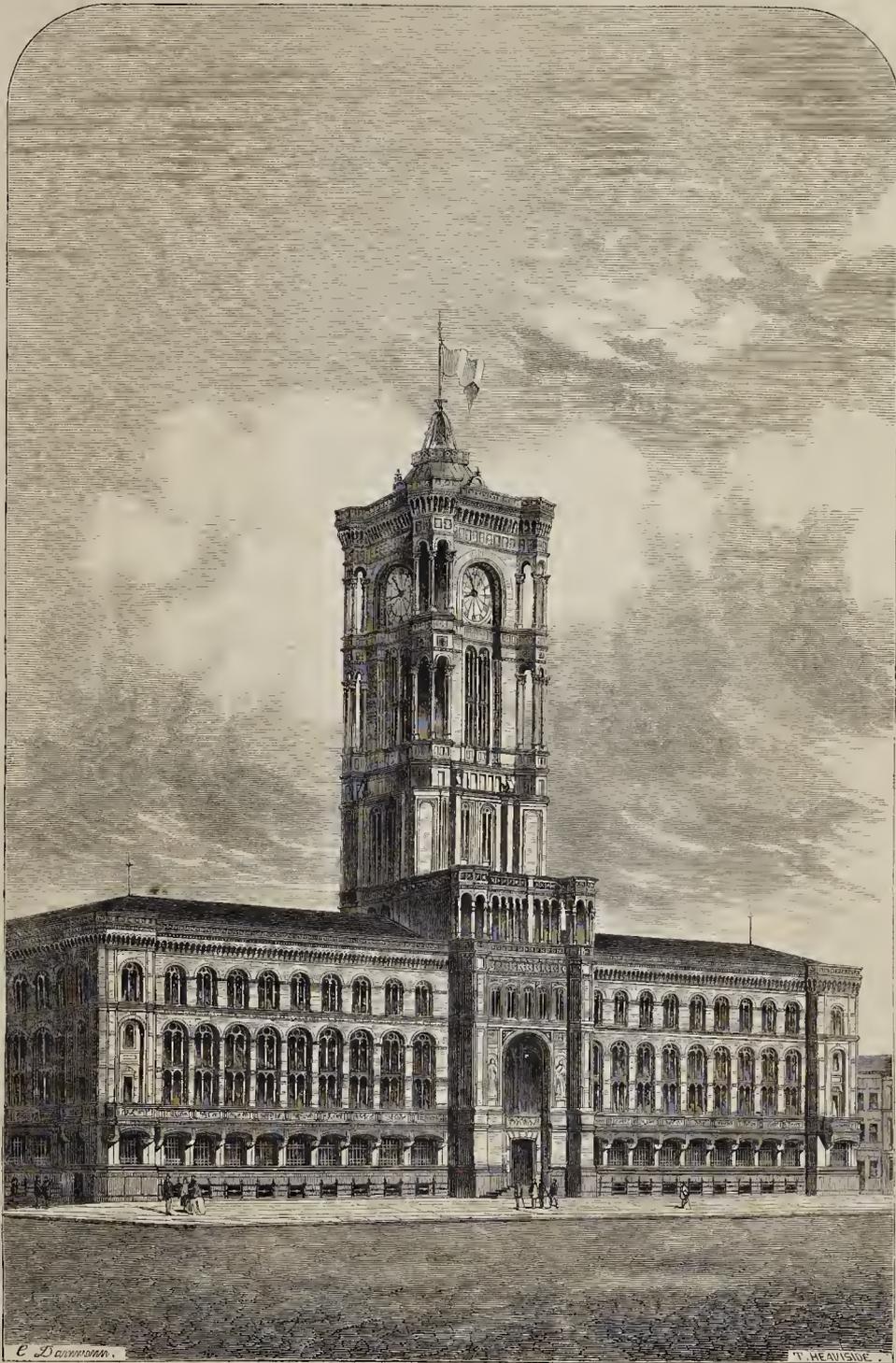
Blackburn.—At the adjourned annual county sessions at Lancaster, the Finance Committee have been empowered to negotiate for the purchase of a site for a new lunatic asylum, and to secure land for the purpose to an extent exceeding immediate wants, in the vicinity of Blackburn, Chorley, or Preston.

Deesbury.—Mr. J. Day, a member of the town council, with the object of promoting the erection of an infirmary for the town, has offered to subscribe 2,500*l.* if 50,000*l.* should be raised; 2,000*l.* if 40,000*l.* only be subscribed; and so on in proportion to 20,000*l.* Should the effort be accomplished, Mr. Day promises further to subscribe 50*l.* a year towards the maintenance of the institution.

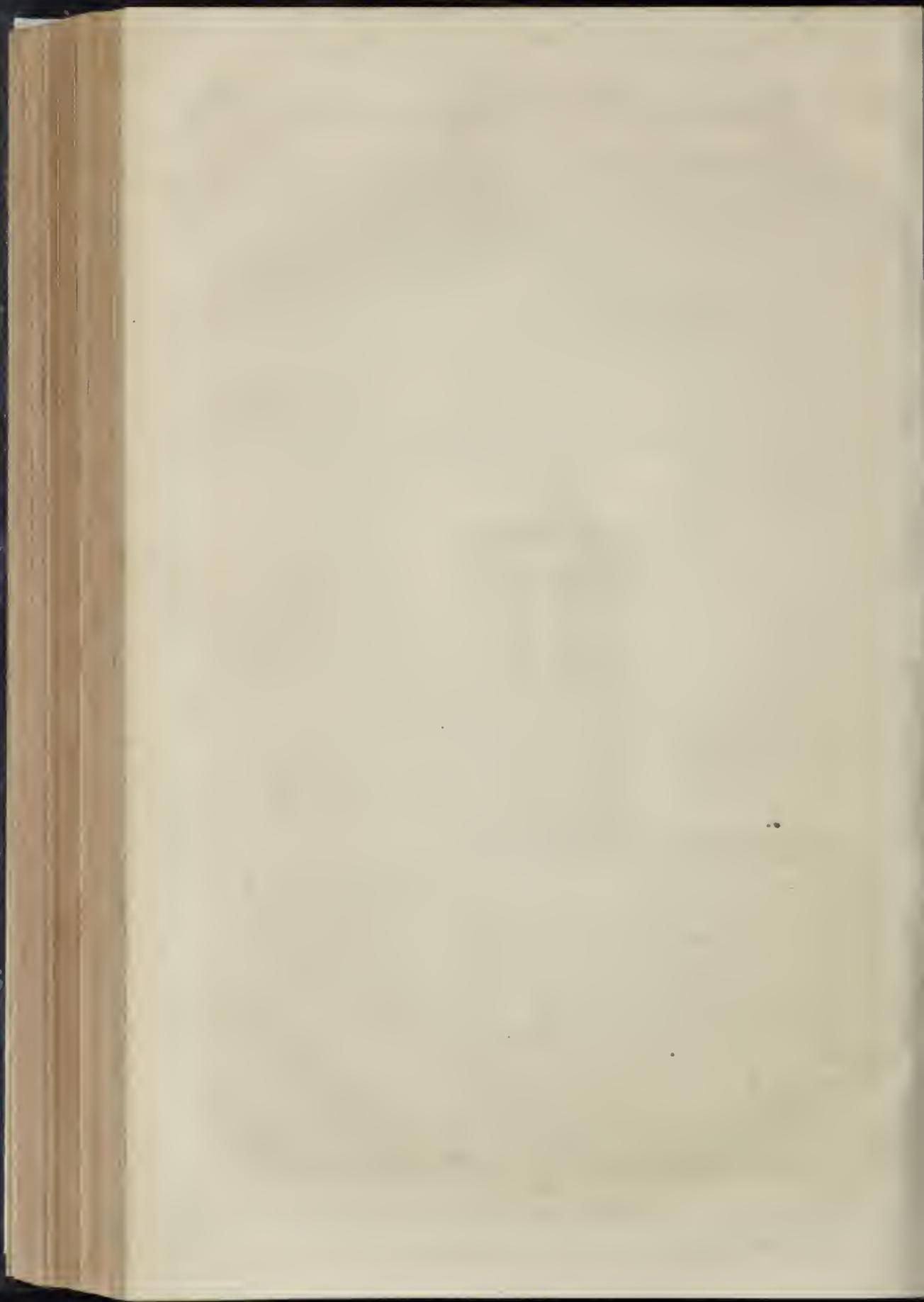
Kirkdale.—At the county sessions in Preston, it has been resolved, that towards the carrying into effect resolutions of the Courts of Annual Session, 1866, authorising the General Finance Committee of the county to borrow 35,000*l.*, for altering, enlarging, and repairing the county prisons at Preston and Kirkdale, to approve of the mortgage of the rates for these purposes for the sum of 8,000*l.*



NEW TOWN HALL, BERLIN.



BERLIN TOWN HALL. — HERR WAESEMANN, ARCHITECT.



THE NEW BERLIN TOWN-HALL.

BERLIN, after something like 600 years of struggle, has risen, from the humblest village, from the position of a simple fishing village, to be the seat of a powerful government, and the capital of all North Germany. Berlin contained at the commencement of the last century, 55,000 inhabitants, at the end of it 169,000, and in December 1867, 703,000, thereby taking rank amongst the largest populations in Europe; whilst the increase of building during the last ten years, has not only placed it on an equality with, but even in advance of, many capitals of much longer standing.

Around the year 1850, the council-house, situated nearly in the centre of the city, being found utterly insufficient for the purposes of government, it was determined to remedy the evil by erecting a splendid building, and thereby provide at the same time a worthy and lasting monument of the increased importance of the city. The first thing, however, to be done, was to increase the irregular, confined, and cramped site, which, on account of the high value of the surrounding land and buildings, was only accomplished by an outlay of nearly a million thalers.

The architectural competition, invited by a circular issued in 1856, created an active interest; but although the prize designs were highly praiseworthy, no definite selection was made from them. Mr. Architect Waesemann was then ordered to prepare a design, with the use of the best designs already sent in; and this, after a careful supervision by a professional commission, was approved and put into execution by the authorities. On the 1st of August, 1860, part of the ground was cleared and ready to be given over to the architect, and all was ready for the triumphant laying of the first stone, in the presence of the king, on the 11th June, 1861. On the 1st of April, 1865, by great press of work, the contract made at the beginning, viz. to have ready for use that portion of the building next the Juden and König streets, and the Nagelgasse, was fulfilled.

The rapid progress of the building of the tower (nearly 300 ft. high) now showed the technical necessity of pushing forward, as much as possible, the König-street front, and the second part of the building generally. The external portions of this, consisting principally of reception-rooms, and large handsome apartments, are now nearly finished, whilst the interior will probably take about two years to complete.

The whole building, of which we give a view as it completed, and plans, will without doubt take a most prominent and important position amongst Berlin edifices; and through the perfection of the artistic brickwork introduced by Schinkel, an epoch in Berlin's building history has been created. The stately building rises from massive foundations of grey Silesian granite, in well-designed blocks of brickwork, the dark red tone of which is varied and lightened by mouldings in granite, and window ornamentations in red sandstone. The complete rectangular ground-plan is 310 ft. long by 235 ft. broad, with a height in the ground-floor of 16 ft., in the first floor 14 ft., in the mezzanine-floor 14 ft., and in the second floor of 16 ft., the front reaching an actual height of 85 Prussian feet. The employment of space is as follows:—

The basement, including the carriage of the two small yards, contains all along the König-street front, the "Rathkeller," so often found in old German towns, dwelling-rooms for under-servants employed in the building, and space for the hot-water warming apparatus and storage of fuel.

In the ground-floor, which is traversed by a handsome corridor, running from the Spandauer-street to the Juden-street, besides the space set aside for the service, are placed the fire-offices and treasury; and it having been found necessary to protect the doors and windows, an iron ornamental wrought-iron grating was provided. Light, roomy, fire-proof passages and vestibules, which are well warmed in winter, afford the means of convenient communication for servants and the public on all the floors.

The first, mezzanine, and second floors, contain offices for the government of forests and landed property of the city, the direction of churches, schools, charities, trade, and the building commission. For those branches of the government which come under the jurisdiction of the civic authorities only, the large council-chambers necessary, as well as a large designing-room for the building commission have been provided on the second floor.

The transport of papers, &c. to the upper floors is effected by means of lifts. Gas, water-supply, closets, &c. are arranged with all the latest improvements, and the greatest care has been paid to the security from fire, in that every compartment, divided by fire-proof walls, is well supplied with hose, and spacious water-tanks under the roof. Most of the apartments are vaulted, the corridors and floors are nearly all paved, and the staircases constructed in granite.

The connexion between the reception-rooms and principal council-chambers is as follows:—

The public steps at the principal entrance lead through the dome, *a*, which terminates in a star-shaped vault, after passing through three floors, and then on to the grand staircase, which forms the approach to the hall, *A*. From here one ascends by the state staircase, lighted from above, and of which the walls are ornamented with frescoes, to the chambers destined for public meetings, *B*, immediately adjoining which are the council-chambers, *C*, *D*, and *E*.

On leaving the hall, *A*, and going to the right, is the court of the city authorities, *S*, which is supplied with a lofty gallery for the use of the public during session. In close proximity with *S* is *R*, the noble principal room, which runs up through all the floors, and is used for receptions on grand occasions. It is rich in architecture, and forms a sort of two-storied arcade, the gallery being connected with the ground by alternated twisted columns and pillars. The walls are painted in gold and light colours, and a rich parquetry floor helps to make up a harmonious whole. The high vaulted hall, *U*, forms the means of communication by a circular staircase, with the largest passage connected with the State staircase, and leads immediately to the library, *W*, with its minor rooms. A corridor, finely decorated with historical frescoes, runs through the tower to the hall, *b*; *o* is the magistrates' court, already completed, and imposing from its stately solidity; *e* is a room for the *sheriff*; and above it, in the mezzanine floor, is a similar one for the *sheriff*. The rooms *Z*, *L*, *H*, and *I* to *Q*, on the first floor, and others on the mezzanine floor, are used, with necessary corridors and staircases, as dwellings for the principal officials; but in case that at some future time it should become necessary to abolish such dwellings, they have been planned and constructed in such a manner as to allow of their being turned into offices.

To conclude. The cost of furnishing, and decoration by gilding and paintings, will bring the whole cost of the building to about four million thalers. Something like 800 officials will be employed in the various offices.

CLEMENT'S INN.

SOME of the members of the Inn are afraid our paragraph last week may lead to the impression that this Inn has ceased to exist, which is not the fact. The Commissioners of the Law Courts have only taken a small portion of the buildings. Mr. Fairfoot, as one of the senior members of the Society, and as representing a firm which has occupied chambers there for nearly half a century, writes:—"The status of the Society as an Inn of Court is not affected, and the present members entertain a confident hope that a new and appropriate edifice will be erected on or near the very important site they still possess, where the Society, which has been in existence at least 300 years, will continue to flourish for many future generations."

EDUCATION.

THE elementary principles of all useful arts and sciences should be sown broadcast among the people; indeed such matters, besides simple reading, writing, arithmetic, and catechisms, should be taught alike to growing boys and girls in the schools of the rich, the middle-class, and the poor; for the truths of natural philosophy are not abstruse but plain, even to the understandings of intelligent children, when they are expressed in simple and familiar language, and illustrated by clear drawings and proper models. If such things were taught at schools with care and persistence the minds of the recipients would be expanded and trained to right principles; sound knowledge, that would be useful to them in after life, would be acquired, and develop with their growth; and they would, by such

knowledge, be brought to perceive and understand more of the attributes, omnipotence, and boundless beneficence of the Creator. In this way, as ignorance and irreligion die out, useful art-and-science-knowledge, combined with true religion, would fructify, and be matured in coming generations. The time has arrived when useful-knowledge-schools should be established in every parish, when the people should be obliged to send their children to them, and when equalized educational rates should be levied to defray the expenses. It is singular what little technical knowledge is taught at schools, and at many schools much that is taught is worthless. The deplorable ignorance among the working-classes is due chiefly to the elimination of art-and-science-knowledge from the teachings at schools, and to the indifference with which such knowledge has been treated in its relation to religion. The non-education of the people is a disgrace to the age; for there are vast numbers of men and women, of grown boys and girls, and of children in the metropolis, as well as in all large cities and towns, whose ignorance is so intense, and whose means of existence are so precarious that they live in a state of semi-barbarism, and are ripe for any crime and mischief. With the majority of these plunder is fair game, and crime is a rule. But establish schools in every parish, teach the rising and coming generations really sound and useful knowledge, and open up for them fields for thought and for labour, then right principles would be fostered, industrious habits would be acquired, and crime and pauperism would be diminished.

JOHN PHILLIPS.

LIGHT AND COLOUR.

THE discussion on the science of colour, which you have permitted in the columns of the *Builder* for these several weeks past, is a very valuable opportunity for ventilating the subject, as I am more than ever convinced that a deeper and clearer understanding of the two great hypotheses of light and colour must supervene ere we shall have an enduring and thoroughly useful aesthetic theory propounded; for the language generally used in speaking and writing upon this topic is inconsistent with those hypotheses, and too often expresses erroneous notions formed on our first and false impressions derived from the sense of sight.

The two hypotheses which for some time divided the scientific world, were the corpuscular (Newton's), and the undulatory (Huyghens's). But the advocates of the former are few indeed, if any; and the latter is now generally accepted as the true theory. Sir John Herschel thus describes the reason of its acceptance:—

"An analogy subsisting between sound and light has been gradually traced into a closeness of agreement, which can hardly leave any reasonable doubt of their ultimate coincidence in one common phenomenon, the *vibratory motion of an elastic fluid*. Any æsthetic superstructure raised upon a Newtonian foundation, therefore, will be insecure. But there is one important point in the Newtonian hypothesis which may serve as a stepping-stone to a clearer view of the fundamental principles of the subject, viz. that it does not suppose the different colours to be inherent in the fasciculi, or bundle of rays, producing, according to this system, the effect of white light; but that the velocity of the atoms of each fasciculus, or ray, determines the particular sensation of colour which we experience on its impinging upon and disturbing the retina, as will be plainly perceived from the following authoritative statement of the hypothesis: 'It is a difference of velocity in the particles which produces in the eye the sensations of different colours.'"

It is therefore inconsistent, according to this statement, to talk about coloured rays, or to talk of colour as if it had an objective existence out of and independently of the eye: the hypothesis only postulates the externality of rays of force.

The undulatory or received hypothesis which supposes the production of light and colour to be analogous to that of sound and music is, however, totally different from the *emissive*; a solid superstructure consequently cannot be built partly upon one, and partly upon the other: we may test either, if we please, and wait till we are convinced of the truth of one of them before attempting to construct the æsthetic portion of the science, which should of course be a deductive sequence of the first principles of the adopted hypothesis. To contend that yellow is a "secondary," is not to make a new theory; all that we can do is to show whether this view is more consistent with the received hypothesis than that formerly taken. It will be evident then that if we do attempt to build up the æsthetic portion of the science one or other of the famous hypotheses must be chosen; and I accept,

in common with the majority of thinkers, the vibratory as the true theory. But the undulatory is as innocent as the corpuscular hypothesis of postulating the external objectivity of colour; the vibrations of the elastic medium only become light and colour in conjunction with the retina, just as the pulsations of the air become sound in conjunction with the auditory nerve; and people who do not think deeply on these subjects erroneously believe in the external objectivity of sound as well as of light and colour.

Thus we may proceed a step further, and show that the compensating spectra your correspondents so frequently refer to have no external existence whatever, but are merely states of reaction of the retina within the eye itself; for it is clear if they had, another person would be able to see the spectra, though the wafer were hidden from view; and that this is not the case has been repeatedly proved by experiment. Every colour, therefore, may be raised in the eye as a compensation to some direct excitement of the retina from without, independently of any external and corresponding vibration; the retina in this way balancing its disturbance by the external ray.

Now, as there may be infinite variation in the external vibrations, which produce "in the eye" all the variations of colour, we may inquire why one colour should be dubbed "primary" in preference to another? There would appear to be two reasons, either for marked or distinctive difference, or the impossibility of blending any two vibrations to produce that particular sensation of colour. Yellow, for instance, would be a "primary" by distinctive difference, and "secondary" also if it cannot be compounded in the way suggested. "Primary" and "secondary" are not entities, and every colour is a compensation to some other.

Now, although accepting the undulatory theory in the main, I do not accept some of the notions imported into it from the corpuscular hypothesis; as, for instance, separate vibrations, as of separate fasciculi, issuing from the sun, but in a general vibratory motion of the elastic medium, which, modified by the prism or other means, produces in us all the varieties of light and colour. This I hope soon to have the means of demonstrating: it has indeed been demonstrated over and over again, had the significance of the fact of the reconcentration of the rays of the spectrum been duly appreciated; for, when the various vibrations are thus recombined, they produce one homogeneous action, and the sensation of white light.

According to the received theory, the analogy between music and colour is no longer a fanciful conjecture, these as well as other phenomena pointing to a science of proportion underlying all nature as the basis of harmony which I am endeavouring to work out.

W. CAVE THOMAS.

P.S.—To work out the aesthetic theory scientific artists should unite their endeavours with those of Professor Tyndall.

STREET LIGHTS.

I SHOULD like to occupy a small space in your paper on the subject of street lamps. I think every one will allow that throughout the metropolis they are in a most defective condition. There is hardly a capital in Europe where the lamps are so neglected. Why I wish at this moment to intrude upon you is that we are opening large and important thoroughfares, in which I wish to see suitable lamp-posts erected, a design which will assist the effect of the street architecture. On the new embankment, as far as I can understand the plan, it is proposed to place standards on the granite wall; if so, I think it will require an unusual treatment. The lantern should be brought out from the lamp-post by an arm bracket. The lantern, at least the lower part, should be spherical, in one piece, without any framing, so that the light may be thrown on the pavement without shadow. The upper half may be any form, but the material should be opaline glass, which acts as a reflector, and it also gives a more brilliant appearance to the street than a metal cover. The opal glass could easily be kept clean. The base of the lantern should not be more than 10 ft. from the ground, and the distance from lamp to lamp about 25 yards. There is at present, I observe, an experiment in Piccadilly, of three lamps, but they all have their lantern framing too heavy, especially the base, throwing thereby

a deep shadow. The Paris post and lantern are good: some specimens may be seen in London. There are two in Oxford-street; and in the Duke of Buccleuch's carriage-drive they are in use. In the Builder, some two or three weeks since, a large lamp was figured; and, taking the dimensions from your account of it, it appears that the centre lantern is 25 ft. from the ground. That is a great waste of light, and at such a height it becomes certainly inconvenient, if not dangerous, to the lamp-lighter. More might be made even of our present lamp-posts and lanterns. Why should the former be painted white? It seems to mock the light of the lantern, which surely ought to give light enough to show the lamp-post. If they are not white, the colour selected is pea-green, as in St. James's-square. The lanterns, too, are not only heavy-framed, but are again placed in an outer cage, so that there are eight lines to throw a shadow. The patty, again, is smeared over the glass, to assist in obscuring the light. A square frame is not the worst form of lantern, but a polygon is an absurdity; the height of which seems to be in the lanterns of the Guards' Memorial, where the frame obscures the light entirely. A. B.

CAMPANOLOGY.

SIR,—Allow me to send you a note on the celebrated peal of St. Bride's, Fleet-street. Thanks are due to Mr. Walesby for his labour in supplying such interesting particulars of the bells. In addition I wish to record it on your pages, that the two trebles, added to the peal of ten in 1719, were presented to the parish by the two Societies of Ringers, the College Youths and the London Scholars; the latter ancient society having afterwards assumed the new name of the Cumberland, in 1748, after the victory of Culloden, and in honour of the Duke of Cumberland, who presented the then London Scholars with a gold medal on the occasion of their ringing the bells of Shoreditch Church when he entered London that way on his return from Scotland.

After the bells of St. Bride's were augmented to twelve, the College Youths rang, in 1726, the first peal of Bohé Maximus, or all twelve in. Among the performers were several gentlemen; and I was told by Mr. Osborn, a late secretary, that it was very commonly reported by the old ringers that every one who rang in that last-mentioned peal left the church in his own carriage; and also that when St. Bride's bells were first set up, by the Rudhalls, and for some years afterwards, Fleet-street was thronged with the carriages of gentlemen, who came from far and near to listen to the ringing; the bells were considered the greatest novelties of the day. Benjamin Annable was a noted composer and ringer, and a College Youth at the above date. I have in my possession a thick octavo MS. full of peals most beautifully written by him, from three to twelve bells. John Hardman, too, of 37, Fleet-street, was a celebrated ringer with them. It would be well if other gentlemen and respectable Londoners of the present day would take more interest in the noble and manly science of ringing (I lately heard two Etonians say that cricket is a farce to it), and associate themselves as members of one or other of the old societies of clever ringers, whose masterly performances may still be heard weekly at their respective churches.

H. T. ELLACOMBE, M.A., College Youth.

THE STONE OF THE PARLIAMENT HOUSES.

SIR,—We are now told by Mr. Abel, the chemist appointed to examine into the matter, "That of the processes employed, not one has proved successful in arresting or preventing the decay of the stone." A very conclusive declaration, no doubt, and sufficiently decisive to arrest public inquiry. * * * In his report, Mr. Abel very affectingly speaks of the decaying stone by the name "dolomite." I say he so speaks affectingly, because, as a chemist, he must know that the proper name of the stone is magnesian limestone; and, as I shall hereafter show, it is just because it is a magnesian limestone (a compound of magnesia and lime) that it is decaying. The word "dolomite," I may remark, was formed many years ago, in the infancy of science, by torturing, more geologically, the name of M. Dolomieu, a French savant of that period.

But as a clear comprehension of the cause of the evil will be greatly facilitated by the knowledge that the stone in question is composed substantially of the carbonates of magnesia and lime, I throw the dolomitic distortion onboard, and adhere to the name-magnesian limestone in my remarks. In Mr. Abel's opinion, the "principal cause of decay is the lodgment of water;" and therefore he advises us to protect the projecting surfaces "either with a light metallic covering or with some other sufficiently impervious coating." This kind of advice has at least one merit, it is sufficiently impervious to argument; for we are left in utter darkness both as to the specific nature of the metallic covering and the sufficiently impervious coating. In order, therefore, that I may do no injustice to projects which, it is no demerit for me to say, I do not understand, I will leave Mr. Abel to enlighten the world, and meantime the following observations may prove not altogether uninteresting to the public.

About thirteen years ago my attention was drawn by my friend Mr. Goldsworthy Garney to a crystalline efflorescence which then presented itself on many parts of the exterior of the Houses of Parliament. Upon examining this efflorescence, I found that it was composed almost wholly of sulphate of magnesia, or Epsom salts; and an extended examination of the building proved to me that, more or less, the whole surface of the new Houses was charged with sulphate of magnesia, which, of course, would be dissolved and washed away by the first heavy fall of rain that might occur. The question which naturally arose upon this was, what is the cause of this destructive formation of Epsom salts under these circumstances? It could not be, as Mr. Abel now asserts, due to the "lodgment of water;" for the cathedral at Milan, the minster and the city walls at York, and a vast number of other public buildings, not to mention St. Stephen's Chapel itself, have all been built with magnesian limestone, and have, nevertheless, resisted the effect of this lodgment of water for many centuries; added to which, the well-known Parisian marble is a magnesian limestone, and the same remark applies to the marble of Iona, in the Hebrides, from both of which statues have been sculptured, whose high polish and beauty remain unimpaired after centuries of exposure to the weather. To solve this decaying problem practical experiments were therefore needed, and, in conjunction with Mr. Garney, I commenced a series. We soon found that water supersaturated with carbonic acid gas had no appreciable effect upon the magnesian limestone, and that to render such water effective it was necessary, in the first instance, to roast the magnesian limestone at a red heat, a plan used many years since by Mr. Pattinson, of Newcastle, for extracting carbonate of magnesia from such limestone. Disappointed in this experiment, we next passed 500 cubic feet of common air through an imperial pint of distilled water; but this water was still without action upon the magnesian limestone. Rainwater collected at Croydon was then tried; but this also was inactive. Distilled water was then mixed with common soot to the consistency of thick cream, and filtered through paper; the clear solution thus obtained was found to act rapidly upon the magnesian limestone; and when portions of it were placed upon a polished surface of the stone and allowed to evaporate to dryness in the sun, minute crystals of sulphate of magnesia or Epsom salts were formed, and the polished surface was found to be highly corroded. It was afterwards demonstrated by analysis that the sooty solution contained sulphate of ammonia in considerable quantity, and that the corrosive effect and production of Epsom salts were due to the presence of sulphate of ammonia in the soot. Hence, therefore, an answer to the seeming contradiction with respect to the durability of magnesian limestone in different localities. The soot formed from pure vegetable matter, like wood, contains no sulphate of ammonia whatever, and it is consequently inactive upon magnesian limestone; but the soot formed from coal invariably contains a large quantity of sulphate of ammonia; and when such soot lodges, as it will do in the cavities of finely-chiselled stonework, a concentrated solution of sulphate of ammonia will drain from it under the influence of the first shower of rain; and this it is, and not the "lodgment of water between string-courses," as suggested by Mr. Abel, which causes the decay. In fact, the whole subject was gone through and explained by me before a Committee of the House of Commons in answer

to questions from Lord Palmerston twelve years ago; and I then said, what I now repeat, that no practical method will ever be devised to prevent the deterioration of the stone.

Within the last forty years the consumption of coal in London has increased a hundredfold, and it is absurd to expect that such a change should bring no inconveniences along with the immense advantages which it has bestowed. And here let me say a few words upon coal soot. It may be supposed, perhaps, that if the formation of this soot were prevented by what is called "thorough combustion," no sulphate of ammonia would be produced. This, however, is not so, for the sulphate of ammonia would then continue to be generated, perhaps even in larger quantities; and it would fall, as it now does, under the influence of the wind and the neighbouring buildings. In other words, the evil would not cease, though the production of this kind of soot were put an end to by combustion, since the soot is only a companion and not a mere vehicle for the sulphate of ammonia. In conclusion, I will briefly explain the mode in which sulphate of ammonia acts upon magnesian limestone. This limestone consists of carbonate of magnesia and carbonate of lime, both of which are decomposed under the sun's rays by the power of sulphate of ammonia, with the production of carbonate of ammonia, which flies away, and sulphate of magnesia or Epsom salts and sulphate of lime, which remain and form an efflorescence upon the surface of the stone.

L. S. D.

MADRAS IRRIGATION.

SIR,—In your No. 1,325* appears a letter asserting that "the Madras irrigation has been a complete failure." As the father of one of the gentlemen employed in the undertaking, who has not the opportunity to reply, perhaps I may be allowed to observe that my son is not one of "a lot of speculative adventurers," but is well versed in the works required of him, and is progressing satisfactorily towards the very some of your correspondent's desires, in effecting "useful land-marks" of a generous and civilizing occupation.

So far is this commendable enterprise from being "an entire failure," as the language of seeming disappointment has laboured to indicate, that (as I have intelligence by this week's Indian mail) portions of earthworks are completed in the Pennar Division, where also the masonry is in full swing; so as to justify the conviction that at least in this district, which is thirty miles in length, a result will issue from skill and economy actually applied that must be considered prosperous; and that ought to reassure all parties concerned throughout the broad scope for kindred undertakings. Indeed, I look forward with full confidence to the period when such works besides being thoroughly remunerative in a commercial sense, shall have a very exhilarating and exalting effect upon the natives of that splendid empire; and I trust that the vigorous refreshments, faintly so represented, will at length invigorate their religious susceptibilities, to the glory of the great and true God.

T. CRUSE.

CONCRETE BUILDING.

HAVING noticed a letter in your paper from "G. C. J." (p. 645, ante) on the above subject containing a challenge to any one to erect concrete walls at the prices quoted by Mr. Tall; and having had some experience in the construction of concrete buildings; a few facts from my own might be of service to him.

I am now engaged as surveyor in erecting a large building on the St. Margaret's estate, Saleworth, intended for a private residence, and the following is the actual cost I am now paying for labour and materials:—

1 Thames ballast, delivered on the ground, per cubic yard	2s. 11d.
1 Best Portland cement, per bush	1 10
1 Labour, including all plant necessary to mix the concrete, raise it to the scaffold, and fill into the walls, per cubic yard	2 3

and I may add that the contractor for the labour is quite satisfied with his bargain; and, I have no doubt, would take any given quantity of the work at the same rate.

I have erected boundary walls in concrete on the same property, each 118 ft. long, 6 ft. 6 in.

* See p. 473, ante.

high, and 6 in. thick, with a pier at each end only. The total cost was 11l.: each wall including a projecting saddle-back coping running the whole length, and caps to the piers. The lowest estimate for wood fencing for the same place was 15l. 10s.; and for 4 ft. brick, with 9-in. piers, 20l.

W. F. HOOPER.

MESSRS. T. LYTHGOE & H. THORNTON, Manchester, have patented improvements in the construction of walls, &c. This invention consists, first, in lining the wood or other frame or mould into which the concrete is filled with an improved concrete having a hard and smooth surface. Secondly, in forming the outer and inner surfaces of the wall of fine concrete, which is run in between the outer frame or mould and a small inner frame. Thirdly, in certain improved apparatus employed in the construction of walls and other parts of buildings made of concrete. Fourthly, in attaching to the inside of the frame or mould triangular or other shaped projections placed horizontally and vertically, or otherwise, which projections produce corresponding recesses in the face of the building in imitation of the joints of the stones or panels, or other designs; and in making recesses in the mould to produce ornaments or other designs in relief. Lastly, in certain improved modes of constructing floors and roofs with bars of iron and concrete.

TO KEEP BRICK WALLS DRY.

SIR,—I have noticed in your paper the letters respecting damp walls. I beg to state that I have tried the application of a solution of soap, followed by one of alum, with great success. This was recommended by you some two years ago. I tried it on the front of a red-brick farmhouse, and it gave such satisfaction that I have orders to continue the dressing every summer. I could not perceive that it in any way altered the colour of the bricks till this year (this being the third dressing), and now only by a slight tinge of white scarcely perceptible. I have great faith in this preparation, believing it is a certain cure.

ANTHUR CHAMBERS, Builder.

UNPAINTED DEAL WORK.

SIR,—I have been informed by a London architect of some standing and experience, in whose opinion and judgment I should be disposed to place confidence, that it is not necessary to paint deal timber in external work in order to preserve it, and that its appearance without any paint or varnish is much improved by time. In proof of this he mentions some very ancient doors, made of deal which have been recently brought from Norway and placed in the South Kensington Museum. I should be very glad if some of your professional readers could be induced to give their opinions, or the result of their experience, on this subject.

PLAIN DEALER.

SCHOOLS OF ART: EDINBURGH v. NOTTINGHAM.

SIR,—To studies in the Nottingham School of Art and in the South Kensington Museum, and to the opportunities there afforded me, I owe an acknowledgment at least, as I have been much benefited thereby in my professional career. It is, therefore, but natural that I should evince considerable interest in the various schools throughout the country, and more especially in the one in such active operation in my native town, Nottingham. Hence I have constantly examined the reports of the schools whenever any comparison as to their efficiency has been published; and I have recently had an opportunity of so doing, for the Department of Science and Art has, with very great wisdom, offered premiums to the masters of the various schools throughout the country who, at the annual examinations into the state of the schools, could show the greatest amount of proficiency amongst the students; and the list of awards to those masters has now been published; and the statistics from which these awards have been adjudged have likewise been printed by the Department.

In the award Edinburgh stands first, Nottingham second. I take exception to this award, thinking, according to the statistics given, that to Mr. J. S. Rawie, the Head Master at Nottingham, the first premium should have been awarded; and as your space is valuable, I will add little more, except to subjoin an extract from the statistics, merely explaining that the number of students in each of the two schools is nearly the same; that the Edinburgh School heads the list in one item only, namely, the elementary; while the Nottingham School gained the greatest number of medals for advanced work, and in what may without doubt be considered the most important section of the whole, namely, the annual examination of the Department (the real test of the efficiency of both master and pupil), the Nottingham School surpassed Edinburgh by double the number.

The figures subjoined are abstracted from the report printed by the Department of Science and Art, and therefore may be presumed to be correct.

Surely Nottingham and its Master in Art have not had justice meted out to them.

Comparison between the Nottingham and Edinburgh Schools of Art, as regards the honours gained in 1868 in the Medal Competition and Examination, instituted by the Department of Science and Art.

Nottingham. Edinburgh.

1. Number of students attending the school	389	404
2. Number of medals national competition awarded for works in the advanced stages of study	8	5
3. Number of Queen's prizes for advanced works	2	2
4. Number of book prizes for works in the elementary stages of study	4	33
5. Number of students who passed in the Government examination in drawing, &c.	142	76
6. Number of prizes for great excellence in the above examinations	55	37

The 2nd, 5th, and 6th items in the above list tell their own tale.

S. DUTTON WALKER.

THE WATERING AND CONCRETION OF ROADS.

At the Norwich meeting of the British Association for the Advancement of Science, Mr. W. J. Cooper read a paper on "The Watering of Roads," in which he thus speaks of the new system of watering with which he is connected:—

"At an expense of about 100,000*l.*, the various parishes of London have been watered this season; but, notwithstanding this enormous outlay, the dust could not be laid; and it is quite evident that the time has arrived when the assistance of deliquescent salts is absolutely necessary to aid in this operation; and from the results obtained by the use of the chlorides of calcium and sodium mixed with the water in certain localities, there can be little doubt that they will soon be generally adopted. A patent was taken out in September last for a compound of these well-known deliquescent salts, and its application to the purpose of road-watering.

The proportions used are 1 lb. or 2 lb. of the mixed salts to one gallon of water. The salts are put into the cart before it is filled; the water is then laid on; and by the time the cart is full the salts are in solution. The application of the salts has produced a most important effect upon the surface of a macadamised road, hardening and concreting the material in such a manner that, when it is perfectly dry, no dust whatever arises from the passage of ordinary traffic. The light dust always found upon a dry road surface which is usually watered with plain water is not to be seen, the surface remaining smooth, firmly bound down, with no detritus whatever upon the surface.

In considering the economy of road-making, this state of the road is very important. There is scarcely anything for the scavenger to sweep up and take away; and what has usually been carried away by waggons, as waste, remains an integral part of the road; consequently the repairs to the road would be much less frequent, and a considerable saving would be effected. The chloride employed, being antiputrescent, tends to alleviate the evils arising from organic matter deposited on road surfaces; a sanitary advantage is therefore gained, and the economy in the water is also a favourable feature of this method of watering roads.

The water consumed in watering roads in London is one-sixth of the daily supply for all purposes; and as, by the introduction of the chlorides, so much less water is required, a saving of at least 75 per cent. would be effected, which is really an important consideration, as this water is required at the hottest period of the season, when the demands for other purposes are more urgent than usual; and the necessity of an increased water-supply is being seriously discussed.

Thus the effect produced by the use of deliquescent salts mixed with the water is not only the essential and complete laying of the dust, but the collateral advantages of economy in labour, in road-making, and in consumption of water. It also obviates the necessity of Sunday labour in road-watering."

The result of a trial of the new system of watering during this very arid and trying season may be seen in Baker-street, where it is applied once or twice a week. Arrangements are now made, we understand, for the manufacture of the chloride of calcium, in large quantities, all over the kingdom, so that numerous applications for leave to use the patent can now be responded to. The municipal authorities of Calcutta, under the sanction of the Government, are about to test the system in that distinguished city.

CHURCH-BUILDING NEWS.

Stinsford (Dorset).—St. Michael's Church, Stinsford, has been re-restored. The chancel floor has been raised 6 in. above the level of that of the nave. Open stalls of stained deal have been placed in the chancel. The east window of the chancel was formerly a plain structure, divested of its tracery, and filled in with common lights in iron framework. It was also blocked up on the interior by the reredos of the Corinthian style in plaster; but this has now been re-opened, and a window of Bath stone constructed after the old pattern, with the perpendicular tracery added. The window, which consists of three

compartments, is filled with stained glass, the subject being the Ascension of our Lord. The old-fashioned lights on the north and south walls of the chancel have been substituted by small windows, with heads of tracery, and filled in with diaper glass. On the south side of the chancel a stained window has been inserted by Mr. John Floyer, M.P. There are two subjects, representing Dorcas and the Good Samaritan. The chancel is separated from the nave by an archway of Early English design. The north aisle, which we understand was enlarged from its originally limited dimensions as a "lean-to" to a size parallel with the south aisle, was erected by some members of the Pitt family in the latter part of the eighteenth century, the structure bearing the style of that period. The old windows, which were of very meagre dimensions and quite plain, have been removed, and on the north wall two windows of chiaroscuro glass have been inserted, the compartments being filled with representations of the major prophets. These windows were supplied by Messrs. Lavers, Barrand, & Westlake, of London. At the eastern end of this aisle a new window of stained glass has also been placed, in which the subjects represented are Faith, Hope, and Charity. Underneath them, as though in illustration of these three great attributes, are representations—of Faith, in the woman having an issue of blood touching the hem of Jesus's garment; Hope, in the Magi offerings; and Charity, in the widow's mite. The perpendicular tracery of the window is filled up with angels bearing instruments of music. This window, together with the three chancel windows, and one on the east end of the south aisle, were given by Mr. James Fellowes, of Kingston House. The latter is a *Te Deum* window, and contains subjects illustrative of the passages, "The glorious company of the apostles praise Thee," "The goodly fellowship of the prophets praise Thee," "The noble army of martyrs praise Thee," "The Holy Church throughout all the world doth acknowledge Thee." The tracery of the window is filled with the representations of angels bearing scrolls, upon which the word "Alleluia" is inscribed, the centre light containing the symbol of the "Descending Dove." The two remaining windows in the south aisle are filled with tinted cathedral glass, and were made of corresponding shape with the chiaroscuro lights on the opposite side, both of which are ornamented with dressings of Ham-hill stone. The roofs of the nave aisles and chancel are ceiled, and thus the perpendicular oak roof are obscured from view; they are so decayed as to preclude the possibility of their renovation and repair. The new vestry is built of Portesham stone, and covered with a roof of stone tiles, to match the exterior of the nave roof. The whole of the stone carving has been executed by Mr. R. F. Chapman, of Bath. The old Perpendicular tower, shrouded in its mantle of ivy, has not been interfered with. The works were carried out under the direction of Mr. J. Hicks, of Dorchester, architect, by Messrs. Wellspring & Son, builders.

Lechwyfaryny, Anglesey.—The parish church has been re-opened for divine service. The new edifice, the style of which is Late Decorated, has the same ground-plan as the former one, with the exception that it has been lengthened to the east, and widened towards the north, the nave and chancel now measuring together 39 ft. 6 in. from east to west, and 16 ft. 7 in. from north to south; the south transept or chapel being 12 ft. 6 in. wide by 11 ft. 6 in. long (internal dimensions). The porch, which is on the north side, has been entirely rebuilt and enlarged. By the lengthening of the building the chancel has been rendered a more marked feature. The nave is lighted by a square-headed window in three compartments on the south, and on the north by an arch-headed tracery window of two lights placed under a small gable to light the pulpit and prayer-desk. The transept is lighted by an arch-headed window in two lights. The east window, which is of three lights, has an arched head with tracery, the whole being filled with stained glass tracery, bearing the "dove" in the upper part, the Alpha and Omega on the north side, and the sacred monogram on the south. Messrs. J. A. Forrest & Co., of Liverpool, were the artists. The bell-turret is new. The roofs, which have arched principals, resting on stone corbels, have the timbers exposed and lightly stained and varnished. The seats are all open, and with the rest of the internal fittings, are lightly stained and varnished. The church will

accommodate 105 persons. The plans, &c., were prepared by Messrs. Kennedy & O'Donoghue, of Bangor and London; and carried out under their direction by Mr. Joseph Hughes, of Llanstffraid Glan Conwy, builder. The total cost has been 540*l.*

London.—The parsonage of St. Michael's, Mark-street, Finsbury, has been laid with Ridgway & Bellerocche's tiles. The architect is Mr. James Brooks, of London; and the builder, Mr. Henshaw.

Wembdon.—The parish church of Wembdon, near Bridgwater, which was destroyed by fire in the spring of the present year, is about to be rebuilt, from plans prepared by Mr. J. M. Hay, of Bath. The sum of 760*l.* has been subscribed towards the rebuilding.

Little Ellingham.—The first stone of the nave of Little Ellingham Church has been laid.

Leeds.—St. Clement's Church has been consecrated. The site is on Chapel-town-road, and was given by Mr. Nicholson, of Roundhay, at a cost of upwards of 1,200*l.* The edifice has been erected from the plans of Mr. George Corson, of Leeds, architect. The scheme in connection with it is an extensive one, as the Board of the Church Extension Society have purchased land sufficient also for schools and parsonage house. The church is so placed as to leave on the north ample space for the latter, and on the south for schools, playgrounds, and master's house. The church may be described generally as consisting of nave, north and south aisles, with open porches at the west end of them, apsidal chancel, with organ chamber on the north side, vestry under the tower on the south side, and chancel. The tower is placed in the angle formed by the south aisle. It has been erected in this somewhat unusual position in order that its proportions may be seen from the principal approaches to the church. It is 19 ft. square at the base, with octagonal buttresses on the angles, that at the south-east being made larger than the others, as it has to contain the stair giving access to the various stages and to the flat roof of the tower. The stages are five in number, the lowest containing the vestry, the third the ringers' loft, and the fifth the bell chamber. The first bell of an intended peal of eight has been cast by Messrs. Taylor, of Loughborough, and will be hung as soon as the tower is completed. The height from the ground to the top of the parapet is 90 ft.; to the top of stair turret, 122 ft.; and 113 ft. 6 in. to the top of the others. The nave is 88 ft. long from the west end to the chancel arch, and 29 ft. 6 in. wide from wall to wall. On each side an arcade of five arches divides it from the aisles, which are each 75 ft. long by 15 ft. wide. These arches are supported on cylindrical pillars of red sandstone from the Damfries quarries, with moulded bases and caps, the latter being carved with natural foliage conventionally arranged. The arches are of red Suffolk bricks, the springers, keystones, and vousoirs being of stone. Above the arches, on either side, there is a range of sixteen single light clearstory windows, with tracery heads. The west end of the nave is filled in by a window of five lights, its dimensions being 13 ft. wide by 25 ft. high to the crown of the arch. The head is filled in with tracery. The roof is framed with principals, with curved ribs. A ceiling is formed between these ribs, and following their line, it forms a pointed wagon vault. A ventilating chamber is thus formed in the roof, having openings at each end to the outer air, and the curved ribs at the ceiling ridge being framed double, with spaces between and connecting fillets, the vitiated air escapes into the air-chamber above, and is expelled by the through draught. The aisles have each five two-light windows, with tracery in their pointed arches, each window being set between buttresses. The aisles do not extend up to the extreme west end, the space of one bay on each side being occupied by a porch 17 ft. by 11 ft. 9 in., with inner door admitting to the nave, and a large open outer doorway, with clustered shafts of red sandstone, caps, and bases, and deeply moulded arches. The chancel is divided from the nave by a lofty arch of red brick and stone, carried on pillars of the red stone already described as from Damfries, with corbels under them, carved with natural foliage. The chancel is 37 ft. 6 in. long by 24 ft. wide, and the east end forms a seven-sided apse, with buttresses on the angles, and a double tracery-headed window on each of the seven sides. It is hoped that the whole of the windows in the chancel will be filled with painted glass. A scheme has been drawn up so that the designs

may form a consecutive series, illustrating the principal events in the life and death of our Lord. Each window having two lights, will contain a couple of subjects. The following is the proposed arrangement:—

South window.....	{ 1. Entry into Jerusalem.
	{ 2. Mary anoints Christ's feet.
North window.....	{ 3. Christ washing the disciples' feet.
	{ 4. Last supper.
South.....	{ 5. Agony in the garden.
	{ 6. The betrayal.
North.....	{ 7. Before Pilate.
	{ 8. Ecce Homo.
South.....	{ 9. The crucifixion.
	{ 10. The descent from the cross.
North.....	{ 11. The body of Christ.
	{ 12. The entombment.
Centre.....	{ 13. The resurrection.
	{ 14. The ascension.

Nos. 9 and 10 have already been given by Alderman Hornby, and No. 13 by Mr. J. Morris. These three designs have been executed by Mr. Wailes, of Newcastle-on-Tyne. One of the two-light windows of the south aisle has been filled with painted glass by Wailes; the subjects delineated illustrate the texts, "Suffer little children to come unto me," and "Feed my lambs." In the quatrefoil above the two lights is an angel bearing a scroll. If funds can be obtained, the large west window will also be filled with stained glass. It is probable that the subjects will illustrate Old Testament events. The church is provided with open benches of white deal, varnished, and will seat about 750 adults. The contractors for the various departments are as follows:—Mr. Thomas Whiteley, mason; Messrs. Shires & Son, joiners; Messrs. Watson & Wormald, slaters; Mr. Lindley, plumber and glazier; Mr. Blakey, plasterer; Messrs. Wood & Son, painters; Messrs. Nelson & Sons, for heating apparatus, &c.; Messrs. Mawer & Ingle, for the stone carving, and for the pulpit, reading-desk, font, and communion rail. Mr. John Kay has performed the duties of clerk of the works. The cost of the church, inclusive of the purchase of the land and the stained-glass windows, may be roughly estimated as above 8,000*l.* This sum includes the tower, which was not originally contracted for by the Board.

DISSENTING CHURCH-BUILDING NEWS.

Ilkley.—The memorial stone of a new Methodist Chapel, at Ilkley, has been laid. The new buildings, inclusive of 1,000*l.* for the land, are estimated to cost about 4,500*l.*, of which upwards of 2,000*l.* have been subscribed. These buildings will front the Wells-road, having Promenade-road on the western side. The style of the chapel is Gothic of the twelfth century, and the front has a centre and two side-entrances. Over the principal doorway there will be a large four-light window, having tracery in the upper part. The staircases to the galleries are placed on either side, that on the east being of a semi-circular shape, and forming a termination to that front, whilst the corresponding one occupies the lower portion of the tower. The side elevations of the chapel contain alternately two-light and three-light windows, with tracery heads, the latter of which are carried up above the eaves, and surrounded by gables. These fronts are also improved by the gables of the minister's residence, which contain circular tracery windows, and help to express the character of the building. The tower rises at the south-west angle of the building, with buttresses terminating at the heltry windows. Each face of the tower contains one of these windows. The spire is carried to a height of about 120 ft. from the ground, with angle pinnacles and gables. The interior of the chapel is divided into five bays by iron columns which support the galleries, and are continued up to the roof. These columns have ornamental hands and enriched capitals. There are also recesses at either end, that at the front extending over the entrance vestibule, and the one at the other end forming an organ chamber and staircase communicating with the minister's vestry, and enclosed by an open screen of a decorated character. The centre part of the ceiling is formed by curved ribs springing from the caps of the columns which support the roof timbers, the greater portion being exposed to view, but the spars of the roof are concealed by a plaster ceiling, in order to add to the warmth and acoustic properties of the building. Ventilation is provided by openings in the ceiling, and the lighting is effected by star pendant gas burners. The seats, gallery fronts, pulpit, and the joiners' work throughout, are

designed in accordance with the character of the building, and will be stained and varnished. In addition to the chapel itself the building comprises a school-room, 40 ft. by 36 ft., and two rooms for the chapel-keeper in the basement. The width of the building is 45 ft., and the extreme length 96 ft., of which about 20 ft. are occupied by the minister's house in the rear, and the chapel is calculated to seat 650 adult persons, 400 on the ground floor. It is estimated that the total cost of the building, exclusive of the land, will be about 3,500l. The design for the chapel was selected in a competition, Messrs. Andrews, Son, & Pepper, of Bradford, the architects, being the successful competitors.

Coventry.—The memorial stone of a new Baptist chapel has been laid in Gosford-street, a desirable part of the city. The style of architecture is Italian, with a slight Gothic treatment in mouldings and other details. The total cost, including land and fittings, will be 2,100l., of which about 1,007l. have been already subscribed or promised. The architect is Mr. J. D. Webster, of Sheffield, and the builders are Messrs. Hallam & Co., of Coventry, who have entered into a contract to complete the whole for 1,011l. 5s. 5d. The materials used in the construction of the walls are red brick, from the neighbourhood, with Bath stone dressings; the arches to windows being relieved with vousoirs of white and blue brick. The woodwork is stained and varnished. Galleries are provided at the sides and one end of the chapel, and are reached by stone staircases. Behind the chapel, and immediately adjoining, are the schools. On the ground-floor is the boys' school, 35 ft. by 27 ft.; also a commodious kitchen and store-room. The upper floor is devoted to the girls' school, which is 45½ ft. by 27 ft., and is approached by a stone staircase. Attached to this room are two classrooms, each 13½ ft. by 13½ ft. The schools and classrooms will be heated by open fireplaces. Attention has been paid to the means of ventilation, which are simple. The schools provide accommodation for about 450 children, and the chapel will have sittings for 700 persons. The total cost, including site, gas-fittings, law expenses, &c., will be upwards of 2,100l.

SCHOOL-BUILDING NEWS.

Wolstanton.—The foundation-stone of a new Sunday-school building has been laid on a piece of ground adjacent to the Wesleyan Chapel at Wolstanton. The plans of the new building have been gratuitously furnished by Mr. T. Roberts, of Trentham. The school will be in subordinate keeping with the Gothic chapel, near which it is to stand, with its front towards a new street which is to be laid out shortly. There will be one large room 70 ft. by 50 ft., with five classrooms for teaching and for a library. The roof of the building inside will be supported by four circular ribs, and the floors will be boarded. The place will be lighted with three Gothic windows, glazed with the same kind of glass as that used in the windows of the chapel, and it will be warmed with hot-air pipes. The contractor for the building is Mr. W. Sutton, of Newcastle, and the cost will exceed 900l.

Bilston.—The memorial stone of the new day and Sunday schools, which are now in course of erection by the side of the Wesleyan chapel, Bilston, has been laid. According to the plans which have been accepted by the committee, the new buildings will comprise one large school-room, 58 ft. 6 in. by 45 ft. 3 in., with a range of ten classrooms,—five on each side. Eight of the classrooms will measure 8 ft. square each, and the other two 15 ft. 6 in. by 8 ft. There will be a gallery over the front entrance 18 ft. long by 11 ft. 6 in. wide, and two side porch entrances. At the two back external corners space will be provided for warming apparatus and boiler. The large school-room will be lighted from windows placed above the elevation of the classrooms, which are a few feet lower than the main building. The walls internally will be wainscoted 5½ ft. from the floor, and all the joinery-work inside will be stained and varnished. The ceiling will be a level one. The front of the building is to be of pressed bricks. The schools are intended to accommodate about 600 children, and the total cost is estimated, exclusive of the value of the old materials, at about 1,000l. The contract for the joinery and timber work has been taken by Mr. R. Hickman; that for the brickwork by Mr. Thomas Johnson; and the plumbing and slating by Mr. Beebee.

London.—New schools in connexion with the district parish church of Edensor have been erected and opened. The site,—upwards of 1,400 square yards,—is adjacent to the church, and is the gift of Mr. Heatbroke. The schools have been erected from the plans and designs of Mr. C. Lyman, of Stoke, by Messrs. Collis & Hudson, of London, who have carried out the contract. The total cost, exclusive of the land, will be upwards of 1,100l. The internal arrangements include accommodation for a mixed school of boys and girls and an infant school.

PATENTS CONNECTED WITH BUILDING.

APPARATUS FOR VENTILATING BUILDINGS, &c.—*J. S. Smith.* Dated 27th November, 1867.—The patentee claims the use and application of a movable cap, cover, plate, or equivalent for opening and closing the upper end of air-shafts used as ventilators for the purpose of excluding dust, dirt, and extraneous matters, irrespective of the form thereof, or of the mechanical means employed to effect their rise or fall. Secondly, the general construction, arrangement, and combination of the apparatus for the purpose, as described.

CONSTRUCTION OF ARTICLES OF EARTHENWARE.—*J. R. Pratt.* Dated 28th November, 1867.—This invention relates to an improved method of joining together the separate parts of articles of earthenware by forming on them male and female screw threads while the clay or plastic material from which the articles are made is in a soft state.

VENTILATING ROOMS, &c.—*J. P. Parkes.* Dated 29th November, 1867.—These improvements are applicable chiefly to such houses or buildings as are provided with a circulation of hot water. In carrying out the invention the patentee encloses a tube or series of tubes in a casing forming an air space, and placed above the chamber to be ventilated, the said tube or series of tubes being heated by the hot water circulating through them. The casing is placed in communication with the chamber to be ventilated by means of a tube terminating in a grating placed in the wall of the chamber. The upper end of the outer casing is connected with a pipe leading out into the open air, where it is surmounted by a cowl. The rarefaction of the air surrounding the heated tube or tubes, and contained in the outer casing, causes the air to ascend and escape into the atmosphere by means of the pipe and cowl above mentioned, thus forming a partial vacuum in the pipe below the heated tubes, the air in the chamber being drawn off through the grating to supply its place, thus effecting a continual ventilation of the chamber so long as the tubes are kept heated.

CONSTRUCTION OF METALLIC AND OTHER BUILDINGS.—*R. Porter.* Dated 2nd December, 1867.—This invention has reference principally to buildings constructed mainly of metal, and consists, first, of the following method of constructing the walls of the said buildings:—The patentee makes the said walls of corrugated sheeting, either of iron or zinc, the corrugations being situated vertically, and he supports and strengthens the said walls by means of standards made of metal, rolled or otherwise formed into a trough-like figure. The said standards are fixed against the corrugated walls in such a position that the edges of the said trough-like standards fall into and fit against the bottoms of the corrugations in the walls. The standards may be made of a width proper to include two, three, or more corrugations. Along the interior of the walls, and nearly midway between the floor and roof, he fixes horizontal rails, which may be made of wood, iron, or of both combined. The said horizontal rails are supported in brackets connected with the standards, the connexion between the said standards and brackets being effected through holes in the corrugated walls. Horizontal rails of the kind described may also be fixed in a similar manner at any required height inside the building. The standards may be fixed inside the building, and the horizontal rails outside, where required. The walls may be lined internally with a cheap description of paper board, such as mill-boards, straw-boards, and the like. He attaches the said lining by making it in sheets or panels, which are inserted in rebates, or grooves of wood or metal, fixed to the walls or to the horizontal rails. The invention consists, secondly, of the following method of attaching the ridge-caps on the roof of metallic buildings, and other buildings having cor-

rugated metallic buildings. On the summit of each side of the roof he fixes a strip of hoop-iron, which has been corrugated with corrugations similar to those of the roof-plates. The said strips of corrugated hoop-iron are so fixed on the summits of the sides of the roof that the concavities in the said strips are opposed to the concavities in the roof-plates, and there is thus formed a series of nearly circular spaces or openings. The ridge-caps are fixed upon the said corrugated strips of hoop-iron. There is thus left a series of nearly circular openings along the whole length of the ridge of the roof, by means of which the ventilation of the building is effected.

IMPROVEMENTS APPLICABLE TO WATER-CLOSETS AND PUMPS CONNECTED THEREWITH.—*J. H. Wilson.* Dated 3rd December, 1867.—The patentee claims, first, constructing closet pans or basins of glass; secondly, forming the same at the lower end with a shank or hollow faucet, having a lateral opening or aperture therein for discharging the contents thereof, substantially for the purpose and in the manner described and set forth; thirdly, turning the closet pan on its vertical axis for discharging its contents, substantially for the purpose and in the manner described and set forth; fourthly, constructing closet pans so that they may be removed or lifted from their seats, substantially for the purpose and in the manner described and set forth; fifthly, forming the rotating pan, neck, or seat of the rotating pan with recesses to receive tallow, or other lubricating material; lastly, the general arrangement and combination of the several parts described and set forth as applied to ships' and other water-closets.

Books Received.

"NOTES ON St. Patrick's Church, Jordanstown, in the parish of Cammonee," is chiefly devoted to an account of the saints represented in stained glass in the chancel windows. The building, designed by Mr. Lynn, is in the round-arched style of the early architecture of Ireland, and includes a "round tower," attached, 73 ft. high and 14 ft. 6 in. in diameter at the base. The upper portion of the tower forms the belfry. We do not know of any other modern appropriation of these forms in Ireland.—"Right to Light and Air, being a Summary of the Laws relating to Ancient Windows," by O. S. Round, Barrister-at-Law (Amer. Lincoln's Inn-gate), is a reprint from the *Estates Gazette*. It serves to introduce the matter to those who require a general knowledge of it; but those who have to fight the question must look to a bigger book.—The current number of the *Art-Journal* contains a view of The Hermitage (the picture-gallery), St. Petersburg, and, *inter alia*, a paper by Professor Ansted on "The Influence of certain Physical Conditions on the Origin and Development of Art." Mr. C. J. Richardson is contributing a series of papers, illustrated, "On Picturesque Garden and Villa Architecture." The admirable catalogue of the Paris Exhibition was concluded in the August number.—*The Broadway* begins a new series (giving up the special American element) with a very good number, including the vigorous commencement of a new novel by Mr. H. Kingsley, called "Stretton"; the Rev. Newman Hall's American Notes; and several other interesting papers.—*The Tourist's Annual for 1868* (Hogg, York-street) is damaged by a common cover. It contains a good deal of amusing and suggestive writing, and would be found valuable by many who are seeking to determine how to spend their holiday.—"Remarks on Street Tramways applied to London and its Suburbs," by Herbert Bright, G.E. London: Spon. In this pamphlet, which is printed for private circulation, the author gives an account of his patented plan of tramways with rails or trams sloping slightly outwards at either side so as to be adapted to wheels on round the circumference on the inside and flat on the outer, so as to enable them to run either on or off the trams. The vehicles are seated, inside and out, the reverse way to that of omnibuses, passengers sitting back to back inside, and face to face outside. The patentee proposes to form tramways, not through the main thoroughfares generally, but through bye streets near them, so that the tramway traffic would interfere as little as possible with that of the chief thoroughfares. A map shows several

proposed routes through London and its suburbs, south and north.—“The Saturday Half-holiday Guide to London and the Environs.” Second edition with map of the environs.—This useful threepenny guide gives particulars as to open-air resorts, such as the parks and environs, commons and open spaces, cemeteries, cricket-grounds, rowing clubs, rivers, and distances, fishing-waters, bathing places, and gymnasia; also as to the free national Exhibitions.—“On the Removal of the Sewage of the City of Glasgow and the Purification of the River Clyde.” By William Robertson, C.E. Printed at the University Press, Glasgow, 1868. The author some years since advocated a system of sewage by pumping and utilization. This system he now disclaims, and suggests another, in which the tidal waters of the estuary are to be used to flush the river from the point where the sewage would be discharged into it, carrying it out to the Firth, in front of the towns of Port Glasgow and Greenock. The reservoir would be 9½ miles long, with a wall 15 ft. high, inclosing an area of about 1,300 acres, so impounding 150,000,000 cubic feet of water each tide, or double that quantity daily, to be let out through flood-gates at its lower extremity, above Port Glasgow.—“Hand-book of Fresh Water Aquaria.” Edited by James Bishop, &c. London: Dean & Son. In this hand-book instructions are given for the construction and management of fresh water aquaria for gold-fish, &c., and the treatment of plants, fish, molluscs, beetles, &c., kept therein, or in glass globes. The present is the fourth edition, revised and improved. It is illustrated with engravings.—“Loughborough Water-supply.” A report prepared by the town surveyor, Mr. George Hodson, on this subject, has been presented to the local board. It points out the necessity for the adoption of some system of water-supply to replace the local wells in the midst of soil saturated with the contents of cesspools, which sufficiently account for the prevalence of diarrhoea and other ailments at Loughborough. There are two schemes under consideration; one by a company, who propose to impound the Black Brook waters; and another by the local board, who propose to take the Wood Brook waters. The reporter advocates the local board's scheme, which will cost about 16,500*l.*, including Parliamentary expenses, or 13,000*l.*, exclusive of these.

Miscellaneous.

HOT-HOUSE WORKS.—Messrs. Weeks & Co. (Chelsea) have issued the twelfth edition of their “Trade Book,” containing a number of designs, some of them very appropriate, for winter-gardens, conservatories, hot-houses, vineries, and forcing pits. If the approximate cost were attached it would be an advantage. The vulgar colouring of some of the views does them injustice. Mr. Weeks has long been known as a successful and trustworthy builder and heater of horticultural structures.

DEATH OF SCHONBEIN, THE DISCOVERER OF OZONE AND CUN COTTON.—Dr. Schonbein died the other day at Baden. He was born in 1799 at Mitzingen, in the kingdom of Wurtemberg, and was consequently in his seventieth year. He made the discovery of gun-cotton somewhere about thirty years ago. He disposed of his interest in the invention to Baron Lenk, who, after years of research and experiment, made the explosive manageable. Lenk span the cotton and wove it into fabrics suited for cartridges. Prentice & Sons, who hold the patent in this country, adopted his plan, but now make the gun-cotton into paper, which is rolled up for cartridges. Collodion, the solution of an imperfect gun-cotton in ether, became a valuable application in surgery, and afterwards became the film on which glass photographs were taken. Schonbein had then lost all interest in its development, and was busy with experiments in alchemy which led to the discovery of ozone. He had observed certain atmospheric effects accompanied by a peculiar odour, and research led to the discovery of ozone, which he pronounced to be oxygen in a different condition. The subject was one of intense interest to the chemist, and he worked at it till his death. Sanitary science, which has had many a death problem to solve, seems likely to have the road smoothed in no small degree by the discoverer of ozone.

SQUARE SET AND MACADAM PAVING IN LIVERPOOL.—At the local Health Committee, last week, Mr. Robertson Cladstone called attention to the large quantity of macadam being laid down in Church-street, and said he thought the question would arise shortly whether it was desirable to lay down so much macadam when there were now square sets equally available for the purpose. The small square sets which had been laid down in North John-street and Dale-street were almost noiseless, and far cheaper than macadam. It was agreed to refer the matter to the borough engineer.

STONE UNDER FIRE.—Some short time since a house in Hanover-square, the residence of Mr. and Mrs. Dallas, was unfortunately considerably injured by fire, more especially in the upper part. A glance at the cornice outside shows a suggestive fact. The flames rushed out of the two-pair windows, and above them, exactly to the extent of each opening, the heavy stone cornice is either completely burnt away, or otherwise destroyed by the effect of cold water on the heated stone. We should apprehend, however, that the former was the case; had the damage been caused by the cold water, it would not have been confined so exactly to the width of the window, as it is now.

THE SANGHI TOPE IN CENTRAL INDIA.—This is one of the most ancient and remarkable Buddhist architectural remains in India, dated 250 B.C.; and recently an application was made to the Begum of Bhopal, in whose territories it is, by the French Consul-General, M. Place, to allow the principal gateway of the tope to be carried off and set up in Paris! The Begum, who is Mahomedan, and indifferent to Buddhist buildings, before consenting to M. Place's proposal, offered the gateway to the Indian Government, to be sent to England. The Indian Government, with proper feeling, declined the gift, and recommended that the tope should be conserved, and suggested that it would be quite sufficient for France and England to have casts of the gateway, which is of a highly decorative character.

FATAL GAS ACCIDENT.—Mr. C. C. Lewis, the coroner for Essex, has held an inquest at Stratford on the body of Mr. Henry Bennett, late landlord of the Railway Tavern, Stratford New Town. A lengthened inquiry showed that the deceased took down a double branch gaslight in his bedroom, and ineffectually stopped the service pipe with a cork. Scenting an escape of gas, he lighted a match to discover the leakage, when an explosion took place, and his clothes becoming ignited he was so severely burnt that he lingered in great agony till the next day, when death ended his pains. His wife and also severely burnt. In summing up, the coroner pointed out the necessity of doors and windows being at once thrown open on the least suspicion of gas escaping, and the jury expressed a hope that the press would publish such a needful caution. A verdict of “Accidental death, caused by an explosion of gas,” was recorded.

CO-OPERATIVE ASSOCIATIONS.—The magnitude and progress of these great retail stores in the manufacturing districts of the north of England are very remarkable. In Lancashire there were 121 of them last year, and the large sum of 2,833,345*l.* was received by these establishments in cash for goods in 1867. The best of them appear to sell only for cash, and give no credit; but some allow a short credit to members up to a certain amount. Two great retail associations at Oldham do business to the amount, together, of about 200,000*l.* in the year, and realise good profits for the members. In Yorkshire the money received for goods sold by these societies in 1867 reached 1,425,021*l.* Yorkshire and Lancashire have several receipts exceeding 100,000*l.* in the year. In Durham the sales of the year were to the amount of 264,492*l.*; in Northumberland, 207,765*l.*; Cumberland, 91,105*l.*; Cheshire, 173,243*l.*; Staffordshire, 42,177*l.*; Derbyshire, 81,710*l.*; Monmouthshire, 24,918*l.*; Glamorganshire, 24,733*l.*; Gloucestershire, 71,599*l.*; Wiltshire, 28,955*l.*; Nottinghamshire, 45,795*l.*; Leicestershire, 26,251*l.*; Northamptonshire, 116,844*l.*; Middlesex, 140,647*l.*; Surrey, 60,109*l.*; Kent, 56,038*l.*; Essex, 23,316*l.* The amounts in other counties were below 20,000*l.*—in Warwickshire only 6,200*l.*, and not 4,000*l.* in Devon, Dorset, or Salop. These statistics would have gladdened the heart of Robert Owen had he been alive.

THE EGRESS FROM CONCERT-HALLS AT BIRMINGHAM.—At the conclusion of the local licensing meeting, the Mayor announced that the magistrates had adopted a resolution to the effect that the attention of the proprietors of music halls and large concert-rooms be especially directed to the necessity of having proper and sufficient means of egress in the event of an alarm. Particular attention to the subject is expected before next licensing day.

THE SCULPTURAL ORNAMENTATION OF CHESTER TOWN-HALL.—The raising of the images at the Town-hall, Chester, is a matter of embarrassment to the council. To one thing they appear committed, that is to spend 400*l.* on the matter, for that was included in the contract; but in what precise way they are not by any means determined. “Messrs. Lanyon & Co.,” remarks the local *Chronicle*, “are naturally anxious to have a fine building, adorned with stained windows, elaborate sculpture, and all that can make it rich in effect. The city would gladly second them but for one consideration—it has to find the money. At the present juncture the last thought will have to take precedence of the first.”

ROCK BLASTING.—At Caldon Lowe, Staffordshire, an attempt has been made to level a rock by a monster blast. The rock formed part of the limestone quarry of the North Staffordshire Railway Company, whose canal engineer, Mr. Forbes, directed the operation. The rock had been perforated at its base, a chamber 5 ft. square having been formed at the end of the tunnel. In this chamber 36 cwts. of powder were deposited; and when the powder was fired, the rock opened and crumbled as if by magic. The blast was not quite so successful as was anticipated, but a minor blast was expected to complete the operation, by which, in all, some 14,000 tons of limestone will have been dislodged.

THE GERMAN WORKMEN'S CONGRESS.—This congress has now closed. The programme of the International Working Men's Association, emanating from London, was adopted by a majority of 69 delegates, representing 61 associations, against 46 delegates, representing 32 associations. The consequence was a split, and the minority determined to hold a separate meeting of their own. Some of the resolutions arrived at by the majority are regarded as being rather Utopian. The congress rightly set their faces against war. They recommended working men to abstain from all work on war taking place in their respective countries,—rather an odd determination, certainly, unless the congress disapprove of all defensive no less than offensive war: as well recommend them to abstain from food and drink. That labour is of no country is the fundamental principle of the association; yet their principle is scarcely cosmopolitan; for the congress voted against giving the German Austrians and all other foreigners a deliberative voice in their assembly, although, we presume, they allowed it to Germans resident in countries not German.

FALL OF A HOUSE.—On Sunday evening, a number of persons miraculously escaped death by the fall of a house in Park-street, Birmingham. The house was a three-story building, adjoining other houses on one side. It was occupied by several families, who rented furnished apartments; and, at the time of the occurrence, there were two persons in the attic; five on the middle floor; and three on the lower floor. The whole of the front and side of the house gave way and fell forward, leaving nothing standing except the chimney portion, and the flooring of the attic. The two persons in the attic escaped injury, but the occupants of the second floor were carried away with it, precipitated below, and buried beneath the falling debris. The ceiling of the lower floor did not entirely give way, but became formed in the shape of an arch, affording protection to the three inmates below, who would but for this undoubtedly have suffered serious injury from the full weight of the falling materials. In a very short time, however, the whole of the inmates were got from beneath the debris, and it was then found that none had received fatal injuries. The building was a very old one; and a house on one side having been removed some time since, attention was called to the unsafe appearance of the structure on that side, but no precaution would appear to have been taken to erect proper supports, a necessity for security which is alleged to have been urged by the tenant.

THE ORPHAN HOUSES, ASHLEY DOWN.—Mr. George Muller has just published his report relative to this institution for the past year, and the following are a few of the interesting facts which he gives:—The amount which he received for the support of the orphans between May, 1867, and May, 1868, was 15,878l. 11s. 6½d.; for the building fund he received 6,633l. 18s. 5½d.; his receipts in aid of the school, Bible, missionary, and tract fund were 7,825l. 8s. 10½d. The average cost of maintenance, including every expense, is 12l. 10s. each child.

THE POLYTECHNIC.—A very interesting lecture is daily delivered here by Professor Pepper on the eclipses of the Sun in general and the recent total eclipse in particular. Some of the illustrations are remarkably good. The electric organ has been set up, as we mentioned a few weeks ago, over the proscenium of the large theatre, a scale of 120 wires communicating with it from the key-board at which the organist sits during the performance. The lecturo on the eclipse is accompanied by an organ performance. The organist sits at his key-boards in the orchestra, and therefore instantaneously realizes all the suggestions and directions of the conductor, although the organ itself is distant behind the scenery. Moreover, perfect accord with the band is insured with more precision than before.

THE RIGHTS OF RAILWAY TRAVELLERS.—At the Uttoxeter Police-court, Mr. Buchanan Finlayson, a commercial traveller from London, was charged by the North Staffordshire Railway Company under the following circumstances:—He took at Derby, a few days previously, a third-class ticket to Ashburn, for which he paid 1s. 3d. On reaching Uttoxeter he alighted, and 3d. was demanded from him, that making, with the 1s. 3d. he had already paid, the third-class fare from Derby to Uttoxeter, which latter town is about ten miles nearer to Derby than is Ashburn. He refused to pay the sum demanded, and hence the summons. Mr. Tennant, of Hanley, the company's solicitor, contended that a demand had been attempted, but the defendant argued that he had a legal right to break his journey at any station short of that to which he had booked. The bench concurred, and the defendant was dismissed the case.

GAS.—The Sunderland gas company have declared a dividend of 4½ per cent. for the last half-year. A meeting of gas consumers has been held at Black Heath. The meeting was informed that the Rowley Regis and Black Heath Gas Company are unwilling to grant a reduction except to the smaller class of consumers, who would in future be charged 6s. instead of 6s. 6d. per 1,000. The reason assigned by the directors was, that the shareholders had not received sufficient remuneration for the money invested. The meeting was unanimous in the opinion that it was bad policy on the part of the directors to expect to increase the dividends of the shareholders by continuing to charge so much for their gas, and expressed themselves unwilling to pay such a high price. It was decided to discontinue burning gas at the end of the present quarter, unless the price be reduced to 4s. 6d. per 1,000 ft.—A mode of lighting by gas, to which General Fave has called the attention of the Emperor, is being tried in Paris. The gas is self-made, and the apparatus easy to manage and move about. They say it can be used for heating as well.

SIZE OF THE HOUSE OF LORDS.—Oddly enough while a committee of the Commons has been recommending an enlargement of their House, a committee of the Lords had nearly determined to report that their meeting-place was too large, and that the Peers' Smoking-room should be fitted up to serve the purpose better, the present chamber being retained for great State occasions. The size of the House of Lords, on the floor, is 84 ft. by 45 ft.; on the gallery level the length is 98 ft. The height is 46 ft. The cubical contents of the House are 173,000 ft., being 46,000 ft. more than the House of Commons. The House of Lords contains seats for 100 persons on the floor and in the galleries. The journals of the House were examined, and they showed that the attendance of peers exceeded 150 only thrice in 1865 and twice in 1866. The report prepared by the chairman of the committee, the Earl of Carnarvon, recommended the adoption of this plan, but it was not retained, the numbers for and against it being equal. The Lords and Commons might change, but this would not suit the arrangements made for the visits of the sovereign.

A NEW CEMENT.—The following directions are given for making cement impermeable by air and steam, which is said to be superior to any in use for steam and gas pipes. Six parts of finely-powdered graphite, three parts of slaked lime, and eight parts of sulphate, are mixed with seven parts of boiled oil. The mass must be well kneaded until the mixture is perfect.—*Mechanics' Magazine.*

A MILLION OF PAUPERS IN ENGLAND AND WALES.—On the 1st day of January of this year the number of paupers in receipt of relief, indoor or out-door, in England and Wales (including lunatics and vagrants) was more than 1,040,000. In the year ending March 25th, 1867, nearly 7,000,000l. were expended for the relief of the poor, or more than half a million in excess of the sum spent during the previous year. The rate per head on the population for the relief of the poor was 6s. 6½d. for the year ending March 25th, 1868.

PANIC AT AN AGRICULTURAL SHOW: FALL OF TWO GRAND STANDS.—An alarming occurrence has taken place in the show-ground of the West Riding Agricultural Exhibition, which was being held in Belle Isle Fields, Wakefield. There was a large concourse of people present. Two large stands or slanting [sloping floored?] platforms had been erected, which were thronged with persons. One of the stands fell, and the occupants were thrown upon each other, and some of them seriously hurt. The panic occasioned by the first fall had scarcely subsided when the other stand, which had been overcrowded, also went down. A number of ladies were seriously injured.

REOPENING OF RAOLAN CHURCH.—Raglan Church, Monmouthshire, has been reopened, after extensive restoration. The Duke of Beaufort gave a donation of 600l. and also a piece of land for enlarging the churchyard; and the duchess gave the pulpit, of carved oak. In the church is the Beaufort Chapel, which was erected by one of the Earls of Worcester (probably the third), who, in the reign of Henry VIII., greatly beautified the castle and extensive domains, and whose deplorably-mutilated effigy still lies here. Beneath the chapel, in a spacious vault, are interred the remains of many members of this noble family, and among them those of Edward, the sixth Earl and second Marquis of Worcester, who, as is well known, devoted himself to mechanical science, and left behind him an imperishable name as the inventor of the first practical steam-engine.

INFRINGEMENT OF A MANUFACTURER'S DESIGN IN THE POTTERIES.—At the Police-court, Fenton, Messrs. Cocksack & Chetwynd, earthenware manufacturers, Coleridge, were lately charged, on the information of Mr. John Edwards, manufacturer, Fenton, with unlawfully copying the design of a jug, for which Mr. Edwards claimed protection by registration certificate. At the beginning of 1866 Mr. Herbert Beech, Mr. Edwards's American agent, came over to England for the purpose of introducing, in Mr. Edwards's interest, a new design in jugs, which were to be specially for the American trade. The distinctive feature of the new jug was the angularity of its top and handle and its raised lip. Messrs. Chetwynd were entrusted with the modelling of the new jug, for which service Mr. Edwards paid them a sum of 120l. At this time Mr. Edwards was not aware that Messrs. Chetwynd were connected with a manufactory. Mr. Edwards was surprised a short time after to find that jugs similar in design to his own had been issued from the defendants' manufactory, introduced into the American market, and were "taking" immensely. The only apparent difference in the jugs was the embossed ornamentation of the imitation jugs. The defence set up was, that the said-to-be-new design of jugs, was simply a combination of previously existing forms, and that consequently there was no offence. A fine of 5l. was imposed.

TENDERS.

For a new public house, for Mr. G. D. Groom, at Hitchin, Mr. Shilcock, architect:—	Warren & French (accepted).....	£330 9 6
For a new house, for Mr. Joshua Whiting, at Hitchin. Mr. Shilcock, architect:—	Extra if stone dressings to front windows	
Butterfield.....	£200 0 0	..... £15 0 0
Amell.....	475 0 0	..... 7 0 0
Stapleton.....	473 0 0	..... 14 0 0
Jeeves.....	472 0 0	..... 9 0 0

For alteration at the Infirmary, Brentford Union. Mr. Hoimes, architect:—		
Nightingale.....	£1,887 0 0	
Wiles.....	1,555 0 0	
Lodge.....	1,519 0 0	
Crab & Vaughan.....	1,517 0 0	
Gardiner.....	1,541 0 0	
Poole.....	1,397 0 0	
Brunden (accepted).....	1,323 0 0	

For six houses in Wynford-road, Barnsbury-road, Islington:—		
Mann, Junr.....	£2,900 0 0	
Hind.....	2,850 0 0	
Turrell.....	2,784 0 0	
Mundy & Hutchinson.....	2,650 0 0	
Pett.....	2,460 0 0	
Blackmore & Morley.....	1,950 0 0	
Stentford.....	2,200 0 0	
Pearce.....	2,190 0 0	
Heath.....	2,148 0 0	
Jay (accepted).....	1,770 0 0	
Harrison & Edwards.....	1,750 0 0	
Ireson.....	1,710 0 0	
Williamson.....	1,595 0 0	

For additions and part restoration of Bourne Abbey Church, Lincolnshire. Mr. Edward Browning, architect:—		
Hilton.....	£1,400 0 0	
Richardson & Roberts.....	1,372 0 0	
Milson.....	1,318 0 0	
Dagnell & Tinkler.....	1,193 0 0	
Halliday & Cave.....	1,172 0 0	
Perkins.....	1,097 0 0	
Hall, Norman, & Vinter*.....	1,080 0 0	

* Accepted.

For restoration of Sempringham Church, Lincolnshire Mr. Edward Browning, architect:—		
Allen.....	£804 0 0	
Millaou (accepted).....	910 0 0	

For additions to the Deanery, Peterborough. Mr. Edward Browning, architect:—		
Peach & Furness.....	£510 0 0	
Halliday & Cave.....	472 0 0	
Perkins.....	465 0 0	
Hobson & Taylor (accepted).....	457 0 0	

For alterations, repairs, and decorations at No. 27, Grosvenor-street, for Dr. Hartree. Mr. Frederick P. Walters, architect:—		
Kilby (accepted).....	£340 0 0	

For three houses and shops in the High-street, Tunbridge Wells, for Mr. Thomas Elliott. Mr. Henry Stapley, architect. Quantities by Mr. Clever:—		
Kilby.....	£3,840 0 0	
Hammond.....	3,317 14 0	
Vidler, Junr.....	3,580 0 0	
Walker.....	3,565 0 0	
Mercer.....	3,503 0 0	
Strange.....	3,339 0 0	

For alterations to Hawthornden, Tunbridge Wells, for Colonel White. Mr. Henry Stapley, architect:—		
Hammond.....	£220 0 0	

For erecting boiler-house, &c., Kentish-town, for Messrs. Winsor & Newton. Messrs. George & Vaughan, architects:—		
Kelly, Brothers.....	£457 0 0	
R. Mann.....	478 0 0	
Murray & Rogers.....	471 0 0	
King & Sons.....	460 0 0	
Newman & Mann.....	375 0 0	

For rebuilding No. 23, Old Change, E.C. Mr. Danby architect:—		
Thompson.....	£1,750 0 0	
Garnson & Sons.....	1,735 0 0	
Carter & Sons.....	1,661 0 0	
Foster.....	1,544 0 0	
Piper & Co.....	1,577 0 0	
King & Sons.....	1,560 0 0	

TO CORRESPONDENTS.

R. W. Montreal (we will give an answer when we have seen view)
 A. R. (the additional run must be completed)—J. R. Jun (the point mentioned would destroy the appearance of brickwork)—P. J. N. (write to Mr. Bowditch)—Young Architect (do not mind). Apply to a proper professional.—T. C. A. C. R. E. B.—Dr. M.—India.—C. R.—J. W.—B. A. R.—J. B. R.—Sir E. L.—An Engineer.—K. B.—Messrs. H.—J. B.—W.—F. W.—T. P.—D. K.—J.—F. J.—W.—P. F. W.—J. E. H.—W.—D.—A. D.—W.—H. B.—F.—W.—A. G.—H.—S. F.—J. H. Bay.—A lawyer.—A member of the Inn.
 Country newspapers should be marked.
 We are compelled to decline pointing out books and giving addresses.
 All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.
 Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

Advertisements cannot be received for the current week's issue later than **THREE o'clock, p.m., on THURSDAY.**

The Publisher cannot be responsible for ORIGINAL TESTIMONIALS left at the Office in reply to Advertisements, and strongly recommends that COPIES ONLY should be sent.

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The Builder.

VOL. XXVI.—No. 1338.

The International
Congress
of Working Men.

CLASS of men in whom we take a never-failing interest, the actual rank-and-file of the great army of industry, has been holding an international Congress at Brussels. Subjects of the deepest

social importance, not to the working men alone, but to all members of civilised society, have been discussed, and the opinions of the French, the Swiss, the German, and the Belgian, have been freely exchanged with those of the English workman.

The main subjects considered have either been those towards which the congress has sought to direct its action, or those on which it had to seek for further information. Of these, that which is the most important, because on its development depends the power and the wisdom of the workman to deal with the other, appears in the most shadowy state. The congress adjourns till 1869 its reception of a report on education. The main current of opinion, so far as we can gather from the reports, ran in the educational direction. That instruction should be practical and technical, not that of books alone (although not without the aid of book-learning), but that of intellectual, manual, and moral training combined, was the view of the majority; nor did it seem to be contested by any. The difficulties raised were chiefly those that regarded the action of the State upon education. All present appeared to concur in the feeling that education, to be worthy of the name, must be totally removed from the interference of the clergy; and it was pretty plainly intimated that ecclesiastical schooling, directed, as it usually is, chiefly to the maintenance of sacerdotal influence, has a "stupefying" effect upon its recipients.

On the subject of credit, banking, and currency, the discussion at Brussels might rather serve to enforce the necessity of elementary education, than to shed any light upon a subject of which the great principles are not actually unknown. Credit banks, giving aid to every one, and receiving profit from no one;—Government banks, the profit on which should amount to 40,000,000l. per annum, and thus save four-sevenths of the annual taxation of the United Kingdom;—above all, banks issuing a currency not convertible into the precious metals,—were among the improvements which the congress wish to see introduced. The one master idea that a bank note is simply a reliable promise from a responsible promiser, and that a promise, to be reliable, must be definite, has not yet been grasped by many of those who would fain instruct others on the subject. Let such a promise be regarded as a sale-note. A sale-note is definite. It undertakes to deliver, at a fixed date and place, a fixed quantity of a certain material. It may be ores, lead, coals, gold, or any other commodity. The principle is the same. We can imagine a highly organised state of barter, in which a very large amount of business should be carried on by means of these sale-notes. In

each instance the receiver runs a certain amount of risk. He makes his plans accordingly. We omit any notices of the risk as to the solvency of the issuer of the sale-note. Let us suppose that to be past question. But there still remains the risk of fluctuation in the value of the material. Three months hence the relative value of a ton of iron, and a ton of lead, or a load of corn, may be very different from what it is to-day. This risk is of the very nature of all commercial transactions, and success in speculative business depends, in great measure, on the skill with which the future course of demand and supply may be divined.

But if, to this unavoidable risk, the seller should seek to add another, and that, one dependent solely on his own interest or caprice, the conduct of business would become impossible. A has undertaken to deliver to B, at a fixed date, 100 tons of iron. When the date arrives, the supply of iron in the market is less than the actual demand. Iron has risen in price, as compared, say, with copper. But a large quantity of zinc has been imported from some newly-opened mines. A, therefore, sends to B, instead of the covenanted iron, 80 tons of zinc. B has no want of zinc; his works are standing still for the iron. If this method of substitution were allowed to the debtor, it is clear that all trade would come to a dead lock.

What some financial reformers propose is nothing more nor less than a recourse to such an indefinite system of promises. A five-pound note, now, is an order for the delivery, over the counter of the Bank of England, of an exact weight (an ounce and a third, in round numbers) of gold of a standard quality. So certain is this order to be honoured, that it freely passes from hand to hand as the representative of this ounce and a third of metal. The risk of fluctuation in the value of the gold is the only risk (beyond that of fire) borne by the holder of the note; and as this fluctuation is less than that contingent on the value of any other commodity, such an order, or sale-note, is the best possible common measure for all transactions.

The moment, however, that the note is rendered inconvertible,—that is to say, the moment that it ceases to represent a definite commodity, its value becomes matter of credit, or of caprice. We have seen, within the past year or two, how such imaginary or conventional notes,—promises to do nothing definite,—have fluctuated in their power of purchase, in the "green-backs" of America. And while the influence of the mere name of money, the prevalence of the ordinary idea of a bank note, has been such as to prevent these "green-backs" from attaining the extreme depression formerly reached by the French *assignats*, there has prevailed such a relation between the number of notes actually issued and their value as measured in gold, as to show that the printing of paper is not the coining of money. *Definiteness of engagement* is the life-blood of commerce. It is by making all engagements indefinite, or at the caprice of the purchaser, that the advocates of inconvertible notes seek to serve society.

A third subject has been approached by the Brussels Congress with considerable hesitation and suspicion. Men brought by steam to the bright little capital could hardly look each other in the face and deny the utility of machinery. Accordingly, more than one speaker carefully guarded himself against the imputation of hostility to the aid of machinery. But the subject was evidently one to which the general opinion was not altogether favourable. The mighty genius that had been invoked by Watt, and honned by Stephenson to the chariot of human progress, was looked upon as a very untrustworthy slave. "The machine was always well oiled,—that is, fat," said one delegate; "The workman was lean." It was proposed to the Congress to resolve that "machinery has

proved a most powerful instrument of despotism and extortion in the hands of the capitalist class." There is so much sad and sober truth in this position, that we must ask attention for a word or two on the subject.

It cannot be denied that the introduction of each successive improvement in machinery has been attended by a great amount of suffering among those whose labour is, for the time, displaced by the new competitor. Further, the great revolution which has taken place, and is still going on, in the method of performing what used to be manual work, has been attended, in many instances, with great aggravation of the misery of the producer. Not that this is altogether the case. The producer everywhere has benefited as a consumer by the introduction of machinery. But in that growth of great cities which has been stimulated by steam manufactures, in the agglomeration of workmen, the frequent fluctuations and rebate of wages, and all the untold evils of the worst phase of civilization,—very much direct suffering has been, and is, attendant on the development of machine power.

Attendant on it,—occasioned by it,—it is true, but not caused by it. This is the first point to bear in mind. To relieve him of the most crushing part of his toil, by substituting the motive power, first of animals and then of heat, for his sheer naked strength, is to remove the curse from his labour. The race has acquired a slave; the race is in an improved condition from the fact. That the result of that slave's labour has been so unduly proportioned,—that the rich has grown richer, and the poor poorer, by the distribution, may or may not be the case; but if it be so, it is the fault, not of the slave, but of the master,—not of machinery, but of man. It is not the introduction of machinery that has injured the labouring classes, but the contest between avarice and overhearing on one side, and ignorance and obstinacy on the other. Where were we without machinery?

We can answer that question pretty distinctly. Every year adds to the knowledge which we possess of the condition and habits of our ancestors before the invention of machinery. Man had a slave before he learned the use of the mechanical powers, as they are called. When there were no blacksmiths, because iron was unknown; when there were no joiners, because the rude hewing of timber had to be effected by flint axes; when the potter had not learned to use the wheel; and when the shuttle had not displaced the bone needle in the slow and imperfect fabrication of hempen web,—the slave of man was woman.

Our earliest historic works, the sculptures and bas-reliefs of Assian and of Egyptian antiquity, the implements discovered in barrows, at the bottom of lakes, and in the vicinity of other scenes of ancient habitation, the present habits of the wildest human races,—all tell the same tale. The traveller over many parts of the Continent who visits agricultural spots as yet undefiled by the steam-plough, may say that it is not with the naked savage alone that woman is to be found in a state of slavery. In the field labour of many parts of France, the hardest work still lies on the shoulder of the weaker sex. The earth of the railway embankments of the countries bordering the Mediterranean has for the most part been carried in baskets, on the heads or backs of women. When man has no other slave, he seldom fails to lay hard service on his wife.

In her own immediate sphere of the household, the labour of woman, before machines were made, was not slight. The preparation of bread was her daily task. To beat out the grain from the ears, and to grind it into a coarse and unpalatable meal between two stones, was the wont of our ancestors. The first lightning of their toil arose from the invention of the

quern, or hand-mill. How naturally do ancient writers speak of "two women grinding at the mill," and speak as if that hard and thankless labour were to be the constant duty of the sex!

During the darker ages of European history, disputes were high around the meal-sack. The tyranny of the feudal lord was at times bitterly complained of. He compelled his peasants to bring their corn to his mill to be ground. He took, no doubt, a heavy mulcture. Some of the grist, moreover, stuck to the dusty fingers of the miller. There can be no doubt of the abuses and of the hardships that often attended the compulsory age of the seignorial mills, in feudal times. But of what do those very complaints tell us? They tell us of the invention of the mechanical mill; of the minute reduction of grain to pure and wholesome meal, between a pair of stoues; of the whirling of the ponderous mill-stone, not by the hands of woman, but by the cheap and well-applied service of wind or of water. What was the gain to the position of woman in the family, and thus to the elevation of the race in the scale of intelligence, of comfort, and of elegance, by the displacement of the daily toil of the quern by the machinery of the flour-mill?

In this instance of the earliest introduction of machinery, propelled by any other than human, or, at least, by animal strength, we see an illustration of the whole history of the subject. The function of machinery is to free man from the more painful, more degrading, and more brutal, forms of labour, and thus to give him both time and stimulus to increase his skill, his knowledge, and the productive character of his industry. He may be slow and stupid in learning the lesson. So much the worse for him! But he can not fail to learn it sooner or later.

The history of individuals to a great extent reproduces itself. The same recurrent phases of life are undergone by the king and the peasant, by the Celtic rampart builder of thousands of years back, and the Coventry ribbon-weaver of to-day. To take his place in the series of fleeting generations, each individual must be born into the family circle. Arrived at maturity, he marries, or continues the family. He passes from it by death, and leaves his place to another. All the busy occupation of his waking hours only fills up the intervals between those three great duties paid to his species. But the history of the race is a widely different matter. Comprehending, as it does, nay consisting as it does of, individual biographies, it yet tells a tale of steady, certain, irresistible progress. That progress consists in the establishment of the dominion of man over matter. His mission is not only to replenish the earth, but to subdue it. He has been much more ready to fulfil the earlier, than the later, clause of the command; for man's subjugation of earth, to be worthy the name, is not that of the wild hunter and fisher who yet roves unclad in the interior of Africa or the fast-diminishing forests of America. It is not that nomadic possession which the Bedonins, and other pastoral tribes of our day, keep, with as loose and thriftless a hold as did their ancestry in the time of the shepherd kings of Egypt. It is not the possession enforced by a hedge of hissing bayonets, or by the loud-voiced thunderbolts of war. It is the possession of the cultivator, the builder, the architect, the engineer. It is the subjection to human service of the force of the wind and of the waterfall. It is the exaction of duty from the unimprisoned genius of heat, which has for so many thousands of years been bound in the unopened coal-seam. It is the power of putting nature to the question, by the analysis of the chemist, and of learning direct from her replies how best to feed, and to clothe, and to comfort the feeble infants of our kind. It is the power to raise a bushel of corn where once grew a tangle of conch-grass;—to span the ocean;—to defy wind and tide;—to make the very material of the lightning convey the articulate message of human will.

The advance which has been made in this method of subjugating nature, within the past century, has been far greater than that which all the preceding centuries of human aëdon on earth have witnessed. It is true that, in the great struggle, we may have lost, or thrown aside, some of the earlier marks of our nobility. In our pursuit of accurate scientific knowledge, and our attainment of practical mechanical skill, we may have deteriorated in art, in poetry, in oratory,—in the adornments of the infancy of a race. We cannot now produce sculpture like that of the age of Pericles, we cannot mix the unfading hues of Pergino or of Titian, we cannot speak in the music of Homer, or with the

perfect mastery of language attained by Shakespeare. Our pulpits may give forth uncertain and discordant sounds; our legislators may laugh in the sleeve if any one speaks to them of patriotism or of self-devotion; our men of business may have little time to spare from the rapid accumulation of capital.

But amid all this,—in spite of it,—by means of it,—the great scientific conquest is pushed on. We are advancing along the whole line. It is not a century since we made our island permeable by roads—since we learned to make smooth highways of broken stone, and to traverse them at the rate of ten miles an hour on carriages furnished with the novel appliance of steel springs. It is not longer since we opened water-ways from shore to shore, from Thames to Trent and to Severn, for the transport of heavy goods. Already our turnpike roads are grass-grown, and our canals are strangled with weeds. An entirely new locomotive system has superseded the great improvements in transit effected in the eighteenth century, and already our new roads are so choked by the traffic which they have evoked that great improvement is demanded. All sheer labour is being lightened to man. Even the ancient and simple toil, in the employment of which man has entered into partnership with the horse, and, long before he tamed the horse, with the ox, from the very commencement of agriculture, is becoming obsolete. If anything had a long future predicted for it, it was the plough. Where will the plough be twenty years hence? How rude and petty will be the tillage from which it is not driven by the use of the steam cultivator? If there was one section of human labour in which, more than in any other, it seemed unlikely that the steam-engine could be advantageously employed, it was that of breaking up the surface of a large extent of country. What is the case now? What, is, we do not say the opinion, but the experience, of any farmer who has given a fair trial to steam-cultivation? Like the spirit evoked by Michael Scott, the genius of steam is constantly demanding fresh employment at our hands. And are we now to speak of putting restrictions on the employment of machinery?

Those alone are the true friends of the working man who open his eyes to truth. There is much, no doubt, that yet remains for discussion and for elucidation in what has been called social science. There is room enough for the luxury of ample difference of opinion. But certain great laws underlie all human action. They are either laws of thought—such as are illustrated in the question of the measure of value, before referred to—or laws of observation, derived from a long series of observation, such as that which prescribes the gradual displacement of human labour by the use of machinery. In all social progress, and in every amendment of the position of the workman, these laws must have their due influence. Those who attempt to start theories, and to reform society, without, in the first instance, having the patience to ascertain all that is actually known on the subject of their incursions, do worse than waste their own time. In so far as they misdirect the working energy of those who listen to them, they become obstructive and reactionary. Those who seek to turn the stream of progress up-hill will only get drenched for their pains.

That a new era is opening for labour, we not only trust, but believe. That this latter age will be attained by the development of industry, within its own proper sphere of action, and not by its direction into political channels, we hold to be certain. The province in which industry has attained its greatest triumphs, is that which promises best for the future. That a co-operation of the productive forces, not a forcible antagonism between capital and labour, but the aid of the labourer of to-day by the stored labour of generations of labourers who have preceded him, is the great requisite for progress which experience denotes, there can be no denial. That the credit which arises from trust in character, and not the artificial operations of imaginary banking schemes, will form the sinews of successful organisation, we also hold. And it will be by the final performance, by tools and mechanism driven by steam or electricity, of all that man shall hereafter have to do, except to think, and to enjoy the full exercise of his intellectual and animal functions, that we hold that the final subjugation of the material world will be effected. It is towards that end that the race has, slowly and blindly, but no less certainly, advanced, since bronze replaced stone, and the corn-mill was substituted for the quern.

GENERALISATION IN ARCHITECTURAL EDUCATION.

In a previous article* we endeavoured to point out how much the idea implied in the term "generalisation," the perception of broad laws and principles permeating and linking together branches of study and knowledge, which to a cursory glance might seem perfectly independent, in a grand and comprehensive unity of plan, is underlying and influencing all the best intellectual life and progress of the present time; and how the art of architecture, as a kind of *microcosm* in the great world of art, seems peculiarly to demand this generalising spirit in its practitioners, both from its central position with regard to other arts, and from the absence of the definite expression† and imitation which serve to mark clearly the prime end and object of these latter, in the delineation and presentation of physical beauty; while architecture is rather occupied with that metaphysical beauty which, while directly imitating no natural object, seeks to govern itself by those general abstract laws of harmony of proportions, and fitness of means to an end, of which all natural forms are but so many separate and concrete instances. Nor is it possible to look at the profession of architecture from this point of view, without perceiving not only how much it is heretofore elevated above the commonplace brick and mortar and specification standard, but also how much mental training and delicacy of taste and perception is necessary to acquire even the capability of appreciating such subtle relations between principles and ideas and external forms, much more the power of designing and carrying out a work in accordance therewith. This we take to be the real reason why architectural art is so little comprehended by the mass of outsiders, and why, for ten persons who can form a fair judgment as to the merit of a painting, there is scarce one to be found who has the slightest notion of the merits or faults of a building, or why they should be called merits or faults at all, or what architecture essentially consists in; the preferences of the public on such matters being almost entirely governed (as some architects know to their cost) either by fashion and prejudice, or by whims of the most absurd and unreasonable description. The relation between the purpose and the site of a building on the one hand, and the form and character of its design and detail on the other, cannot be perceived or judged of without a degree of general cultivation of intellect which is at present, unfortunately, the reverse of ordinary; and, considering this—considering what a large demand must be made upon refined intellectual perception, in addition to mere practice of hand and eye, in determining, for instance, how an isolated building should be placed with reference to the landscape around it, what character of outline will best harmonise with such landscape, to what extent and in what manner the purpose and interior plan of the building should be indicated in the exterior design and grouping, what style and amount of ornament will be in keeping with that purpose, and where and how the decoration should be placed so as to enhance and not encumber the expression of the design, it certainly appears of great, even of paramount importance, that those who have to decide in such matters should have an education calculated to develop and strengthen the powers of the mind generally, and enable them to use pencil and compasses in accordance with certain and definite principles,—considerations which will appear of none the less weight when we reflect upon the monumental and enduring character of large architectural works, which, unlike pictures and poems, are forced under our notice whether we will or no, and remain as objects of pleasure or annoyance for perhaps many generations. Viewed in this light, how does our present system of architectural education appear?

It is customary at present to speak with much pity and contempt of those good old days when an architectural pupil was solemnly and in set form introduced to the "Five Orders" as the "he-all and the end-all" of architectural excellence, to be studied and copied with rigid exactness through all the conventionalities of "modules" and "parts." Doubtless there is an activity and energy in the modern practice of the art not

* See p. 672, ante.

† One of the many points in which architecture resembles music, and may be classed with that art in its effects on the mind; but to go at all fully into this fascinating subject would require a separate essay.

to be found among the dry bones of quasi-classicalities; yet it must not be forgotten that in that slower-paced generation there was more time given for thinking out the plan of a work than now, and that the mere study and contact with forms so lofty and pure in themselves as the relics of Greek art were not without their influence in refining and educating the mind and connecting the idea of an architect with that of a cultivated gentleman more decidedly than, it is to be feared, is now the case. How much of thought, and care, and study, how much of the refining influence of a familiarity with delicate and beautiful forms, either in drawings or their actual remains, went to the prodding of a first-class architect in those benighted Pagan times, let the lives and works of Cockerell and Barry* attest against all counter-pretence. But, admitting all that is to be said against the one-sidedness and comparative barrenness of the "five orders" system, an impartial observer will scarcely see that we are, in our theory of education at least, any more rational now. The usual course of things is much on this wise: a lad shows talents for drawing, and predilections for drawing buildings (this is supposing a favourable case, for natural talent is by no means considered a *sine qua non* for entering the profession); and hereupon his friends make exertions to get him into the office of some eminent architect, in the high tide of successful practice. "It is a heavy premium, to be sure; but then it is such an advantage to get him into —'s office!" and into —'s office he accordingly goes. And now, in the name of common sense, what is it that he learns, or is expected to learn there, in any sense which ought to be attached to the word "learn?" His friends give themselves little concern about this; it is the usual system, and everybody speaks very highly of this particular office, &c. But, in point of fact, architectural education he gets none, so far as education signifies the gradual development and strengthening of the abilities in a special direction and with a special object. He enters the office with no definite idea as to the limits and objects of the profession he is to acquire, no general idea of any leading principles connected with it, often with not even a general notion of its history (though this latter may be brought to his own neglect). The principal, whose time is probably occupied with multifarious works, of which he can only manage in a hurried manner to direct and oversee the leading details, cannot of course pretend to instruct the pupil systematically, or even to instruct him at all; and the latter is consequently simply thrown into the midst of a chaos of work to pick up what he can. By degrees he begins to attach a definite meaning to what at first seem the cabalistic and inexplicable diagrams that come under his eyes, and attains by little and little a facility in reproducing ornamental detail of the same kind as what he constantly sees, and a certain indiscriminate acquaintance with various details of construction; but in most cases it is long before he is able to generalise sufficiently from these to arrive at a comprehensive view of the whole system of design and construction pursued in the office, and the relation of one part to another. But having attained this, what has he really learnt? Proposing to qualify himself for a profession which, above all other artistic professions (if our views are correct), requires a comprehensive study of its history and its bearing upon other arts to rightly understand it, he has simply acquired a knowledge of one method of practising this profession by one single man at one single period; the said practitioner being by no means infallible, and indeed being by possibility a very shallow though clever and energetic hard-working man: for popular success is no evidence, either in architecture or in anything else, of the possession of any deep thought or clear principle. The pupil (we speak now of a good specimen) has indeed got what his parents and guardians paid for, the capability of making a living by his profession; even of getting some credit by it, as times now go. He has the prestige of the office he has served his time in, to begin with, which gains him credit

* As a single instance alike of the defects and merits of the period, take the Royal Institution at Manchester, one of Barry's early works: externally it is not the least fitted for a northern manufacturing town, whether as to expression of design or practical power to stand against the onslaught of snow and weather; yet in the interior, with its central staircase and rooms divided by low columned corridors, there is evident a distinct thought, and a simplicity, yet originality, of architectural effect, which we may look for in vain through many a score of sets of recent competition drawings.

with that large majority of persons who cannot judge for themselves, and are consequently obliged to take everything on trust; and he has gained by long habit a ready facility in "knocking off" designs and details in the style and manner of his former master; and in these hurrying days, when all who want buildings want them at once, readiness is everything, and no one stops to inquire whether (to parody Goldsmith's connoisseur) the building might have been better if the architect had bestowed more thought on it. And while, on the one hand, it must be owned that none but a man of very decidedly original talent could possibly go through this course of apprenticeship in one office, hard at work in only one style (or rather one manner), without unconsciously falling completely into the manner of his master, as a kind of transmitted instinct; on the other hand, it is evident that to acquire a power of rapidly "designing" (as it is facetiously termed) in this parrot-like manner demands no high order of talent, being little more than a matter of habit; the one thing indispensable to success being that the style or manner should be a popular one. It is owing, in a great degree, to this fatal facility in acquiring a popular style of draughtsmanship, that the intellectual status of the profession, even judged of from among the ranks of the tolerably successful men, is sensibly lowered. Without wishing to be censorious, it must be said that the gushing young architect of the present day is not a type of character on which men of intellectual training will be inclined to look with much respect. He has good qualities certainly; the best of which are that he generally has a love of his profession *per se*, and that he works very hard; commonly, indeed, to the exclusion of all interest in wider and more general and intellectual pursuits. But he is loud-talking, bustling, egotistical, and affects a kind of "slap-dash" manner calculated to impress you with an idea of the press of work he always has to get through. He has a great respect for Mediæval literature (it is the only one he is acquainted with), with an supreme contempt for the Renaissance in all its developments; and holds Rossetti to be the only modern painter worth looking at. His office is strewn with barbaric pieces of furniture of the most inconvenient and clumsy make, painted in violent colours or inlaid with Feejee ornament; he dabbles in Ritualism, and "goes in" for church millinery and floral decorations. As we have said, there is good in him; but on the whole we prefer the old classic type of architect to this latest invention; and at least it is not to such persons, trained under such a system of non-education as we have hinted at, that any thoughtful man would wish to find the future aspect and architectural expression of our streets and public buildings entrusted, seeing that what is done in these matters cannot easily be undone.

Neither type, however, we apprehend, will accomplish the work which seems likely to be demanded of the architectural profession in an age which is yearly showing stronger symptoms of its impatience of anything like a sham, which is getting into the habit of inquiring the why and the wherefore of everything, and of insisting on a general fitness of things, and a banishment of anomalies. The dissatisfaction expressed *in re* the Law Courts designs, with all their splendid elaboration of drawing; the strong sense exhibited, in some not unimportant quarters, of the absurdity of such an insane sprouting forth of towers and turrets as came to light on that occasion, show which way the wind sits, and indicate a possibility that the architect may even be called upon by the intellectual part of the public to show cause for his existence, unless he can do something more to the purpose than this. And if he is to go successfully through such an ordeal, architectural design must certainly be made more a matter of thought and reflection, and less a thing of habit, than it is at present. And the main step to this will be that the present system of what is called architectural education be as nearly as possible reversed. To turn a boy loose into the midst of architectural work, to fish up for himself a bit of information here and a bit of experience there, is to ignore all logical principles of education altogether; and is so far worse than valueless, inasmuch as it leaves him free to imitate and adopt any practice or predilection of his master, however illgrounded and absurd these may be, seeing that he is not supposed to be prepared by any study of the history and principles of architecture as a whole, which might teach him

how to refuse the evil and choose the good: nor, for the same reason, is he in any position to make the most of information which may be really valuable, nor having the data whereby to measure its real importance or bearing with regard to the whole field of his profession.

The branch of knowledge which alone can be acquired in a practising architect's office, and nowhere else, is just that which the pupil stands in need of rather at the close than at the commencement of his studies, viz., the practical constructive details, and the general working of the profession in its relation to the two classes, capitalists and the building trades, between whom it has to arbitrate. Before he can be competent to carry on a practice on his own account, it is necessary that he should have experience in these matters; but these do not constitute the art of architecture, the end and object of which, broadly stated, is so to plan, group, and ornament buildings as to transform that which is originally merely a material necessity into a source of intellectual pleasure.

Here, then, we return to our leading idea of "generalisation" and we do most strongly urge, upon the grounds aforesaid, that any proper, natural, rational system of architectural education must commence with, and indeed, mainly consist of, such a training in the general principles of art, and the application of these to the conditions and objects of the art-architectural in particular, such a general and comprehensive view of the history of all the leading styles considered in relation to the conditions of climate, society, &c., under which they were evolved—and such a cultivation and refinement of the intellect through the agency of literary, and what we will call metaphysical, study (taking the word in a wider sense than usual)—as may qualify the student when he comes to deal practically with his profession, to subordinate details into their proper place as parts of one scheme, to exercise a deliberate judgment as to what sources of effect commonly employed are legitimate and suitable for his purpose, and to take a comprehensive view of the requirements and tendencies of his own time and circumstances, and so produce, not at haphazard, but on principle, that which will be permanently acceptable and valuable to the best educated part of the public. Along with these general studies will, of course, go the practice of drawing and designing, instruction in the general principles of mechanics and of construction with various materials, and an elementary knowledge of the principles and practice of the various arts which touch upon architecture as ornamental and accessory, always keeping in mind the main object of architecture as just now stated, and admitting any accessory branch of study only so far as it educates the mind towards that end, not following it out to the point where it entirely diverges from any connexion with architecture.

This kind of scheme, thus roughly shadowed forth, is what we mean when we speak of a generalisation of architectural education; and all students of average ability, who had passed through the discipline of such a system, would, we apprehend, find themselves in a position to learn more of the practical working of their profession in the course of one year in an architect's office,—more, that is to say, which will be of real value to them,—than in the course of the five years now commonly spent in an architectural apprenticeship; while, if time and opportunity are favourable for the carrying out of a sketching tour or an extensive round of visits to existing buildings, ancient or modern, not only will this comprehensive education give a far deeper interest and significance to these than they can ever have for the mere facile draughtsman, but the cautious and judicial habit of mind which an education worth the name always induces, will guard them against being carried away by this or that grand relic of an old style into the lust of imitation, and the folly (so universal at present) of raking out details and oddities from old remains, to be repeated in a meaningless kind of manner at home. But the existence or carrying out of such a complete scheme of architectural education as we have indicated, presupposes either the foundation of a national college of architects and engineers (as the two professions overlap to some extent, though not so much as is often imagined), or else the institution of regular architectural degrees, combined with facilities for a complete education in the theory and a certain part of the artistic practice of architecture, at our existing seats of learning. With regard to the former idea, what difficulties there certainly would be in founding

it, and what drawbacks there might be in the working of such an institution it would hear too long a business to discuss here; but it is known that our German neighbours have long carried on the system of collegiate education for the architectural and engineering professions with apparently a great measure of success; and certainly, in conversing with German architects who have been so educated, we have always been struck, even in the case of men not distinguished for any brilliant talent in their profession, with the apparently complete and all-round character of their professional knowledge, as compared with the results, in men of the same calibre, of the desultory and one-sided, though, perhaps, in some respects, more practical education attainable among ourselves. The second proposition is one which we should imagine not only could he, but ought to be, and before long must be carried out at our universities, unless they are destined to lose all title to their supposed rank as the great centres of education for the youth of England. We are far from undervaluing what is called classical education, believing that the study of the Greek language and literature in particular is a refining influence which nothing can thoroughly stand in the way of; but does it not seem a gross absurdity that a man can attain the highest honours which the two older universities have to give without any knowledge of the science which has changed the face of the globe, and gone far to revolutionise society, and without having gained the slightest insight into the principles or practice of those arts which are the sources of the loftiest and purest enjoyment of which the human mind is capable?

It may be objected, with some show of reason, that in pleading for more attention to general education and mental culture, in preparing for the profession of architecture, we advocate a system which would needly distract the mind of the student from acquiring the practical knowledge and practical power of design, the adequate attainment of which, it may be urged, is itself enough for any one man's task. But this notion of the multiplicity of the subjects of architectural study is much exaggerated by the want of consideration on the part of both learners and teachers as to what is really required, and what is not. For instance, a move has lately been made in certain quarters for teaching water-colour drawing to young architects, and forming classes for the purpose. One can scarcely regret that so delightful a branch of art should be encouraged in any way, but it ought to be pointed out that the sole practical use of such an acquirement to the architect, is to enable him to enter the baneful lists of architectural competition (soon we hope to be closed), without the expensive aid of the professed colonist. For any aid towards the one object of the architect, the production of a well-considered building, the study of water-colour is all but valueless. This is one of other instances that might be named of the manner in which the energies of the student are often diverted to matters which are not really necessary or helpful to him as an architect; not to mention also the priceless time which, under the apprenticeship system, is wasted in mere routine office work, tracing drawings, &c., which might have been employed in studies of permanent value and importance. Let us also guard against another misconception that may be put upon our remarks, either willfully or otherwise. Let us not be understood to be for a moment upholding the visionary idea that a man may philosophise himself into an artist in any way; that thought and mental cultivation can supersede in any manner the training of hand and eye in practical drawing. There is no such royal road to success. But it is a fact, patent to all who live and work with their eyes open, that in the architectural practice of the present day a great deal too much importance is attached to mere *tour de force* in drawing; the result being not only that much valuable time is wasted in merely getting up drawings to look well (a process which, of course, has no more effect upon the ultimate value of the design than has the water-colour study before mentioned); but that success in the profession is really coming to depend very much upon mere rapid and clever draughtsmanship, the manner of which, as we observed, is caught up, with little aid from thought or education, from one successful practitioner by a number of pupils and draughtsmen, and thus disseminated abroad, cheating the public into the belief that we have an overflowing of talented architects amongst us; the real truth being only that we possess a number

of clever imitative draughtsmen. Now, it is peculiarly necessary in the present day, that the hand in using the pencil should be under the guidance of the mind; because, owing to the amount of material before us to choose from, in the histories and remains of past periods of art, and from the increased intercommunication between different countries, we are not in the isolated position that our Medieval forefathers (for instance) were in, and we must of necessity have some principle to guide us in selecting what is best to follow and imitate, so far as imitation is necessary, which it always will be to some extent. In a time when there is so much to be learnt, so much work to be done, and such an increasing necessity for something like a division of labour, nothing can be really of greater importance to a man, whatever his profession, than to ascertain his real place in connexion with the work of the world around him, and how he can so carry on his own branch of work as to go with and supplement the main current of human energy, which, labouring apparently in so incongruous a manner, is yet in the main proceeding so surely towards one end, that all work which does not actually conduce to that end will in time have its utility exposed, and be cast aside as rubbish. And what is the use of labouring violently and aimlessly at this or that so-called style of architectural design and ornament, if in the end this prove to have been merely a passing fashion, and your work, instead of remaining a monument to future times, be scouted by the next generation with "This is not what we wanted; you have wasted your time over what is of no use to us: away with it!" In all that concerns that which is enduring in art, the race is not to the swift, and while competition draughtsmen are turning out *bravura* drawings by the thousand, the final and lasting success will remain with those who have taken the trouble to look before them in the race, to ascertain what is really wanted of them, what is essential to their profession, and what is merely accidental, and whose motto has been that which must be adopted by all who would produce work worthy of lasting commendation—*festina lente*.

THE HALL OF THE REFORMATION, GENEVA.

On the 2nd of September, 1861, the tricentenary anniversary of Calvin's death, a congress, composed of Protestant delegates from different parts of Europe, assembled in Geneva, at the instigation of a society called the Evangelical Alliance. Its object was to commemorate this great and to confer on questions of church discipline, and on others of a practical religious character. At the end of its labours it was resolved to perpetuate the memory of this meeting by erecting a monument to Calvin. This object has been carried out, not by erecting a statue, but in conformity with what was the constant aim of the Reformer's teaching, by contributing in a permanent manner to the enlightenment of the people.

Every winter series of lectures on religious subjects are delivered in Geneva by distinguished laymen and clergymen. To these lectures the population, remarkable for its love of philosophical disquisitions and historical inquiry, flocked in numbers so large that no hall then existing could afford comfortable accommodation for the audience. This want of a large public meeting-hall was strongly felt. The Genevese, therefore, thought that the most worthy monument to Calvin would be such a hall destined to continue his mission and diffuse widely among the population the vivifying light of truth. A subscription was set on foot for this purpose, and soon contributions poured in from different parts of Europe. The English contribution was exceedingly large, inferior only to that of Geneva. The amount subscribed was about 10,000*l*. The committee formed for carrying out the resolution of the Congress determined, in order to increase the utility of the building, that it should contain the following rooms:—Firstly, a hall containing 2,000 seats; secondly, a room with 400 seats for smaller assemblies; thirdly, a library with reading-room, destined principally to receive the works of the Reformers; fourthly, two school-rooms for thirty or fifty children; fifthly, an assembly-room for workmen; sixthly, a porter's lodge.

This building was completed and inaugurated on the 26th of September, 1867. Worthy of our attention by the idea from which it origi-

nated, it is no less so by its constructive qualities. The architect was Mr. Brocher, of Geneva. It forms a long rectangular edifice, free on three of its sides; the fourth is built against a large dwelling-house. The principal front is divided into three parts by vertical courses in freestone, the mass of the walls being built in masonry parge-tinted. It is pierced by a large entrance-door and two smaller lateral ones, and by a large bull's-eye in the gable. The two lateral façades are without windows in that portion of their length which flanks the large hall. The walls of this portion are simply enlivened by equidistant vertical courses similar to those of the principal façade.

The inhabited part of the building or the annex, containing the library and schoolrooms, is characterised as such by the very contrast of its doors and windows with the blind wall of the hall. Through the entrances on the lateral façades we penetrate into the annex, which is two stories high, and may proceed by a flight of steps down to the under-ground floor, where we find, firstly, a room intended for evening and Sunday lectures to workmen; secondly, the heating apparatus, for the building is heated by means of hot air. Above this room is the small assembly-hall, from which a private passage, as well as the general staircase, leads to the committee-rooms on the first story. On the second story are the library, the reading-room, and the schoolrooms.

The principal entrance to the great hall is naturally from the front; moreover, three doors lead from the hall into the annex. The hall is rectangular, with two rows of galleries. It is 108 ft. long and 70 ft. wide. The side opposite the entrance presents to the eye a niche of about 20 ft. in diameter, giving to the interior a severe Byzantine appearance. In this semicircle of a choir is raised a "tribune," or speaking platform, on which benches for 200 places are arranged in the form of an amphitheatre. This arrangement permits the hall to be also used as a concert-room. The tribune is brought into immediate connexion with the smaller meeting-hall by a door at the back of the niche, so that the members of the committee and the speakers can enter the tribune without passing through the hall. The architect, in order to obtain a roomy, airy appearance, and also to give the hall a character of simple severe truthfulness, thus reflecting the spirit of Calvin's genius, decided on covering it with an apparent roofing of iron and wood, according to the Pellencé system. The acoustic qualities of this hall lead me to mention the construction of its ceiling. It is formed by a wood panelling fixed on the purlins, so that an empty space remains between the ceiling and the wall-siding of the roof. By this disposition the ceiling becomes a large sounding-board, so that the faintest sound is distinctly heard from all parts of the hall. But the most important innovation in this building is the fact of the hall receiving its light through a hypocaust opening in the roof, the walls, as above stated, being pierced by no windows. This disposition, while adding greatly, by concentrating the light, to the effect of the hall, offers considerable facilities for ventilation. But the most important advantage obtained by this arrangement, which leads me to think that this innovation will tend, with time, to gain ground and transform the church style in our towns, is the perfect exclusion of all sound from outside; for though the building is flanked by two large thoroughfares, the inside of the hall is as quiet as if it stood in a desert. Thus I should strongly recommend it as a step in the right way to the study of all thinking architects who seek originality in the real adaptation of our buildings to modern circumstances.

LAWRENCE HARVEY, Architect.

NARROW ESCAPE OF GUILDHALL, LONDON.—A workman, by allowing some turpentine to boil on a fire used for cooking dinner in the mess-room of the workmen employed in repairing the hall-keeper's house (No. 1 Committee Room), set the whole in a blaze; and the flame was not put out till water was brought from the pump in Basinghall-street, as no one knew where to find the key to turn on the water at the three hydrants in the yard. The whole building has thus been imperilled by the carelessness both of the workman and of the waterman, or watchman, or whoever was responsible for the prompt supply of water in case of fire.

ANOTHER TRIP TO NORTH WALES.*

HOWEVER small an old country church may be, there is always some architectural fragment,—a font, or a brass,—to contemplate. As Socrates says, "Pardon me, my excellent friend, for I am a lover of learning. Now the fields and trees will not teach me anything, but men in the city do." There is also always something to be learned from the old clerk's story, who will give an account of that which existed in the church prior to its being restored.

Tourists to Llangollen will doubtless recollect a lithograph, by Day & Hague, representing the Right Hon. Ledy Butler, aged 90 years, and Miss Ponsonby, aged 74 years (with a greyhound), in walking costume at Plee Newydd, with the old Welch babe, and in the background a pointed recess in a stone well with a fountain supplied by a spring. Now the font in Llangollen Church is situated at the west end, in form of a modern marble balustrade, surmounted by a wash-basin. In reply to an inquiry for the ancient font, the clerk referred me to Plee Newydd, and accompanying me thither through romantic grounds, now a wilderness, but formerly bedecked in tea-garden fashion with beautiful Medieval spoils taken from the church and from Valle Crucis Abbey, there was the identical fountain, *alias* the old Perpendicular (not the Early English) stone font, octagonal, and pinnacled, with rosettes and obelisk on the stem. The fount or coronet on the recess, shown in the lithograph, is an Early English foliated capital, perfect and nicely cut, placed upside down! Here is a good opportunity, prior to these curious old grounds, well known in history, being swept away, for the Architectural Museum, to ask for the ancient capitals, pedestals, bases, carved figures and panels (all from the old church and abbey, and many of them etched higgledy-piggledy on the house), and being in good condition they would form a valuable addition to the existing collection. The old font must of course return to the church. About five years ago the subject was discussed by the parish, but the cost of replacing, cleaning, and fitting up the old font would, it is said, cost as much as a new font! This ignorant argument was maintained when the question arose as to restoring the old nave of St. Sever's Church, Southwark; the estimate to restore it was 12,000*l.*; to build the present miserable nave was 8,000*l.*; but the latter really cost 12,000*l.* In an architectural and historical point of view there can be but one opinion,—*viz.*, that the retention of an original, properly restored, is by far more valuable than an ignorant new erection.

The "Llangollen Guide" is edited and printed by Jones, of course; who else than Jones is better fitted for the task? Upon the subject of architecture he is modest. Speaking of Castle Dinas Bran, he says that "We confess we are not learned in architectural knowledge." This admission enables us to understand his assertion "that the ancient Britons had a tolerably good conception of the Gothic style," and that the roof of Llangollen Church is supported by three massive octagonal pillars. Jones's account, however, of Valle Crucis Abbey is creditable.

Llangollen Church consists of a nave, with aisles, north porch, chancel with aisle, and a tower at the west end containing four bells. This was an Early English church, with a north aisle only; a south aisle has recently been added, and the chancel and aisles have been rebuilt. The new aisle and additions are in the Decorated and Perpendicular styles; the ornamental Early English doorway (formerly external on the south side of the church is retained as an inner doorway between the nave and new aisle. It is to be regretted that the additions were not made to accord with the original style remaining, or in the style of the day. In former times, if additions were made to our old churches, the additions were always in the new style—the style of the day: our ancestors never rebuilt in half-a-dozen styles. The tower was rebuilt about 100 years ago, and if it were again rebuilt it would be well.

The roofs over nave and north aisle in Llangollen church are original, of oak, open, and truncated, with collars, hammer-beams, carved angels, &c. The east end of the nave is ceiled with oak, and formed into panels, and enriched with ornaments. The new roofs are of deal varnished. It has been suggested that the roof of the nave formerly belonged to Valle Crucis Abbey: without

documentary evidence I saw nothing to confirm this opinion.

There are a few brasses; the clerk hands the visitor a paper with the inscriptions printed thereon,—not a bad precedent to be followed by officials in churches generally; there are loose brasses handed to you to read; on this I urged that they be immediately fixed in their proper places, as they might be lost: this was promised to be done.

With a view to obtaining a list of all the brasses remaining throughout the United Kingdom, the British Archaeological Association should issue a paper to each incumbent to fill with the number and dates of all brasses in his church. The Society of Antiquaries some years ago attempted to collect inscriptions, but did not succeed.

There is a tomb of the fifteenth century beneath an arched recess in the wall of the aisle, forming a canopy, with crocketed label, and pinnacles, springing from small attached columns. The effigy has gone; it was taken piecemeal to cure disease in horse's eyes! It was not a founder's tomb, but belonged to the Trevor family.

Prior to leaving Llangollen: the bridge was regarded as one of the seven wonders of the world. How many seven wonders there have been! This bridge was erected in the fourteenth century by Dr. Trevor, bishop of St. Asaph; and consisted of irregular, narrow, pointed arches. The bridge is not now attractive; it has been lengthened to accommodate the railway, a toll-house added, and raised 6 ft., and now it is proposed to widen the bridge to about double its present width, which is 11 ft. 6 in. The county has promised 600*l.*, the railway company 300*l.*, and the parishioners will give 100*l.*—total 1,000*l.* It would be, in my opinion, by far the wisest course to rebuild the bridge. There has been a market-hall erected at a cost of 3,500*l.*; the building is a great addition to the town. The architect was Mr. Pomfret Smith, Shrewsbury; builder, Mr. Morris Roberts, Llangollen.

About two miles from Llangollen, on the right of the road towards Ruthin, in a sequestered valley, is Valle Crucis Abbey. The stile, leading to the fields, on approaching the building, have two or three stone steps; these, it will be observed, are portions of the shafts of columns, fragments of the abbey. The edifice being a "Tinturn Abbey in miniature," affords pleasure to ladies to sketch; this interesting work, which at one time was useful, is now much lessened by the photographer relieving the ladies of their studies. It has also been visited by several London architects of extensive practice; who, no doubt, supplied their sketch-books with abundant material for new churches. The abbey affords an illustration of the maxim that heaviness is the offspring of simplicity. It is in one style of architecture, Early English, and was decorated just sufficiently to raise it above plainness, and no more. The ornamentation is really partly of a Norman character,—consequently the abbey is of a very Early English date.

It appears that this building was buried in obscurity until 1851, when, as the inscription (in Old English), cut in stone, and let into the wall of the south aisle of the nave) informs, "the leveling and clearing of the building, with the permission of the proprietor, was commenced May 28th, 1851, and completed May 14th, 1852, under the superintendance of Arthur Viscount Duncannon, of Brynkinalt; W. W. E. Wynne, esq., of Peniarth; R. K. Penon, esq., architect, of Oswestry."

At the west doorway is a rope suspended from the apex of the arch, and a notice to the effect that the bell will be answered as soon as possible, the house being some distance. The door is not opened by a Cistercian monk, but by a lady who has for many years taken a great interest in kindly explaining all the leading points. After a request not to walk over the memorials, and a compliment for not bringing a large hamper of provisions to decorate the spot, I was duly admitted.

The abbey, although a ruin, is by no means past restoration. The remains consist of nave, aisles, transepts with eastern aisle, chancel, and a tower at the intersection. The nave was separated from the aisles by clustered columns, with moulded haase (the base remain *in situ*) and sculptured capitals, lying about the ruins. At the west end is a large window in three lights under one label. In the gable is a rose window in eight radiating divisions, each having a trefoil head. The west doorway externally was originally highly enriched with attached columns, having sculptured capitals and mouldings. At the west end of nave is a perfect stone staircase,

with a small pointed doorway leading to the triforium, now gone. At the east end of the nave a portion of the stone staircase to the roof-loft remains.

The transepts, with their eastern aisles are especially interesting, particularly the south transept, which is more perfect than the north transept. It has the clustered columns and arches between transept and aisle remaining perfect. The arches are plain, and nearly equilateral, and have two courses of voussoirs, 9 in. wide, and over them a rough arch of ely stone, set edgewise. The groining is partly remaining, exposing the framework of the freestone-arched ribs, and the rough manner in which the banchées were filled with lime slate. The architectural student is enabled to gain more practical knowledge of the early stage of rib-vaulting from this ruin than from any book, however minutely it may be explained.

In the west wall of the south transept is a long, narrow window-opening, formerly filled with treceery of later date; and in the south wall is a large window-opening, now filled up, formerly connected with the conventual buildings. The transepts are joined to the nave-aisles by pointed-arched openings without response. In the transept aisles are the remains, *in situ*, of the altars, piscina, founder's tomb, sundry, &c. The aisles are connected with the transepts by two arches, supported by moulded piers. The window openings have moulded arches, with squared freestone quoins to jambs. The north transept has the lower portion of an outer doorway, and also a stone staircase in the north wall.

The east end of the chancel has five lancet window openings,—three lower and two upper,—with labels, string-course, &c. The lower central window has attached columns with ornamental capitals. Between the chancel and north transept-aisle are the remains of a shrine. Tombs of benefactors were discovered while excavating; the remains of these are placed at the west end of the chancel. One is an incised slab of a half-length knight, in chain armour, Jenafep Adam, of Trevor, and fragments of his wife Myfanwy's tombstone. Another, of a lady, with the following inscription: "*Hic jacet Gwercy filia Owain cyfus animus propitietur, Deus, Amen, 1290.*" On another stone is "*Edwardus filius Yo,*" date thirteenth century. Loose boards are placed over these stones to avoid injury. These memorials were found under 12 ft. of earth, on which ash trees had grown during 200 years. In the north transept is a large perfect stone coffin, found filled with bones.

The walls of the abbey are constructed with the blue local clay stone, and all columns, arches, window-heads, quoins, string-course, &c., are of wrought freestone. Ivy freely covers the ruin, and adds to their picturesque appearance. The stone corbels of the roofs of the chancel and the south transept remain perfect.

On the walls and piers of the south transept are several masons' marks, which, with the exception of two or three, may be engraven in the "Archæologia," vol. xxx., p. 113, illustrating a paper on "Masons' Marks on Buildings of the Middle Ages," by Mr. G. Godwin, F.R.S.

The slanting , it will be seen, occurs in

St. Pierre, Poitiers, France, diagram No. 88; the six-pointed star in Gloucester Cathedral, diagram No. 11; of these there are many. Also the simple cross, and others. These masons' marks have to be searched for, being superficially and unobtrusively marked.

The east front (externally) is plain and peculiar. There are no labels, except to the lower central lancet.

In concluding the investigation of this venerable ruin, it may be observed that the student will find ample materials for his pencil,—the stone fragments placed about the spot, consisting of ornamental lively-leaved capitals, bases, corbels, chamfers, &c., well repaying him for his time and trouble; and he must not be discouraged if a countryman should ask him, whilst sketching, if his labour will pay well. The cost of the excavation was 100*l.*, and making good to the west doorway, &c., about 60*l.*

Arriving per rail, at Corwen, and walking in a southerly direction, Llangollen Church is reached. It consists of a nave, south porch, chancel, and a stone bell-turret at the west end, containing one bell. This church has been closed since 1852, except for burials; and as it may not long remain (a new church having been erected else-

* See vol. xxii., p. 718, and vol. xxiv., p. 609.

where), it will be well to record a few notes. The date of the church is late Perpendicular. The font appears to be of an earlier date, although partly placed in a Tudor-headed recess. The lid of the font is like a modern copper-lid,—date 1755. The nave windows are square-headed, with moulded mullions, filled with quarry glass. There is a gallery at the west end of the nave, and a mural marble slab against the north wall, date 1851. The altar is raised one step. The east window, in three trefoil-headed lights, with foiled panels over, is peculiar. A locker is placed in the north wall, and there are mural monuments on the south side,—dates 1710, 1712, and 1742. The pulpit is on the south side, by the chancel. The stained glass in the window is to Johannes Hughes de Cymer, *obit* A.D. 1694. A stone staircase leads to the helly. The hatchments and shields against the walls are in bad condition. The porch has an open roof,—date 1702. There is a sun-dial on the south side of the church.

Leaving this church, and returning to Corwen, and thence in a northerly direction, the tourist arrives at Rhug, the seat of the late Sir Robert Williams Vaughan, bart. The Vaughans of Rhug, Henwrt, and Nannan, all branches of the same family, are all lineally descended from Owen Glyndwr, whose patronymic was *Fechan*, or Vaughan—*id est*, little. The guide-books pronounce the chapel to be remarkably diminutive, and very ancient; this is not correct, as it is in what is termed the Renaissance style. This building is under one roof, 37 ft. 7 in. by 19 ft. 8 in., inside measure; the roof is open, with collars, hammer-besoms, and the angels are as flat as if they were cut out of pasteboard. There is much ornament about the roof, such as bosses at the intersections, decorated with the thistle, goat, sacred monogram, and other devices. At the east end is an open screen, with crested top. At the west end is a large gallery, and beneath it an octagonal modern stone font, with quatrefoil on panel. The east window is pointed in three five-foiled lights (with five-foiled panels over), and filled with stained glass, in memory of Edward Williams Vaughan; Selesbury, Rhug, 1807; and Griffith ap Howell Vaughan, Rhug, 1848. The altar is inclosed, and has on each side monumental shrines, with quotations from Scripture in panels. The walls are covered with carvings and frescoes, which are fading. On the tie-beams over the east window is the sacred monogram and 1637. The altar table has an inscription in Welsh, and the sacred monogram. On each side of the chapel are open benches; at the base (on riser to seats) are carvings of grotesque animals in relief, also flowing stems with fruit and foliage. The chandelier, suspended from the roof, is an oddity: it consists of two tiers of imitation candles, painted. All the windows are new, of Perpendicular character. The pulpit is within the screen on the north side, with Welsh scriptural inscriptions in the panels. The sides of the chapel are lined with oak wainscoting, with carvings on rails. Rhug chapel is more interesting to the antiquary than the architect, being more curious than useful. Westward of the chapel is a large cross, erected, it is said, in memory of a favourite horse!

Returning to Corwen, and journeying per rail through Cynwyl, Llandreilo, and Llandderfel, the tourist arrives at Bala. The lake is well known, and speaks for itself. The town is small, clean, and neat, principally inhabited by Welsh woollen cloth and linsey manufacturers. The taste at some of the hotels is startling—bright green mouldings on French white grounds. On the ugly townhall is a clock turret; it has just been added, with a notification that it was erected "in honour of John Jones, esq., Trecyaty, 1868."

The parish church is at Llany Cil, a mile distant. Here a surprise was offered: the Rev. Mr. Evans had directed a woman to attend with the key wearing the old and formidable Welsh hat, now almost a matter of history. The key itself is curious, 8½ in. long, ½ of an inch diameter, with R R O H on one side and 1785 on the other, and L Y in the wards. The plan of the church is a parallelogram, 71 ft. by 21 ft. 9 in.; the date Perpendicular. It consists of nave, chancel, north porch, and bell-turret with one bell; roof ceiled, windows mere openings. The font is modern, a tall stone stem with basin. Part of the old font is lying loosely on the floor; it was octagonal, with water drain; a modern gallery at the west end; the pulpit is hexagonal, on the south side, with a brass plate to Elizabeth, wife of Mr. E.

Jones, curate, date 1770; mural marble monuments on south side, dates 1736, 1758, and 1824. There are two old benches, with carved finials. The east window is pointed, and in three trefoil lights, with three foiled lights over, filled with a memorial of painted and stained glass, put up by Robert Anwyl, 1855, to David Anwyl Plascock, 1831. A plain open screen between nave and chancel; altar enclosed with an oak balustrade, date on gate 1739; two boxes padlocked, date 1756. On the back of a bench is 1637. The altar table has D. R. (David Roberts), 1739 upon it; and on a box beneath, J. D., R. K., 1751. The decalogue is in Welsh. In the churchyard are objects of interest; there is a lych-gate, with an open-timbered roof. On the south side of the church are stone tombs, sculptured with columns and arches in relief, date 1695. On a stone set into the south wall is H W Y P E R Y C L O D N A H O E D L, on a shield, date 1671. There is also an ancient incised slab, with a sculptured half effigy, used as a base for a modern tomb. At the east end of the church is an altar tomb of great interest to Calvinistic Methodists, viz., to the Rev. Thomas Charles, B.A., of Bala, who died October 5th, 1814, aged fifty-nine. He prepared two editions of the Welsh Bible, and he had an important part in originating the British and Foreign Bible Society. There are eight yew trees in the churchyard. At funerals a leaden bowl is handed by the clerk at the grave to receive contributions towards digging the grave and tolling the bell.

Starting from Corwen to Cerig-y-Druidion (noticed in a former paper) over a mountain in an easterly direction, Llanfihangel church is to be seen; comprising a nave 41 ft. 2 in. by 12 ft. 11 in., south porch, bell-turret containing one bell, and a chancel 22 ft. 11 in. by 14 ft. 11 in. inside measure. The roof of the nave is of oak and open. Gallery at west end. Font modern, date 1853. The seats are open. Deal brackets against walls for candles. On a bench is "Hugh Davies s [his] hench, 1753." The roof of the chancel is ceiled. The pulpit is octagonal; it is on the south side. The altar is enclosed with railing; the decalogue is in Welsh. The table is old. There is a brass in the floor to "Alice Davies, daughter of David Davies, rector of this parish, 1771." This church stands on the side of the river Alwyno; about 1709 it overflowed, and the flood mark is still traceable 8 ft. 7 in. above the floor of the chancel.

On returning from Llanfihangel and alighting on the top of the mountain at Tal Drall, a good specimen of an old farm-house closes the note-book of the present trip. In this farm-house the kitchen is 21 ft. 8 in. by 17 ft., including the chimney. There is accommodation between the jambs under the chimney for a large party; and here the farmers smoke, being a great benefit to those who have to sit in the room. The clock is of pure brass (in a tall case), inscribed, "Hampton, Wrexham, 1528," and ornamented in the angles. There is an old oak chair, and other antiquities. One of the daughters produced a tin horn, 3 ft. 1 in. long, used to announce the dinner-hour, and sent a fine hlew over the mountains, distinctly heard for two miles. The result of venturing upon a blast was a sound similar to the squeak of a pig, proving that London lungs cannot compete with those of the mountain maidens.

W. P. GRIFFITH.

EXPLOSIONS AND OTHER ACCIDENTS BY FIRE.

EXPLOSIONS have been very frequent of late, as well as other accidents by fire.

A serious accident has occurred at the Foaty Station of the Queenstown Railway, in Ireland. Workmen are engaged nightly repairing an adjoining viaduct. As three of the men were filling the lamps with which they were furnished from a cask of paraffine, a spark ignited the oil, and a fearful explosion ensued. The men were dreadfully burned, and their lives, we learn, are despaired of.

A terrible disaster has occurred at Metz, on the Moselle. A loud explosion took place in the cartridge manufactory situated in the court of the arsenal. The number of persons employed in the place at the time was 109, the workshop being constructed of wood, and consisting of two rooms. In the first were 71 women, and in other 14; there were also 10 foot-chasseurs,

10 artificers, 3 sub-intendants, and an inspector engaged in the same employment. A young workwoman, it appears, in throwing a pair of scissors to one of her companions, struck the point of the instrument on the capsule of a cartridge, and so caused the explosion. In a moment a formidable detonation was heard; the woodwork of the building was blown to pieces; and the roof fell in. The fire having communicated to the heaps of cartridges, made in a few moments fearful havoc amongst the persons present. The court of the arsenal after the accident presented in some sort the appearance of a field of battle, being covered with dead, dying, and wounded. From beneath the burning *débris* 16 dead bodies were withdrawn, so calcined and mutilated as not to be recognisable, and 59 persons dreadfully injured and bruised lay on the ground until they could be conveyed to the hospital. The fire was soon extinguished, and by activity and courage further calamities were averted, as from under the ruins of the burning planks several barrels of gunpowder and of cartridges were got out, which the slightest spark would have caused to explode. The Minister of the Interior immediately forwarded 10,000 fr. to the families of the victims. The Emperor also at once sent word that both he and the Empress were prepared to give ample assistance in such cases as might be brought to his knowledge.

One of the most extensive fires that has been witnessed in Dublin for many years broke out lately in the timber-yard of Mr. Michael Meade, of Great Brunswick-street. The greater portion of the ground was covered with two-storied sheds, in which were considerable stores of timber, and steam sawing, mooling, and planing mills were erected on an extensive scale. There were also several large piles of valuable timber outside the sheds. The fire broke out from the roof of one of the sheds, and in a very few minutes after the whole of the stores were in a blaze. The entire premises and contents were destroyed. The origin of the fire is unknown.

A similar fire has occurred in a number of contiguous timber-yards in Lauriston Park, Edinburgh. The enclosures included five joiners' yards, in one of which the fire is believed to have originated. A large quantity of timber and joinery work, with several offices and their contents, have been wholly destroyed.

At Coxhoe, while a man was standing with his back to a burning brick kiln, the wall of red hot bricks gave way and buried him. He was brought out from beneath the *débris* as soon as possible, but expired shortly after being rescued.

FROM AUSTRALIA.

Melbourne, Victoria.—The design for the Church of the Immaculate Conception, Grace Park, Hawthorn, by Messrs. Crouch & Wilson, of Melbourne, was selected from about twelve or thirteen which were submitted in competition. It is in the Decorated style, and exhibits a church 119 ft. long, and 53 ft. 6 in. wide, comprising nave, aisles, transept, chancel, lady-chapel and vestry, and tower and spire. The whole building, when completed, is calculated to afford accommodation for nearly 1,000 persons. The width of the nave is 24 ft. from centre to centre of columns, which support a clear-story roof, rising to the height of 51 ft. 6 in. from the finished floor-line. The transept is 24 ft. wide, and 54 ft. long in the clear between the walls; the chancel, 23 ft. wide and 30 ft. deep; lady-chapel, 12 ft. by 20 ft.; vestry, nearly same size. Five entrances have been provided. The tower is 18 ft. square at base, and is nearly 170 ft. high to the top of vane on spire. It is not at present intended to go higher than about 60 ft. The walls will be of bluestone, in random uncoursed rubble, with tracery mouldings, weatherings, gables, and other dressings in best white freestone. The estimated cost of the entire design is about £5,000.

A rapid increase of buildings of every description, simultaneously with the establishment of valuable industries, is perhaps one of the best proofs that can be given of the progress of a young country. Such proofs of progress Melbourne is now more than ever displaying. The *Australian News*, in an article on architectural improvements in Melbourne and the suburbs, says:—

"Nearly all the rude structures which the climate and materials to hand twenty years ago compelled Victorians to adopt, have been superseded by buildings in the erection of which much taste, as well as a regard for the comfort and health of their occupants, has been displayed.

Side by side with these dwellings have sprung up ecclesiastical edifices, public buildings, and commodious stores, which, as architectural compositions, possess considerable merit, and denote very extensively the wealth and industry of an enterprising population. A very large majority of the buildings now in progress, especially dwelling-houses, have been commenced during the past few months, or shortly subsequent to the time when a reduction in the rate of bank interest took place. A great impetus has been given to the building trade; and, although the number of houses which have been built within the past few months, or during the corresponding period of 1867, is chiefly in the suburbs that the spare cash of the wealthy and the hard earnings of the industrious have been expended. The following statement shows the increase in the number of the population in the city, including Bourke, Gipps, Latrobe, Lopsdale, and Smith Wards, from 1861 to 1867, ending March of each year, together with the increase of houses, and their annual rateable value:—

Year.	Houses.	Value.	Population.
1861.....	8259	£632,676	37,165
1862.....	8019	581,774	38,785
1863.....	8814	655,708	39,663
1864.....	8999	650,298	40,955
1865.....	9632	699,483	47,734
1866.....	9182	695,265	42,534
1867.....	9722	613,655	43,749

The present total number of houses is estimated at 10,200, thus showing that during the last twelve months the buildings erected in Melbourne were erected by 500 those built in any preceding year. In 1861 A much larger number of buildings were, however, being erected during the first four months of the present year than in the corresponding period of 1867. In that portion of the city and the districts under the provisions of the Building Act, the number of buildings erected in the first four months of 1867 was sixty-nine, whilst 107, nearly double the number, were erected in the first four months of 1868, and some of these houses are contrasted with what has taken place in some of the suburban districts, is insignificant, the advancement, made from an architectural point of view, is great.

It would be tedious to enumerate the names of the streets in Melbourne in which new buildings have been erected since the commencement of the present year. There is scarcely a street or lane in Melbourne or its suburbs in which one or more houses have not been built within the last few months, or are now in course of erection. A good class of houses which have cost from 500l. to 1,000l., exclusive of the land, have been erected at Folliott, by Messrs. Leslie, Abraham, and Willoughby, and Mrs. Lush; at East Melbourne, by Messrs. McKenzie, Wilmet, and Grey; and at West Melbourne, by Messrs. Turnbull, Hill, and Cooper. In many other districts, more particularly in the suburbs, handsome villa residences have been built, and it is gratifying to notice that the more humble dwellings are of a much better class than those erected in former years.

In nearly every part of that immense and important wing of the metropolis, Collingwood, all classes of buildings are now being erected. In some of the districts, over 20,000, has been spent for building purposes during the last six months.

The change which Emerald-hill has undergone during the last eighteen months is also great. The buildings completed in that period are of a better class than most of those erected during previous years. The number of houses in June, 1867, was 2,250; since then about 1,500 have been added, a large portion of which have been but recently completed, or are yet in course of erection.

Bendigo (Sandhurst).—The orderly-room for the Bendigo Volunteer Rifles has been erected by Captains Taylor and Joseph, of the Corps. The architects were Messrs. Vahlund & Getzschmann; the contractors, Messrs. Webb & Harlow; and the clerk of the works, Sergeant Fly. The room is 70 ft. by 36 ft. inside, and the walls 22 ft. high. The style of architecture is Modern Ornamental Italian. The foundations are of granite, and the walls of white and red ornamental bricks. The hammerbeam roof, wrought, stop-chamfered, and varnished, is covered with corrugated iron, and has five ornamental ventilators on each side. The building cost 700l.

Ballarat.—The foundation stone of the new Primitive Methodist Church, Eyre-street, Ballarat, has been laid. The expense of the new building is estimated at about 1,400l. The design has been furnished by Mr. Doane, architect.

It will be of oblong shape, the dimensions being 57 ft. by 35 ft. on the outside, and capable of accommodating 325 persons. It will be in the Corinthian order; the front facing Eyre-street will have a large pediment supported by fluted columns with carved capitals, with pilasters at the angles, with circular-headed windows at the sides.—About four months ago the council invited competitive designs from architects for a new Town-hall for Ballarat West, and at the fixed date they received fourteen plans. The councillors determined to leave the awarding of prizes to competent judges, and therefore Messrs. Terry & Billing, two of the leading Melbourne architects, were requested to adjudicate upon the merits of the submitted plans. In compliance with this request, these two gentlemen examined the plans carefully, and submitted a report to the council, which was immediately adopted. On opening the envelopes containing the names of the successful candidates it was found that the winner of the first prize of 100l. was Mr. H. R. Caselli, a gentleman who has for many years successfully followed the profession of an architect in Ballarat. The

second prize of 50l. was awarded to Mr. Oakden, of Melbourne. The council were much pleased with a plan by Mr. J. T. Lorenz, a gentleman who has lately established himself as an architect in Ballarat, and therefore purchased his plan for 30l. The council in their instructions to architects had stated that, if in other respects suitable, the preference would be given to the plan that should leave the largest frontage for shops. In Mr. Caselli's plan only 20 ft. are taken up by the main entrance, and the superior convenience and good effect of the interior arrangements were especially commended by the judges. But Mr. Lorenz's plan included a clock tower, which feature Mr. Caselli had declared he could not erect for the amount to be expended now, namely, 6,000l. Several lively meetings and protracted debates have taken place in the borough council with regard to the different plans.—A peal of eight bronze bells in the key of E flat, is about to be cast by Messrs. Meares & Stainbank, of Whitechapel, the result of a subscription of the inhabitants of Ballarat, to commemorate the happy deliverance of the Duke of Edinburgh from the assassin. The tenor bell is to weigh 23 cwt. It is expected that the Duke and other members of the royal family will witness the process of casting. It is suggested to us from more than one quarter that the committee would do well to obtain a peal of bells the tenor of which should weigh at least 30 cwt., in order to secure dignity of tone.

Bengeo.—The ceiling of Bengeo Church has been removed, owing to the plaster having fallen away in places, and match-boarding has been substituted. The boarding has been stained, so as to resemble the other portions of the church.

Adelaide.—The cathedral for the diocese of Adelaide is to be begun forthwith, and the stone is expected to be laid in December next, when the bishop will have completed a residence of twenty-one years in South Australia. The designs are furnished by Mr. Butterfield, and the cost of the first portion is to be 10,000l.

Sydney, New South Wales.—A glass manufactory has been established in New South Wales. The premises are situated on leased land about an acre in extent, abutting upon the Camperdown-road, and midway between the Newtown and Parramatta roads. The buildings consist of a furnace-house, store-sheds, pot-rooms, and workmen's cottages. The fire-hole furnace is constructed on what is said to be the American principle. It is a quadrangular building, arched at the top, fed with fuel in the centre, and has at each corner a low flue. By having the flues so placed the heat is conducted to every part of the furnace. The draught is obtained by the ordinary cave. The furnace of five holes is capable of giving employment to fifteen blowers.

An Australian Scholarship.—An item of Australian interest appears in that unpromising source, the *Tasmanian Government Gazette*. Despatches from Downing-street inform the governor that a scholarship in the University of London, for Australian youths, has been offered by the trustees of the Gilchrist Educational Trust. This scholarship is of the annual value of 100l., and is tenable for three years. It will be annually awarded to a candidate resident in, and a native of, Australia, who shall have graduated in arts either in the University of Sydney, or in the University of Melbourne, and who shall be desirous of pursuing a further course of academic study in Great Britain under certain conditions.

POSSINGWORTH MANOR.

The building which we illustrate has been erected for Mr. Louis Hath, at Possingworth, about six miles from Uckfield, on the London and Brighton Railway. The house is situated on ground rapidly falling to the south, commanding extensive views, and is screened at the back by a belt of fir trees. The materials used in the construction of the house are red brick, with Bath stone dressings, and slated roofs.

The principal rooms on the ground-floor are the hall, dining-room, morning-room, drawing-room, picture-gallery, and conservatory. In the centre of the building is a quadrangle, entered under a gate-house, by which access is gained to the porch, forming the principal entrance.

The hall, which forms the south side of the quadrangle, is 50 ft. by 20 ft. in the clear, and 40 ft. to the underside of ridge-piece, with an open timber roof. In the hall are the principal staircase, entirely of oak, with carved panels, an

ornamental chimney-piece 15 ft. high by 9 ft wide, and several stained-glass windows by Lavers & Barrard, the one at the end of the hall having representations of the Seasons, the bay window on the north side the Months, and the other windows various subjects. At the end of the hall is a gallery for musicians or for lookers on.

The dining-room is 38 ft. long by 22 ft. 6 in. wide by 16 ft. high, and is entered directly from the hall. In this room are a large bay window, 17 ft. by 8 ft. inside; a recess, opposite the bay, in which is a carved oak sideboard, specially designed by the architect; a chimney-piece, carved in Mansfield Woodhouse stone, and an elaborate ceiling. From this room leads the southern turret, forming a recess on the ground-floor, and from the top of which a fine view of the country is obtained.

To the west of the dining-room and south of the hall, from which it leads directly, is the morning-room, 25 ft. by 22 ft. On the south side are steps into the garden. The drawing-room is 43 ft. by 30 ft., exclusive of two bays, each 17 ft. wide by 7 ft. 6 in. The walls are all panelled in oak, and the ceiling is elaborate. Between this room and the picture gallery is a fine flight of steps, leading into the garden, the balustrading to which is of pierced stone-work.

On the west of the quadrangle is a corridor, next which is the picture gallery, 60 ft. long by 23 ft. wide, by 22 ft. high. The ceiling is treated, the panels being of open ironwork, between carved and moulded oak beams, supporting the glass, forming the inner ceiling of the gallery, which is lighted from above; the beams rest on ornamental brackets, which are supported by corbelled heads, carved by Pfyffers. The gallery leads from a triple-arched doorway on the west side into the conservatory, which is composed solely of glass and iron. The roofing of glass is supported on iron columns with ornamental cappings, and is crowned by a light glass and iron dome. To the north of the picture gallery and conservatory is Mr. Hath's room, 48 ft. by 20 ft., with a bay at the west end, and a polygonal bay on the north.

The whole of the east wing of the building, about 100 ft. by 70 ft., is occupied by the kitchen and its offices. The kitchen itself is 36 ft. by 18 ft., by 22 ft. high, with an open roof, crowned by a lofty turret. It is fitted up with cooking apparatus, plate-warmers, ovens, &c. Round it are placed the larder, scullery, dairy, yard, servants' hall, and so on. There are four water-closets on the ground-floor.

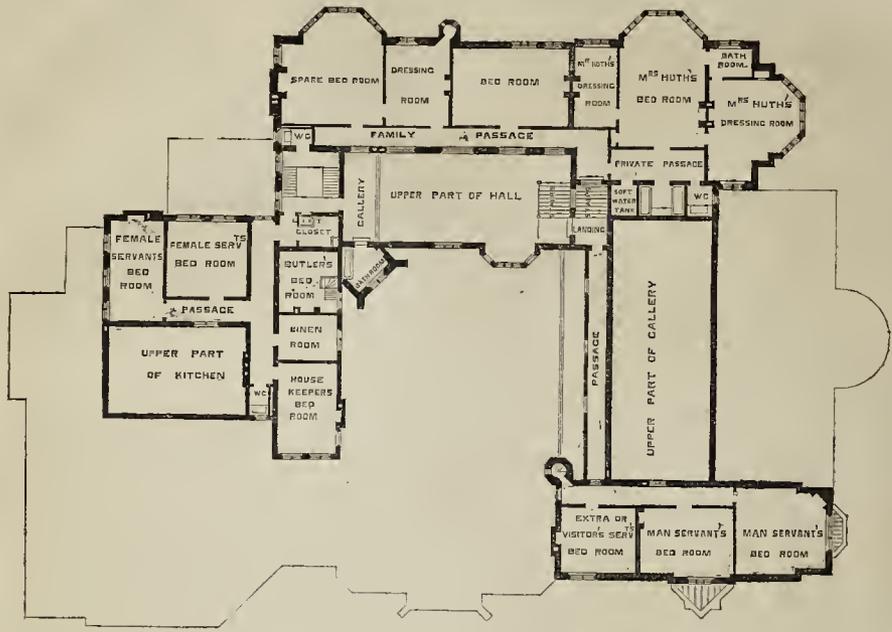
The first floor is devoted entirely to bed and dressing rooms, with a bath-room over the porch, and various domestic offices. The principal bedroom, with its two dressing-rooms adjoining, is about 50 ft. by 30 ft., by 12 ft. 6 in. high; the other rooms are in like proportion. The second or attic floor is also used for bedrooms; the rooms are 10 ft. high, and of various superficial areas.

In the basement are extensive coal, wine, and beer cellars. At some distance to the east of the house are the stables, containing coach-house, stalls for four horses, six loose boxes, harness-room, open sheds, carpenter's shop, &c., forming a complete block, and a stable-yard, 80 ft. by 70 ft. At the different entrances to the estate are three lodges.

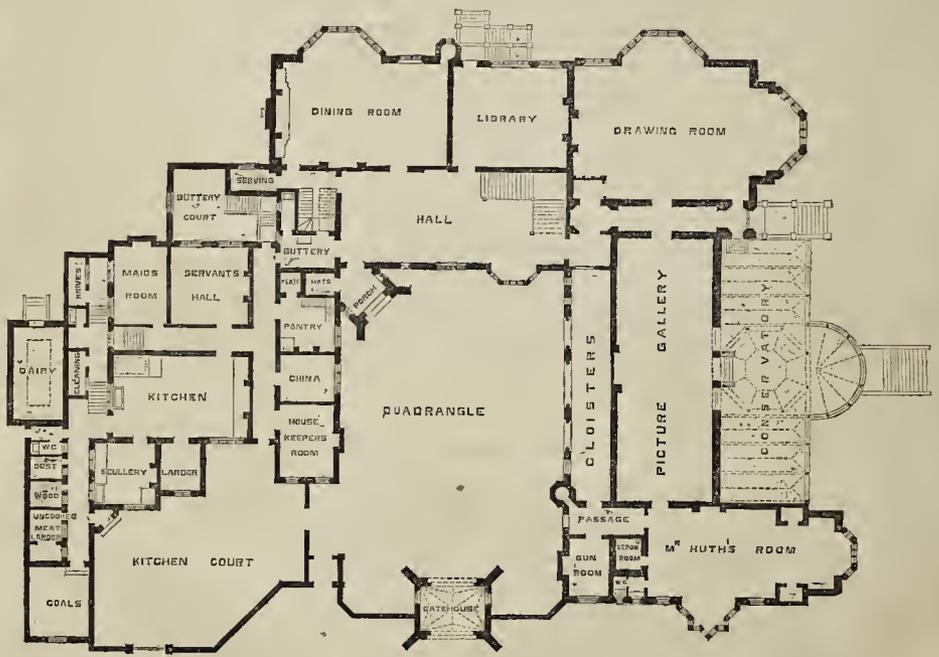
The builder was Mr. Alexander Cheale, of Uckfield; the resident clerk of the works was Mr. Winter; the landscape gardening was carried out by Mr. Marwick; the hydraulic engineers were Messrs. Easton & Amos, who have executed extensive works, including the formation of a large lake; the ironwork and heating were done by Messrs. Potter & Son.

The cost of the building, including the stables, was slightly in excess of 60,000l.; and the whole was erected from the designs, and under the superintendence, of Mr. Digby Wyatt, F.S.A.

SOOTFALL FROM CHIMNEYS.—A Peckham correspondent suggests the suspension of a bunch of light attractive substances,—perhaps feathers,—from a small iron bar, furnished with a small pulley and chain,—for working it,—at the top of the chimney, to intercept the smoke passing up, and convert it into soot adhering to it; the hunch in question, or "soot-collector," to be lowered down, by means of the pulley and chain, from time to time, and cleared, and rehoisted for a fresh collection. The hunch, or "collector," to be somewhat less in bulk than the area of the flues, so as not to interfere with the draught.



UPPER FLOOR



GROUND FLOOR

POSSINGWORTH, SUSSEX.



MANSION AT POSSINGWORTH, SUSSEX: THE SEAT OF MR LOUIS FITZROY

W. H. STUBBS DEL.

W. H. STUBBS DEL.

A SOUTH LONDON WORKING-CLASS EXHIBITION FOR 1869.

A CROWDED meeting has been held in the Congregational Church, Borough-road, for the purpose of promoting a South London Working Class Exhibition for 1869, and of explaining the price scheme in connexion with the series of scientific lectures to be delivered at the Lambeth Baths during the ensuing winter. The chair was taken by Mr. Thomas Hughes, M.P.

The Rev. G. M. Murphy read the programme of the lectures and prizes, and the proposed prospectus of the Exhibition, of which, among others, Lord Shaftesbury, Mr. Gladstone, and Mr. Bright are to be requested to become patrons.

Mr. Hughes said he believed that the objects of industrial exhibitions were, in the first place, to make individual workmen better acquainted with the principles of their own particular handicraft. After that, there was this further object,—to make men not only understand and take an interest in the craft by which they got their living, but to enable them to recognise and appreciate good work performed by other artisans. That being so, what did it come to? It came to this,—that we were providing them, or doing all we could to provide them, with technical education, and to promote it in the country. The programme of scientific lectures and the proposal of Mr. Twining as to prizes, formed an excellent leading up to the Industrial Exhibition for 1869. In foreign countries, and especially in Germany, there was a far better technical education and scientific instruction given to the people than there was at home in England. Surely it was high time that state of things should cease. There were many other things in which the English people were behind other nations besides mere mechanics. There were, for instance, the laws of form and colour, the knowledge of which added incalculably to the value of the work of skilled artisans. He hoped these matters would be attended to. It had been objected that, in a country like this where labour was so subdivided, instruction of this kind was likely to make men discontented. He did not believe a word of that. No doubt it was said, "Let the cobler stick to his last." (Yes; but let him know how to use his last to the best advantage. After all these things a good deal remained to be done.

Resolutions approving the programme of the scientific lectures and the proposal for the Exhibition were passed.

RAILWAY MATTERS.

THERE has been a private inspection of the Western Extension of the Metropolitan Railway, preparatory to the opening of the line for public traffic on the 1st of October next. This line leaves the existing route of the Metropolitan Railway at about 200 yards from the Edgeware station, continuing its course down Praed-street until opposite the Great Western Hotel, where a commodious station has been erected. A subway for passengers will be formed from this station to that of the Great Western. The line proceeds from this Paddington station to Queen's-road, Baywater, where the second terminus has been erected. Leaving Baywater, the line proceeds to Notting-hill-gate, where the third station is situated; and thence the district of Kensington is traversed until the fourth station is reached. This has been erected in the High-street, almost immediately opposite to the vestry-hall. This station will, at the terminus of the Metropolitan District Railway, which, it may be remembered, will run along the Thames Embankment, through Pimlico and Chelsea, to Kensington. The Kensington High-street station will be jointly used by both companies. From here the Western Extension proceeds to Gloucester-road, Brompton, where at the present it will terminate. When complete, however, it will continue its course some half-mile further to Cromwell-road, Brompton, the Metropolitan District and Extension lines running parallel with each other from Kensington High-street to the Cromwell-road. By the new line passengers will be able to travel from within a short distance of the South Kensington Museum to Moorgate-street in about thirty-three minutes. At present the fares have been arranged from the City to Notting-hill-gate, and the charges fixed between these points is eightpence, sixpence, and fourpence,

or one shilling, ninepence, and sixpence for return tickets. Ninety trains are to travel each way per day, commencing at five o'clock in the morning, and continuing until midnight. In compliance with the provisions of the Act of Parliament, workmen's trains will run every day conveying passengers between Notting-hill and Moorgate-street, at a uniform fare of twopence.

Another accident has happened to the Irish mail train since the recent dreadful catastrophe. On the night of Friday before last, as it was entering Chester station from London, it ran into a goods train standing in a siding, the points of which had been left open. Fortunately the mail train was proceeding at a very slow rate, and the damage was confined to the breakage of one or two of the wagons. The mail engine got off the line, but no person was injured. Another collision on the Chester and Holyhead line has occurred near Holyhead by the running of an express train into part of a goods train, smashing the trucks and throwing them off the line.

The shaft of the tunnel near Penge, on the London, Chatham, and Dover Railway, has fallen in, and for a time it completely blocked up both lines. The occurrence was fortunately soon discovered, and nothing serious resulted. The up and down traffic of the tunnel has since been carried on as a single line.

The station at Belfort (Haut-Rhin), the extremity of the branch of the Paris and Mediterranean railway in the direction of Switzerland, has just been burnt down. Thirty-seven trucks, loaded with merchandise, were totally destroyed, with their contents. The rapidity with which the fire spread, from the nature of the goods (a great part being oil) and the scarcity of water, prevented anything being saved. Nothing is known as to the cause of the disaster.

The traffic receipts of railways in the United Kingdom amounted, for the week ending September 5th, on 13,350 miles, to 857,031l., and for the corresponding week of last year, on 13,008 miles, to 817,374l., showing an increase of 342 miles and of 39,657l.

Railway travelling is a little exciting in America. The Indians recently in New Mexico stopped a train, hurst it, and scalped the engineer, stoker, six guards, and all the passengers.

SANITARY MATTERS.

THE vestry of St. Pancras have lately had occasion to complain to the New River Company of the very impure state of the water supplied by the company for watering some of the roads of the parish. On the officers of the vestry investigating the matter, it appeared that the supply was obtained from the Highgate ponds, into which there is "a flow of house drainage and an accumulation of black filth." The New River Company, in answer to the complaints of the vestry, call upon that body to construct drains to intercept the sewage, which has now become intolerable in the neighborhood, and prejudicially affects the water used by the company for non-domestic purposes.

The sanitary condition of Truro, at the present moment, is said to be in the highest degree unsatisfactory. There is a regular nest of typhoid fever in the centre of the town; and why is this? "The answer is," says the *Cornwall Gazette*, "bad drainage and inadequate supply of pure water. Who can be astonished at an outbreak of typhoid fever who passes over Lemon Bridge or Lemon Quay? The river above the bridge is no better than an open cesspool, and that abomination which the town authorities permit in the pig-market requires to be smelt to be appreciated. The system of sewerage, too, is radically bad. As a rule there are no drain-pipes; the sewage, as a matter of course, is to a great extent retained in the clay sub-soil, and under favorable atmospheric conditions gives forth noxious fever-bearing vapours. The long drought and great heat have produced these favourable conditions, and the consequence is the present unfortunate prevalence of typhoid."

A visitor in Lincoln, from the Antipodes, says,—

"There is one thing calculated to drive a stranger away as speedily as possible, and that is the dreadful effluvia arising from the great open sewer which, with its black fetid stream, flows through the heart of the city, and renders the atmosphere insufferable. That such a nuisance should be permitted to exist, when sanitary precautions are so generally adopted, is most astonishing, and the more so when the fatal effects of such negligence are

so apparent; for I am given to understand that the rate of mortality in Lincoln is very high, if not the highest in England. Can this be wondered at? It appears strange, however, that, even allowing the authorities of the place to be too indifferent or supine to correct the evil, the medical men do not one and all cry out against it, and let their protest be heard as loud as the Great Tom of Lincoln.

The canal, now converted into a common sewer, if returned to its original state, would bring health instead of disease; and why should not this be done? and in place of using it as a sewer, let proper ones be made, as in other places."

A Norwich medical man writes to the *Norfolk Chronicle* as to what he calls privy bins, of which he approves, yet of the state of which he complains:—

"At the White Hart, in St. Miles," (he says), "the neighbouring cottages were rendered unhealthily by parcellation from a bin which, by the carelessness of the tenant, contained a mass of floating ordure. Also in the Staff-of-Life Yard, in St. Edmund's, which I visited in consequence of a case of malignant scarlet fever having occurred in it, I found a similar condition in a bin which was the only accommodation for more than fifty persons, whose only water supply was from a superficial well in the same yard. Our local death-rate for the quarter will be a heavy one, from diseases which medical science believes to be preventable. My object in writing this letter is simply to ventilate the importance of the plain sanitary axiom, of keeping decaying organic matter from the contact of water, and, as at this time diseases from preventable causes are unusually prevalent, to recommend to the city's executive an immediate and searching inspection of the bins of the city."

Under such circumstances it was scarcely to be expected that the writer should speak approvingly of the "earth closet" system, even although, as he says, "nothing is more simple and easy than to render a privy bin harmless until it is required to be emptied, provided that its legitimate purpose he adhered to." It is (amongst other reasons) because earth closets are not likely to be properly attended to that they ought to be disapproved of in towns.

COMPETITIONS.

Olley.—*New Mechanics' Hall*.—About nineteen different designs were submitted for competition by architects from Leeds, Bradford, and other places. The whole of the designs were sent in under motto. The committee, in their selection, have been guided principally by the amount of money at their disposal. The subscriptions already promised amount to just over 3,000l., and the committee are anxious that the new building, when erected, shall be free from debt. The design and plans selected have been prepared by Mr. Charles Fowler, architect, Leeds. The design is Italian, and the following are the chief features of the internal arrangements:—On the ground floor there will be a small lecture-room, capable of holding about 250 persons, and which, if found desirable, may be divided into two class-rooms; there will also be retiring-rooms, reading-room, library, two class-rooms and lavatory, &c. The basement will contain kitchens, scullery, chemical classroom, heating apparatus, &c. On the first-floor will be the large hall, with gallery, platform, and orchestra, and space for organ. There will also be a librarian's residence attached to the premises. The large hall, including gallery and orchestra, will be capable of seating about 1,000 persons. There will be two staircases and three separate entrances and exits into and from the large lecture-hall, which will be very useful on occasions of large assemblies, or in case of any panic or pressure. The building is intended to be built of stone, at an estimated cost of about 3,000l.

THE NEW ALLIANCE BANK BUILDINGS, LIVERPOOL.

THE new buildings in Castle-street are now rapidly approaching completion. They have been erected from designs furnished by Messrs. Lucy & Little, of Liverpool, architects; Messrs. Holme & Nicol, of Liverpool, being the contractors. The building, which is erected in the Italian style of architecture, partaking to a considerable extent of the Venetian type, is square in form, the dimensions being about 70 ft. each way. The edifice has three prominent elevations, the principal facade facing Castle-street. This elevation, from the street level to the extreme summit of the balustrade, is 68 ft. high; the ornamental chimneys, which are carried to a considerable further height, increasing the entire altitude. There is a good deal of carving and sculptural ornamentation on the whole face of this elevation. The main central entrance is one of the prominent features in the facade.

It is upwards of 6 yards in height from the street level to the top of a projecting canopy by which it is capped, and the passage through it into the bank is nearly 3 yards in width, the inner sides of the entrance, as well as the top, being faced with polished grey granite. Circular-headed windows pervade the elevation, between which, in the third story, are semi-fluted columns and pilasters. The James-street elevation is uniform in height and general architectural character with that of Castle-street, though not so elaborately decorated. The Lower Castle-street elevation may be regarded, to some extent, as the rear of the building, and has not the same architectural pretensions, so far as regards artistic finish and decoration. In the construction of the building, stone from the Cefn quarries in Wales has been exclusively used. The whole of the ground floor and also all the sub-basement, with the exception of two apartments which it is intended to let off as offices, will be exclusively devoted to the purposes of the bank proper. The bank is a spacious apartment, its dimensions being 64 ft. by 65 ft., and containing altogether an area of more than 400 square yards. The ground-floor also contains the board-room, manager's room, tellers' rooms, besides other private and clerks' rooms. In the centre of the apartment there are four ornamental columns, the basement from which they spring being of stone, whilst the columns themselves are of Derbyshire marble, and are surmounted by Corinthian capitals. The walls are also ornamented by fourteen pilasters, composed of Derbyshire marble, between which will be highly decorated panelling. Although the light will be chiefly obtained from the windows in the James-street and Lower Castle-street elevation, it will be considerably added to by that proceeding from the dome, which will be inclosed and ornamented by eight stained-glass circular windows. The dome is not so large as that in the Exchange News-room. The ceiling and walls are being ornamented in stucco work, with festoons, grouping of figures, fruit, flowers, and sculptured classical heads, being in this respect a reflex of the carved work on the exterior, and will be finished in delicate painted colours, enriched by gilding. The bank floor is composed of polished oak, whilst the whole of the apartment will be heated by hot-water pipes running round the walls, the apparatus for effecting which will be in the basement. The interior of the bank floor, as well as the upper stories, approaches completion. The sub-contractors with Messrs. Holme & Nicol for the several portions of the works are Mr. Demeter, of Liverpool, who has executed the stonework; Mr. Green, of Manchester, the carving and sculpture; Mr. Thomas Jones, of Liverpool, the slating, plastering, and the whole of the modelling and interior stucco work; and Mr. Merrick, of Manchester, the plumbing and glazing. Mr. Kitchen, of Liverpool, has superintended the whole as clerk of the works.

THE SCIENCE OF COLOUR.

As opinions are frequently expressed on the subject of light and colour which betray an entire ignorance of the very first principles of the science of light,—a science which has already opened to us a more beautiful and wonderful view into the mysterious constitution of the universe than any other, and has been the parent of innumerable discoveries and inventions of the highest interest in every department of science and art,—Mr. Cave Thomas deserves thanks for calling your readers' attention to it by his letter in the last number of the *Builder*.

It may be safely said that no man with any capacity for reasoning, who knows what has been found out about light, can doubt the truth of the undulatory theory. It is now known that light is nothing but inconceivably minute waves or shocks of transverse vibration, arising in certain cases about the atoms of bodies, and transmitted with extreme velocity through an all-pervading ethereal medium; that these waves differ from each other in nothing but their lengths or periods of vibration; that when they traverse any material body, as air, water, or glass, their velocity (which is alike for all through the perfectly elastic homogeneous free ether in the interstellar spaces) is less for the shorter waves than for the longer, whence arises the difference of refraction; and that, when they fall on the retina, the waves of different

periods excite different sensations of colour. The magnificent assemblage of colours which constitute the complete and pure prismatic spectrum is produced when a series of the waves of light of all the different wave-periods fall in order side by side on the retina; and what we call "the colours" of the various bodies we behold are nothing but combinations of the sensations excited by the mixtures of the different kinds of waves which those bodies reflect or transmit to the eye. The term "ray" merely imports an imaginary line, perpendicular to the surface of the wave, in which direction it everywhere spreads; and when we speak of "coloured rays" or "coloured light" as white, yellow, or red, nothing more must be understood than such a compound of innumerable luminiferous waves as produces on the retina the sensation of white, yellow, or red, or whatever other colour it may be.

I mention these points, not as unknown to your correspondent, but because he seems to suppose that the discussion in your columns has arisen from some aesthetic theory, in part, at least, inconsistent with the undulatory theory; and I should be sorry to have it supposed that I am chargeable with the ignorance, folly, or presumption of a writer who contradicts or ignores what is firmly established in science. On the contrary, having studied the subject well, I fully accept what is called the undulatory theory, with the admiration due to it, not as a theory, but as known truth, and without the reservation which Mr. Thomas at present makes in respect of "separate vibrations;" but which, if I do not mistake his meaning, he will, on further reflection, find it necessary to withdraw. The whole essence of the theory is involved in the fact that every separate wave maintains its own time invariable, and produces its own proper effect at every point in the ether which it reaches, whether such point is at rest, or is disturbed by any other wave or waves at the same time. Without this doctrine the theory would be inconsistent with the simplest principles of dynamics; it is, indeed, merely the same truth which is so much used in acoustics, and so beautifully illustrated in Professor Tyndall's lectures on sound. The prism necessarily alters the form of the wave-surfaces, and therefore bends the rays in different degrees, because waves of different lengths traverse the glass with different velocities from those with which they traverse the air; but it in no way modifies the wave-periods, on which alone the colour depends.

Newton's great discovery in optics was that the sun sent out an infinite number of different kinds of light, all differently refrangible, and producing different sensations of colour; and that the property, whatever it might be, which gives to each kind its peculiar refrangibility, is invariable, together with the colour-sensation that attends it. This is the very foundation of the science of colour. Sir David Brewster attempted to contravene it, and by some inconclusive experiments to show that colour was independent of refrangibility; but the examination of the question has made the truth of Newton's doctrine more evident than it was before (see Professor Stokes's lectures to the Chemical Society, 2nd June, 1864); and though Brewster's hasty theory of three kinds of light may still be met with in popular works, no adept in the science of light will now, I think, be found to maintain it.

As few even of those who have paid some attention to these subjects have read Sir Isaac Newton's propositions in colour in his own language, the following quotations from his "Optics" will be interesting, as exhibiting some of his striking propositions which he established by unanswerable arguments drawn from an admirable series of experiments. They undoubtedly form the groundwork of the science of colour, properly so called, to which a knowledge of the actual nature of light is not at all essential.

Definitions.—"The light whose rays are all alike refrangible, I call simple, homogeneous, and similar; and that whose rays are some more refrangible than others, I call compound, heterogeneous, and dissimilar. The former I call homogeneous, not because I would affirm it to be so in all respects, but because the rays which agree in refrangibility, agree at least in all those their other properties, which I consider in the following discourse."

The colours of homogeneous lights I call primary, homogeneous, and simple, and those of heterogeneous lights, heterogeneous, and compound. For these are always compounded of the colours of homogeneous lights, as will appear in the following discourse."

Propositions.—"Lights which differ in colour, differ also in refrangibility."

"The light of the sun consists of rays differently refrangible."

"The phenomena of colours in refracted or reflected light are not caused by new modifications of the light variously impressed, according to the various terminations of the light and shadow."

[This refutes some of the then prevalent notions about colours, which Goethe and others afterwards attempted to revive.]

"All homogeneous light has its proper colour answering to its degree of refrangibility; and that colour cannot be changed by reflections and refractions."

Definition.—"The homogeneous light and rays which appear red, or rather make objects appear so, I call rufous or red-making; those which make objects appear green, blue, and violet, I call yellow-making, green-making, blue-making, violet-making; and so of the rest. And if at any time I speak of light and rays as coloured, or ended with colours, I would be understood to speak not philosophically and properly, but grossly, and according to such conceptions as vulgar people in seeing all these experiments would be apt to frame. In them there is nothing else than a certain power and disposition to stir up a sensation of this or that colour. For as sound in a bell or musical string, or other sounding body, is nothing but a trembling motion, and in the air nothing but that motion propagated from the object, and in the sensorium is a sense of that motion under the form of sound; so colours in the object are nothing but a disposition to reflect this or that sort of rays more copiously than the rest; in the rays they are nothing but their dispositions to propagate this or that motion into the sensorium, in the sensorium they are sensations of those motions under the form of colours."

Propositions.—"Colours may be produced by composition which shall be like to the colours of homogeneous light as to the appearance of colour; but not as to the immutability of colour, and constancy of light, or compound colours, by how much they are more compounded, by so much are they less full and intense; and by too much composition they may be diluted and weakened till they cease, and the mixture becomes white or gray. There are also colours produced by composition which are not fully like any of the colours of homogeneous light." [The last sentence refers to the purple formed by mixtures of the red and violet rays.]

"Whiteness and all grey colours between white and black may be compounded of colours; and the whiteness of the sun's light is compounded of all the primary colours mixed in a due proportion."

"All the colours of the universe which are made by light, and depend not upon the power of imagination, are either the colours of homogeneous lights, or compounds of these, and the latter accurately or very nearly agreeing to the rules of the foregoing problem."

The rule referred to in the last of these extracts is a very remarkable one; and had it been attended to by subsequent writers on the theory of colours as it deserved to be, the common erroneous ideas about complementary colours would never have obtained the credit they have been honoured with, both in England and abroad. Newton arranged the series of the prismatic colours in the circumference of a circle, and prescribed the parts of the circumference which are to be occupied by the colours of the seven parts into which he divided the spectrum. The colours which fall opposite to each other are those which he was led by his experiments to regard as most nearly complementary in hue. From his diagram it appears that the middle of his red space falls opposite to that part of his blue space which verges on the green; and as his blue space includes all the seagreen-blue rays, up to the seagreen itself, this is perfectly correct according to all those experiments with the prism and with pigments, which I have endeavoured in my treatise and former letters to point out. The middle of his orange space falls opposite to that part of his indigo space which verges on his blue space; the first or golden part of his yellow opposite to the middle of his indigo space, which contains the deepest and purest blue; the greenish part of his yellow opposite to the middle of his violet; and the middle of his green space opposite to that point in the circle where the extrem rays of violet terminate in darkness, and those of red begin. Had Newton let a blank space in this part of the circumference, opposite to the green rays, the whole would almost perfectly agree with the results recently obtained by accurate observations with refined apparatus by Helmholtz and by Maxwell. But how different from the conventional system which, contrary to all rational experiments, put the red opposite to the green, the orange opposite to the pure blue, the yellow opposite to purple, and has ever since been followed by artists literally blindfold, as one would think since the eye itself, if allowed to judge for itself uniformly declares for the other system! This any one may see who will take the trouble to compare the effect of placing side by side the colours asserted to be complementary in the two systems; or will look at a shaded white surface through a small hole cut out in a sheet of paper coloured strongly with scarlet vermilion, with king's yellow, with emerald green, with verdigris, with cobalt, or with rose madder. The white surrounded by scarlet will not appear green, but seagreen; that surrounded by yellow

will not appear purple, but blue; that surrounded by green, not red, but pink; and the reverse: and as according to the terms of the well-known law of simultaneous contrast, the white always assumes a hue complementary to that of the surrounding surface, this is another proof for those who seek one, or our conventional complementary colours are not the true ones.

Newton seems to have regarded all the prismatic colours as equal in depth of hue, or equally distant from a neutral colour of the same brightness. If they were so, it might not have been easy to answer the inquiry why some should be called simple or primary in preference to others. But they are not so; Mr. Maxwell has proved that they do not lie in a circle about a centre of white, but in the form of a triangle, imperfect on one side, whose angles are occupied by the deepest red, green, and blue: so that all the colours which lie in the spectrum between the first and second, and the second and third of these may be produced by mixtures of these with the same depth of hue (or strength in proportion to their luminosity) which they possess in the spectrum itself.

I am sorry that so ingenious a thinker as Mr. Thomas shows himself to be should seem to adopt the common but inaccurate idea that a colour "may be raised in the eye as a compensation to some direct excitement of the retina from without." The real cause of the complementary ocular spectrum so commonly observed when the eye excited strongly with any colour is suddenly directed to a dull neutral ground, and of all the effects above alluded to under the term "simultaneous contrast," is evidently nothing but a reduced sensibility of the retina for that one or more of the simple sensations of colour with which it has just been so strongly affected. Thus a spot of white, when surrounded by blue, appears tinged with yellow, because the eye then becomes less sensible than it ought to be to the blue rays reflected by the white.

W. BENSON.

Str.—Having had the advantage of a personal interview with Mr. Benson, and having put the question to him, "Why is green a primary colour?" I find that we are not agreed as to what constitutes a primary colour. His definition of primary colours is "the colours of the pure spectrum, being the *degrees* that can be found of their respective kinds," while I have assumed, according to the generally received theory, that red, yellow, and blue are primary colours, because they cannot be divided into two other colours of the prismatic spectrum, and are therefore not compound, as orange, violet, green, &c.

I have, then, received an answer to my question. I have simply to say that I cannot see the force of Mr. Benson's definition, and that I certainly remain unconvinced by his theory. But as I have no wish "to wrap the veil of any false theory about my eyes," I may perhaps let you know the result when I have further investigated it.

JAMES K. COLLINGE.

WAS JOSEPH A CARPENTER?

I In reply to Mr. Black's denial (see p. 647, *ante*) Mr. E. Gardner Smith writes,—"Mr. Black asserts that Joseph was not a carpenter, as has been supposed, but a mason, and for this opinion he gives two reasons. I. 'The original term used signifies architect, builder, or mason, and not carpenter.' The question then becomes one of philology, and I think it requires no profound knowledge of Greek to enable any one successfully to dispute the point. It cannot be denied that the word in question, *τίκτωρ*, does mean sometimes architect or builder; it is, as every Greek scholar knows, derived from a word signifying 'to bring into being,' so it sometimes in classic Greek may mean an author or planner, and, with qualifying adjuncts, a worker in metal or in stone. Both Homer and Euripides use the word in the former of these senses. Still, I maintain that in those passages in the works of Greek authors where the word is used, its meaning is by far the majority of cases will be 'a worker in wood,' a carpenter. Further, I dare affirm that if any English-Greek lexicon be consulted, the word *τίκτωρ* will not be translated by *τίκτωρ*; and, on the other hand, I believe no Greek lexicon can be found which does not give as the principal meaning of the word, a worker in wood. Again, I may say that the early Greek fathers, in their works, had this idea. Justin Martyr says:—"Christ, being among men, was a maker of desks and yokes, which were the works of carpenters."

III. The other reason assigned by Mr. Black is this—"In the times where Joseph dwelt, wood was used in the erection of the structure of their houses, but stone only." In other words,

Mr. Black's logic seems to amount to this—(1). Where the houses are built only of stone there can be no carpenters. (2). In Palestine the houses were built only of stone. (3). *Ergo*—In Palestine there could be no carpenters. (4). Conclusion No. 2. Therefore Joseph could not be a carpenter. Any schoolboy, I think, could detect the fallacy so palpable here. As to the first term: admitting that the houses were all of stone there were even then no need for workers in wood? Then as to these houses, was there really no woodwork about them? No beams in the roof, no doors separating the rooms, no lounging sofas whose framework was mostly wood, no elaborately ornamented ceilings of wood, no window shutters which often were beautifully inlaid with many pieces of polished wood? Historians then must have been dreaming, and Eastern travellers continuously deceived.

I have not time to say more, but I think, sir, that many of your readers will still believe that the translators of our Bible, the old writers, and the old painters, too, were after all right, and that Mr. Black is wrong."

SMOKING-CARRIAGES ON RAILWAYS.

Str.—I shall feel obliged if you will use your efforts to remedy an evil strongly felt by smokers. When gentlemen travel by rail they must do one of three things, *viz.*, travel in a smoking-carriage and endure an amount of suffocating smoke alike injurious and unpleasant, or deprive themselves of the pleasure of a cigar and go in an ordinary carriage, unless they smoke in the ordinary carriage, which is, of course, exceedingly wrong, inasmuch as it makes it very uncomfortable for those who enter the carriage afterwards. This evil, I think, be greatly averted by introducing a simple fan into the ceiling of the smoking-carriage, which would revolve directly the train was set in motion, bring pure air in and drive out the smoke; a string or other simple means should be attached which would stop it at the will of the passengers. The force of air met by the fan would cause it to revolve and ventilate the compartment in the manner I have described.

WALTER CHESTERTON.

UNPAINTED DEAL, AND DISTEMPER COLOURING.

In respect to the durability of unpainted deal, I noticed in a street of Vienna numerous instances of doors, &c., being of deal unpainted and unvarnished, and which appeared to stand perfectly well.

In this country it will no doubt last well indoors, but I think would not bear exposure to our moist climate. Apropos of atmospheric influences, I was struck in Vienna and also in Florence with the durability of the distemper colouring applied to the outside of houses, and giving to them as good an appearance as stone. I was told in the latter city it lasted twenty years. We know too well what an unsightly miserable appearance a house with us will present only three months after being coloured! This, I think, must be owing to the dampness of our climate. A durable water-colour is with us a desideratum.

P. E. MASY.

Str.—Noticing a letter in the *Builder* about the enduring quality of deal timber (unpainted), it brought to mind a circumstance noted when visiting Hertfordshire three years ago. I went to see the "great bed of Ware," and noticed a plain plank of deal, fastened at the foot of the bed, with a date roughly cut 1656. I was surprised at its perfectly sound condition after the lapse of so long a period, contrasting with the rotten state of harder wood of much later date; possibly this might not be the actual date of the addition to the bed.

A LOVER OF "THE BUILDER."

Str.—In answer to your correspondent of last week signed "Plain Dealer," respecting deal timber in external work, my opinion is that it would lose all its colour in a very short time, and decay for want of nourishment, such as oil, paint, or varnish. I have seen the two ancient doorways from Norway that were at the South Kensington museum, and must say that they were remarkably sound. I noticed them particularly as executed the colouring of the two plaster casts, mentioned in the leading article of your last week's *Builder*. The pine wood these doorways were made of seems to be of a very hard kind, but I am inclined to think they must have had some coating of oil or varnish. To preserve deal from decay in a climate like England, I should recommend one or two coats of boiled linseed oil, with best yellow bees-wax, say a quarter to one gallon: this would be found to be durable, and keep the deal from losing its colour, and much cheaper than using ordinary oil varnish.

THOMAS KESSEAW.

DEEP WELL SINKING.

This time of the year is the most suitable for well-sinking, and it can be done at half the expense when the springs are low. As to hydraulic machinery, atmospheric pressure should be thoroughly understood. In theory it is supposed to be 15 lb. to the square inch. In pumping machinery the pressure should not be more than 10 lb. to the square inch; that is to say, the seat-valve should not exceed 20 ft. in elevation, although the raising main pipe may be unlimited in height or distance. We find the air-pump will not raise mercury 29 ins. and at times, when the barometer goes down, we have 2 1/2 lb. less.

Then, you may say, friction and leakage would reduce the drawing power to 10 lb. Serious mistakes are made in the erection of such machinery of great magnitude. It will have the same effect in water mains, syphons, &c. Persons qualified should adopt methods simple in construction, and easy enough in case of repairs. The turbine is much used.

T. PARR.

SHIPBUILDING IN WATER.

AN ENGINEER writes—

With reference to the remark in your article on the "Launch of the *Bermuda*," that "Rennie, the architect and builder of London Bridge, of Southwark Bridge, and of Waterloo Bridge, would have done under the circumstances of having to place in the water such a structure as the *Great Eastern* or *Bermuda dock*," it is as well it should be known what the Rennies of the present age, the grandsons of John Rennie, have actually done in transporting a huge iron structure into the water. An iron floating dock, for the Spanish port of Cartagena, the first of its kind, was designed and constructed by them; and, instead of launching, it was built in a shallow basin, and when completed, the water was gradually allowed to flow in until the structure was afloat, as proposed in your article. The comparative size of the dock at Cartagena with the *Bermuda* may be made by the fact that the Cartagena dock has actually lifted a larger vessel, *viz.*, the *Namancica*, than the class of vessel, *viz.*, the *Bellerophon*, for which the *Bermuda* dock is intended. The following are the sizes of the *Namancica* and *Bellerophon*—

	<i>Namancica.</i>	<i>Bellerophon.</i>
Length	316 feet.	300 feet.
Breadth	57 "	56 "
Displacement at low draught	7,420 tons.	6,372 tons.

CHURCH-BUILDING NEWS.

Norton (*Radnorshire*).—The parish church has been re-opened for divine service after restoration by Mr. Coleman, of Claxhill, builder, under the supervision of Mr. G. G. Scott, architect. The whole of the interior has been coated with plaster. A small transept, suitable to the size of the building itself, has been let in by means of low turned pointed arches. The exterior has been freshly pointed and dressed down, and a new low shingle spire has taken the place of the old one. A new Early Decorated window, consisting of three lights, has been inserted in the east end, filled with stained glass, the subject being Our Lord's Ascension. New windows of a similar character have also been placed in the transepts, the subject of that in the south side representing the "Call of St. Andrew," to whom the church is dedicated. In the north transept window the subject is Christ blessing little children. The portion of the church parted off from the nave for the tower has now been opened out to form a baptistery. A west window of stained glass has also been inserted, the subjects being the baptism of Christ by John the Baptist, and the charge to the Apostles, "Go ye forth to all the world, and preach the gospel." There are besides two new windows of grissled glass placed in the chancels, and two others of the same kind in the nave. These latter all occupy the old window spaces, which are mostly played on the inside, and show an immense thickness of wall. The stained glass is from Messrs. Clayton & Bell's. The larger oak timbers of the roof have been preserved, but new intervening rafters of varnished deal have had to be used, the spaces between them being plastered. A new panelled channel roof of varnished deal has also been added at a somewhat lower level than that of the nave. The old carved roof-screen has been repaired whilst the pulpit and lectern—both of carved oak—are new. The seats are all open, are of pine, and have oak ends. The flooring-tiles are all of a plain red colour in the nave, with a little variation in the sacristy, but no speciality; they are from Codwin's works. A new organ, with complete pedal, six stops, and manual, has been placed in the north side of the chancel, at the sole expense of Mr. Cecil Parsons. It was made by Messrs. Forster & Andrews, of Hull. The contract for the restoration was 2,000*l.*, but extras have been incurred amounting to 200*l.* more.

Orlerton.—Boughton Church and the addition to the graveyard at Boughton have been consecrated. The old building was very dilapidated,

and inadequate to seat the population of the parish. The new church stands apart from the old site. The parsonage-house is nearly completed. Schools were erected a few years ago by Mr. J. W. Pickin, Whitmore. The style of the church is Geometrical Pointed, and it will seat 200. Mr. Fowler, of Louth, was the architect.

Newcastle-upon-Tyne.—The restoration of St. Nicholas's steeple has not yet been effected; nor indeed have the mears been collected, the subscriptions remaining at 2,862*l.* 10*s.* 6*d.* against a contemplated expenditure of about 7,000*l.* The committee have resolved unanimously, "That in order to raise the necessary funds for the completion of the restoration of the steeple, it is recommended that a voluntary rate of 3*d.* in the pound be levied, and that the Corporation at their next meeting be respectfully solicited to permit their officials to take the requisite steps for collecting the same." The mayor stated that, Dissenter though he was, yet so thoroughly did he appreciate the beautiful steeple of St. Nicholas, and sympathise with the movement for its restoration, that he had determined to make his subscription up to 50*l.* He therefore handed to the honorary secretary 30*l.* (having previously paid his first subscription of 20*l.*). The committee were informed that Messrs. R. Stephenson & Co. had obligingly consented to allow a collection-box to be placed in their manufactory, so as to afford their employes an opportunity of contributing towards the restoration fund.

Ryton.—The re-opening of the church at Ryton-of-the-Eleven-Towns after its restoration has taken place. The present vicar (the Rev. J. Paget Wilkinson) restored, re-roofed, and refitted the chancel, and has now effected the same improvements to the rest of the church—lowering the floor to one of the old pavements (one still older having been found some inches below), repaving, reseating with oak, warming with hot water, and generally improving the structure. It must also be mentioned that the peal of six bells which have been fixed in the tower were procured through the efforts of the vicar. Further efforts are required to recast the present very ugly porch, and to clear away the earth from the walls of the building. The whole of the work has been carried out under the superintendence of Mr. Pountney Smith, architect, Shrewsbury. A new window, which has been inserted in the south wall in the habitory bay of the church, was supplied by Messrs. Done & Davies, of Shrewsbury. The subject on the left-hand opening represents "The Baptism." In the right-hand opening is a design taken from the left, "Suffer little children to come unto me." Above each of the subjects is a canopy, and a narrow border runs round each of the openings. In the quatrefoil above the heads are introduced the lily and the passion-flower. The same firm has also filled the large west window with grained glass, with stained border all round. In the tracery of the window are the figures of our Saviour, and the patron saint of the church, St. John the Baptist, on either side of them being the figure of an angel, in standing attitude.

Halgrave.—The parish church has been reopened, after extensive alterations. The church was in a most dilapidated condition. The broach spire, being in a dangerous condition, has been partly taken down and rebuilt in the same form by previously marking the stones. In the south aisle the symmetry of the building is broken by an excrescence, in which there was formerly a vault belonging to the Langham family, and a gallery above it. These having both been removed, space is gained for a vestry (to be formed at some future time) and for a heating chamber below, which is entered from without the church, and contains a Haydon's heating apparatus. The west window and helfry arch which were both hocked up, have been reopened. The walls have been stripped of plaster and pointed. New high-pitched roofs have been put on the nave and the chancel; the aisle roofs remain in the same form as before. Open seats of unstained oak have been substituted for the old pews. The arcade is Early Decorated. In the chancel the high roof affords a view of the east window, the upper portion of which was formerly hidden by a flat roof. A low side window was discovered in the usual place on the south of the chancel, but the tracery had been cut away on the outside before it was built up. The remains of what was believed to be a lead casement were observed in one of the openings of the window. The tracery has been preserved on the inside, and reproduced on the outside in

one large hock of Ketton stone. The chancel has been paved with Codwin's tiles. Oak stalls are fixed in this part of the church.

Leyburn (Yorkshire).—The diocese of Ripon has had another new church added to its number, Leyburn Church, in the North Riding, having been consecrated and opened for divine worship by the Bishop of Ripon. The site is the joint gift of Lord Bolton and the Hon. W. T. Orde Poynter, the next heir to the title and estates of Bolton. Lord Bolton also contributed 1,250*l.* towards the building fund. The entire cost was 2,900*l.* In addition to this, the necessary furniture of the church is the gift of the richer members of the congregation. The church is dedicated in the name of St. Matthew, and has been built from the designs of Mr. C. G. Wray, London, architect, in the Decorated style. It consists of a nave 57 ft. long and 23 ft. wide, with a north aisle of the same length and 13 ft. in width, separated from the nave by an arcade of four moulded freestone arches and piers. The chancel is 24 ft. in length and 18 ft. in width. The tower is at the west end, rising to a height of 65 ft., and consists of three stages, and a prominent feature in its appearance is a projecting stair turret at the south-east angle. The lower stage opens into the nave by means of a high moulded arch, and has a three-light window. There is an ornamental opening for a clock in the second stage, and in the upper stage are deeply recessed two-light helfry windows, fitted with louvres. The porch is situated at the extremity of the south wall and nave, and an organ-chamber and vestry are built on the north side of the chancel. The east window of the chancel has five compartments. The sittings in the church are open, and plain; they are of deal, stained and varnished, to correspond with the roofs, and afford accommodation for 350 persons. The brass-work is by Messrs. Hart & Sons, of London. Mr. Jones, of Leyburn, has been the contractor.

SCHOOL-BUILDING NEWS.

Beaminster.—New parochial schools have been opened here. The site is in White Hart-street. The buildings, which consist of an infants' and a girls' school-room, with class-room and residence for the mistress, stand upon ground extending 100 ft. from front to rear, and having a frontage of about 40 ft. The whole structure is built of red stone, in "random work," with a roof of red tiles, and dressings of Hamhill stone. The front of the building is thrown back about 14 ft. from the road, and is enclosed by a wall about 4 ft. high, with triangular coping of Hamhill stone. At the entrance to each school is a porch lighted by two lancet windows, with a second door leading into the school-room. The interior walls of the infants' room are whitened, and the roof is supported by light principals of varnished deal, the ends of which rest on plain corbels of Hamhill stone. At the end of the room facing the street are two large windows with trefoil heads, surmounted by a fanlight, whilst light is obtained by three large plain windows inserted in the side wall. The room is 40 ft. long by 20 ft. wide. The girls' school is of larger dimensions, being 45 ft. in length, and at the head of it is a class-room 15 ft. by 22 ft. The style is the same as in the infants' room as regards the building; but all the windows in this apartment are plain, with merely a circular fan-light in the gable end. It is approached by a porch, and is separated from the class-room by folding or sliding doors. Surrounding the schoolrooms are necessary conveniences for the children, fuel-houses, out-buildings, &c. The yards, which are somewhat circumscribed, are gravelled. There is also a residence for the mistress. The structure was erected in accordance with designs by Messrs. Slater & Carpenter, of London, architects, Messrs. John Chick & David Hann, of Beaminster, contracting for the carpentering work, and Messrs. Chambers, of Beaminster, for the masonry. It is expected that the work, when completed, will have cost about 2,000*l.*, including the site.

Hurley (Berks).—The foundation-stone of a school has been laid at Birchet's Green, Hurley. This is a hamlet remote from the parish church and school.

Sharston.—The foundation-stone of the new national schools at Sharston, in the parish of Northenden, has been laid. The new schools are being built upon the site of the old one, at

the meeting of the three roads from Altrincham, Cheadle, and Northenden. The accommodation is for 154 children, boys and girls—the infants school being near to the church, in the village of Northenden, and more than a mile distant. There are two school rooms, one 39 ft. by 20 ft. and the other 30 ft. by 20 ft., with a class-room common to both. There are separate entrances play-grounds, porches, lavatories, and conveniences for the girls and boys respectively. There is a third porch to the schools, for visitors, with doors communicating with both girls' and boys' rooms. At the eastern extremity of the group is the master's house, with the usual complement of six rooms, and a cellar and pantry besides. The walls are being built of brick, of two colours with moulded bricks in arches, strings, cornices &c. The windows are all of white stone, contrasting with the framework of red brick which surrounds them. There will be one rose window and several others with traceried heads of various patterns. The style is Tudor, harmonizing with the parish church. The contract has been taken for 1,213*l.* by Mr. Joseph Daves, of Cheadle. The architects are Messrs. J. Medland Taylor & Henry Taylor, of Manchester.

Ashton.—The foundation-stone of a new school at Waterloo, in the parish of Christchurch, Ashton-under-Lyae, has been laid. The building will contain a room 60 ft. by 30 ft., and two class-rooms; and, with an apse at the east end, can be used either as a school or, when required, for divine service. It is calculated to hold 260 day scholars. Mr. John Eaton, of Ashton, is the architect.

Books Received.

A Treatise on the Steam-engine in its various Applications. By JOHN BOURNE; being the eighth edition of "A Treatise on the Steam-engine," by the Artisan Club. London: Longmans, Green, & Co. 1868.

Examples of Modern Steam, Air, and Gas Engines of the most recent approved Types, accompanied by Working Drawings. By JOHN BOURNE. Part IV. London: Longmans, Green, & Co.

We take it ill of ourselves that we have not before now mentioned the appearance of a new edition of Mr. Bourne's well-known and widely-appreciated "Treatise on the Steam-Engine." It is dedicated to Mr. C. Hutton Gregory, and contains some emendations and improvements; but finding that there was a large amount of important information which could not be added without too largely increasing its size, the author determined on publishing the second work named at the head of this notice, and concerning which we have already informed our readers. Mr. Bourne has long seen that in the case of steam-engines a given quantity of heat does not generate more than one-tenth of its equivalent power, the rest being lost in the imperfections of the machine, and believes it impossible that this enormous fault, now it is known, can be much longer tolerated. If we had a good way of transforming heat into electricity, we should be able to work an engine with little more than one-tenth of the fuel now required! In his new work he brings forward the expedients which have been proposed to take the place of the steam-engine, and criticises their merits and promise. We should not be surprised if important results followed its publication. We can conscientiously recommend strongly for increased circulation both Mr. Bourne's works.

Miscellaneous.

PLANS OF LABOURERS' COTTAGES.—Numerous plans by competitors for the prize of 20*l.* offered by the Hertford Labourers' Friend Society for the best plan of a pair of labourers' cottages to be erected for 200*l.*, have been sent in. In most of the plans, says the *Hertford Mercury*, the apartments are sufficiently wide and long, and some of the living-rooms are very good indeed; but the height is not what it should be. In awarding the prize, we suppose that the judges will feel tied by the conditions to those plans which are guaranteed to be carried out at a cost of 200*l.*; but the guarantee is in many cases made conditional on neighborhood, railway communication, &c. The prize was to be awarded at the dinner, after the Agricultural Show.

ROME.—A letter from Rome says:—"The discoveries of the Emporium continue, greatly to the satisfaction of antiquarian connoisseurs and to the increased reputation of Commander Visconti, whom the Pope has just nominated a Baron, as doubtless you have heard. The excavators have found 432 blocks of marble of colossal dimensions; 1,256 others suitable for statues, or the pavement of churches and of public buildings; and upwards of 2,000 of smaller size."

THE SEA-WALL PROMENADE AT BRIDLINGTON.—After an expenditure of much time and money in planning, forming, and perfecting the sea-wall promenade at Bridlington Quay, it is pleasant to see this place of resort so popular as it is. It does not appear that there is any special need of further improvement to be made in the quay at present other than getting the several lots of building-ground built on, as soon as possible, with mansions similar to those recently erected in the new street.

BARROW-IN-FURNESS.—The Corporation of Barrow-in-Furness has just acquired a public square, comprising a town-hall, a market-hall, police courts, and business offices, built in the centre of the town two years ago, and vested in the hands of the Duke of Devonshire and Mr. Ramsden, the managing director of the Furness railways, as trustees. The purchase-money, 15,000*l.*, to be paid immediately. The greater portion of the property has for some time been in the occupancy of the corporation.

VIENNA PALACE OF THE FINE ARTS.—On the 21st inst. the first stone of the Palais des Beaux Arts, in Vienna, was laid by the Emperor. The day chosen was that of the opening of the general exhibition of German art, which had attracted an immense number of artists to Vienna. The authorities of the city gave a banquet in honour of this the tenth meeting of the artists of Germany, the number of guests amounting to 550, the burgomaster of Vienna holding the presidential chair, and being supported by the ministers.

ACCIDENT TO TEDDINGTON LOCK.—A high tide, assisted by the low state of the water above, recently lifted out the paddles which are used in constructing the "weir," and carried them up stream. Sufficient time had not elapsed to enable some men to replace them properly, and the tide, which continued to run up for some time, no doubt reached Hampton Court. The wreck of the "weir" went as far up as Kingston, or rather the island below Kingston railway bridge. The water, it seems, by this occurrence, above the lock, was reduced between 4 ft. and 5 ft.

BEAULIEU ABBEY HOUSE, HANTS.—This Abbey house is now undergoing thorough renovation, previous to its being the permanent residence of Lord Henry Scott, a son of the Duke of Beaufort. The Abbey House was originally an abbey's residence and private chapel. Margaret of Anjou's apartments in the Abbey House, with their ancient furniture, are now closed to the public, and only the doorway where she made her escape from the abbey grounds, and a spot in Beaulieu river where she embarked during the period of her claiming sanctuary had survived, can be visited by tourists.

ARBITRATION CASE, LEEDS.—An important arbitration case has just been concluded at Leeds, where Mr. Hunt, from the Board of Trade, occupying eight or nine days in hearing it. The case concerned the London and North-Western Railway Company and the North-Eastern Company, in forming their new station at Leeds, take down the Midland Company's engine-house, and buy about eleven thousand yards of land from the former company, and also use the Midland Company's road in front of the Queen's Hotel as a passage to the new station, and the Midland Company arch over about half of the land which the London and North-Western Company had acquired the right over from the Leeds and Liverpool Canal Company, at a cost of about 10,500*l.* For that land the two companies asked 11,000*l.* from the Midland Company. But the free use of the surface of the arches is somewhat interfered with by lights and telegraph poles of them; and Mr. Hunt has awarded the Midland Company to pay 8,500*l.* for it to the London and North-Western Company. The Midland concluded their offer by crediting the value of the land they so recovered, and still asking for a balance of about 2,500*l.* from the two companies, whilst Mr. Hunt has awarded them 42,000*l.* only, and leaves the London and North-Western Company to pay their own costs.

AIR NAVIGATION.—M. Joseph Lytchak, a Russian journalist, in a letter to the *Lemberg Slave*, maintains that he has solved the problem of navigating the air. The motive force applied by him is steam; the rate of speed attainable with his machinery he estimates at eighty miles an hour. Years ago we insisted that if we were ever to navigate the air it must be by power, not by lightness, and that until a steam or electrical engine were taken up the air would be mastered. A congrue rocket to take us up, and an umbrella to let us down, formed our initial machine.

PICTURES AT CRAWLEY.—Through the exertions of Mr. Mark Lemon and some few of the other inhabitants of Crawley, in Sussex, a collection of paintings by living artists has been got together, and will be open to the public on the 1st of October. It is advertised that it will be kept open "in the first instance" for ten days, probably to ascertain how it is appreciated; but the time will doubtless be extended if found desirable. Every landlord and employer in the neighbourhood should see that their tenants and workpeople and their children have an opportunity to visit the collection.

EXCURSION OF THE NORFOLK AND SUFFOLK ARCHOLOGICAL SOCIETIES.—It is usual for the former of these societies to make at least one general excursion during the year, but it has this season been put off later than usual. Arrangements, however, were at last made for an excursion, in conjunction with the Suffolk Institute of Archaeology, to the various churches at Haddiscoe, Haddiscoe Thorpe, Toft Monks, Fritton, Herringfleet, Blundeston, Flixton Rain, and Oulton. All the members had been advised by circular to meet at Haddiscoe station, and accordingly about fifty ladies and gentlemen were assembled there at the appointed time. Omnibuses and carriages had been prepared for their conveyance. In the course of the day this party was further increased at the different churches visited. The weather could not have been more suitable.

SCIENTIFIC INSTRUCTION IN YORKSHIRE.—A public meeting of schoolmasters on the subject of "Scientific Instruction," called by the Yorkshire Board of Education, has been held under the presidency of the Mayor of Leeds, in the Civil Court Room of the Leeds Town-hall. There was a numerous attendance. Mr. Sales, the secretary of the York Board of Education, stated that the Yorkshire schools were very deficient in the means of supplying scientific instructions, and the meeting had been convened for the purpose of affording information regarding the scheme which the Department of Science and Art had devised for the benefit of the industrial classes, and with the object of procuring them proper scientific instruction. Mr. Iselin then submitted a summary of the plan proposed by the Science Department for adoption. He also spoke highly of the success which had attended the scheme in Lancashire and Cheshire. Mr. J. G. Fitch, of York, and Mr. Traice, of Manchester, then addressed the meeting, and Mr. Jarman announced that he was about to establish a class, with the object of teaching chemistry to schoolmasters in Leeds. After some further conversation, the proceedings terminated with the customary compliment to the chairman.

"REARING" OF THE TOWN-HALL, ROCHDALE.—The "rearing" of the Rochdale Town-hall has been celebrated in the large assembly-room over the Co-operative Store, Toad-lane. The edifice, of which we gave a view and plan in our volume for 1866, pp. 868-9, is not yet completely erected, but it is far advanced. The west end is covered in and slated; portions of the east end are rapidly approaching completion also; and several principals for the roof of the great hall have been placed. The dimensions of this room will be 92 ft. long by 57 ft. wide, and 75 ft. elevation from the floor to the roof; it will be lighted by fourteen traceried windows of great altitude, and by a circular window 16 ft. 8 in. in diameter at each end, near the roof. At the west end will be an orchestra of some 33 ft. by 12 ft., separated from the large hall by lofty columns, divided into two bays. A portion of the tower has had to be taken down, in order to substitute girders for an arch which it was found would not be so safe as the former. There is now apparently sufficient stone on the ground to complete the job. About 200 persons, including several workmen employed by Messrs. Warburton, of Harpurhey, the contractors, on other works in different towns, partook of the entertainment, which was accompanied by music during the evening.

CLOSE OF THE NORWICH EXHIBITION.—The exhibition of modern paintings at the artists' room will close on the 26th inst., and the attendance of the general public, it seems, fully justifies the proposal to establish a permanent picture gallery in Norwich.

RAISING A FLAME.—Among the *trouvés d'invention* recently granted in France, we read of a strong coffer, the peculiarity of which seems to be that if fraudulently opened it will kindle a Bengal light, brilliant enough to assemble a multitude, who will firmly believe that the house is on fire.

ARTISANS' DWELLINGS ACT.—The Chelsea Vestry have the credit of being the first, we believe, to put in force the Artisans' and Labourers' Dwellings Acts. At the last meeting, with reference to a nuisance in Wickham-place, it was resolved that the new Act should be put in force.

THE NEW STREET THROUGH THE CITY.—In the course of a few days the block of houses extending along the Poutry, from the western side of the Mansion House, will be removed for the purposes of the new street which is to run from that point to Blakfriars Bridge. At the north side of Cannon-street the ground has already been cleared.

CLOSING OF THE LEEDS FINE ART EXHIBITION. The executive committee of this exhibition have decided that it shall close on Monday, October 26th, so that a month now remains during which the art treasures can be inspected. The total number of admissions since the opening day has been—by payment, 278,956; by season tickets, 67,981; total, 346,937.

KENSINGTON IMPROVEMENTS.—An improvement is now being effected in Kensington, involving the demolition of sundry blocks of buildings, to facilitate the passage of the traffic through the High-street of the "Old Court suburb." Yesterday, twenty-seven dwelling-houses and premises, situated in High-street, Young-street, Market-court, and Gardeners' buildings, forming a portion of the projected alteration, were disposed of by auction, and arrangements made for the immediate clearance of the ground to widen that great thoroughfare.

DESTRUCTION OF IRISH ANTIQUITIES.—A correspondent, writing to the *Cork Examiner*, gives this account of the way in which antiquities in the Green Isle are dealt with. The Earl of Dunraven, with Dr. Stokes, went to see the ruins of Nimard Castle, and the former, knowing the locality by means of previous visits, looked for the oratory of Kilmurry, which stood above the castle. A farmer, by way of accounting for the utter disappearance of the older structure, told the earl that the proprietor had thrown it down, in order to build his own house with its materials.

PETITION FOR A FISH MARKET IN THE LIMEHOUSE DISTRICT.—The Board of Works for the Limehouse district, learning that it is in contemplation to remove Billingsgate Market from its present site, in consequence of the inconvenience arising from its inadequate size and its crowded locality, have forwarded a petition, praying that in that event the Corporation will apply for an Act of Parliament to establish a fish-market at Shadwell. They suggest a site on the river-side at Shadwell, close to the entrance of the London Docks, as a most eligible spot, for various reasons.

COST OF ABBEY MILLS PUMPING STATION.—At the last meeting of the Greenwich District Board of Works, Mr. Maslem brought under notice the recent visit paid by the different metropolitan Boards to the Abbey-mills Pumping Station. He complained of the lavish expenditure for the building in question, which he said to a stranger might be taken for a mosque or Chinese temple, and the cost of which had not been less than 200,000*l.* For embellishments no music-hall in London could be compared with it, and the cost of the roof alone he held to be sufficient to erect a building suitable for the purposes for which the pumping station is required. Mr. Halsey, another member, spoke of the gold and crimson railings, the polished oak doors, filled in with bronze flowers, the cost of which could not have been less than 200*l.* each; and Mr. Hunt said the building was an elegant structure in a swamp, and had more the appearance of an exhibition than anything else. Ultimately a resolution was passed expressing the dissatisfaction felt at such use having been made of the ratepayers' money.

"IMPERIAL GREEN."—Once a Week announces the production of a green pigment which is above "suspicion." It is a preparation of a salt of chromium, is brilliant in tone,—the tone is not mentioned, however,—and is quite harmless. It is to be called "imperial green."

ARCHEOLOGICAL CONGRESS IN BONN.—An international archeological congress has just been opened at Bonn, Prussia. The proceedings were commenced by a speech from M. Noigeron, after which the burgomaster of the town warmly welcomed the visitors. In the evening a banquet was given to 200 members assembled.

EXHIBITION OF WORKS OF ART AT WEST BROMWICH.—An exhibition of works of art, chiefly contributed by the tenantry of the Earl of Dartmouth, on his several estates in Yorkshire and Staffordshire, has been opened, under favourable auspices, in the large drill-room and theatre, Queen-street, West Bromwich. According to the programme, the exhibition consists of "useful and ornamental needlework, works of art, cloth from the Yorkshire looms, hand-made lace from Buckinghamshire, and various articles of industry." The ultimate purpose is to raise a fund for the purchase of a lifeboat for the National Lifeboat Institution.

HOSPITAL FOR SICK CHILDREN, MANCHESTER. The foundation-stone of a new dispensary for sick children in Garside-street, Deansgate, Manchester, has been laid. The building is intended as an adjunct of the general hospital and dispensary for sick children which now occupies premises in Bridge-street. It is being erected by Messrs. R. Neill & Sons, from the designs and under the superintendence of Messrs. Mills & Murgatroyd, architects. It will cover a plot of ground of 550 square yards in area, with frontages to Garside-street and Green's-court. The building will contain, on the ground-floor, a waiting and reception room, 60 ft. by 32 ft., entered from Green's-court in the rear, and capable of accommodating at one time about 350 persons. Adjoining this, and so arranged as to be in the line of route to the exit, which is in Garside-street, are two surgeons' consulting-rooms, 27 ft. by 16 ft. and 17 ft. by 16 ft. respectively, followed by the dispensing-room. The building is to be warmed by open fireplaces. In order to give sufficient altitude to the front elevation, the ground-floor has been fixed at between 5 ft. and 6 ft. above the street level, and it is only in the Garside-street front that the very simplest and plainest materials and design have been departed from. This front will be executed in stock bricks, with stone dressings, Medieval in character, and will consist of a central gable with open porch. On each side a range of five arched windows will be surmounted by a frieze, with an inscription in coloured tiles. A moulded stone cornice and high-pitched roof will complete this elevation.

STEEL AND IRON BOILERS.—Messrs. Carroll & Snyder, proprietors of the Fort Pitt Boiler Works, Pittsburgh, have lately built a boiler of Black Diamond steel. It is a cylinder boiler, without flues, and is made entirely, even to the bolts, of No. 3 homogeneous steel, made at the Black Diamond Steel Works. The plates are full ¼ in. thick, and the heads ½ in. Its length is 5 ft. 8 in., and its diameter 3 ft. 2 in. A trial of the strength of the boiler has been made in the presence of the Government inspectors and a large number of boiler-makers and others. A small hydraulic pump, the same as is used in testing iron boilers, was employed. The intention was to put on pressure enough to burst the boiler if possible. As the gauge approached 600 lb., the gasket, or leaden joint by which the manhole is stopped, began to leak freely, and water also spouted in the form of spray from the seams, until it was found impossible to maintain the pressure. The circumference of the boiler was now found to have increased 1¼ in. by the stretching of the plates. The leaks mentioned having been partially stopped, three more trials were made, thus more severely testing the boiler by their repetition. By the last of these a pressure of 665 lb. was reached without producing any further effect than to cause the boiler to swell still more, until it increased 2½ in. in circumference. There were no signs of the plates giving way at the rivet-holes, where they are necessarily weaker than at any other part, the whole strain being thrown upon the part remaining between the holes. Heretofore no boiler has ever stood a greater pressure, it is said, than 538 lb., and that was one expressly prepared for the test.

PROPOSED MEMORIAL OF LEIGH HUNT.—The amount required, small as it is, has not yet been fully subscribed, and we therefore add to our former intimation that the treasurer of the fund is Mr. Townshend Mayer, of 25, Norfolk-street, Strand, who will gladly receive subscriptions.

FONTAINEBLEAU.—Extensive works have been commenced for the increase of the internal accommodation of the Château de Fontainebleau. The Court of the Fontaines will be soon completed, by a pavilion parallel to the Galerie François I. This new part of the palace will be called the Pavillon Napoleon III., and contain the apartments of the Imperial family. It will look on the court on one side, and on the artificial lake on the other; and will be separated from the theatre, and from the pavilion of the Queen Mother, by arcades designed from those of the Pitti Palace at Florence.

TENDERS.

For Congregational Church, at New Cross. Mr. J. H. Blake, architect. Quantities supplied by Mr. J. A. Barker:—

Rider & Son	£1,875 0 0
Brass	1,867 0 0
Macey	1,819 0 0
Brown & Robinson	1,790 10 0
Carter & Son	1,786 0 0
Turner & Son	1,756 0 0
Colls & Co.	1,747 0 0
Deacon	1,650 0 0

For Assembly-rooms at Havant, Hampshire, for Mr. C. Longcroft. Mr. R. W. Drew, architect. Quantities not supplied:—

Deacon	£1,729 0 0
Stallard	1,367 0 0
Tear	1,343 0 0
Carroll	1,127 0 0

For building 106, Fenchurch-street, and 62, Leadenhall-street, for Messrs. Innes, Brothers & Co. Mark-lane. Mr. R. B. Marsh, architect. Quantities by Mr. G. F. Baggett:—

Macey	£4,556 0 0
Henshaw	4,775 0 0
Carter	4,600 0 0
Newman & Mann	4,565 0 0
Foster	4,529 0 0
Coleman	4,500 0 0
Pritchard	4,427 0 0
Myers	4,389 0 0
Corder	4,380 0 0
Brass	4,003 0 0
Hill, Keddell, & Waldram	4,077 0 0

For warehouse for Messrs. Adams, Brothers, West Bute Dock, Cardiff. Mr. J. Hartland, architect. Quantities supplied:—

Shepton	£2,294 0 0
Lock	2,284 0 0
Sesgar (accepted)	2,230 0 0

For detached villa residence and offices, at Linkfield-lane, Redhill, for Mr. W. E. Dawson. Quantities supplied by Messrs. Rees & Son:—

Rees	£1,995 0 0
Holbrook	1,970 0 0
Wood	1,961 11 11
Abbott	1,950 0 0
Waterman	1,843 0 0
Wignore	1,800 0 0
Blake	1,800 0 0
Brown	1,783 0 0
Nightingale	1,757 0 0
Anson	1,690 0 0
Deacon	1,650 0 0

For new Wesleyan Chapel at Purton, Wills, near Swindon, exclusive of old chapel. Mr. T. S. Lansdown, architect. Quantities supplied by the architect:—

With Bath stone		Native stone
Gray	£372 0 0	£367 9 0
Titmarsh	300 0 0	200 0 0
Drew	275 0 0	...
Barrett	240 8 0*	238 0 0

For St. Ann's new Boys' Schools, Birkenhead:—

Fisher	£1,320 0 0
Cameron	1,311 7 0
Harkness & Dempsters	1,300 0 0
Dobson	1,250 8 6½
Black & Readie	1,233 0 0
Forde	1,170 0 0
Morris & Allen	1,167 10 0
Bleakley	1,145 0 0
Booth & Richards (accepted)	1,150 0 0

For additions to the Cheshamford Union-house. Mr. C. Fettes, architect:—

Chest & Son	£557 0 0
Roper	552 0 0
Baker	550 0 0
Thorn	549 0 0
Last	470 0 0
Fincham (accepted)	465 0 0

For heating and lighting Bocking Chapel. Mr. C. Fettes, architect:—

Harrison & Bettridge	£115 0 0	£46 10 0
Dennis & Scruby	85 0 0	45 0 0
Charley	80 12 6	...
Farrow	...	41 0 0
Crittall (accepted)	87 18 6	31 18 0
Bloomfield	...	45 0 0
Biggs	...	20 10 0

For house and offices, Woodford, Essex, for Mr. H. F. Barclay. Messrs. Hooper & Lewis, architects:—

For House		Fencing and Gates.
Sharpington & Cole	£2,570	...
Dover	2,434	115
Egan	2,316	110
Morter	2,287	120
Hedges (accepted)	2,240	118

For new villa residence at Swindon. Mr. T. S. Lansdown, architect. Quantities supplied by the architect:—

Woodbridge	£908 15 0
Draw	750 0 0
Draw	745 0 0
Spreadbury	597 0 0
Selby	572 0 0

For villa residences on Caterham Manor Estate for Mr. G. Farbury. Mr. R. Martin, architect. Quantities supplied by Mr. Bunker:—

Wheeler	£1,374	76	1,200
Axford	1,360	89	1,300
Deacon	1,344	70	1,250
Carter & Son	1,335	85	1,385
Gammum & Son	1,317	73	1,273
Stonor	1,274	66	1,200
Turner & Son	1,268	83	1,236
Colls & Co.	1,224	75	1,197
Rees & Son	1,207	68	1,165
Baldwin	895	68	895

For house at Caterham, for Mr. J. B. Fletcher. Mr. R. Martin, architect. Quantities supplied by Mr. Bunker:—

House.	Extra	Extra	Extra
	For Green	For Pitch	For Burham
	Slates.	Brick.	Brick.
Axford	£2,469	82	£107
Stonor	2,460	8	103
Wheeler	2,460	9	113
Gammum	2,453	10	123
Carter & Son	2,343	10	90
Colls & Co.	2,288	48	110
Turner & Son	2,278	34	82
Deacon	2,284	16	125
Rees	2,184	5	84

For the erection of a pair of villa residences, Fortingale, Finchley, for the Rev. C. Room. Mr. W. Waymouth, architect:—

Fish	£2,590 0 0
Axford & Whillan	2,515 0 0
Henshaw	2,378 0 0
Colls & Son	2,378 0 0
Webb & Sons	2,339 0 0
Foster	2,330 0 0
Cool & Co.	2,272 0 0
Merritt & Ashby	5,139 0 0

For fifteen cottages and three shops, at Ilford, Essex, for Miss Harvey. Mr. W. Allen Dixon, architect. Quantities supplied:—

Edon & Chapman	£2,985 0 0
Manley & Rogers	2,975 0 0
Staines & Son	2,948 0 0
Mann	2,879 0 0
Garrud	2,413 0 0
Withers	2,405 0 0

For two houses and alterations at Windsor-court Monkwell-street. Mr. W. Smith, architect:—

King	£975 0 0
Merritt & Ashby	851 0 0
Sherman	825 0 0
Bowley, Broad	800 0 0
Waters	796 0 0
Pearce	700 0 0
Blackmore & Morley	689 0 0
Crabb & Vaughan	596 0 0
Fletcher & Congley	604 0 0

For the erection of a warehouse, in the city of Canterbury, for Mr. James Green. Mr. John Green Hall, architect:—

Epps	£3,890 0 0
Drummond & Co.	3,810 0 0
Sollitt	3,610 0 0
Wilson	3,600 0 0
Gaskin & Co.	3,420 0 0
Adcock	3,444 0 0
Naylor (accepted)	3,385 0 0
Lawson	3,289 0 0

For alterations to the George Hotel, Strand. Mr. M. P. Manning, architect. Quantities supplied by Mr. D. J. Brown:—

Henshaw	£2,379 0 0
Longmire & Barge	2,233 0 0
Foster	2,230 0 0
Macey	2,196 0 0
Newman & Mann	2,045 0 0
Mather & Readie	2,022 15 0
Longmire & Way	1,969 0 0
Mann	1,977 0 0

For five houses and shops in St. George's-road, South-wark. Quantities supplied. Allowing for local materials. Mr. H. S. Legg, architect:—

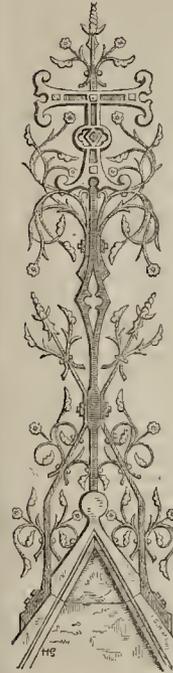
Ronald	£4,805 0 0
Raynham, Brothers	4,247 0 0
Carter	4,100 0 0
Henshaw	4,083 0 0
Blackmore & Morley	3,994 0 0
Landfield	3,994 0 0
Wignore	3,900 0 0
Ehbs	3,874 0 0
Nightingale	3,848 0 0
Ferry	3,775 0 0
Falkner	3,679 0 0
Crabb & Vaughan	3,594 0 0
Wills	3,569 0 0
Merritt & Ashby	3,554 0 0
Scrivenor & White	3,407 0 0
Palmer	3,320 0 0
Wicks, Bangs, & Co.	3,305 0 0
Gilks	3,188 0 0
Pearce	2,761 0 0

The Builder.

VOL. XXVI.—No. 1339.

Indian Engineering, and Social Arrangements.

WO more volumes of papers, detailing various experiences in Indian engineering, have reached us, since our notice of those first issued from the Roorkee College press.* These, likewise, contain professional accounts of several of the great public works now in course of execution, or recently completed, in India, and are illustrated with photographs, photozinographs, engravings, and lithographs, in the same manner as the two volumes first noticed. Among the photographs is one of Marochetti's colossal angel, and Colonel Yule's screen-work, which form the Cawnpore Memorial. This, however, we perceive, has been taken some time, as it does not show the hemishes in the marble, that recent



visitors deplore as becoming more and more evident. Another photograph shows us the Tonse Bridge, on the East-Indian Railway; a third, the process of launching girders for the Jubhempore Railway; and a fourth, a grim, grim, shadowless kirk at Dungalore. A lithograph of a Presbyterian church at Allahabad, revealing a similar stiff, martistic, unfeeling character as this last-mentioned building, is a further indication that Gothic architecture in India is in the same stage of development as that through which it passed in this country about forty or fifty years ago. More satisfactory is the exterior of an Artillery Mess-house, recently built at Meerut, in the style of a winged temple.

Among the papers is an account of the progress of the great Trigonometrical Survey. This is thus compressed by Sir Andrew Waugh on his retirement from the superintendence of the survey:—

"The almost impassable barriers of the greatest mountain range in the world, covered with perennial snow, have been unable to check the progress of our operations; for the Himalaya has been crossed and re-crossed, and our stations planted on peaks never before trodden by the foot of man; the swampy morasses and deadly forests, in several parts of India, have been traversed, and many tracts of hilly country covered by primeval jungles, scarcely inhabited by human beings, and forming almost *terre incognita*, have been covered by our stations. The Little Desert has been crossed by our triangulation, and several chains of great length have been carried across the Rann and its contumacious tract, uniting among themselves the worst features of the desert and swampy mo-

raases and jungles of other parts of India. All these undertakings have been arduous in the extreme, and have been achieved with small numbers and most inadequate means."

Major Medley, in a paper on the Public Works Department, in like manner furnishes testimony of the great difficulties and inadequate means which militate against the ordinary sequence of success that might be expected to attend upon industry and enterprise. We are accustomed to hear Indian engineers spoken of with very faint praise. We are sometimes told they are chiefly draughtsmen with a sprinkling of young farmers, and here and there an old soldier among them. The agents and inspectors, too, are eyed askance as the officers of a system of public waste rather than public works. But Major Medley, the principal of the dusky students at Roorkee, while owning that the Public Works Department is the "best abused" in the country, contends that this censure is most unjust, and affirms that on the whole this arm of the public service does good work. He takes no notice of the young farmers, looks with friendly eyes upon the old soldier as a comrade in arms, troubles not about unscrupulous agents or wealth-accumulating inspectors, but glances carefully over the area that comes within the jurisdiction of the Department, and sees that it is as large as two-thirds of Europe. In this vast tract of country every mile of road and canal, every church, barrack, and public office, nearly every building, in fine, that is of more consequence than a private dwelling, is constructed and maintained by the Department; and, besides this, it is responsible for the exercise of a control over the numerous railways far more close and minute than that required of the Board of Trade in this country. After calling attention to the fact that India is a poor country with a very inelastic revenue, he remarks that money has to be doled out with a sparing hand after anxious consideration of the innumerable wants of the whole country; and that, instead of the public pocket being kept open for any loose-minded persons to dip their hands into, the expenditure upon public works is jealously scrutinised and controlled. Those interested or curious about the *personnel* and organization of this department, will find a succinct account of its composition, working, and powers from Major Medley's pen, and from his point of view, to which we would refer them.

Taking the contents of these volumes as an index to the precedence enjoyed by the various engineering works in India, we perceive that bridges claim the first place. The particulars of twenty-two bridges have been given. Twenty-one of the papers refer to buildings, nineteen to irrigation, eighteen to railways, fifteen to roads, nine to military engineering, four to river improvements, four to drainage, three to water supply, and two to lighthouses. One of the four papers relating to drainage is an abridgment of a report on a project for the sewerage of the town of Madras, by Captain Tulloch. In this some facts are stated that would astonish the sanitary reformers who deplore the overcrowding in some parts of London. According to the last statement drawn up by the assessor to the municipal commissioners, in one part of Madras 70,931 persons were housed in 3,433 dwellings, the average number being 20.7. In no part of the town were there less than nine souls to a house, and taking one with another there was an average of 13.8 souls to every dwelling, or a density 2½ times as great as that of the population of London. In some of the villages there is a density of 31 souls per dwelling. The homes of the natives consist of terraced or tiled buildings, running round open courtyards. The first-class dwelling will have sometimes as many as five of these courtyards, one behind another. The water supply is drawn from the wells, hilt in one or more of the courtyards, and is always more or less impure, owing to the escape of the

sewage of the town from the badly-constructed drains into the stratum of sand that holds the supply. There are no cesspits, but every house has its privy in the back courtyard: it consists of two low brick walls, seat high, between which walls the ordure falls, and from which the watery matter escapes, and runs into the open channels which carry away the waste waters of the house into the street drain. The solid matter is removed by scavengers, who call at every house for it, sometimes twice a-day. There is a great deal of washing and bathing going on, which takes place, like the clearing of the pots and pans, in the backyard. The drains and sewers are built of ordinary bricks, set in shell lime mortar, and are as porous and offensive as can be supposed. In some neighbourhoods the sewage has no outlet, but stagnates in open trenches round the dwellings, from one month's end to another, only getting a partial removal when a heavy fall of rain causes it to overflow the sides of the trenches and find a way for itself. But there are three outlets into which other lengths of sewers are discharged—these, the river Cooum, and the canal. The dry conservancy system has been strongly recommended by its supporters for Madras, but Captain Tulloch sees insuperable objections to it in the publicity of its latrines and in its great cost. Dr. Cornish, in a pamphlet urging the adoption of dry conservancy, estimates the probable cost at 2½ lakhs of rupees. Captain Tulloch first makes a calculation that the cost of the privies, urinals, and earth-sheds for the city will not be less than 26 lakhs of rupees, besides a monthly expenditure of 20,385 rupees for looking after and cleansing them; and then proposes his own scheme, which is to separate the rain-water from sewage, carrying away the former by open surface drains, and the latter by sewers of moderate dimensions. This arrangement he assumes will vanish the difficulties attendant upon the fact that double the quantity of rain falls in India in thirty days, and sometimes in ten or twelve days, than waters England in the course of twelve months. If the sewers were constructed large enough to receive the down-pour of the rainy season they would be needlessly and ruinously costly. "While 4 in. are the utmost that has been recorded to have fallen in England during the day, upwards of 20 in. have been known to fall in Madras in the same period of time. How could Madras afford to pay for sewers constructed to discharge five times the quantity of water which the London sewers discharge?" asks Captain Tulloch. The existing large drains he proposes to use as the outlets for storm-waters, and new egg-shaped sewers with bell-mouth junctions are to convey the sewage matter from the town. This matter could be advantageously used on a low-lying tract of land to the north-west of Madras. A chart is given, based on five years' observations, showing the number of days in the year the wind blows in the town from the various points of the compass, by which we perceive that favourable breezes would blow away the smell of the sewage, in this low-lying tract, from the town, for more than nine months out of the year. The total of the estimated cost of carrying out this treble scheme is 31½ lakhs of rupees.

A manufacture of earthenware irrigation-pipes has been set up at certain stations superintended by English potters, concerning which Captain W. Jeffreys furnishes some memoranda. The pipes, it must be premised, are required for the purpose of regulating the supply of water from the canals to cultivators. This necessity has been hitherto performed by the aid of wooden boxes or covered troughs, called *colabas*, imbedded in the banks of raphas or minor irrigating channels. These were, however, clumsy, costly, apt to leak, and subject to the necessity of frequent renewal. Captain Jeffreys describes the tiles made by the natives as de-

* Professional Papers on Indian Engineering, Vol. III., 1866; vol. IV., 1867. Edited by Major J. G. Medley, R.E., Principal, Thomason C.E. College, Roorkee. Roorkee: printed and published at the Thomason College Press. Calcutta: Thacker, Spink, & Co. Bombay: Thacker, Vining, & Co. Madras: Gault, Brothers. London: Smith, Elder, & Co. 1869-1867.

fective, crooked, imperfectly burnt, porous, and not of uniform size. As a perfectly sound glazed earthenware pipe was expected to be the best cure for all sorts of irrigation and drainage to which they could be applied, an experimental manufacture was established at Nanon.

A moulding machine, consisting of a strong wooden vertical cylinder, 5 ft. 6 in. in length by 20 in. in diameter, constructed of seasoned, and strengthened with four iron bands, supported on beams securely embedded in masonry, was set up. In this cylinder is a piston worked by a wooden screw, and at the lower is a dod or die. The clay is thrown into the cylinder, and then pressed out of the dod by the action of the screw, in the form of a pipe. We quote the writer's description of the next process:—"Below the die is a moveable platform, balanced by means of weights attached to ropes running over pulleys, and arranged in such a manner that the resistance offered should just be overcome by the descending clay. When the necessary length of pipe is attained the action of the screw is stopped, the pipe is cut off with a piece of thin wire and removed to the drying sheds. Being relieved from the presence of the clay, the platform ascends to its former position, and the operation is repeated. The cylinder full of clay contains twelve 8-in. pipes. In this manner 250 to 300 can be taken out in one day. The pipes are then kept from four to five days under sheds to dry; if exposed to the sun or wind, they crack or lose their shape." The burning is the next process. Captain Jeffrey has designed a kiln of great depth of flue and thickness of arch, and suggested the use of fire-clay for cement instead of ordinary clay, which improvements he believes will put an end to the frequent falling in of the arches of the flues whereby so many of the pipes were at first cracked and broken. The pipes manufactured at Nanon are esteemed superior to those turned out of ordinary tile-making machines. The pressure to which the clay is subjected, on passing through the cylinder, is accredited as the cause of this superiority.

One of the most interesting papers is entitled "Engineering in the Derajat." It is written by Major Medley. The Derajat is a strip of country some 250 miles in length, lying between the Indus and the Sulaiman Mountains. Where the river approaches the mountains, it is not more than fifteen miles in breadth; where it recedes, it is fifty miles broad. In the southern district canals have been cut from the river, which there runs between low banks, and the country, being well cultivated, is also well peopled. Northwards, however, the river runs between high banks, and there are no inundation canals to moisten and enrich the soil. This upland district is stony, intersected by numerous dry torrents; has a hard, stiff, clay soil and one of the driest climates on the earth's surface; consequently a scanty crop of millet is all that is got out of the ground. Between the few villages is a coarse, scrubby jungle, upon which the barren hills look down with more desolation. There are more prosperous valleys among the hills, on which reside a lawless population ever ready for a raid into the plains. When Major Medley took up his quarters in this country there was not a map of it in existence, nor a mile of road in it; and the soil was either deluged with water or parched with thirst according to the season. He describes the population as scanty and the laborers as few when he set to work to survey the country and prepare a map. The natives of other parts, he records, looked on the Trans-Indus with dread, and could only be induced to cross the river by dint of much persuasion. Camels were the only beasts of burden, and there was not a single wheeled vehicle in the Derajat. Notwithstanding these drawbacks to rapid progress, a tolerably correct survey was executed by means of polygonal traversing with the theodolite and the filling up of details by the prismatic compass and chain in the hands of native surveyors, showing the course of the river, and the positions of the canals, towns, and villages. This accomplished, projects were laid out for the extension and improvement of the canals, most of which, with some others, have been executed by the major's successor, who was at that time his assistant; and the prosperity and revenue of the district, accordingly, improved. A system of roads is in the course of being worked out, in which there is a main line of road running the whole length of the two districts through the principal towns, and generally parallel with the river, and a series of cross-roads connecting the frontier

with the first-mentioned line of communication. Here is a fragment of this pioneering experience:—

"These roads were laid out from the map, or by means of special traverses made from place to place; they were then cleared for a breadth of 20 ft. or 30 ft., and inequalities of surface tolerably levelled, while temporary wooden bridges were made over the canals. Where the jungle was very thick it was cleared for some distance on both sides of the road. As money was not forthcoming to raise these lines clear of inundation, many of them were annually flooded, and repaired immediately after the subsidence of the river. For the passage of the dry hill torrents, the sides were sloped down and paved; causeways, in some cases, substituted as a cheap and efficient makeshift in lieu of bridges, which would have been practically not required for more than perhaps ten days in the whole year."

Another piece of experience detailed deals with the means taken to turn back the river from a passage it had newly made for itself, for a length of sixty miles, through the heart of the district, on which occasion one of the three cantonments from which the frontier garrisons are served, was cut off from the military poste that it was appointed to support, and 500 square miles of the best land swamped. A thousand laborers were brought to the spot from Hindostan and the Punjab, and, aided by labour in the district, were set to form an earthen embankment across the month of the inundation, so as to keep the waters back. Scarcely was the work finished when the river rose and made its way through in eleven places. Nothing daunted, these breaches were defended by spurs and brushwood piling, and when the waters fell again they were closed so successfully as to resist the next rise. In the following year, a heavy rain had so materially increased the bulk of the waters that they again swept through the embankment in several places, carrying away the outcrops of the Bera Ghazee Khan, and flooding the city. Many lives and much property were lost on this occasion. The third year brought a rise considerably less than the average, consequently the new work had time to consolidate before being put to another severe test, and has since stood well. It cost rather more than a lakh.

An account of the Hastings shoal, in the Rangoon river, by Mr. Hugh Leonard, is another descriptive sketch of a local difficulty and its removal. A paper "On Bridge Foundations in Sandy Rivers," by Mr. R. G. Elwes, comes under the same category. Lieut. MacNelis furnishes an able description of the Double Island Lighthouse, constructed under his charge; and there are papers "On the Mathematics of Engineering" in these Oriental volumes that are of professional interest and value.

In the May number for the current year there is an extract from a speech of the Viceroy, in which official mention is made of the numerous irrigation works in hand, or about to be commenced, for the undertaking of which thirty engineers were deputed from this country a few months ago. Among these, in the Punjab, is a new canal from the Sutlej, the remodelling of the Barea Doab Canal, the improvement of the Western Jumna Canal and its extension into the arid districts near Srest, and surveys for projects for new canals for the extension of the Ferozpur and Mooltan, and for the extension of the North-west Provinces, a new canal to irrigate the Agra and Malwa districts is already partly marked out, and the remodelling of the Ganges Canal is in contemplation, which will comprise a continuous water communication from Lahore to Delhi, Agra, the Doab, and on into Oudh. At Rohilkhand there are to be both irrigation and drainage works, and in Bundelkhand three rivers are to be placed in the hands of engineers for the utilization of their waters. In the province of Oudh a canal is in contemplation, to be taken from the Sarda, that will not be on a smaller scale than the Ganges Canal. In Bengal on the north, the Gandak river is to be utilized, and in Nuddea it is proposed to form a canal from the Ganges to Calcutta. Navigation and irrigation works are in store for at least three other districts in this part of India, and the canal from the Soane, undertaken by the East Indian Irrigation Company, is now about to be executed by the Government. In the central provinces further irrigation works are in contemplation. Madras is now likely to see the completion of the great work connected with the ancients on the Godavari and Kistna, and two very large tanks near the town are in course of execution. The irrigation from the Pennair river in the Nellore district is to be further extended. The survey for a canal has been made, which is to turn the waters of a river in its higher ranges of the Travancore mountains

into the plain of Madras. In the Bombay Presidency a large canal from the Indus to irrigate the Hyderabad collectorate, and a canal from the Tapti, are among the most considerable works in contemplation. Surely all this enterprise augurs a good time for India. In this number, too, are two designs for the ornamentation of the walls of rooms in Indian houses. In one case a surface of rich cream colour is bordered with a few green, black, and white lines, with floral scrolls at the angles; and in the other a green surface is bordered with red and yellow. These are given for the benefit of those in up-country stations where it is difficult to get suitable decorations. They have been prepared in the garrison engineer's office, Calcutta. After the walls are enamelled with lime plaster, a thick *crnd*, *orchana*, mixed with lime-water, or simply milk and water of equal proportions, is to be applied to them to form a body. The water-colours are directed to be mixed with milk and water, white of eggs, and pure China gline in a liquid state, and then laid evenly on the walls. The patterns are to be stencilled on this surface.

THE LESSONS TAUGHT BY THE ABERGEELE COLLISION.

THE inquest held on the sufferers by the Abergele disaster has been protracted to the length demanded rather by the magnitude of the calamity, and by the public excitement that it has awakened, than by any other cause. Into the details of the evidence and of the verdict we do not propose to enter. The *invidie* are beyond our province, and the special circumstances of the case, so far as they are independent of any questions of construction, are rather subjects for the consideration of the daily journalist, or of the papers more especially devoted to railway intelligence, than for our own.

There are, however, two independent considerations to which we have, more than once, more or less distinctly adverted, on which this great calamity sheds a lurid and warning light. The one is, in the main, a constructive question; the other is financial.

In all mechanical arrangements the question of "clearance" is one in the treatment of which the workman delights to show his skill. In some of the most beautiful productions of the lathe and the tool bench,—such, for instance, as Mr. Cotton's machine for weighing sovereigns,—the whole action of the apparatus depends on delicate and accurate "clearance" and successive movements of different parts of the machine through the same space follow one another with the precision of clockwork.

In a vast and complicated system of mechanical movement, such as is presented by a railway, it is obvious that the question of "clearance" must be dealt with in a very different manner from that which is appropriate to the arrangement of a simple machine. Where any movement depends on a preceding movement, after the manner of cause and effect, precision is to a great extent self-secured, and a delay in the first motion is not attended with danger, because the later movement waits upon the former. But where independent sources of motion produce action which, if not harmonious, must be destructive, the conditions of the problem are altogether reversed. What was, in the former case, a wise constructive economy, becomes, in the second instance, a foolhardy rashness. In the timing of railway trains almost every source of disturbance becomes possible. The same space, identically the same, has to be frequently passed over by bodies of great bulk, great length, great weight, and moving at very high velocities. The only tie to regulate the excessive timing of the transit of these bodies is human care. The case is not like that of street traffic. Let a traffic propelled by horses be as dense as that of Chesapeake, or as rapid and dashing as that of the Corso at Naples, and yet there is a natural element of safety in the instinct of the horses, as well as in the practiced skill of the driver. Collisions occur, it is true, but they form the exception and not the rule. Moreover, when they do occur, they are often slight—mere warnings, and that not too late, to slacken speed, or to give a wider sweep round a corner. Each independent source of movement, and thus of danger, has its own independent instinct of self-preservation, and by the action of this common instinct much of the danger arising from independent origination of motion is avoided.

In this case of railway trains it is widely

different. The iron horse has no instinct. It will rush as blindly on an invincible obstacle as it will over a perfectly clear course. The instinct of the driver remains, but his power is greatly diminished. He has no possible means of avoiding collision, except by stopping, or by reversing, the longitudinal movement of the vehicle which he directs. He requires a certain time, and generally a considerable distance, in order to do this. The attention of the engine-driver, unaided by the instinct of his steed, has to be kept constantly on the stretch; and instances are numerous in which no attention on his part can inform him of threatening danger in sufficient time to enable him to adopt the only means in his power to lessen or to escape it. In sudden fogs, in running round curves, and under circumstances which are more numerous than railway travellers would care to have particularised, the safety of a train is left pretty much to the PROVIDENCE OF GOD. The driver thunders on at forty or fifty miles an hour, keeping the best look-out he can, trusting that the coast is clear, but possessing the intimate knowledge that if a rail is up in such a spot, or if a wagon is on the line in such a station, collision and destruction are unavoidable.

It must be remembered, moreover, that the engine-driver does not time his own train. If he alters his regulated speed he is liable to be called to account. If he slackens, for instance, to run with less hazard round a blind curve, he disarranges a calculated series of movements, and may cause the very danger which he endeavours to shun. The independence of his movements is strictly limited. He does not even leave a station as he ought always to be bound to do, by the indication of the clock, but by the signal of the station-master. An important and redoubtable personage comes to the station just a little too late,—distanced, it may be, by the error of his watch, or by some slight obstruction to his carriage, in that race for the last minute with which busy Englishmen usually amuse themselves in the run to the station; or a large family, or a helpless old lady, arrives in time, indeed, but incumbered with a many-packaged luggage, which claims numerous and unattainable porters. In either case the station-master relents. He prefers private convenience, personal civility, avoidance of black looks or hasty words, to punctuality and the public safety. He detains the train till the fuming director, or the anxious *pater familias*, is comfortably ensconced in his seat. What may not those three minutes cost?

Now it is obviously undesirable that, where the sources of danger are so many, and the check is so slight, ample "clearance" should be allowed. It must be remembered that the velocities of the different kinds of trains, which follow one another over the same line of rails, differ so materially, that the result of an express train overtaking a luggage, or cattle, or ballast, or mineral train would be as disastrous as that of a collision with a train that was at rest. We have enormous weights propelled at great and varying velocities over the same space, each started by independent volition, and all regulated by no very distinct laws of sequence. It really speaks volumes for the practical sense and anxious care of railway servants that accidents are so rare.

For, it must be remembered, even the most indefatigable student of Bradshaw can never calculate the dangers he has avoided. The trains as to which the public can ascertain the timing, are the passenger trains alone. How shortly his carriage has been preceded, or may be followed, by a goods train a third of a mile long, propelled by three powerful engines, the first-class passenger, happy in his unconsciousness, has no means of judging; and the more the shareholders are congratulated, at their half-yearly gatherings, on the increase of their goods and mineral traffic, the greater is this invisible danger; invisible, it may be, not to the toil-worn and anxious staff, but to the comfortably conveyed and unconscious subjects of the peril. An accurate notation of the times at which trains pass certain spots on some of the most frequented railways could hardly be read without a shudder.

In all this there is much for which no one is to be blamed. The growth of traffic is one of the most valuable features of the railway system. It has been as unexpected as it has been stupendous; as great (or greater) a benefit to the English public as it has been to the railway proprietary. In all things that grow, the moment of crisis is hard to predetermine. What amount

of traffic may be safely taken over one pair of rails, and what is the actual addition that involves danger, no statistician can hope to define; for it is not a matter that admits of any universal rule. Much in each case must depend on mechanical conditions, on the gradients of the line, the power of the locomotives, the worthy state of the rolling-stock; more must depend on the brain, the eye, the habit of control of the manager of the traffic. But what is certain is this: there is a point, towards which the vows of the shareholders would urge the traffic of every line, at which it is inconsistent with public safety to carry passenger traffic and merchandise traffic over the same "metals." There is a maximum amount of service to be exacted from a single line of railway. There is an amount of traffic, possible and desirable, which demands a fourfold line in place of a twofold one. To go far beyond that point, without making that provision for the public safety, is to endanger the traveller. The remedy is costly; but it can only be postponed at the risk of a far more costly evil.

In the mean time there is much that may be done,—and *must* be done,—in the way of increasing the accommodation now afforded by sidings. In the Abergele case the train, into the detached portion of which the express dashed, was nearly as long as the siding into which it should have run. This siding, moreover, was partially occupied by another train. It is said that there was a second siding, of some 100 yards long,—but all those who are at all familiar with the working of railways know that the running of trains in and out of sidings, and especially the dividing and re-uniting of long trains, are costly, cumbersome, and delicate operations, which every careful manager will take pains, as far as possible, to avoid. The construction of long parallel lines,—portions of a future fourfold way,—in which slow trains may be conveniently accommodated, so as to place them out of any danger of collision with passenger-trains, is an expense which every well-to-do company must be prepared annually to encounter.

With this constructive remedy must be combined the faithful and rigid use of the electric telegraph. When our English railways were first opened, the most ordinary cause of accident was the inexcusable stupidity of allowing two trains to meet on the same line, advancing in opposite directions, as if for the very purpose of a charge. When single lines were introduced, it was supposed that the danger of accident, from this cause, was much increased. The opposite proved to be the case. As all danger that is foreseen is greatly diminished by due precaution, the obvious danger of a collision between an up and a down train on the same line was guarded against by the proper use of the telegraph. The up train X was not allowed to leave the station B until the down train Y had arrived. By the application of this simple rule of common sense the working of single lines was rendered at least as safe as that of double ones. Collisions on branches thus worked are simply impossible.

There can be no reason adduced, and there ought to be no excuse allowed, for the neglect of a similar precaution on all passenger lines. A certain, and sufficient, "clearance" should be allowed for every train. It is not for us to limit this clearance in minutes, although it is certain that it must to a certain extent be determined by the velocity of the trains. A rapid express, stopping at few stations, ought to have a greater length of clear unoccupied way in front of it, than is necessary for a slower train stopping at every station. But the clearance, once determined, should be enforced by the telegraph. The train Y should not be allowed to pass the station B until it was known that the train X had passed that point. To ensure this, the train Y should not be allowed to leave the station A until the passage of train X through station B was telegraphed up by the station-master. In the case of an express train that is not intended to stop at certain stations, the same rule should absolutely apply. Let us take Z to be an express train. Its starting from the station A should be dependent on the receipt of a telegraphic message from D that train Y had left that station. To insure punctuality of departure, let us consider that the proper time for the starting of Z from the terminus would be three minutes after Y ought to have left station D. As the hand of the station clock indicated that minute, the express should start, independently of any order or signal from the

station-master, but subject to the exhibition of a telegraphic notice that D was clear. The running of the express through stations B and C would thus be un-checked, provided no danger signal was shown at either of these stations. At F let us suppose train Y would run into a siding, and then Z would pass, without stopping, on the main line; but it would only be allowed to do so if it had received the intimation by the signal of station E that the line was clear at F. Until receiving the signal that train Y was safe in the siding at F, the station E would be blocked by the danger signal, and Z would be consequently detained there. During such detention station D would in its turn be blocked by the danger signal, so that no train could pass it towards F. By such a system as this, collision from overtaking would be rendered as impossible as collision from meeting may be considered to have been rendered on single lines perfectly worked.

It may be urged that the rigid enforcement of rules of this stringent character would interfere with the frequency of trains. "It is all very well," the manager of a line will say, "for an engineer sitting in his office to prescribe rules for the working of a line. As to absolute safety for passengers, as far, at least, as collisions are concerned, no doubt it would be thus secured, but how are we to conduct our traffic? We are at our wits end already how to divide the twenty-four hours. We are obliged to run it five every now and then; and if we are to have Parliament interfering, and rules of this kind laid down, so far from being able to increase our traffic, we shall not be able to carry what we have." It may be all very well for the passenger trains, but what is to become of the heavy traffic?

If the case be thus brought before the public,—and we are anxious to state it fairly,—we have little doubt as to the verdict. On the one hand we propose certain regulations, faithful adherence to what would render railway collisions impossible. This cannot be denied. But it is tacitly replied that it is inconvenient for the companies to adopt these rules. The goods traffic may be checked by their enforcement. That is as much as to say that the amount of fast and slow mixed traffic, which is carried on a single line of rails, exceeds the maximum that may be safely so conveyed. To squeeze a little more service out of the permanent way, the safety of the passengers must be risked. For if it can be shown that a practical regulation, which may, indeed, place the running of successive trains somewhat further apart, would render collision impossible, and that such a regulation is neglected solely because it thus "wastes time," or enlarges the distances between the trains, the question is broadly stated. It is one between safety and dividend.

Between certain safety and uncertain dividend, that is to say. For this brings us to the second consideration to which we referred, that, namely, of finance. Our recent remarks on this subject* received a sad and pregnant comment at the late half-yearly meeting of the proprietors of the London and North-Western Railway. The gloom of the Abergele calamity brooded over the meeting. There was evidence of the honest, human sympathy with which Englishmen are always accustomed to regard any great loss of human life. But with this generous and disinterested feeling was mingled emotion, not ungenerous, indeed, but of a widely different order. The commercial question could not be altogether lost sight of beneath the gracious mist of sympathy. Such was the dividend earned, subject to costs and damages from the recent calamity. Very freely, we doubt not, would the great majority of the shareholders, if the question could have been submitted to them, have subscribed the amount of the dividend to prevent such a sacrifice. But the sacrifices had taken place, and the shadow of the question of compensation to the representatives of the sufferers could not fail yet further to depress the spirits of the shareholders.

This risk of a great financial disaster is one as purely gratuitous as is the risk of collision itself. It may be avoided by every company, as we recently took occasion to show, by the simple plan of making every railway ticket at the same time a policy of insurance. Whether a direct addition to fares which are almost everywhere below the parliamentary maximum, should be made, to cover this insurance, or not, is one of those questions of detail into which we do not

* See p. 613, ante.

feel called to enter. It is certain that, if it can pay an independent company to insure a given proportion of railway passengers, it must pay the carrying companies to insure them all upon the same terms. It is probable that the mere simplifying the question of damages by an amicable assessment of their amount would pay the companies,—not for incurring new risk, but for defining the risk which they already run. The worst would be known in any case, and it would be pretty much the fault of the companies if that were not ever occurred.

All invidious distinctions between different classes of travellers, or different grades in the social scale, would be obviated by this plan. We should no longer be scandalised by the spectacle of juries awarding one amount of compensation for the death of a poor man, and another for that of a rich man. The proportionate sums already assumed for first, second, and third class passengers might be adopted, or might be modified. License might be given for the insurance of any individual for a higher sum at will. We repeat, that we do not wish to enter into details as to which there can be no difficulty, although there may be ample room for discussion or for modification; but as to the principle, we think there can be no doubt. We urged its adoption *à propos* of the exhibition of an unusual instance of ability and of success in the conduct of a line which was once the very byword of the traveller. We repeat it, after the awful echo to our recommendation that yet tingles in the ears from Abergele. Will shareholders prove themselves still neglectful of their own interests? Will they allow suggestions so obviously to their interest to be neglected, because they come from an impartial, disinterested source, instead of being the projects of any of their own officers? If they do, they will have only themselves to blame when dividend is absorbed as deadweight. More than that, in any future case (and would that such may never arise), it cannot fail to be brought before the notice of a jury, that a mode of rendering collisions impossible has been made public in our pages. If collisions occur in neglect of this precaution, and in defiance of this warning, the responsibility of all concerned will be aggravated in no slight degree. We do not say that the mere neglect to establish and to enforce such a rule, when its practicability and its value had been once clearly pointed out, would change a verdict of manslaughter into one of murder, but we can not deny that it might do so. The failure to use any certain precaution would be animadverted upon by every high judicial authority in no mincing terms. The criminal nature of an accident, or rather of the neglect that caused it, might be held to depend very intimately on such an omission. The civil responsibility, which is ordinarily measured by damages, might no less be held to be augmented; and the shareholders of a line which, six months hence, shall neither regulate the succession of its trains by telegraph, nor assure the lives of its passengers on their tickets, will assuredly deserve little compassion if, in the event of any accident by collision, the half year's dividend should be entirely swallowed up for compensation.

SKETCHES ON THE TWEED.

THERE are very few districts of country in the British islands possessed of more interest to the artist or the antiquary, or even, as we shall try to show, to the sanitary engineer, than the valley of the Tweed. The river itself is naturally of unexampled beauty and purity; and it has been the subject of more poetry, we suppose, ancient and modern, than any river of its class in Europe, excepting, perhaps, the Rhine. All along its banks we shall find ancient feudal castles proudly situated, like Norham or Neidpath; and princely modern palaces, like Floors Castle and Hildon Hall. Ruined abbeys there are of rare beauty, like Melrose and Dryburgh, closely allied with ruined moostowers' towers like Darnick and Smilholm. There are also some splendid bridges and railway viaducts: take Kelso Bridge as an example of the one, and the Berwick Viaduct of the other. Nowhere in Scotland have we seen such picturesque villas and gentlemen's seats. Then there are a variety of pretty, old-fashioned towns like Jedburgh and Selkirk, as well as their modern manufacturing compeers, like Galashiels and Hawick, singly situated on the tributary streams. With all this there is still a sylvan beauty and

an abundance of fine upland-hill scenery which make the valleys dear to all lovers of nature; and we must never forget that the whole atmosphere, so to speak, is redolent of the genius and the whole landscape teeming with the memorials of Border chivalry, poetry, and romance. It is almost unnecessary to mention Abbotsford or the name of Sir Walter Scott, for it would be as easy to go to Stratford-on-Avon and try to forget Shakespeare! There is not, we venture to say, a morsel of ground or a rivulet of water in the old Borderland that Sir Walter Scott has left without his footprints or his stepping-stones. He belonged to the clan of the bold Buccleuch; he was sheriff of Roxburghshire; Melrose Abbey was the scene of his meditations, the haunt of his muse, and the shrine of his inspiration. In Dryburgh a plain granite slab, under the window of a ruined chapel in the transept aisle, will long point out the spot where they have deposited his bones. The very railway which traverses the district is called the Waverley route. And it is curious to tell that the rocks of the valley will faithfully and readily show to the admiring stranger the identical spot in the fairy glen where Halbert Glendinning met the White Lady of Avenel, and the actual ford on the Tweed where that amiable phantom used to duck the Dominican friars.

The real facts of the case with regard to Sir Walter Scott and the literature of the Borders may be summed up in one sentence,—he has exhausted the theme. For the ancient poetry of the district we must go to the Border minstrelsy; for the modern renaissance, to "Marmion" and the "Lay of the Last Minstrel;" for the manners and customs of the people, to the "Monastery," or the "Bride of Lammermoor." Who does not remember, for example, the stirring lines in the opening canto of "Marmion"—

"Day set on Norham's castled steep,
And Tweed's fair river broad and deep,
And Cheviot's mountains lone."

We cannot venture to speak of his immortal delineations of Border character in the Waverley Novels; for the poetry and romance of the Tweed is not exactly our present subject. We happened to pass a week or two in this delightful district during the course of the summer, and we made a few stray notes, which may be of value to our general readers. We cannot hope to say much that is new to professional men, either with regard to its archeology or its architecture. The pollution of the Tweed does not differ very much from that of certain other arterial streams in this country; and the condition of the manufacturing towns is not so bad as we might, judging from previous experience, have been prepared to expect. At the same time, such disconnected observations as we have been able to make will possess this recommendation, that they are done in an impartial spirit and independent of all local influence or authority. Of course we must try, as we have said, to eliminate as much as possible the romantic element from our subject, and stick as far as we can to the scientific character of the facts. To this end we shall first of all say a few words concerning the physical aspects and hydrology of the river itself.

The river Tweed, then, has usually been ranked as the fourth in importance of the Scottish rivers; but if we look at it according to the extent of country which it drains it surpasses them all, except the Tay. The countries which it passes through are Peebles, Selkirk, Roxburgh, Berwick; and with some trifling exceptions these districts are entirely within its drainage basin, which has been estimated on the data of the Ordnance Survey, to contain an area of 1,870 square miles.* Its tributaries, and the bills which they drain, are too numerous even to mention; but we may state that from its source at Tweedsmuir, in Peebleshire, to the outlet on the sea at Berwick it performs a run of about 100 miles irrespective of windings. About one-third of this distance is overtaken in Peebleshire, and about another third in Roxburghshire. After leaving Roxburghshire, the Tweed becomes partially an English river. It divides Berwickshire from England till within $\frac{1}{4}$ miles of its outlet; then it bids adieu to Scotland altogether, and flows between the county of Northumberland and the liberties of Berwick, where it fulfils its destiny by finally mingling with the waters of the North Sea. The Tweed and the Clyde, we may add, for

many miles from their source flow nearly in a parallel direction; and it is worth mentioning that there was, at one time, a project conceived by the Tweedside proprietors of turning the Clyde into the Tweed, with the view of rendering the Tweed navigable. This must have been, of course, before Glasgow had acquired its present character for commercial greatness, and certainly many generations anterior to the splendid engineering operations which have made the Clyde itself navigable to the Broomielaw.* This extensive run of the Tweed is also accompanied by a corresponding fall. From its source to its embouchure, where it is crossed by the celebrated viaduct of the North-Eastern line, the river possesses a total aggregate fall of about 1,500 ft. Of this fall 1,000 ft. are obtained when it reaches the town of Peebles. In the very long run, therefore, as compared with the fall, between that town and the sea, the river might be expected to become sufficiently sluggish in its current as to be, at least over a considerable distance of its extent, navigable. But this is not the case. It accomplishes its remaining fall of 500 ft. in so many separate descents, so far apart, and of such gentle gradients, that it seems destined by nature to be altogether a stream of woodland beauty, and a total stranger to the ironroads of river-steamers or even of fishing-sloops.

This natural incapacity of the Tweed for commerce and navigation from the sea upwards becomes more apparent when we examine the nature of its bed. It abounds in deep pools and in long stretches of scarcely perceptible current, yet in almost every sweep of it which can come under the eye in the course of its beautiful curves it presents one or more soft rapids, sometimes of considerable length. The banks, also, which are thickly strewn with pebbles, or small boulders, and gravel, and which are chiefly formed by the action of these rapids, are very inaccessible beaches for boats. Again, in one instance, at least, two or three miles above Kelso, there occurs a perforated, broad, greywacke dyke, which crops up quite across the channel. All these circumstances render it both naturally unfit and artificially unimprovable for navigation. At the same time ferry-boats are stationed upon it in certain localities, such as at Dryburgh Abbey, where there is ample depth of water; and the small flat boats, used in salmon fishing (provincially called trows), are freely navigated even over the fords. A few miles above its embouchure the river loses its prevailing character, and becomes capable of admitting sailing craft of slight tonnage.

The tidal flow reaches beyond Norham Castle, ten miles above Berwick; and up to New Water Ford, four miles below this, it produces sufficient depth to float, at any time, a vessel of thirty tons burthen. The real navigation of the Tweed, however, is all confined to Berwick; and as to other capaciousness or depth of sea-room and harbourage afforded for it, might be quite as well accommodated in many a nameless creek of the rugged and indented Scottish coast. The fact is, that Berwick-upon-Tweed has long been regarded, not so much in the light of a seaport as a pleasant watering-place. While the Tweed was thus undisturbed by traffic, it was, up to a recent period, nearly as much untroubled by the liquid outpourings of manufactories; indeed, it has always had, up to a recent period, a clean, shining path of gravel and pebbles; and thus it almost everywhere possesses a remarkably limpid and sparkling appearance. This quality, combined with the majestic and placid flow of its current, and with the prevailing beauty of its banks, long ago suggested the poetical name of the Silver Tweed, with all the serene and joyous images which it recalls to the tasteful observer of landscape.

It would be easy to dilate, if this were the place, on the beauty of the flowers and gardens which adorn the verdant banks of this beautiful river:—

"What beauties doth Flora disclose,
How sweet are her smiles upon Tweed!"

So sang the poet more than a century ago, and

* These figures are quoted from "Chamber's Encyclopedia," vol. iv. p. 602.

* "The main water-shed of the country between the Tweed and the Clyde crosses at one part a low valley through which it would be easy to cut a channel from the Clyde. Indeed, if good care were not taken of its banks, the Clyde would ere long dig the channel for itself, and flow into the Tweed."—"The Scenery of Scotland, Tweed in Connection with its Physical Geology." By Archibald Geikie, F.R.S. London, 1855. P. 118.
* "The Fullerton's "Gazetteer of Scotland," article "Tweed."

his description is still exact and true to nature. There are valleys on the Tweed so richly wooded and so luxuriantly laid out that they give the spectator the impression that he is traversing a series of beautiful private orchards more than anything else; and we have no hesitation in saying that we seldom have seen such splendid old forest trees, such silver birches and stately oaks, as adorn the scenes of the principal estates on the Tweed. In the scenes of such exuberant beauty it is idle to particularise. Nevertheless, we may venture to point out the beautiful and stilly sheet of water, with its richly-embowered banks, which is partly retained, and to that extent formed by, the mill-weir at Melrose. This is to our taste one of the sweetest sylvan scenes on the whole river. The splendid woods of Gattonside in the middle distance, and the gently-sloping ridge of hills, covered with yellow corn, and towering against the horizon, constitute a picture which has, indeed, been often painted, but we believe has scarcely been done justice to. The wooded amphitheatre of Peebles is also very beautiful. But the view from Kelso Bridge, where, from the confluence of the Teviot, the noble river expands to a width equal, we should think, to the Thames at Putney, or the Tay at Perth, with the town on the right hand, the woods of Springwood on the left, and the Duke of Roxburgh's noble castle of Floors, surrounded with beautiful foliage, in the distance, is unquestionably the most magnificent.

The beauty of the valleys, it is interesting to note, has in a great measure originated their geological structure. The valley from Melrose, for example, occupies the basin of what was once an ancient lake. This is quite manifest whenever the ground is turned up. From east to west deposits are met with, quite close to the surface, of fresh-water sand-beds, inclosing water-worn boulders. In fact, this valley had at a very recent geological period,—certainly long after the era of the Silurian Rocks, which it traverses,—acted as a great basin or reservoir in the course of the river; and had so existed until, in the ordinary process of lake and river phenomena, it burst the eastern barrier and liberated the pent-up waters. It will at once be seen, on this hypothesis, what a rich and fertile soil, on the ancient lake-bed would yield to the future vegetation of the river valley.*

The same geological phenomena will account for the peculiar beauty of the Tweed-side hills. A little south of Melrose we have one of the most remarkable groups—the Eildon hills, once the Triontum of the Romans, so called from the peculiarity of their form. Properly speaking, the Eildons are only one hill rising from one base, but divided into three peaks.† The top of the highest summit is 1,364 ft., at above the sea-level, at which point there is a magnificent view. The composition of the rocks of the two northern peaks is a sort of felspar and porphyry. On the south-west descent of the southern hill the opening of a quarry has laid bare a number of perpendicular pentagonal prisms of beautiful flesh-colored felspar, each about 20 ft. high, as exposed, but probably of far greater height, with remarkably acute and distinct angles. Near this locality are traces of stair or trap, rising from the partly broken bed of the strata, and other evidences of a basaltic character. Sometimes pieces a foot square lie exposed jutting out from the surface of the ground, looking towards Bowdenmore. No less than sixteen terraces are traceable on the sides of these hills, rising above each other like the steps of a stair. On the summit of the eastern hill there are also unmistakable traces of a Roman encampment.

Keeping this character of an ancient river-basin in view, with its copious deposits of sandstone, and keeping in view the phenomena of the igneous intrusive rocks of the trifrom Eildon hills, we get some insight into the character of the stone. Hornblende rock, of a quality capable of being polished like marble, occurs in various parts of the valley. Greywacke, which abounds over all the north and west, with a north-easterly dip, is worked as a building material. There is also a species of conglomerate, which is at this moment regularly blasted at Quarry-hill (and an ugly gap it makes in the

landscape). But although sandstone of fair quality occurs in the south-east corner of the valley, that which is chiefly used for building purposes is brought from Spronston, or from Eccles, in Ancrum, on the estate of Sir William Scott. The splendid red sandstone of which Melrose Abbey was built seems to have been obtained from the old quarries in the vicinity of Dryburgh.

But, although so fertile in the possession of materials, it is curious that the Tweed was for the greater part of its history remarkable for its poverty in bridges. Up to a late period, indeed there were only three old bridges within a range of seventy miles: these were built at Peebles, Melrose, and Berwick respectively. But now within the same distance there are at least twelve bridges crossing the river, many of them suspension bridges: a timber bridge at Inverleithen; a good stone bridge at Yair, between Selkirk and Galahide; a suspension bridge (one of the earliest constructed, we believe) for foot passengers between Melrose and Gattonside; another stone bridge at Drygrange, near the mouth of the Leader. There was a suspension bridge at Dryburgh Abbey (which, we regret to see, has been allowed to fall to pieces, the chains only being now in existence); and another fine suspension bridge still connects Floors Castle and St. James's-green. Last, though not least, there is a magnificent stone bridge at Kelso, designed by Rennie, consisting of five elliptical arches 72 ft. in span, with deep narrow voussours, and adorned on the spandrels with Ionic capitals; and there is also a splendid stone bridge across the Tweed at Coldstream. We need not again describe the railway viaducts at Melrose and at Berwick. The latter is one of the most striking and costly viaducts we possess, and was only excelled by that of Plymouth in the difficulties of its construction.

In dry seasons the volume of water in the Tweed is not nearly so great as formerly. In very rainy seasons, too, the subsidence of the water is far more rapid than it used to be.* Agricultural improvements, draining more especially, clear away the surplus water from the land, with amazing rapidity, and the best pools, as the fisherman knows too well, are from this cause most seriously affected. Supposing these geological changes and improvements to continue, and ultimately to embrace the mountain slopes and high uncultivated districts of the Tweed, and its tributaries, the time will come, we think, when the heads of the weirs or canals must be lowered at the overshot; or many must go wholly to rest, together with the mills and machinery which are dependent on them. It becomes also more and more apparent every year that the salmon which seek their spawning beds high up the Tweed, cannot repass the mill weirs on their return to the sea; and accordingly the fish are compelled to remain too long in the river; to their great deterioration, and unnecessary exposure to the inroads of the most fisherman and the poacher.

The salmon fisheries were for many generations of great value. Of late years, however, these have sadly fallen off, to the extent, it is said by one authority, of nearly two-thirds of its former average produce. Many causes, in addition to those we have mentioned, have been assigned for this. The projection of the pier at Berwick into the *alevis* of the river, the very general use of lime in the agriculture of the hillsides, the increase of rod-fishing, the use of stake-nets by the lower proprietors, and, above all, the poaching and illegal destruction of fish during close time, have each and all been alleged, but have in their turn been severally pronounced by competent authorities to be inadequate. The real fact of the matter appears to be, that the deterioration and destruction of fish,—not confined to salmon alone,—in the Tweed, are due, in our opinion, to precisely similar causes as are at this moment operating in the Thames or the Trent—that is, in the first place, to the diminution, and secondly to the pollution of the river. This, however, is too important a subject to be discussed at the close of an article which is already too long. The same cause may be assigned for reserving our consideration of the value of the Tweed as a source of water-supply, and of its character with regard to public health.

THE METROPOLITAN RAILWAY.

The Underground Railway of London is *suo generis* among the railway systems of the kingdom. Other systems have their termini and their principal intermediate stations; this, when completed, will have neither beginning nor end. Other lines are alternations of cuttings and runs in the open, more or less elevated above the natural level of the surface, occasionally varied by a tunnel; this is a continuous burrow, a succession of covered ways, with troughs of various lengths, at irregular intervals, open to the sky, for light, but more especially for ventilation. On other lines the distance between stations is measured by miles; on this by furlongs and chains. On other lines trains are run by the dozen in a day; on this they are run by the hundred,—250 each way daily. On some lines trains run at intervals of hours; upon this at intervals of about two minutes and a half during the busiest times of the day. With other railways the increased passenger traffic is indicated by per-centage, greater or less; its traffic has tripled in four years: in the half-year ending June 30th, 1863, the number of passengers carried was 4,823,437, in the half-year ending June 30th, 1867, they reached 11,488,368, with an accelerated increase since then. The receipts of the most prosperous of other lines fall far short of 100l. per mile; its receipts exceed 1,000l. per mile. The construction and character of an important addition to such a system are worth longer notice than we gave last week.

In speaking of the Metropolitan Railway as to have, when finished, neither beginning nor end, the Metropolitan District Railway is included with it. Although the two companies are, and have always been, separate and distinct as regards financial affairs, they will be, as regards working, and as a system of communication, one concern. An ultimate complete fusion of the two seems one of the likeliest of all future amalgamations of railway companies. The portions of the systems of the Metropolitan and the Metropolitan District Companies which constitute to what is known as the inner circle, secured the special approval of the joint committee of Lords and Commons on Metropolitan Railway communication, which took evidence and reported in 1864. The advantages anticipated from the completion of the circuit were,—the distribution of the passenger traffic, arriving by the main lines coming within the metropolis, and also relieving the crowded streets by the absorption of a portion of the omnibus and cab traffic. Notwithstanding the enormous number of passengers carried by the Metropolitan, these advantages have been, as yet, only partially realised, although it is already in direct communication with the Great Western, the Great Northern, and the Midland systems, on the north of the Thames, and with the London, Chatham, and Dover on the south. The communications with the London and North-Western, at Willesden Junction, and with the South-Western, at Clapham Junction, by connexion with the West London, are less direct now than they will be ultimately.

The first portion of the metropolitan line was opened at the beginning of 1863, from Farringdon-road to Bishop's-road. Subsequently the company acquired an extension westwards to Hammersmith; the portion of the line from Farringdon-road to Moorgate-street has been completed and opened; and a line, which forms a junction with the Metropolitan at Baker-street, has been constructed and opened to St. John's-wood. The continuation of the Metropolitan scheme still remaining for execution to complete that company's portion of the inner circle are,—at the East-end, the short but important link between Moorgate-street and Broad-street stations, and thence, by a curve to the south, to Tower-hill, passing under Fenchurch-street station, where it will run into the Metropolitan District Railway. The works between Moorgate-street and Broad-street stations are expected to be completed and the line opened early in next year. The more important portion of the Metropolitan system, the works upon which are now all but finished, is the continuation of the circuit westwards, and round south and east, to return, running into the Metropolitan, *via* Westminster and the Thames Embankment, to Tower-hill. The Metropolitan and the Metropolitan District lines meet each other in the station at Kensington High-street station; but the Metropolitan overlaps the District to South Kensington station in so far as

* This statement first appeared, as far as we are aware, in the "New Statistical Account of Scotland," article "Melrose," vol. iii. p. 116. But the observation is probably due to Dr. Hutton or his school. See "The Theory of the Earth," vol. ii., p. 103.

† There is a foolish tradition in the district which says that these summits once formed a single cone, which was severed in three by an infernal agent of Michael Scott, the wizard. Vide "The Mistreley of the Scottish Border."

* Compare Mr. Geikie's book, cited above, p. 253, as to the geological causes of the change of the river-bed. The Tweed, it appears, has not always pursued an undeviating course. See also Wade's "History of Melrose Abbey," p. 136, *et seq.*, from which we learn that the monastery held a portion of land now divided by the river.

continuation of the circuit is concerned. From this point to Tower-hill the works belong to the District Company, but the running will be continued by the trains and rolling stock of the Metropolitan.

It is a strange experience to "foot" such a piece of new line as this;—to have to draw entirely upon memory and imagination, and to be utterly unaided by sight with respect to the character and appearance of the district overhead which we are passing through;—to be in constant wonderment as to whether we are walking under mansions or mews, wide thoroughfares or hack courts and alleys, green gardens or dusky coalyards. Our polite conductor, however, Mr. W. Morton, resident engineer on the line, was as communicative upon all points as we could desire. The extension about to be opened commences under Praed-street in a hell mouth, which was constructed when the first portion of the Metropolitan system was made, and is at a point rather less than half way between Edgware-road and Bishop's-road stations. From this junction the road is continued under a covered way, succeeded by a short length of open line within retaining walls to the first of the new stations—the Paddington,—which is situated immediately in front of the Great Western Hotel, the distance being 3 furlongs 689. At the point of the fork between the existing line and the extension a round house has been constructed and fitted with levers, and in connexion with them points and repeating signals, to be used for the block system of working. Intermediate signal-boxes are being fitted up between the stations on the new extension throughout. Their effect will be to double the number, and to halve the lengths, of the blocking sections. The additional stations beyond Paddington are at Queen's road, Bayswater, 4 fur. 9-24; Notting-hill Gate, 3 fur. 8-66; Kensington, High-street, 4 fur. 6-98; Gloucester-road, Brompton, 4 fur. 6-28; and Brompton-road, South Kensington, 3 fur. 7-02. The last stage is not yet ready for opening, but the works upon it, and upon the first two stages of the District portion, are being vigorously prosecuted, and in a few months will be so far completed as to admit of opening to Sloane-square, 6 fur. 0-96, and thence to Victoria, 5 fur. 1-10, and Westminster Bridge. The Thames Embankment stops the way eastwards, and financial difficulties may possibly retard the completion of the circuit to Tower-hill, and round to Broad-street. Although they had been made of money, the District Company could not get past Blackfriars now by any possibility, and they have allowed the Embankment to be filled in, in preference to expending capital upon heavy works to lie unproductive for an indefinite time. The only portion of the District work executed to the east of Westminster, is a short length of covered way under the forecourt of Cannon-street Station and Hotel.

The new extension is, as regards the measure of air and of daylight let into it, and especially in the cheery lightness and good looks of the stations, a great improvement upon the original section from Farringdon-road to Bishop's-road. A governing principle in constructing the line appears to have been to prefer the open to covered ways, wherever the property dealt with is of moderate value, and every opportunity appears to have been taken advantage of to lighten the road by open portions. In some districts, such as Pembridge-square, open lengths were totally inadmissible, and covered ways of extraordinary strength have been constructed to sustain the superincumbent weight. In that particular locality the company had to purchase five costly mansions in course of erection. These were underpinned, and now rest upon the roof of the covered way under them, which consists of pairs of strong cast-iron girders under each principal wall. Cross girders are also applied, and the spaces filled in with arches. The work was accomplished without the slightest settlement in any part of the buildings. Numerous other cases of underpinning large buildings were accomplished with equal success; amongst others of a public-house in Cambridge-place, at which business was never interrupted. At Leinster-gardens a curious piece of work presents itself. One tall house in the range had to be taken down, and the flank walls of the houses upon each side of it to be supported. This has been done by four pairs of strong buttresses built against the walls. These are supported by joists of rolled iron between the buttresses, resting in cast-iron sockets; the joists are strengthened by cross iron

ties. To prevent disfigurement of the other houses a wall, the same height as the fronts, has been built over the end of the covered way, and ranging with the house fronts. This wall will be finished as a dummy front. The wall behind the brick-work is at the back, about 90 ft. deep down to the rails. In one portion of the line, at which the depth from the overhead surface to the rails is so great as to have necessitated extra strong retaining walls, with double struts, one range above the other. Cast-iron struts have been introduced between the retaining walls wherever the mass behind them has been considered so heavy as to render this precaution against pressure necessary. The retaining walls are nearly uniform throughout, 8 ft. clear between the piers, piers 3 ft. on the face, or 11 ft. from centre to centre. They hatten about one in eight, and have a thick backing of concrete. The covered ways vary in section: when there is head-room, an elliptical arch, usually five rings of brick, is thrown; but when there is only 3 ft. 6 in., or less, to construct in, the roof is of cast-iron girders, with transverse jack arches between. In cases of heavy superstructures also, extra strong roofs, up to nine rings of bricks, have to be provided for the covered ways. The engineering difficulties encountered in the construction of such a line as this are numerous and peculiar. A minimum clear space from rail to roof must be had, and must be obtained by passing over a sewer here, and under gas or water mains, or a road near it there. An enormous number of owners and occupiers of property have to be satisfied. Occasionally, though very rarely, the engineer gets what he wants without satisfying the claimant. On a part of one of the covered ways sufficient thickness was not left between the face of the wall and the round end of a lumber cellar. The demand made was that the company should purchase the cellar, which would have been perfectly useless to them. While legal proceedings were pending, the work was pushed forward, the end of the cellar was closed up with strong cast-iron plates, which were faced with single brick, and there that matter ended. The line passes over the Ranelagh sewer—one of the main sewers of the Metropolitan Drains system, on the north side; near Sloane-square, on its way eastwards, the line will pass under the same sewer. Several instances were pointed out to us of heavy cast-iron plates laid between the girders, upon which water and gas mains are carried across the line, leaving just sufficient head-room. Near Bedford-gardens a tunnel proper occurs, which was driven in the ordinary manner; not worked from the surface; it is about 450 yards long, and about 65 ft. from the rails to the top at the deepest part. The stuff excavated was London clay, overlaid with loose ballast, that had to be worked out with sheet piling.

There is a long curve on the line, as it turns to the south, in the neighbourhood of Notting-hill. The centre of the curve, which is nowhere sharper than a 10-chain radius, is at about the point where the line crosses under the Uxbridge-road. The prevailing gradients are descending westwards and southwards; lengths, with gradients of 1 in 70 and 1 in 75, are the most severe on the whole line. These are now considered easy.

The stations are uniform in general plan, although varying in some particulars. The double station at Kensington High-street, which is to accommodate the Metropolitan and the Metropolitan District lines, is the largest and finest of the series. The centre consists of a spacious and lofty room, 44 ft. by 31 ft., which is to be used as a refreshment-room.

The two booking-offices are across the ends of the building. The booking-offices and station walls and roofs, although from an engineer's rather than an architect's designs, are very light, graceful, and effective structures. They are faced with white perforated bricks from the Halsey brick-fields, with stone dressings; the ordinary work is of the common Kentish stock-brick. The doors and windows have semicircular heads: each of the two sashes in the windows is filled with a single sheet of plate-glass. The entrances to the booking-offices are under iron verandahs, roofed with glass. The roof of the Kensington Station is 81 ft. in span and 418 ft. long. It differs from the other station roofs in having the principals carried down to within about 2 ft. of the platform level; whereas in the other roofs the principals spring from near the level of a string-course not much below the top

of the station wall. The string-course indicates generally the surface level on the outside of the station wall; but at the Kensington Station the ground slopes from the top of the wall at one end to nearly the bottom at the other, and the principals are hence carried down, that solid abutments may be obtained. There are twenty principals in the roof with two intermediate rafters, supported by trussed purlins. The form of the roof is elliptical, all the bearing and other parts being of rolled or wrought iron, excepting the corbels, spandrel scrolls, and ornaments, which are of cast-iron. The roofs are covered, in nearly equal proportions, with zinc of No. 14 gauge on boarding, and sheet-glass in three continuous belts. The lower edges of the glazed belt on the crown of the roof are set at about 20 in. above the zinc belt for ventilation. There are also ranges of windows above the string-course available for light and ventilation. Several of the booking-offices are built on and across the line, in some instances upon plate girders, 5 ft. deep, under its principal walls; in other instances, upon the covered ways at the ends of the platforms. All the stations are furnished with galleries across the line for exit and entrance or exchange of platform. The gallery and stair rails and ironwork of the roof are painted in two shades of green, picked out with a sober buff. The stations are fully supplied with closets, urinals, &c., substantially and neatly fitted up, the latter lined with blue and white enamelled tiles, with a patterned border at the top, and with divisions of slate slabs enamelled in white. The station platforms have plank floors, and are of sufficient length to serve six carriages, 40 ft. and 42 ft. long each, with their engine and tender. The stations will be lighted at night by globular lamps suspended from the principals over the platforms on each side of the stations. The gas-pipe by which they are hung works in a ball and socket joint. The ribs of the lamps are of copper, and very light, so that scarcely any shadow will be thrown from them. They are worth about 7l. each.

Above 500,000 cubic yards of earthwork have been removed in this length of less than three miles of railway. A considerable portion of the stuff excavated has been utilised in the work. Sand has been taken from it for the mortar, all the ballast for the line has been taken from it, and above 22,000,000 bricks have been made from the clay, tempered with loam and sand in suitable proportions.

The rails are of Bessemer steel, 85 lb., or rather over, to the yard. They are single-headed, and fixed without chairs; the flange is about 6 in. broad, and the rails fixed by $\frac{3}{4}$ in. bolts, with fangs below the sleepers.

An interesting experiment is in progress near the Gloucester-road station. An arch of wide span, and with a rise of only about a tenth of the span, has been thrown across a part of the District line in its course towards the West London line. The vault is formed entirely of concrete, and is about 12 ft. deep across the faces. It is only about 18 in. deep at the crown, and so flat as to give the impression that the tenacity and strength of the material has already borne successfully a crucial test in bearing its own weight without loading, as it has done since the centres were struck. It is expected that this structure will bear a distributed weight of 50 tons or upwards.

Several new streets and roads are in process of construction in the neighbourhood of the line at what will be its terminus for the present. One of these will furnish a short and direct communication between the station at Brompton Old-road and Cromwell-road, in the immediate vicinity of the South Kensington Museum.

The works have been executed according to the plans of Mr. John Fowler, engineer-in-chief, and Mr. T. M. Johnson, the company's engineer, with Mr. W. Morton as resident engineer, by Messrs. Kelk, Waring, & Lucas. They have been about two years and a half in progress.

NOTE.—All who are interested in art-workmanship will hear with regret of the death of Antonia Vechte, the *reposeuseur*, at the age of sixty-nine. Vechte, a native of France, worked almost to middle age before his talent was duly recognised. He worked in London from 1850 to 1860, and gained increased honour at the Great Exhibition of 1862. His reputation is European.

THE TEMPLE OF AVEBURY.

ARCHITECTURAL history, or, more correctly speaking, the history of civilisation which is indicated or recorded by architecture, may be traced back with considerable distinctness for some two thousand years. The exactitude of modern criticism tends to the substitution of actual knowledge for mere opinion; and, in dealing with the substantial facts of brick and stone, there is less room for the latest, or neo-German stage of criticism (namely, the substitution of the imagination of the writer for the traditions of his contemporaries), than is found in literature. With yearly increasing precision, therefore, we are learning to decipher the architectural records, back to that Augustan age which has so strongly impressed the subsequent course of Western civilisation.

Before the period which converted Rome from brick to marble, and which gives us the first historic glimpse of our own island,—a glimpse precious from its date, although manifestly perverted as to many of its facts,—we are able to take a retrospective view, less detailed indeed than in more recent times, but in which certain salient points are marked with great precision. The unearthed cities of Campania, the temples of Paestum, the marbles and the ruins of Greece, the *Cloaca Maxima* of the Roman kings, carry back the dated work of the builder to the period when the Canon of Hebrew Scripture was enclosed, and when, in the golden youth of Pericles, Nehemiah was repairing the megalithic walls of Jerusalem. Those same enduring walls carry back the architectural student for more than 2,800 years from the battle of Waterloo, and reflect a yet more remote antiquity. Nor are we without signed architectural work of a period far anterior to that of Solomon; for in the series of cylinders, purse-formed clay tablets, seals, and bricks, impressed with the long-forgotten cuneiform characters that Sir H. Rawlinson is teaching us how to decipher, we are led back from the reign of Nabonidus, the last king of Babylon, through that of Nebuchadnezzar, of Sennacherib, and of their predecessors, to that of Arioch, king of Ellasar, the contemporary of Abraham, of whom we have a memorial in the shape of a stamped brick, in the British Museum. This king was one of those who made war, "four kings with five," in the vale of Siddim 4,050 years ago.

To say nothing of the distinct and independent record of the wonderful Hindoo architecture, in which the forms and outlines of a wood-building people have been reproduced in stone, and marble has been pierced into lacework, we have a parallel line of historic record in Egypt, which allows us to trace, at irregular but clearly-marked intervals, an architectural and a sculptured record, from the fall of Cleopatra to the Theban tombs of the great Eighteenth Dynasty; under the eighth king of which (not counting the reigns or regencies of the famous queens of the house) the Exodus took place. We see represented on the walls of a tomb of this date the Syrian shepherds at work in the brickfield, and we are enabled to identify the buildings, and to understand the social life of Egypt 3,400 years since, with wonderful exactitude and detail. The erection of the unsculptured walls of the Great Pyramid, according to the patient researches of Brugsch, dates 2,000 years before the Exodus.

Earlier than any dated architectural record,—earlier, artistically (whatever was the case chronologically), than any raised obelisk or sculptured stone, are those Cyclopean remains that are found in certain localities, on the shores of the Mediterranean, and stretching on towards the Persian Gulf, associated, more or less closely, with traditions of a race of giants. Still ruder and more archaic than the megalithic walls of Cyclopean architecture, are those mysterious piles of gigantic stones which are to be traced in more than one line of travel towards the western shores of Europe, from the cradle of the Sanscrit family of speech; and of which some of the most remarkable instances are yet standing in our own islands, and known as cromlechs, or as Druidical stones. In associating these relics of a mighty past with those Druids of whom we form our opinion chiefly from the Commentaries of Cæsar, it is probable, as will be seen from what follows, that we have much undervalued their antiquity.

The general advance of all human art is evidenced by the attainment of a higher and more perfect finish, and by the substitution of the results of skill for those of mere strength. We may go further, and trace, in one direction, the

steady and marked development of skill as well as of taste; while we find, on the contrary, as we bend our glance back, proofs of the exercise of a strength which exceeds our comprehension. Thus if we contrast the enormous bulk of the unsculptured walls of the Great Pyramid, with the work of the tombs of the eighteenth dynasty of Egypt, we are led to the conclusion that a lapse of 2,000 years at once increased the skill of the Egyptian race, and diminished the impulse of the builders to affect the imagination by mere bulk. In the Cyclopean masonry, again, we can trace a growth of skill, evincing, no doubt, an increase in metallurgic knowledge, and the substitution of the craft of the mason for the labour of the giant. We must repeat the caution that it does not follow that artistic progress is absolutely chronological in its course. The migrations of races may lead to a displacement of architectural records of which we have yet grasped the law. The public are only now in India who yet venerate, or even erect, dolmens at any other conclusion than that the rude piling of stones, which we recognize under the term cromlech, marks an earlier stage in human progress than does the erection of even the rudest Cyclopean wall; even as the uprearing of single, massive, minicised stones is more archaic than the raising of wrought and engraved obelisks.

According, therefore, to all the testimony which archaeology has yet adduced, the cromlechs and memorial-stones of pre-Julian England represent a period in the artistic development of the human race approaching that of the construction (entirely undated) of the works of Mycene, or to the 5,400 years of antiquity attributable to the Great Pyramid.

Compared with the work usually called Cyclopean, Stonehenge and Avebury will rank in a late period of megalithic work,—when the mason had learned how to cut his material with the accuracy and the finish of the carpenter. On the other hand, great antiquity is denoted by the absence of cement. The British masons were, if not absolutely ignorant of the value of lime cement, at all events so unprepared to depend on its service, that they encountered vast labour in mortise and tenon joints to some of their largest stones. Indeed, the use of mortar to give that stability which, four thousand or five thousand years ago, Egyptian and Assyrian builders had learned to secure by mortar or by bitumen, was displaced by that of cemented temples rivals that of Solomon himself; but the masonic skill, the true building science, was far less advanced in the former case. The artistic period of our great circular temples may have been pretty close, speaking only of the character of the work, to that of the Pyramid, in which, although there is the later feature of cement, there is the same use of enormous and curiously wrought blocks in the more important parts of the structure.

In the centre of the rolling chalk downs of Wiltshire, about fifteen geographical miles, as the crow flies, nearly direct north of Stonehenge, at a spot where a line drawn from Calne to Marlborough intersects a line drawn from Devizes to Swindon, is the little village of Avebury, or Avebury. The spot is somewhat inaccessible, according to our present habits of travelling, being seven miles from the nearest railway station, and that only being the terminus of a branch of the loop line to Marlborough. A glance at the map will show that, in roadless times, this must have been one of the most central and retired parts of England; impossible of access from the coast, or by the course of any navigable river; and so hidden by the undulations of the ground, as well, in all probability, as by the depths of a vast forest, as to be the most secret, as well as the most sacred, sanctuary of a primeval faith, and capital of a forgotten dominion. The wide-spread traces of enormous labour point to this spot as the capital of the cromlech-building people.

The position of Avebury forms a remarkable contrast to that of Stonehenge, with which it is intimately connected, no less by the character of the remains than by vicinity of position. The latter named place of worship or of concealment appears to have been selected, unless it also was veiled by forest, rather as a conspicuous than as a concealed situation. With Avebury it is the reverse. The shrunken dimensions of Marlborough Forest no longer approach the village, and

the timber that clusters richly around its relics bears no signs of remote antiquity; but the sheltered character of the spot, and the luxuriance with which the indigenous forest trees thrive in the neighbourhood, indicate the former depth and shadow of the sacred grove; and, even in its present denuded state, the traveller must come very close to Avebury before he becomes aware of its claims on his attention.

Leaving the picturesque high street of Marlborough by the Bath road, and passing the quaint red-brick buildings of the college, and its noble chapel, less than two miles brings the traveller to the first station of the cromlech-building people. A grass-clad combe, or valley, known by the name of the Devil's Den, curves round to the north and west, and on this, out of sight of the highway, although at a distance of less than a mile from the road, stands a cromlech of three stones; the upper or horizontal one, of some 12 ft. by 15 ft. in size, being in fair preservation. The cromlech stands alone, in what is, at this moment, a potato-field, but at a little distance the pasture land is covered for a length of more than 600 yards, by a collection of immense fallen stones, filling up the whole of the valley. It must be remarked that all these stones have been brought from a very considerable distance. The geological formation of the country is chalk. The stones are of a fine silicious grit, white and clear when freshly cut, and resembling in their lithological structure the Bramley Fall stone more closely than any other with which we are acquainted. Wherever the quarry from which they were extracted was situated, a question which it is of the highest interest to determine, it must have been one marked by deep beds of solid stone, from which blocks of 18 ft. to 20 ft. square, by 3 ft. or 4 ft. thick could have been plentifully hewn.

At about two miles' distance from the widespread ruin of the Devil's Den, close by the side of the road, lies another site of similar nature, with the exception that nothing remains erect. The stones are known as the "Grey Wethers," and are even more numerous than at the former spot. A third group, of equal size, lies a little to the north, but it is evident that these and other relics have been unsparingly pilfered, and used as quarries for modern work. Gate-posts, retaining-walls, garden-walls, even houses, over the whole distance from Marlborough to Avebury, have been constructed from the noble blocks which formed the temples of the ancient race; and which, by means now unknown, they brought in such profuse quantity from such considerable distance.

Passing the second stone-spread valley, five large barrows strike the eye, on the summit of a swelling down, up which the road ascends. On reaching this ridge a panoramic view extends over wide and bleak downs, the outlines of which are everywhere dotted by large barrows, some bare, some clothed with trees.

At the village of West Kennet, between five and six miles from Marlborough, the stream turns at right angles, descending from the north, and striking an irregular basin, the slopes forming the verge of which are considerably lower than the harrow-crowned elevations, which in their turn look down on them. A road to Swindon diverges from the Western, or Bath, road at this village, running parallel to, though out of sight of, the stream, and at little more than half a mile from the village. This road climbs the brow of the inner circuit of the basin, and looks down upon the trees that shadow the village of Avebury.

The village itself is not seen until it is closely approached or actually entered, and the enormous stones which yet stand partially erect in the fields and yards with which the houses are interspersed are concealed by a remarkable earthwork which surrounds the village. This defence consists of an exterior mound and an interior moat or ditch, in a circular form, which has been preserved from destruction only by its great magnitude. The enclosure is some 500 yards in diameter. The line of rampart and moat is about forty-eight yards in width from the inner edge of the ditch to the outer foot of the exterior mound. The height from the summit of the highest parts of the mound to the bottom of the ditch is now from 50 ft. to 60 ft., and, when the whole work was in a perfect state, must have been considerably more. The temple within the enclosure was thus entirely concealed from view. As a defensive structure the earthwork is remarkably defective, from the circumstance that the moat is placed within the rampart, so that the only resistance afforded to assailants who might

attempt to ascend the former must have been that of the weapons of the defenders. The moat is now entirely dry, but from the depth at which the water is found in the village wells, it is probable that it was formerly wet, and supplied from the Kennet. At Chisbury, a lofty hill, ten miles, as the crow flies, from Avebury, exhibits a similarly moated enclosure. In the latter case, however, there is a rampart within the moat, and the natural elevation of the spot enabled the occupants of the central area to command the approach on every side. The outer rampart, at Chisbury, seems to have been chiefly intended to confine the water within the moat, and as this is now wet, although at the summit of the hill, it seems clear that the rampart makers were aware of the method of confining water by the use of clay, or what we now call puddling.

If the military strength of Avebury was diminished by the erection of an external instead of an internal rampart, the sacred character of the spot seems to be denoted by the position of its defenders without the precincts, and separated from the interior by a broad and deep moat. It is difficult on any other theory to account for this remarkable inversion of the ordinary section of a defensive work. No trace of a ditch exterior to the mound is to be found.

The gigantic stones, some of which are from 16 ft. to 18 ft. square, which yet stand and lie within the moated circle of Avebury, are too few and scattered to enable the observer to form any definite conclusion as to the original plan of the temple which they probably formed. Traces may perhaps be detected of an outer and an inner circle. Some antiquaries have thought that the gigantic blocks were originally disposed so as to form two circular temples. Two enormous blocks, which seem at one time to have been wrought slabs perhaps 18 ft. by 20 ft. in size, and a yard in thickness, stand angle-wise and near to one another, as if they had served for the supports of a cell or built shrine.

The weather has furrowed and grooved some of the stones in a manner which, considering the hardness and purity of the grit, denotes the lapse of an enormous period of time since they were erected on their present site. The labour of transport and of erection must have been stupendous. In the un cemented retaining walls which are to be found in several places along the side of the Bath-road, and which are constructed of this durable and beautiful stone, are to be seen the marks of drills, testifying to the use of powder. It appears, however, on investigation, that this powder could not have been employed in the quarry, but was pressed into the service of the makers of the macadamised road, in their destruction of these priceless relics of remote antiquity for the purposes of the most ordinary work.

The magnitude of the Temple of Avebury is not attested merely by the number, or by the size of the gigantic blocks which as yet have defied the economy of modern improvers. At nearly half a mile from the rampart, sixteen enormous blocks, in various states of erectness, obliquity, or overthrow, yet remain to indicate an avenue 72 ft. wide, and composed of blocks or slabs regularly placed in pairs at intervals of 45 ft. Two hundred yards beyond the last of these stones stands another, in the same line, indicating the former prolongation of the avenue towards Avebury; and two others are to be found at about the same distance to the south. The avenue ran north-west and south-east, and would seem to have been originally at least half a mile in length. The arrangement of the rows of sphynxes placed in the approaches to some of the Egyptian temples is recalled by the remains of this noble avenue of gigantic blocks of freestone.

Thus far the stupendous relics of the cromlech-building people may strike the attention of every intelligent observer. There is a point, however, which is less directly apparent, and which possesses extreme interest.

Great earthworks are not rare, either in this vicinity or in other parts of England. We have described the moated hill of Chisbury, in which no stone is to be found. The rampart of Avebury resembles that of Chisbury, although it is both larger in circuit, and far bolder in section. Neither of these can be referred to Roman work, from their circular plan and great size, as well as from the position, and even from the name, of each relic of ancient fortification. At Marlborough is a hill or tumulus of considerable height, and at West Kennet is the remarkable and lofty conical mound called Silbury Hill.

These truncated cones, in which art seems to have aided and supplemented nature, are spoken of as the tombs of British chieftains, which perhaps they were. But they differ so far, both in dimensions and in locality (close to the stream), from the numerous barrows that crest the downs, that we can hardly err in regarding them as ancient strongholds, even if they were also places of interment. Such tumuli occur in South Wales, where they are known by the name of Rath, and in some of them, certainly, no marks of sepulture have been discovered.

We have thus in the same valley a series of earth-works and, entirely disconnected with them except in one instance, a series of cromlechs and stone circles. But the most remarkable fact as to Avebury is, that the rampart does not appear to have been centrally or symmetrically disposed with reference to the stones. It is impossible, without a careful survey, to speak with certitude as to the evidence yet preserved as to the original position of the Avebury slabs. One of them, evidently *in situ*, is on the very edge of the ditch, and none of the others can be referred with any distinctness to the line of circumvallation. But the most remarkable point is, that the great avenue from the south, which we have before described, does not lead up to the centre of the circumscribed village, but points so far to the east as altogether to miss the opening in the line of the rampart. We speak with the reserve due to observation made on undulating ground, and in the absence of a minute survey. Still, it is undeniable that the blocks forming the remains of the grand avenue, of which there are a sufficient number, placed at an adequate distance apart, to define with accuracy the direction of the ancient approach, do not point to the centre of the space enclosed by the earthen rampart, or to the entrance through the latter, and do not give the idea of any symmetry, or direct relation of structural arrangement with the mound and moat.

The enlarged sheets of the Ordnance Survey containing Avebury are as yet unpublished. On the Survey on the inch scale ten of the large stones of the avenue are delineated. The single stone which serves to fix with accuracy the true centre line of the row is not laid down. The direction of the avenue, as far as can be ascertained from a map on so small a scale, points to the most eastern of the large stones marked within the circle. It misses altogether the opening in the rampart, and has no perceptible relation of symmetry or unity of design with the moat and bank.

The effect produced on the mind by this series of facts is, a suspicion that a spot once famous, and probably while still famous, for its stone circular buildings, was fortified by the earth-building people, who raised Chisbury, Silbury, Marlborough, and other raths or tumuli; and that this was done at a time when the temple had been already so far damaged or decayed that it was not thought necessary to preserve the line of the avenue of approach. There can be no doubt that the delineation of the ramparts of Avebury is as independent of the course of the megalithic avenue to the temple or circle as is the setting out of the modern macadamised roads that now pierce the ramparts. We have the marks of three successive series of workmen, and a question is possible whether not only the labour, but the date, of the rampart builders may not be as distinct from that of the stone transporters, as the work of Telford, or Macadam, or the modern road-maker whoever he was, is from either. It is impossible that the stone builders should have been later than the rampart builders, as in that case their work, even if not symmetrically planned, would have been so disposed as either to accord with the less laborious construction, or else to modify and control it. We find, therefore, evidence of the possible interposition of the labour of a great earth-working race, antecedent to the Roman invasion,—a race of whom we may trace the exertions from Wiltshire to Pembrokeshire, as well as in other parts of the country,—between the Saxonsettlers, who were not, as is notorious, a fortifying people, and the builders of cromlechs and transporters of megalithic blocks. To how remote an antiquity must the labour of the latter people be referred?

The impression produced on the imagination by a visit to this remarkable spot is not one lightly to be thrown aside. We are on the ancient holy ground of Britain—holy from an antiquity which we have as yet no means of determining. At

how distant a period we must fix the era of the giant stone-pilers,—giants in strength and in industry whatever was their actual stature,—we have no clear indication as yet forthcoming. One limit of time may perhaps be inferred. The hewers and transporters of the Avebury blocks must have been provided with metal implements. It is certain that some of the largest stones at Stonehenge were wrought. It is also certain that such blocks could not have been quarried without the use of metal wedges and metal picks or axes. The Wiltshire temples, therefore, are not of the stone age, but come down to the limit of the bronze period. On the other hand, we can find no trace of sculpture or incision on the stones. We have not, it is true, as in Egypt, an intermediate period of sculptured work intervening between our unwritten monuments and modern times; but we have a sign of what, in other parts of Europe, denotes immense antiquity. We can connect the cromlech-builders with a very early immigration from Asia. We recall the tradition of times when men "journeyed from the East," and when the use of bricks, which we can trace back without a doubt for four thousand years, was described as a substitute for stone. We have here enough, and more than enough, to suggest the extreme and venerable antiquity of these relics, which we have been accustomed to term Druidical; and we have pleasure in calling attention to the light which may be gathered from a yet more minute investigation of the relics of Avebury, or to the times when "there were giants upon the earth."

THE SOCIAL SCIENCE ASSOCIATION IN BIRMINGHAM.

CAREFUL arrangements have been made, many good papers have been prepared, and there is every reason to expect a successful congress. Amongst the special questions set down for discussion are, under the head of—

Education,

1. Is it expedient to make primary education compulsory; and if so, on what conditions?
2. In what form and by what means can instruction in science and art be provided, so as to promote the improvement of our manufactures?

In the Health department,—

1. Can the public hospitals and dispensaries of this country be so administered as to conduce more to the welfare of the community?
 2. What ought to be the functions and authority of medical officers of health?
 3. What is the relation of the water-supply in large towns to the health of the inhabitants?
- And in the *Economy and Trade* department,—
1. In what manner can arbitration and conciliation be best applied in the settlement of disputes between employers and employed?
 2. What are the social results of the employment of girls and women in manufactories and workshops?

A prize of 25l. was offered by Mr. W. R. Lloyd for the essay containing the best and most feasible plan for the temporary employment of operatives and workmen in casual distress. The essay to be read at the congress. Nearly eighty essays were sent in, and from them the council have awarded the premium to Mr. Arthur Arnold, barrister-at-law.

On Wednesday evening the opening address was delivered by the president, the Earl of Carnarvon. In the course of it the president said—

"Schemes of all kinds for an effective metropolitan water supply will next session come before us;—the storage of the Thames; the conveyance of the waters of the Welsh mountains; the sources of the Severn; the abundant but by no means inexhaustible resources of our great North-country lakes; and lastly, the as yet unknown recommendations of a Royal Commission that has now sat for some time past, and whose report is anxiously expected. Without venturing to anticipate, on such a point, the verdict of Parliament, I think there are some considerations that may be here briefly noted.

1. Though London, from its vast population and gigantic interests, has a special importance of its own, it is only one of many towns that suffer from a deficient water-supply; and I doubt whether the great manufacturing towns of the North would consent that London, great as she is in her population, her interests, and her

necessities, should intercept and appropriate that supply which they look upon as their own.

2. The relative merits of these two rival systems, distinguished by engineers as the intermittent and the constant supply, must be brought to a decision. Whilst 150 great provincial towns enjoy the benefits of a constant supply, the capital of England is dependent upon an intermittent provision. I hope that we shall, in the discussions of the week, hear it fairly elicited by fact and argument, whether or no there is, as is alleged, a serious waste of water under the constant system; and, if so, whether such a waste can be restrained by reasonable checks and supervision.

3. The question of a proper water supply is intimately connected with the purification of our rivers, and the restoration of their waters to all the purposes of domestic economy.

4. Hardly less important are the liberation and employment in the service of agriculture of all that matter which, whilst present in our rivers, poisons their waters, but which if once extracted would make the poorest soil rich.

Amidst the many questions which crowd upon the attention of such an audience as this, the consideration of how and whence a water-supply may be best obtained may seem humble and prosaic; but there is none which more closely affects the comfort and health and lives of men in our great towns. It is not too much to say that a good water-supply is a necessary condition to high civilization, which, if she too often exacts the sacrifice of many lives in the requirements of modern society, whether necessary or unnecessary, in the practice of unwholesome trades, in the crowded state of great towns, in the physical and mental over-work to which all classes are subject and which engenders disease and shortens existence, had at least the compensating merit, that whilst she consumes she also rates human life more highly, and proclaims in all her works that there is nothing so humble or so mean that science will not take account of it and true statesmanship ponder it, in order to add one week, or day, or hour to the average of life of the millions who are labouring with, and amidst, and around us.

But cleanliness and sanitary precautions, though powerful agents to morality, are not all powerful; and our artificially organised society is upheld and balanced by many provisions and safeguards. So long as human nature remains the same, the question that you propound for discussion, 'What are the principal causes of crime,' will always have to be asked, though it must receive different answers under different circumstances of national existence. But, whatever our wish and policy, one answer, at any rate, in an old and rich and populous country, will, I am afraid, be that the depraved and criminal classes, though they may be reduced in number, must always exist. That they can, indeed, be reduced, and considerably, must be the hope of the moralist, the statesman, and the Christian; or otherwise the course of legislation would be even more thankless and desponding than it sometimes is. But you proceed to the further question, whether 'Reformatory treatment should be extended to adults?' In a certain sense I answer, yes. Penal discipline may be, and ought to be, up to a certain point reformatory; but the reformation of the offender is not the only consideration: his punishment and the security of society are at least equally important. But the action of private individuals may usefully intervene where the State is powerless, and voluntary associations like the 'Société des Patronages' in France, and 'The Discharged Prisoners' Aid Society,' which are happily now common in England, may largely influence towards an amendment of life. Beyond this, I doubt whether the State can safely go, and mainly for these reasons:—

1. That our reformatory system seems to me chiefly applicable in its principles to the young.

2. That the law must presuppose a certain malice and deliberation in men of mature years, which it is willing, by a humane fiction, to ignore in children.

3. That with older men the confirmed habits of a life-time rarely admit of modification, still more rarely of absolute change. I personally have long entertained and expressed my opinion that repeated re-convictions, even for minor offences, ought to be treated with far greater severity than is now the case; and that for the sake of the offender, of society, and of the economical administration of the law, the withdrawal for any lengthened periods of the criminal from his companions and the opportunities of

crime, would be both the most effective and the most humane treatment.

Finally, I cannot, here in Birmingham, the centre of such great manufacturing and artisan life, pass by, without one word of recognition, the increasingly serious question of what is termed Technical Education.

I do not speak now of the technical education which the architect, the civil engineer, the merchant, the chemical manufacturer may require. Technical education for such classes as these has a very wide sense, and means instruction in mechanics, mathematics, physics, chemistry; and in this sense it is certain that the educational appliances at their command, and the special courses of study necessary for their training are much below their ordinary wants. I am rather looking to the technical education which can practically and advantageously be given to artisans. We are sometimes, indeed, challenged to define the meaning of this education. It would not be difficult to do so, but it can hardly be necessary in Birmingham, where I observe, by a recent Parliamentary return, that a school of art has been established since 1842, in which, during the past year, more than 1,000 pupils were under instruction. Let me only say, in passing, that if there is any one branch of such instruction more valuable than another to the artisan it is the drawing class. But the real defence and justification of technical instruction rests upon broader ground,—upon the necessities of that wide industrial competition with the other nations of the civilized world in which we are engaged. That other nations feel anxiety on the subject, that they are issuing commissions of inquiry, and are taking measures for the foundation of schools and institutes for securing a better technical education, is no evidence of our superiority—no argument for our acquiescence in the existing state of things. For my own national industry and skill is too close and severe to justify us in throwing away any chance that we can command; and though I have every confidence in English qualities, I doubt if our natural and acclimatized strength lies in those specialties of taste which have become necessary for many artistic productions. To the Englishman much has been given—the government of land and sea, colonization, the government of men; to the inhabitants of sunnier climates have been granted the instinct of form and colour, and that indefinable and almost nameless appreciation of what is beautiful, which we call taste. But, though we have it not by nature we may obtain some of it at least by education, and, inasmuch as taste is no longer the mere ornament of a cultivated and leisurely life, but has become an essential condition in the commercial existence of the nation, it is our duty somehow to secure it. I will only in conclusion say of all technical education—whether of the higher grades of professional life, or of those lower paths with which the manual labour of the individual artisan is concerned—that its basis must be laid in sound principles of elementary instruction; and that the later teaching is dependent upon the earlier.

I dare not enter here upon the question of State interference. I can only say that, within certain limits to be carefully defined, the State may, I think, afford aid and facilities for such a culture as I have indicated. At the same time, the principles laid down by a recent French commission, that the pupils should be mainly out-of-door pupils, that payment should be the fundamental rule, gratuitous admission wholly or partially the exception, and that the course of the instruction should be for not less than two years, seem to me substantially sound and right principles.

During the last year, we have all read the remarkable evidence published by a Royal Commission, appointed at the instance of working men, to inquire into the operation of that new and important phenomenon of modern civilization, called trades unions. That evidence has revealed the existence of a painfully unsatisfactory condition of things in some particular unions. It has exhibited a system of regulations at variance with all sound principles of trade, and, in some cases as oppressive to the ablest, as they seem unduly favourable to the least skilful, artisans; it has occasionally shown a lawless interference with employers, far in excess of the limits of that legitimate competition, which, though sometimes, perhaps, injurious to both masters and men, is yet strictly within the

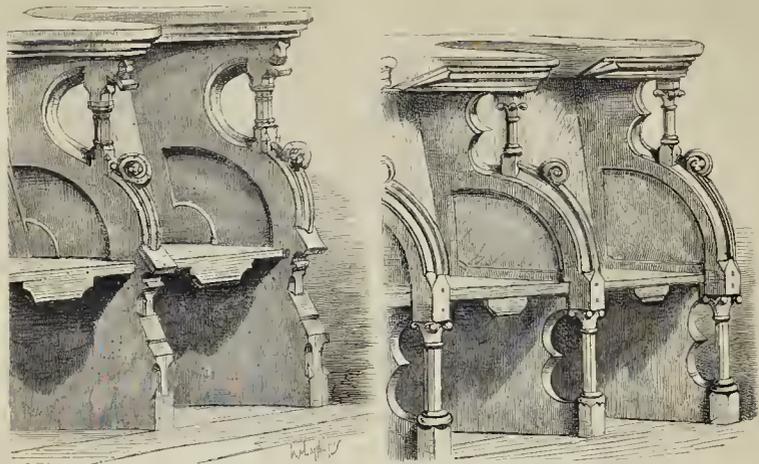
right of the latter; it has revealed the loss inflicted upon the great body of the nation,—the purchasers and consumers,—by the unfortunate discords of employers and employed, and by the injury done to the powers of industrial production; and, lastly, it has brought to light an amount of crime and outrage in particular unions, on the part of individual members of their executive, which has amazed and terrified the whole country, and which every right-feeling man, be he workman or employer, will not hesitate utterly to condemn.

But, whilst yielding to none in our abhorrence of the lawless and detestable crimes which have been committed under the sanction and in the supposed interests of certain unions, I sincerely hope that we shall not confound the existence of trades' unions with the crimes of which some individual members of their bodies have been guilty. *Abusus non tollit usum*; and if legislation on the subject is to be sound, the legislator must recognise the fact of the existence of such societies, and must do justice to what is fairly to be urged on both sides of this delicate question. I will endeavour to state some, at least, of the principal considerations which appear to me to affect the question, and which we may properly bear in mind during our discussions of this week.

On the one hand, it is untrue to deny to the trades' union all advantages and merits. As a benefit society it has an unquestionable value, and as an association for the protection of certain classes of workmen, against the possibility of undue pressure in particular circumstances, and at particular periods, by the preponderating influence of capital, it may also be beneficial. Wages, indeed, are generally defined as the working-man's share of the common product of capital and labour, and their amount must doubtless be regulated by the general law of demand and supply. This is a law deeply laid in the nature of things, against which it is worse than idle to contend. It is true not only in abstract theory, but in practice, if only a sufficient length of time be allowed in which it may work out its conclusions; but as a matter of fact the labourer has in former years been frequently too ignorant of the value of his labour, or too much at a disadvantage in his dealings with the capitalist, from the difficulty and expense of transferring himself from one market to another and from other causes, to enable him to make his terms. I am, therefore, ready to recognise in the union a protection to the labourer and an agency by which he may secure reasonable conditions in what is and must be a bargain between him and his employer. Nay, more, I can recognise, in the idea of the union, principles, however imperfectly developed, of mutual help and brotherhood, and an organisation which might educate workmen indirectly to those habits and that knowledge of business which I believe it is equally for the interest of his employer and for his own, that he should possess.

On the other hand, we must not allow any sophistry to blind us to the anomaly of combining the functions of a benefit society with those of an association for the enhancement of wages by means of strikes and such other expedients. It is an unnatural union, prejudicial perhaps to the association itself and to society at large, an *inceps usus*, a two-edged purpose, as it has been well termed, to which the funds of the body are applied. They are raised for peace, but they are applied to war.

"Fortunately, we need not look to arbitration alone for a solution of that labour question which seems sometimes so perplexing a problem in our present phase of modern commercial life. I have great faith in the sister principle of co-operation, if fairly and prudently applied, by which I mean both the union of workmen amongst themselves primarily and principally for the sale and purchase of articles of consumption, and the union of workmen and capitalists for the purpose of industrial partnerships. An instance of the first kind of co-operation is to be found in Messrs. Briggs's colliery, where we have seen, as its results, an improvement in the workmen's condition, increased profits to employers and a complete absence of strikes. We have an illustration of the second form of co-operative enterprise in the well-known history of the Rochdale Pioneers, an enterprise leading from small beginnings to almost gigantic results. Co-operation is, as yet, I believe, in its infancy; and yet nowhere but in England have we the same prospect of success, because no-



STALLS AT WÜRZBURG, BAVARIA.

where but in England has the enterprise been launched upon such sound principles. In Germany co-operation has mainly taken the form of societies of credit, and is, if I rightly understand the case, too much trammelled by State interference and protection. In France some of the associations have been formed on unscientific principles, some have been mixed up with the theories of political dreamers; whilst of those which have been successful the majority have assumed the character of societies for the purpose of production. In America, agitated as she already is by trade controversies, I believe co-operation to have made but little progress. In England alone it has had its origin, in what is probably the safest and best foundation, a society for the purchase and sale of stores and provisions and of articles of consumption, capable of expanding as time and circumstances may warrant into associations for the purpose of production, as in France, or of credit, as in Germany. In England, co-operation has stood free from State interference on the one hand, and from demagoguism on the other. It has, in fact, reflected some of the best of our English qualities,—good sense, and the practical adaptation of available means to the ends desired and the necessities of the time; it is accepted by most reasonable men of all opinions; it is at variance with no principle of political economy, no instinct of human sympathy; and it promises, I think, before long, to give to the working man many of those comforts and luxuries which have hitherto been only within reach of a far wealthier class. Whatever be our point of view, on any cordially wish it well, and accept it as one, at least, of the means granted us towards a solution of a most difficult problem."

On Thursday and Friday addresses were delivered in different departments, and papers were read and discussed. On Friday evening a working men's meeting was to be held. On Saturday, Lord Lytton, president of the educational department, will deliver an address, in the Friends' Meeting-house; and at eleven the departments will meet in their respective rooms to read and discuss "voluntary" papers. The sections will this day rise early, probably about two o'clock. Time will be allowed for lunch, and then a special train will convey members and others to Dudley, where they will be met at the station by Mr. Frederick Smith, who will conduct them through the caverns and the castle. The Earl of Dudley has been kind enough to order the caverns to be illuminated. The train will meet the party near the place where they come out of the castle, and it is expected that it will be able to arrive in Birmingham early in the evening.

STALLS IN CATHEDRAL AND NEW MÜNSTER CHURCH, WÜRZBURG.

We give sketches of two sets of stalls at Würzburg, in Bavaria. Those in the New Münster church are thirteenth-century work, and those in the cathedral fifteenth century. The latter are in the south aisle of the nave. They were removed from their original position in the choir to make way for the Rococco abominations which at present disfigure that portion of the cathedral.

FROM MELBOURNE.

AMONG buildings recently commenced, and of large proportions, with architectural features, is a warehouse now in course of construction on the north side of Flinders-lane, near Swanston-street. The style of architecture is Romanesque. The windows throughout are to be thrown into groups, and those on the ground-floor will be segmental headed. The building has a frontage of 48 ft. to Flinders-lane by a depth of 157 ft. It will be 78 ft. high, and will consist of six stories, including the basement. The several floors will be supported by ornamental iron columns, and the whole surmounted by a bold cornice with brackets carrying a pierced parapet. The contract price is 12,817l. 10s. Messrs. Reed & Barnes are the architects, and Messrs. Wood & Ireland the contractors.

The design for the new bank intended to be erected in Collins-street East, by the National Bank of Australasia, is that prepared by Mr. Lloyd Tayler, architect, and was selected in competition from among upwards of thirty other designs. The style is Palladian. The author appears to have aimed at producing a massive effect, avoiding as much as possible the use of minute mouldings and sculptured details, which, executed in the best freestone at command, would be the first parts of the edifice to suffer from the effects of time and exposure. The façade has a base of bluestone, above which it is constructed entirely of freestone. From the base rise coupled columns, and an entablature of the enriched Doric order. A balustrade separates this from the upper order, which is Corinthian. There are four floors altogether; the ground-floor rooms being 22 ft. high; the next floor, or "mezzanine," 10 ft. high; the first floor, 15 ft. high; and the topmost floor, 11 ft. high. The architect has received instructions to make the whole mezzanine fire-proof for the documents to be deposited there. The plan of the bank is a modification of all those at present erected in Melbourne. The entrance from Collins-street

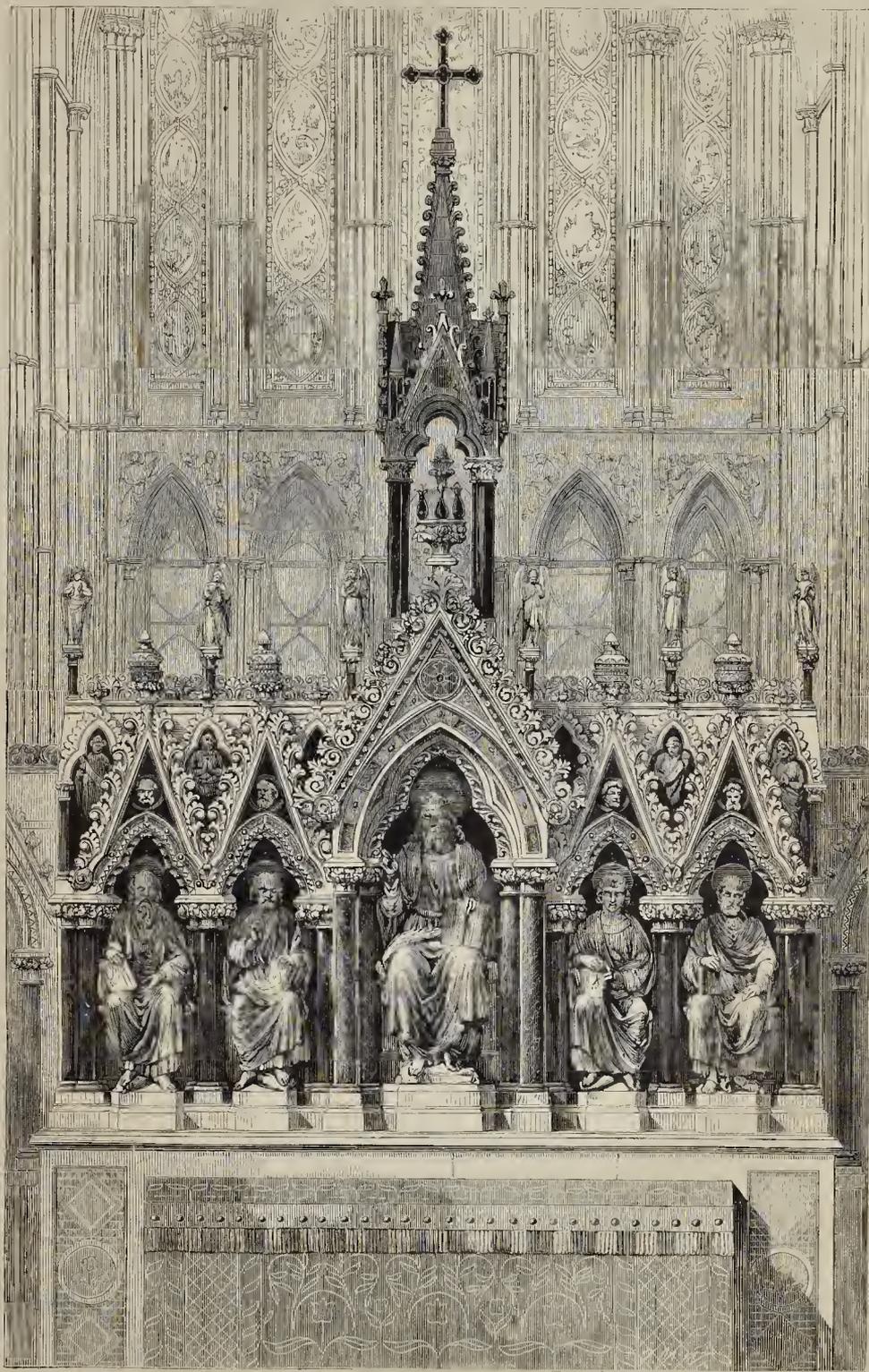
does not open immediately into the banking-room, as in the Bank of New South Wales, nor does it lead into a long passage with suites of rooms on either side, as in the Bank of Victoria and the London Chartered Bank, but through a circular vestibule, 20 ft. in diameter, surrounded by detached columns with niches between, leaving only one room on each side before reaching the banking-room. The banking-room is rectangular in plan, and measures 62 ft. by 53 ft. It is 32 ft. high to the springing of the dome. The dome is divided into enriched compartments, with a circular ceiling-light in each. The ceiling-lights are lighted from external skylights, so that the heating effect of the sun's direct rays is avoided. The dome springs from eight Corinthian columns, which are all placed behind the different enclosures for the clerks, so that they neither obstruct them nor the public in the transaction of their business. Two premiums, each of one hundred guineas, were offered by the Bank for the best and second best design.

REREDOS, WORCESTER CATHEDRAL.

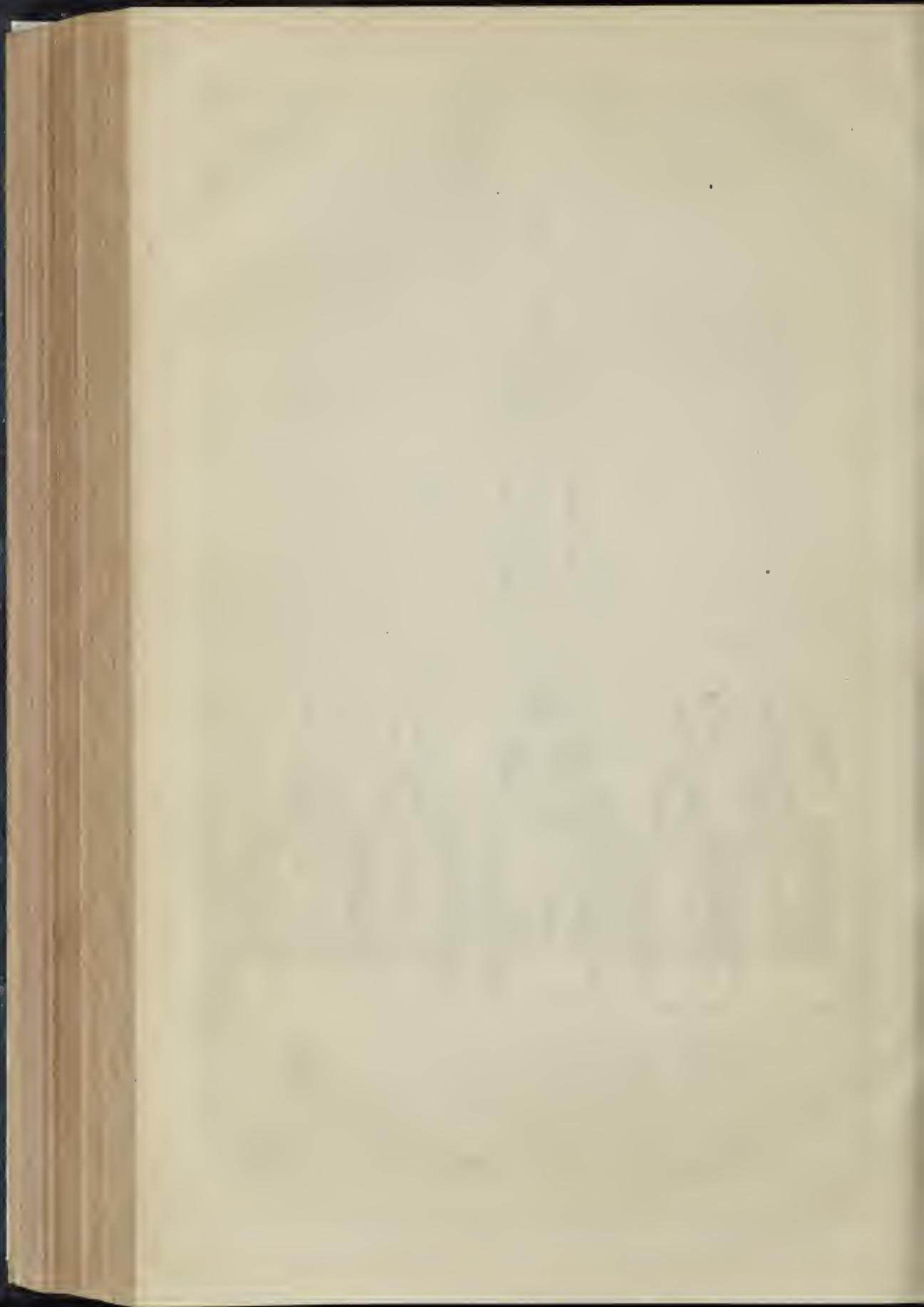
A HANDSOME reredos has been set up in Worcester Cathedral. It is scarcely finished, the steps not being laid yet. A screen connects it with the sides of the chancel. The materials of which the whole is composed are rich. The general structure is of varied alabaster. The columns are of verde antique, sanguine red, and Cornish spars. Plates of marble and mosaic are introduced. The jewels are of lapis lazuli, malachite, and Derbyshire spars.

The reredos and screen present a series of canopied arches. The five centre bays contain statues of Our Saviour and the four Evangelists, all seated, two on either side of the Saviour. The columns are adorned with carved clustered caps and bases. The whole is supported by a dado enriched with diapered work and jewels in rosso-antico, and rich spars.

The steps to the altar-table will be of marble mosaic. An elaborately carved cresting runs along the entire length of the screen and reredos. We should point out that the centre bay of the reredos is loftier than the rest, and above this rises a crocketed canopy terminated by a slender cross. Six figures of angels, upon dwarf columns, assist in enriching the front, and breaking the line of cresting. They are placed one at each end and at the intersections or springing of the canopies. There is a head under the apex of each canopy. The work has been executed, from the designs of Professor G. G. Scott, by Mr. Farmer; Mr. W. Terry having superintended it through the workshops.



RESEDS, WORCESTER CATHEDRAL. — PROFESSOR G. G. SCOTT, ARCHITECT; MR. FARMER, SCULPTOR.



THE SANITARY CONDITION OF GUILDFORD.

FEVER at Guildford has become a serious matter. There have now been about 600 cases, and forty deaths, in a population of about 10,000 inhabitants. Since our last notice of the case, the water has been analysed both by Dr. Letheby and Dr. Hassall. These gentlemen seem to differ in their result, and the local board have resolved that Dr. Hassall should make a second analysis. Dr. Letheby states that there are unmistakable evidences of pollution from surface drainage; and his opinion is that though at present the water is not unfit for human consumption, it may at any moment become so. The chief constable of Surrey writes to the *Times* to state that it is of no use the Mayor writing to show how healthy Guildford has been in past years while fever rages as it now does, and urges that steps should be taken to purify the town. The medical gentlemen practising in the town, to the number of five, have waited on the local board to make a combined representation of the increasing spread of scarlet fever, and the urgent necessity that exists for the provision of a fever-house for the reception of new cases, and also a house where clothes, bedding, &c., may be disinfected. Mr. R. Eager, surgeon, who introduced the deputation, stated that there had been nearly 600 cases of fever and thirty-seven deaths, and that the malady was still spreading. The board resolved to take immediate steps to provide a fever-disinfecting house.

LEGENDS IN STONE.

FROM the earliest times man has availed himself of the endurance of masonry to write upon it facts which he wished to perpetuate. The wandering Israelites, we know, as they neared the land flowing with milk and honey, were commanded to write the words of the Lawgiver upon the door-posts of their houses and upon their gates; and this indication of the capabilities of structures to bear witness, and at the same time to remind and record, has been accepted in many countries during the progress of civilization. Both Moses and Joshua, we are told, wrote the law upon stones; and it was upon the wall of the palace of Belshazzar that the wondrous writing appeared which held that monarch's fate. The remains of Assyrian buildings uncovered in our own times show us that inscriptions were sometimes used as a decorative feature. The ruins of ancient Egypt and of ancient Rome tell us of the same practice in those lands. The eyes of those who entered a Roman dwelling were arrested by an inscription, and those who departed from a building were bidden farewell by another. Every temple, every piece of architecture in fine, was enriched by inscriptions, and we find the deserted quarries the Romans used also lettered to tell their history. And coming northward, still in old times, we find runes treated at once as an ornament and a record, in a border-like arrangement round the edge of memorial stones. This feeling for inscribing upon stone has never left us, though there may have been intervals when it has been set aside. In the Middle Ages it took various forms. We know not whether the Saxon "unlocked his word-hoard" to grace his folkstead; nor whether the Norman attempted to enrich his "earth-house" by this means. When learning was still the gift of the few, the noble placed his heraldic device over his portal, or around his towers; for in those days these would have been more easily deciphered than letters. The ecclesiastic, again, placed the device of a generous donor to the church on some conspicuous place about it, to tell of his munificence. But as the darkness of ignorance rolled away veritable inscriptions took the place of these pictorial substitutes. The lintels of doorways, panels set in the front of houses for the purpose, labels, hands, were inscribed with short sentences, generally of a religious fervour. Thus, over an inner doorway of the entrance into the hermitage hewn out of the rock that rises out of the green shady bank of the river Coquet, in which the unhappy hermit of Warkworth used to dwell, there is a black-letter inscription which seems to take the place of the voice of salutation. It is in Latin:—"furrunt mihi largitur mura panis dat nocte."—"My tears have been my meat day and night." Have we not here the compressed

history of the sorrows of a life expressed in this passage from the Psalms?

In the Elizabethan era the custom of inscribing upon the fronts of houses distichs, quotations from Scripture, memoranda of various sorts, though generally relating to the ownership or date of the building, was quite in vogue in England. On an old house at Tarporley, in Cheshire, the two following curious distichs, accompanied with the crest and initials of Ralph Done, four other crests, and the coat of Arderne, were inscribed at this period:—

"Ralph Done Esquier, the Lorde of thys place
Was an aide to this buldyng in every case
JEON WINTER 1586."

"Feyns quoth Jehn Newson hath kept hys promys just
In buldyng of this house in August.
ANNO 1555."

Over the principal doorway of Dutton Hall, in the same county, may be read, "Sir Peyrs Dutton Knight Lorde of Dutton, and my lady Dame Julian his wyfe, made this hall and huylding, in the yere of our Lord God MCCCCXXIII, who thanketh God of all." And over the great window of Little Moreton Hall, still in the same county, runs the following inscription, carved in the woodwork:—"God is al in al thing.—This wyndows where made by William Moreton in the yere of our Lorde MDLIX. Mycharl Dale Carpenter made this wyndow by the grac' of God." The pleasant cider county has several examples on the old gabled houses that nestle among the orchards. In Tiverton there is an Elizabethan almshouse, very quaint and precious, with an open gallery in front of it, that has this inscription upon it, if the hand of the despoiler has not erased it:—

"John Waldron, merchant and Richard, his wyfe
Buldyd this house in tyme of their lyfe
At such tyme as the walls wer fourtyne foote hie
He departed this world, even the eightynthe of Julye
A.D. 1579."

And in the parish of Walborough, over the door of the hospital founded by Lady Reynalls, in the days of Charles I., for the widows of clergymen, about half a century after this, it is written,—"The widows house 1638.

"It strange a prophets widows pore should be
If strange, then is the Scripture strange to thee."

The writing over the doorway of the house in Rochester frequented by the famous "Seven Poor Travellers" will doubtless occur to many of our readers. There is another pithy inscription on the masonry of a house, far away from the smiling hop county, viz., in Alnwick. It is over the doorway of a long, low, two-storied house, and says,—

"That which your Father
old hath purchased and Left
You to possess do You dearly
Hold to shew his Worthiness.
M. W. 1714."

Sometimes we meet with a repetition of a favourite inscription. "God's Providence is my inheritance" is one chosen by more than one ancient charitable institution. How modest, reliant, and becoming such sweet-savoured sentences appear compared with the self-asserting vanities with which churchwardens and other public officers have, in later days, defaced structures to which additions and repairs have been made during their tenure in office!

Inscriptions of a similar class are frequently found in the interior of houses. In the picturesque manor-house at Ockholt the motto of the Norreys occurs over and over again:—"Feyth fully serve." The mantelpieces are often made the record of the name of the person who built the house, or his coat of arms and the date. In the old parsonage-house at Meppenshall, Bedfordshire, now demolished, there was a curious inscription. The gallant old place, surrounded on all sides by a moat, stood on the confines of the two counties of Bedfordshire and Hertfordshire, and the writing in question, which was carved on a beam in the dining-parlour, bore reference to this circumstance:—

"If you wish to go into Hertfordshire,
With a little nearer the fire."

The cornices of rooms were often inscribed with legends. In an ancient room preserved out of the ruins of Crendon Abbey, Buckinghamshire, the cornice was inscribed, with the Stafford knot, the words, "En lui plaisance." Legends were also sometimes placed over the windows, as in the vicarage-house at Colyton, huilt by Thomas Brerewood, vicar, in 1529, where might be read, "Peditatis totum, meditatio totum." The walls and ceilings of Leckenfield and Wressel were decorated with mottoes.

It is not surprising that this hoary old-world lettering should have a charm for most minds imbued with a love of antiquity. Sir Walter Scott introduced it as a feature of some of the mansions he describes. Waverley, we call to mind, found "Bretar the Baw" frequently repeated upon the bartizans and turrets of the Baron of Bradwardine's manor-house of Tally-Veolan; and the Quaker's pleasant parlour, known to Red Gauntlet, bore upon its chimney front the wise bidding to all who entered to "Trust in God." The great artist knew the mention of these writings would bring a swifter and more vivid realization to his listener's mind than any other word-painting could give.

In modern times crosses and other masonry on the sites of ancient heroic actions have frequently been inscribed with notices of the deeds that have been enacted near them in past centuries. Thus a clergyman has caused to be engraved upon a stone, near the Lady Chapel at Bothal, two dozen lines of the old poem that relates the death of Sir Bertram, beginning,—

"Thei schot hym downe on ye Elston-rigg,
Wher stands ye headless crosse,
Thei left hym swomen in hys bloude
In ye cold moor and moose."

We occasionally meet with inscriptions on the exterior of churches as well as in the interior. The principal fronts of the rich old abbeys were sometimes, too, thus embellished; and less important parts, such as the towers of the entrance-gates were, perhaps, still more frequently so treated. On the entrance-tower of Ford Abbey, Devonshire, below the battlement, runs a Latin inscription,—"An^o Dni millesimo quingesimo vic^o octo A Dno factum est Thomo Chard Abb." This Thomas Chard, whose bull-munch of the fabric, was the last abbot. The ruined Hartland Abbey once possessed a Latin inscription which ran thus:—"Istud: quadratum: claustrum: . . . et edificatum: marmoreo: lapide: perfect: sumptibus: ac: annis A . . . Abbatis: et: arte: Johis: Ewome: sit: et: gr:." But this has disappeared. In the Umerleigh aisle of Asherington Church, Devonshire, we read,—

"God save the church, our Queen Elizabeth, and realm
And grant us pees and truth in Christ. Amen."

And in Tiverton Church, in the same county, on a frieze on a chapel built by a rich merchant benefactor of the town, and elaborately decorated with the arms of the great companies of which he was free, his mercantile mark, anchors, woolpacks, waves, ships, and boats, probably to denote the means by which he made his fortune, is written,—

"Have grace, ye men, and ever pray
For the souls of John and Jone Greenwaye."

This approaches to a memorial character of which there are too many examples to permit of them being incorporated with the present selections; though it is probable it may have formed part of the original design, as a monument inlaid with brass indicates the tombs of these worthies. On the impost moldings of one of the arches of the tower of Sunninghill Church, Berkshire, is an inscription read thus:—"Undecimo Kalendas Martii obiit Longus Presbiter," which, however, we include on account of the peculiarity of its position. In the chancel of Coryton Church it is written,—

"This was a grateful priest: his wealth the small,
He to his patron gave, who gave him all."

Around the base of Lanneston Church, Cornwall, is a range of shields, on each of which is inscribed a letter, which, if commenced to be read from the south side, forms the following legend:—"Ave Maria gratie plena, Dominus tecum sponsas, Amat sponsam Maria, Optimum partem elegit, O quam terribilis ac metuendus est locus iste, vere aliud non est hic, nisi domus Dei et porta celi." The doorway of Dinton Church has another curious Latin inscription. It is in Roman capitals:—

"PREMIA PROMERITISSIGDESFPITHABENDA.
AVDIATHICPREETASIBIQVESITRETINSIDA."

The same county can show us another example. Under the east window, on the exterior of the chancel of the parish church of North Crawley, built by Peter de Guildford, rector, who died in 1321, runs,—

"Petrus cancellum tibi dat Firmine novellam,
Ut cum lauderis Deo, Zetri memoreris."

The font in Auroc Church, Northumberland, we may quote as a sample of inscriptions of a post-Reformation character. It says, "God his this church. R. M. W. Anno Dom. 1670."

Upon a beam of the roof of the wayside-chapel on Wakefield Bridge there is now carved "Verbum caro factum est. Gloria in excelsis Deo."

Melrose Abbey has several curious inscriptions. In a churchyard, on a tombstone, may be read the following vigorous lines, which, with slight variation, have, within the last few years, been inscribed on a panel and inserted on the north side of the ancient Edwardian pele tower, incorporated with the vicarage-house at Shilbottle, Northumberland:—

"The earth goeth On the earth Glistring like gold The earth goes To the earth Sooner than it wold.	The earth builds On the earth Castles and towers The earth sars To the earth All shall be ours."
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On the west side of the south transept there are two inscriptions, which, taken in connexion with a shield close by them bearing compasses and fleur-de-lis, seem to indicate that the French architect here left a record of his courtship of a Scottish muse:—

"John: Andro: sum: hym: callit:
was: E: and: born: in: parysse:
certainly: and: had: in: keeping:
al: mason: work: of: saint:
drams: pe: hys: kirch: of: glas
gu: melcos: and: paslay: of:
nyddysdappil: and: of: galway:
pray: to: god: and: mari: bairth:
and: sweet: sant: iohn: to: keep:
this: baly: kirch: fra: skaith."

The second is still more Scottish. We give it a modern reading first, to assist in its deciphering:—"As the compass goes round without deviating from the circumference, so, doubtless, truth and loyalty never deviate. Look well to the end, quoth John Murdo."

"A gair pe compas roun about
sa truth and laite de, but doute
schaulde to pe hend e, iahie murdo."

Another touching, stirring kind of writing on masonry is that which State prisoners have traced on the walls of the dungeons in which they have been confined. Here we have wite reflections, expressions of faith, tender remembrances of absent and loved ones, records of facts, dates, names, initials, and oftentimes devices of considerable skill, both in design and execution. Of English State prisons, the Beauchamp Tower, in the Tower of London, has probably the largest number of these memorials. Whilst the Cheshire carpenter, Ryehard Dale, was making the great, low-window at Little Moreton Hall "by the grace of God," there was a prisoner languishing in this stronghold, by name William Rame. Nothing is known of him, neither his offence nor his fate. But we can tell, as the bright spring days went by, he solaced himself with writing on the wall, for his work is to be seen at this day. It reads like a string of sad proverbs, setting the "howse of mornyn" before the "howse of banketing," and is dated April, 1559. His mourning, or lamentation, has a consolatory tinge in it, which, it is to be noticed, is very general in similar inscriptions. The peril of the prisoners, the proximity of death, their alternations between hope and despair, perhaps, too, a certain dash of adventure that must have been in most of their minds when led to take part in the enterprises or plots for which they were incarcerated, seems to have led many of them to look upon their lives as a journey just concluding. "A passage perillua makethe a port pleasant," wrote Arthur Poole, in 1568, on the piltless walls of the same tower; and "Per passage penible passens a port plaisant," wrote Thomas Rooper, 1570. The unfortunate Duke of Norfolk expressed the general feeling of those confined for their religious opinions when he wrote over the fireplace of this prison-house some Latin verses to the effect that the more suffering for Christ in this world, the more glory with Him in the next; and near a loophole, "If is a reproach to be bound in the cause of sin, but to sustain the bonds of prison for the sake of Christ is the greatest glory." "My hope is in Christ," "Typing stand and here thy cross," are specimens of this feeling. The great benefit to be derived from patience is frequently laboriously set forth by the languishing souls in durance. "The most vnhapy man in the world is he that is not patient in adversities, for men are not killed with the adversities they have, but with ye impacione which they suffer," wrote Charles Bailly, among other records of sighs and anguish, in

1571. "Grief is overcome by patience," wrote G. Gyford on his prison wall in August, 1586, when "Ralph Done, Esqnyer," was rejoicing over the completion of his house at Tarporley, and causing his delight to be engraved on the front of it. Some of the luckless ones learnt wisdom from their confinement, and perpetrated their conclusions on the stones, that so grimly kept them fast. "Wise men ought circumspectly to see what they do, to examine before they speake, to prove before they take in hand, to beware whose company they use, and, above all things, to whom they trust," wrote the young gallant Charles Bailly, who has recorded he was twenty-nine years of age when he arrived in England from Flanders, hearing letters in cipher for Mary, Queen of Scots, advising her of an attempt about to be made in her favour, and was seized on landing at Dover, and committed to the Tower.

"I leve in hope and
I gave credit to my frin
do in time did stand me
moste in bande, so woulde
I never do again excepte
I hade hime sver in bande and
to al men wisho I so vnles ye
evstaine the leke lose as I do."

bemoaned Thomas Clarke, 1576. "As verduc maketh life, so sin causeth death," another unfortunate incised upon the stones. But of all the memorials in this sad chamber, the most touching is the iteration of a woman's name. Graven on the stones, twice repeated, at some distance apart, we seem to have before us all that could be rendered into words of a burst of passionate anguish,—"Jane, Jane!" For this was the prison of Lord Guildford Dudley, the husband of the accomplished, youthful, and amiable Lady Jane Grey. Let us hope their terrible "perilous passge" ended in a "port pleasant."

Except in very occasional instances, we have left off writing upon our houses. We seem to have reserved all writings on stone for perpetuation of the memory of the dead on their tombs. But surely we are suffering a practice to fall into oblivion that has many things to be said in its favour. Especially all restorations of ancient work should be furnished with tablets recording the fact, for the enlightenment of posterity. It is not to be contested that inscriptions of suitable character, sense, situation, and size add an interest to a fabric, especially after the lapse of years. Does not the distich over Lady Lucy Reynall's hospital give us an insight into her pious mind, and makens picture her, as we fear her considerate provision reveals her to have been, a "poore widowe" in weeds and wimple? Do not the quaint Tudor lines of John Waldron, and Richard his wife, of John and Jane Greenway, help us to portray these worthy merchants and their partners as fit members of the class of wealthy, successful merchant-adventurers, or merchant-princes, of which Edward Osborne, Thomas Gresham, and Richard Whittington are world-known examples? They are voices. If we would know a man, let us hear him speak; and these have spoken to us in this fashion.

ANAGNI CATHEDRAL.

AMONG the old towns in the Papal States least frequented, but well worthy to be visited by tourists, Anagni, the Anagnina of the Hernicians, to which Virgil gives the epithet "dives," is picturesquely conspicuous, and, seated on the long ridge of an isolated height amidst the cultivated uplands of the Frosinone province (anciently Latium Novum), looking towards two noble ranges of mountains: the Hernician on the east, the Volscian on the west: this decayed city, chosen residence of so many Mediæval popes, seems from a distance far more imposing and prosperous than it proves to be on nearer view. Among its tortuous, gloomy, and labyrinthine streets, one is often surprised by the relics of past magnificence, in fronts or fragments of fine architecture, porticoes with arcades, arched windows divided by colonnettes, Corinthian capitals and classic frieze; or, it may be, some nondescript animal-head, or other Gothic fantasy cut in marble, set into the rough stonework of modern houses. The Communal Palace, but a remnant of what it was as built in the fourteenth century, stands a heavy pile of sombre and imposing effect, pierced by a broad cavernous archway, with some fine old windows of three lights, under acute arches, divided by

colonnettes, and framed in mouldings; armoial shields in stone emblazoning its dusky fronts, both on the sides of the streets and on that overlooking a court. But our principal business at Anagni is with the cathedral, noticeable on account both of its architecture and its contents, historic through its association with the memory of several pontiffs among the most illustrious of St. Peter's successors—particularly the high-spirited and unfortunate Boniface VIII. Local tradition states that the first bishop of this see was consecrated by St. Peter in person; and it is certain that its prelates may be counted in unbroken succession up to the seventh century. The actual cathedral church had origin in the eleventh century, though, no doubt, much altered in later ages, and in many details, especially those in the interior, indicating the style of the thirteenth and fourteenth centuries; the first historic notice of it importing that the primitive church on this site (referrible to very high antiquity, we may assume) was enlarged and embellished, probably quite renewed, by the Greek Emperor Michael (A.D. 1071-78), in gratitude for his recovery from illness through the prayers and merits, as he believed, of Peter, a canonized bishop of Anagni; but it was not till A.D. 1107 that the renovated edifice was consecrated by Alexander III., a pope who spent several years in this city, and who within this church's walls performed the canonization of St. Bernard; as it was in this same cathedral that St. Clara of Assisi was canonized by Alexander IV., A.D. 1256; that the Emperor Frederick II. was excommunicated by Gregory IX., A.D. 1227. The architecture actually before us presents an example of the transition between the Early Romanesque and the Italian Gothic, the round and the pointed arch being here placed together, though the former predominates both interiorly and exteriorly; instead of the coffered ceiling in flat woodwork, as common in Rome, is the stone vaulting over nave and aisles; and, instead of the classic columns (seen in Rome's basilicas), are heavy built-up stone pillars alternating with quadrate piers. The plain façade terminates in a gable, but the original form is lost owing to the raising of lateral walls above the lean-to roofs of the aisles, still visible under the more modern stonework. At each side of the single round-arched portal on this façade are set into the walls a variety of friezes, classic and barbaric, nondescript animals in rude relief, among other details, pieced together without plan or symmetry. Three apses project from the eastern end, behind the chancel, the central and largest of these with an arcade gallery near to its summit, at the springing of the arches in which gallery fantastic animal-heads alternate with the capitals of columns, neither shafts nor capitals being in those alternate spaces. Near one angle of the façade projects a quadrate structure, on whose outer front we see the outline of a walled-up acute arch, lofty and spacious, sufficing to indicate the former existence of an atrium with Gothic arcades, demolished in all but the portion now converted into a lateral chapel entered from the corresponding aisle. A lofty campanile, with walls that batter (or lean inwards), and stories of arcade-windows divided by colonnettes, stands isolated, at some distance from the façade, a remarkable structure, referred to the eleventh century, and indeed one of the best examples of the Mediæval belfry in these parts, though much maltreated by modern restorers, the ancient arched doorways being walled up, and the arcades, on one side, converted into large windows without any architectonic character. On the northern side of the church, high up near the cornice, is an arched recess with canopy and columns, containing a colossal statue of Boniface VIII., seated on a throne, in full pontificals, with one hand blessing, with the other holding the keys,—a figure rude in execution, but of marked character and dignified individuality, reminding of the recumbent portrait statue on that Pope's tomb at St. Peter's by the Florentine Arnolfo; but as to the authorship of this singular work, placed in so singular a position, on the Anagni Cathedral, we regret our inability to give information. The noticeable details in the interior of this church are,—the rich intarsia pavement of coloured stone; the massiveness of pillars and pilasters that support rounded arches, their capitals of the most rude simplicity, with fantastic animals coarsely sculptured, above the abacms in some instances; the wagon-vault roof of the nave; the elevated choir, and high altar under a graceful white marble canopy, with four

columns supporting architraves, a double story of light colonnettes above, and pyramidal roof, surmounted by a lantern of open work with globe and cross on its apex.

But the most onrions, and no doubt oldest part, is the dim-lit crypt, divided into three aisles by columns, with light abacts and barbaric capitals, dimensions and orders different, the vaulted roof resting on stilted arches, three small apses projecting behind as many altars, and the whole extent of walls and vaulting covered with ancient frescoes, now in great part faded, many groups being totally effaced. These quaint pictures are believed (our authority is an intelligent canon of this cathedral) to be of date within the twelfth century. Among the best preserved are: "Christ Blessing (in the Greek form) with four Apostles beside Him," "Christ amidst the four Emblems of the Evangelists," "The Blessed Virgins amidst female Saints," "The Divine Lamb worshipped by the twenty-four Elders," who all wave censers; "St. Magnus, patron saint of Anagni," a seated figure, in episcopal robes, of some dignity; also groups of apostles, among whom St. John appears most frequently, and in each instance with a scroll in his hand, displaying the words, *In principio erat Verbum*. Not all, apparently, of the same date, these paintings are all characterized by more or less of rudeness and quaintness, the outlines of some figures being about half an inch thick; the expression in others rather pleasing, however childlike the incapacity manifest, and the general style of drawing either absolutely barbaric or giving some faint indication of the dawn of a better day in art-history. It would be interesting to confront these works with the wall-paintings lately discovered in the ancient, and now untenanted, *S. Clemente* at Rome.

In the sacristy of this cathedral is a very rich assortment of sacred objects,—vestments, censers, mitres, &c., no longer used, but now exhibited as curiosities, and all, we are glad to find, photographed for sale, in such copies, at a Roman establishment. Interesting are the numerous vestments, copes, chasubles, and dalmatics that belonged to Boniface VIII., and were all presented to the church by him; their texture of woven gold, covered with figures in needlework, the aggregate forming a most valuable monument of thirteenth-century art,—if we refer them to the last years of Pope Boniface, who died A.D. 1303,—of fourteenth-century art; and, indeed, hearing any comparison to the designs of Giotto, and scarce showing more than ambiguous emancipation from barbarism. The subjects of the groups are Scriptural, legendary, and hagiographic. Among several scenes of martyrdom are the deaths of apostles, the Suffering of St. John in the Caldron of Boiling Oil, St. Denis carrying his severed head in his hands, and (interesting to English eyes) the decapitation of the Saxon king, St. Edward (supposed to death by the Danes A.D. 870), and the murder of St. Thomas à Becket, who is represented kneeling, whilst three armed assassins attack him, and one cleaves his skull with a long sword, opposite being seen the king, standing in a kind of tribune, hung with colored cloth, in the attitude of one who gives orders,—a curious testimony to the idea admitted at the Papal Court as to the degree of King Henry's complicity in the death of the archbishop! Among legendary subjects, most singular are those from the story of St. Nicholas, who, in one group, appears in the act of causing two devils to fall from their pedestals, by virtue of his prayers; in another, discomfiting the demon of the Storm—an ape-like monster—who seems responsible for a tempest on board of a ship out at sea. The Holy Trinity is represented with Father and Son, almost identical in type, age, and attitude, each in the act of blessing, seated beside each other on thrones, with the dove, in an oval nimbus, between. Most complete and best preserved are the Mysteries of the Gospel, from the Annunciation to the Ascension, with the additional legendary subjects of the Transist, the Assumption, and the Coronation of Mary, each group within a circlet on the gold base of a *lumeral*, or veil for enveloping the shoulders at the rite of benediction.* A singular detail in the Annunciation scene, among these groups, is the manner in which the dove approaches close to the ear of Mary, commandingly to the majestic idea respecting the birth of her preternatural conception expressed

in an ancient hymn. But the veritable gem of the set is an altar-pallium, also presented by Pope Boniface, embroidered with figures of groups from designs ascribed to Giotto, and all, we should say, worthy of the great Tuscan master. The subjects range along two files. On the upper, the Virgin, with sweetly serene countenance, seated on a throne, the child on her lap; two archangels and six apostles each standing under a canopy with cusped arch and supporting columns. On the lower file, the martyrdoms of St. Peter, St. Paul, and St. Stephen; also the baptism and restoration to sight of the first-named apostle,—all treated in a manner that seems decidedly "Giottesque." Several vestments that belonged to Innocent III. are of crimson silk, stiff with gold embroidery in perfect preservation, but not artistic, the subjects mostly heraldic, as in the frequently-repeated crowned eagle, other birds, and flowers, suggesting the notion, that seems admissible enough, of the presentation of these gorgeous robes to Pope Innocent by an imperial ally. The many mitres seen here—some embroidered, others quite plain—are chiefly noticeable as proofs how different and much more modest in its low form was the mitre of old, as compared with those, so ponderous and top-heavy looking, now in use. A beautiful censer, one of Pope Boniface's gifts, exemplifies the taste for Gothic design in his day; and other objects in this sacred treasury are remarkable either for richness or on account of the contrasts they suggest.

The general effects of things seen in the cathedral and in the street at Anagni is mournful. Too evident here, as elsewhere, are the cold neglect, the apathetic non-appreciation of the Middle Ages, their genius and creations, in Modern Rome as in the range of territory still under her sway.

LECTURES TO WORKING MEN.

The Council of the Working Men's Club Union are arranging a list of gentlemen willing to give lectures in the different Working Men's Clubs and Institutes connected with the society in London. It is proposed that the lectures shall be delivered at the various club-rooms, which are but small, admitting an audience of about 150 in number. We would suggest, that should some good lecturers be obtained, the provision of a central apartment of larger capacity, which would accommodate the members of, say, four or five of the clubs, might be desirable, as more fully utilising the lecturer's services. Probably, however, the council have learnt that, while the members of a club might be disposed to go to their own room to hear a lecture, only a part of them would take the trouble to walk half a mile out of their way to do so. There is a terrible apathy in all quarters, which has to be overcome.

THE "BUILDER'S" LAW NOTES.

Injury by Fellow-workmen: Liability of Master.
A scaffold was erected for the purpose of sinking a pit and making arrangements underground for opening a new seam in a certain coal-pit in Scotland. The owners had a manager for the pit, and they had also a general manager over all their works. The pit manager had the charge of sinking the pit. Two days after the erection of the scaffold a workman was engaged by the owners to assist in driving the level. While so employed he was killed by an explosion of freedamp, the accumulation of which was caused by the obstruction to the ventilation occasioned by the erection of the scaffold. It was admitted that both the managers were competent persons selected for their duties with proper care. An action was brought by the mother of the deceased for damages in consequence of his death, and the judge told the jury that if they were satisfied that the arrangement or system of the ventilation of the pit at the time of the accident had been designed and completed by the pit manager before the employment of deceased, and if the owners had delegated to such manager all their authority in regard to the matter, that such manager and the deceased did not stand in the relation of fellow workmen engaged in a common employment, and that the owners were not relieved from liability. A verdict was given for the plaintiff. Exceptions were taken to the charge, and one of the exceptions was allowed, and a new trial

granted. The plaintiff appealed to the House of Lords against such allowance, but it was confirmed by that House. The Chancellor said that the liability of a master to his workmen does not depend on the question of the author of the accident being a fellow-workman. The master is not liable to his servant unless there be default on the part of the master in that which he has contracted to do. He does not contract to execute in person the works connected with his business. What he is bound to do in the event of his not personally superintending the work is to select proper and competent persons to do so, and to furnish them with adequate materials and resources for the work. If the persons so selected are guilty of negligence it is not the negligence of the master.—*Wilson v. Merry*.

Clay-pits: Rates.—A person had an exclusive licence to enter upon lands in two parishes and take clay. Under this licence he worked certain clay-pits, and carried on a trade in clay in one parish, but he did not work any clay-pit in another parish, though he had the licence to do so. The surface of the land in the latter parish was let to a farmer; and it was held by the Court of Queen's Bench that the person having the licence was not rateable in the latter parish as an occupier of clay-pits, but only rateable in the parish in which he actually worked clay-pits under the licence.—*The Queen v. Fayle*.

THE NEW SANITARY ACT.

AMONGST the statutes passed in the late session was one (chapter 114) briefly entitled "The Sanitary Act of 1868," having for its object the making of additional provisions for the removal of refuse matter from dwelling-houses. The Act only extends to England. It commences (after some definitions) with reciting the 51st and 54th sections of the "Public Health Act, 1848," which require that every new house and every house pulled down to or below the ground-floor and rebuilt, shall have a sufficient water-closet or privy and ash-pit, and also that the Local Board of Health shall see that drains, water-closets, privies, and ash-pits within their district do not become a nuisance. The new Act then proceeds to extend those sections to the district of every "sewer authority" in which district there is no enactment in any public or private Act of Parliament to the like effect in force. "Sewer authority" in this Act is to have the same meaning that it has in "The Sewage Utilization Act, 1865," and to be construed as if the phrase used were "local board." Any officer appointed by the "sewer authority" to examine any premises shall be deemed to be the "surveyor" within the meaning of the said sections. Where the sewer authority and the nuisance authority of a district are different bodies of men, the jurisdiction of the nuisance authority is to cease within such district in relation to all matters within the purview of the abovementioned sections of the "Public Health Act, 1848;" and any sewer authority to whose district the said sections are extended making default in enforcing their provisions shall be subject to proceedings under the Sanitary Act of 1866 in the same manner as if it had made default in providing its district with sufficient sewers. Each sewer authority shall, within its district, have all the powers vested in a local board by the "Local Government Act of 1858" (as amended by any subsequent Act of Parliament) so far as relates to the removal of house refuse from premises, and the cleansing of privies, ash-pits, and cesspools. Where the sewer authority and the nuisance authority, in any district, are different bodies of men, the jurisdiction of the former in such district shall cease in respect to all matters over which the latter acquires power. The provisions of the "Public Health Act, 1848," relating to private improvement expenses (as amended by any subsequent Act of Parliament), shall be deemed to be incorporated with this Act so far as may be required for carrying it into effect. Any enactment requiring the construction of a water-closet stall, with the approval of the local authority, be satisfied by the construction of an earth-closet, or other place, for the reception and deodorisation of fecal matter, made and used in accordance with any regulation, from time to time, issued by the local authority. That authority may, as respects any houses in which such earth-closets or other places are in use with their approval, dispense with the supply of water re-

* Used also by the deacon, whilst he carries the paten of High Mass; and at benediction by the priest, who carries the ostensorium containing the Holy Sacrament.

quired by any contract or enactment to be furnished to the water-closets in such houses, on such terms as may be agreed upon between such authority and the persons required to provide the supply of water. The local authority may themselves undertake (or contract with any person to undertake) to supply dry earth, or other deodorising substance, to any houses within the district, for the purpose of earth-closets or the places referred to above. The local authority may themselves construct (or require to be constructed) earth-closets in all cases where under any enactment in force they might construct water-closets, or require them to be constructed. No person shall be required to construct an earth-closet instead of a water-closet if he prefer to comply with the Act requiring the construction of a water-closet, and a supply of water for other purposes is furnished to such house. No person is to be put to greater expense in constructing an earth-closet than he would be put to in the construction of a water-closet. After some sections (which we need not set forth) respecting the recovery of expenses and the enforcement of penalties, the Act provides that the sewer authority (or, in the metropolis, the nuisance authority) shall have the same power with reference to the temporary supply of medicine and medical assistance for the poorer inhabitants as it now has to provide hospitals or temporary places for the reception of the sick by the "Sanitary Act of 1866," subject to the previous sanction of Her Majesty's Privy Council.

THE ISLINGTON NEW WORKHOUSE.

THE ARCHITECT, THE CLERK OF THE WORKS, AND THE BOARD OF GUARDIANS.

On the 28th of August the Islington Board of Guardians passed a resolution (on which we commented) that the clerk of the works at the new workhouse at Highgate should send in weekly reports to them—1st, as to work done and number of men employed; 2ndly, whether any stoppage has occurred, and why; 3rdly, as to any inferior material brought on the ground, whether such has been used after being condemned by him, with copies of any communications made either to the architect or builder with respect to the same, with their replies; 4thly, whether such material has been taken out and removed from the ground after complaint, and generally to report anything and everything affecting the stability of the building. Mr. Burden, the architect, complained to the Board of Guardians that it was not the custom that the clerk of the works should report to them; he ought to send in his report to the architect, and it was for the architect to report to the Board. The Board granted Mr. Burden an interview, in order to allow him to explain and support his views before them. Mr. Burden contended that the clerk of the works should be at the disposal of the architect, and every report should come through him and not through the clerk of the works, Mr. Lewis. The Chairman, on behalf of the Guardians, said that they consider the clerk of the works their servant, as they paid him. Mr. Burden said that, although they paid Mr. Lewis, the custom of the profession made him the servant of the architect. It would be very inconvenient for the clerk of the works to turn round upon the architect and say he was independent of him. Mr. Lewis's influence with the contractors would be lessened unless he derived his power directly from the architect. He, moreover, objected to the clerk of the works having power to condemn materials, or to pronounce any judgment on the stability of the building. For the clerk of the works to report at all was a new thing to him. The architect's monthly report was quite sufficient. The Guardians expressed themselves opposed to doing anything that would tend to lower Mr. Burden in his office as architect, but at the same time said they were determined to watch the work most zealously. As nothing could be done without previous notice of motion, the subject was adjourned until the following week.

At the next Board meeting a letter was read from Mr. Lewis, clerk of the works, expressing his surprise that the architect should reserve to himself the power of condemning bad materials. It was important that, when an attempt was made to use bad materials, they should be at once condemned, as, were they left to be worked in, they might deceive the most experienced eye.

He considered it the duty of the clerk of the works to condemn materials in the first instance, and then report to the architect for his final decision. If Mr. Burden reserved the power to himself, the builders would ignore the clerk of the works altogether. Mr. West brought forward his motion that the resolution empowering the clerk of the works to condemn bad material should be rescinded, as being contrary to the contract. Several guardians were of a contrary opinion, when the clerk informed them that the contract said that either the clerk of the works or the architect could "reject" bad materials; but, in the event of any dispute between the builders and superintendents, the decision of the architect alone should be binding. Mr. Cuffin moved an amendment that resolution 3 should be rescinded; but the amendment was lost. Mr. Box then moved that the words "together with copies of any correspondence," in resolution 3, should be rescinded, and the word "rejected" be substituted for "condemned." Mr. Fairbank seconded, remarking that they had had ample proof that the builders had not been working in a very straightforward manner. Mr. Cuffin replied that in the best of works bad materials would be used sometimes without the builder's knowledge. Mr. Box's motion was put and carried. The fourth resolution was entirely rescinded as being superfluous, and thus matters stand for the present between the architect, the clerk of the works, and the Islington Board of Guardians.

NEW THEATRE OF MUSIC AT WEST HARTLEPOOL.

This building, which was opened on Monday, the 21st ult., is capable of accommodating 2,000 persons. The form of the auditorium is three parts of an oval, having its termination at the proscenium, which has an opening of 25 ft., and represents a picture-frame of rather massive character. The gallery front recedes from the box front, and forms an awning. Pains have been bestowed on the stage. With reference to the ventilation, the pure air in a rarefied state is admitted by means of numerous inlets and fines, and the vitiated extracted by means of the air-shaft immediately over the sunlight. Messrs. Thomas Moore & Sons, of Sunderland, were the architects; and Mr. Gibbon, of Hartlepool, was the contractor. The gasfittings were put up by Mr. T. Sherwood.

RESTORATION OF PERIVALE CHURCH.

The most thinly populated parish in the metropolitan county is Perivale, the number of householders being but four. The parish is situated in a fertile and deliciously verdant vale, through which stealthily creeps or tortuously winds one of Father Thames's smallest tributaries, the gravelly Brent. Just where the stream takes a westerly course, upon the north bank, where it is unusually elevated, stands the smallest church in Middlesex,—a pile of chalk reared at least 600 years since. It consists of nave and chancel, with a south door and a west door, each having an arched head, lancet-shaped outside and segment-pointed inside, the walls being 2 ft. in thickness. The roof is high pitched, and was doubtless once open-timbered, with braces, forming a lancet arch, which appear to have been lathed and plastered in the days of the Puritans. Besides the two doorways, there is left of the original edifice an octagonal font and a hole where the east window was. At a much later date the original nave windows appear to have been replaced by some two-light Tudor windows. The benches also appear to have been put up in the fifteenth century, as well as the pulpit and some memorial brasses. Indeed, but for the doors, the east window, the high-pitched roof, and the fact of the walls being of chalk which must have been brought at least eight miles, the church would be taken for a fifteenth-century one. It appears to have suffered considerably at the hands of the Puritans, and again in the Georgian age.

This interesting relic of Medievalism has been restored, evidently by loving hands, and reopened for divine service. The outside remains unaltered, with the exception of the addition of another two-light window in the south wall, a faithful copy of the old one. The inside, however, has suffered a complete metamorphosis. A new

organ-chamber has been built; the pews are gone, the rood-screen is no longer seen, and the heavy classic altar-rail is replaced by one designed in the spirit of the ancient builders. The floors of nave and chancel are relaid. The white-wash enamel is scraped from the timbers, and they are no longer supposed to be marble or slate; but we are sorry that the restorers should want us to think it oak, by graining it. We would suggest the destruction of all the Puritanical and Georgian anomalies, such as the east window, the porch, and the Punch and Judy construction called the tower. Then the restoration will be complete.

The architect who superintended the alterations was Mr. Charles Jones, of Ealing; and the whole of the works have been carried out by Mr. Nye, of Ealing, builder.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

AN APPEAL TO BUILDERS.

SIR,—From the press that has rendered to the above cause such powerful aid, permit me to seek still a little further assistance; it is only through its medium that we can get aid from the rich and willing, or acquaint the deserving destitute of temporary aid or permanent relief. Our first election takes place next Monday evening, at the Institution, when two widows of builders' clerks, late in the employ of leading London firms, will be elected to the pension of 15*l.* per annum. The applicants are thoroughly destitute; one has three children under twelve, the other nine under seventeen years of age.

It is, indeed, a pleasing satisfaction that the committee are enabled at such a juncture of distress as this at once to offer some permanent assistance.

With the knowledge that still more is required, I earnestly appeal for aid; but I more particularly respectfully solicit the profession, merchants, builders, and others, to aid the endeavours being made to secure the election of one of the children of the last case I have mentioned, into the Orphan Working School, at Haverstock-hill. To secure the election the first time, the difficulties are great; the case is a very sad one, and deserves the support of all your readers. Votes will be received by any of the committee of our Institution. The election is sure if our building friends have sympathising and willing hearts to help us. T. P. W.

THE SCIENCE OF COLOUR.

SIR,—If I may add to my former communications on this subject, and to the extracts which appeared in the review of my treatise in your number for 25th July last, a short statement of the principal facts which refute the common theory of colour, and seem to me to establish the amended theory which I have ventured to maintain, it may prevent some misdirected labour and loss of time in such as desire, like Mr. Colling, to investigate the subject for themselves.

1. A mixture of these red, green, and blue rays of the pure spectrum whose colours are best represented in paints by scarlet vermilion, emerald green, and ultramarine or French blue, without any of the other rays, will produce the sensation of white.

2. These three are the deepest, or most powerful in proportion to their brightness, of any three of the prismatic colours which are capable of producing white.

3. All the other prismatic hues may be produced by mixtures of these three, with the same depth as that which they have in the spectrum; namely, orange, yellow, and yellow-green, by mixtures of the red and green, and sea-green and all hues intermediate between it and green or blue, by mixtures of the green and blue; and therefore all possible colours in nature may be produced by mixtures of the prismatic red, green, and blue, in various proportions. But all the prismatic hues cannot be produced, with the depth they possess in the spectrum, by mixtures of any other given prismatic colours besides these three.

4. From these facts, which have been proved by Maxwell's experiments (Phil. Trans. 1860), and are also in accordance with the fact that every eye which has the ordinary capacity for discerning colours, judges these the most striking

colours in the pure spectrum, it is reasonable to conclude that the prismatic red, green, and blue present the nearest approach to three simple sensations of colour, and that all possible colours consist of mixtures of these.

5. Continuous combinations of the prismatic colours, placed in juxtaposition, show that the deepest and brightest blues, best represented in paints by ultramarine and cobalt, are exactly complementary to the clearest and brightest yellows, best represented in paints by lemon yellow and king's yellow.

6. The combination of the best blue and yellow lights, in whatever way effected, produces a neutral gray or white; and though the combination of blues and yellows approaching more or less to sea-green, blue, and yellow green, will produce a pale green; no deep or powerful green (such as that of emerald green) can be so produced.

7. The analysis by the prism of the best natural reds, greens, and blues, shows that they are produced solely by the prismatic rays in which those colours respectively predominate; but the like analysis of the best natural yellows shows that they are produced by all the red and green prismatic rays, as well as by the intermediate yellow rays.

8. From these facts it is evident that if blue is one of three simple sensations of colour, yellow cannot be another of them, but must be a binary compound of the other two; a conclusion which is also confirmed by the ocular modification of white when viewed in conjunction with bright blue or bright yellow, or immediately after the same.

If I have, as I fear, expressed myself in my former communications with a somewhat unbecoming warmth or confidence, I hope I may be excused when I assure your readers that I did not venture to reject any part of the common theory of colour without much research and many experiments. The subject necessarily requires thoughtful and patient investigation; but I am persuaded that the result of arriving at correct conclusions will amply repay the trouble to those who would produce good and varied effects in colour.

W. BENSON.

OUR BLACK DIAMONDS.

COAL is a black opaque mineral substance of vegetable origin. Its specific gravity varies from 1.25 to 1.75. Its chemical constituents are carbon, hydrogen, nitrogen, and oxygen. The chief constituent or basis of coal is carbon; the other substances are volatile. When coal is rich in hydrogen and oxygen, and poor in carbon, it is bituminous; and when it is rich in carbon and poor in hydrogen and oxygen, it is non-bituminous. Coal does not contain any actual bitumen, only the constituents of it. Bitumen is the result of the decomposition of vegetable matter, and may be extracted from coal by distillation. The bituminous varieties of coal are less hard, compact, and lustrous, and more inflammable than the non-bituminous, which are often made into articles of use and ornament, besides being used as fuel.

Carbon in coal and oxygen in air have great affinity for each other. The moment fire is applied to the coal the oxygen rushes to the fire and supports the combustion. The combination of the oxygen with the carbon produces carbonic acid, and with the hydrogen aqueous vapour. The process of oxidation evolves heat, which is increased or diminished by the speed with which the products of oxidation are allowed to escape. When the combustion is perfect the resulting gases are nearly invisible, but when it is imperfect smoke is produced. It is not possible in the ordinary open fire, or to prevent the formation of smoke, or to wholly to consume it; but much may be done by careful firing to prevent it, and to consume it. Those who desire a clean hearth, and a bright cheerful fire, must take pains to manage it. The fire should be fed frequently, with a small quantity of coal each time, between the front bars, and amidst the hot embers at top. If the ashpit be made to close in front, so as to exclude the air from under the fire, there would be great saving of fuel, and the fire would burn steadily. There are nearly one hundred varieties of coal, about seventy of which are imported into London. All of them differ in quality, and also in lighting and heating power; but the difference is many is so slight as to be undistinguishable except to those conversant with them. They may be arranged as anthracite-coal, pit-coal, and brown-coal.

Anthracite-coal is common in South Wales. It is also found in some English, Scotch, and Irish coal fields. Its composition, by weight, is 92.56 per cent. of carbon, 3.33 of hydrogen, 2.53 of nitrogen and oxygen, and 1.58 of ashes. Hence it is exceedingly rich in carbon, poor in volatile substances, and is non-bituminous. Some samples of this coal, of great purity, yield as much as 98 per cent. of carbon. It has an iron or greyish black colour, and a metallic lustre. It is very hard and brittle, ignites with difficulty, but burns steadily with a strong draught. It is nearly smokeless, burns with little or no flame, and gives out an intense heat, sometimes melting the furnace bars. It does not cake in burning, contains little sulphur, and leaves little ash. It is used largely in iron works for manufacturing metals, and in ocean steamers for generating steam. Its calorific effect for these purposes is much greater than Newcastle coal. Owing to its hardness and compactness, its power of conducting heat through itself is very slow. If it be exposed to great heat at first, the outside will expand more than the inside, and break off in small pieces. To obviate this, and to assist the combustion, it requires to be gradually heated.

Pit-coal has many varieties; indeed, they are as numerous as the seams of coal; and sometimes the same seam differs in character and quality at different parts. Some varieties of pit coal have popular and local names; such, for instance, as *furnace-coal*, which is used for smelting, smiths' work, &c.; *gas-coal*, used for manufacturing gas; *steam-coal*, used for generating steam; and *house-coal*, used for burning in stoves and fire-grates. All these varieties, which are more or less bituminous, are classed under four heads:—1. Caking-coal. 2. Splint or hard coal. 3. Cherry or soft coal. 4. Cannel or parrot coal.

1. Caking coal is obtained in great abundance from the coalfields of Northumberland and Durham; also from those of Cumberland, Lancashire, Derbyshire, and other parts. Its constituents by weight, are 75.28 per cent. of carbon; 4.18 of hydrogen; 15.96 of nitrogen; and 4.58 of oxygen. It is velvet black; is middling hard and brittle, breaks easily, and ignites readily. It melts or falls to pieces when heated, makes a bright pleasing fire, with attention burns a long time, and gives out great heat. As, after lighting, the heat increases, the pieces unite or cake (whence its name), and form a solid mass, which requires frequent stirring. Some kinds of this coal burn slowly, cake hard, and send out a strong long-continued heat; while others burn quickly, cake soft, and give a weak, short continued heat. As this coal contains only 1½ per cent. of earthy matter, it leaves but little ash and little cinder. One hushel of it weighs 84 lb. It yields about 40 per cent. of bitumen. This coal is the most useful and economical for household purposes, and is that commonly sold in London as Newcastle or Wallsend coal. It makes the best coke, 1,000 lb. of it yielding 774 lb. when made in an oven. It is also a good steam-coal.

2. Splint or hard coal is obtained from the coal-fields near Glasgow, in Ayrshire, and in England and Wales. Its composition by weight is 75.00 per cent. of carbon, 6.25 of hydrogen, 6.25 of nitrogen, and 12.50 of oxygen. The coal called *culm* is an inferior quality of it. Splint coal is black, with a brown tinge, and splinters when broken, whence its name. It is much harder, breaks less easily, kindles less quickly, requires greater heat to make it burn, burns with less flame, and makes less smoke, than caking coal. As this coal does not cake when heated, it is not so well adapted for small fires as caking coal; but a large body of it makes a strong lasting fire. It is almost non-bituminous. When prepared in a coke-oven, 1,000 lb. of it will afford 647 lb. of coke. It contains 9½ per cent. of earthy matter.

3. Cherry or soft coal is obtained near Glasgow, in Fifeshire, and abundantly in Staffordshire. Its constituents by weight are 74.45 per cent. of carbon, 12.40 of hydrogen, 10.22 of nitrogen, and 2.93 of oxygen. Its colour is velvet black with a grey shade. It has a resinous lustre, breaks easily with a shaly fracture, takes fire readily, burns with a continuous clear flame, gives out much heat, produces little cinder, and leaves a light white ash. As it also does not melt and cake when heated like caking coal, it requires little stirring; but it burns away more rapidly, creates less heat, and is less economical than either caking or splint coal. In an oven 1,000 lb. of it produce 522 lb. of coke; and it contains 10 per cent. of earthy matter.

4. Cannel or parrot coal is obtained from Scotland, Derbyshire, Lancashire, Yorkshire, and other parts. Its composition by weight is 64.72 per cent. of carbon, 21.56 of hydrogen, and 13.72 of nitrogen. It burns readily with a clear flame like a candle, whence its name, but with much smoke. It is compact, fractures sometimes shaly, and varies much in appearance from a dull earthy to a bright shaly lustre. This latter variety burns like wood, leaving little cinder, and a white ash, while the former retains the shape and size of the original lumps. It contains about 20 per cent. of bitumen. It is seldom used, except locally, as a household coal, but it is admirably adapted for, and much used in, the manufacture of gas. Some very hard shaly qualities are made into toys and ornaments and sold as jet. This coal contains 11 per cent. of earthy matter.

Brown coal, known also as lignite, is of recent formation. One kind of it is soft and mellow when first quarried, but becomes hard and brittle by exposure to the air. In this kind the structure of the plants from which it is derived is little altered,—their stems and fibres are seen crossing in all directions. Another kind of this coal appears as a dense stratified mass, nearly black, fracturing easily, and sometimes presenting indications of vegetable structure. This variety, like that of Bovey, in Devonshire, is scarcely distinguishable from ordinary coal.

To those who are not conversant with the particular kinds and properties of coal, these remarks may be of service in enabling them to order, distinguish, and use that coal which is most applicable for the purpose required.

JOHN PHILLIPS.

SOAP AND ALUM FOR KEEPING OUT WET.

SIR,—I am very glad to see that your correspondent, Mr. Arthur Chambers, confirms my experience as to the efficiency of the soap and alum process for rendering the faces of brick walls impervious to wet. Some years since I brought this "dressing" to the notice of the Institute of British Architects, and I believe there are many members who can bear witness to its success, if properly applied. I know a case where a tenant gave notice to leave his house unless it was coated with cement. The landlord refused to have the brickwork disfigured by plaster. The solution of soap and alum was applied, and with complete success. I do not go quite so far as Mr. Chambers, and declare it to be a certain cure. I think it might fail in cases where the brick or stone is very porous; but unquestionably, when applied to a closely-grained material, it will succeed.

In a discussion a few sessions since at the Institute I directed attention to this simple and inexpensive process as applicable to the stonework of the new Houses of Parliament; and I feel confident that it might be very beneficially applied to that building. When properly used it is by no means injurious to the effect of the stone, but, on the contrary, imparts a greyish tone, which is most agreeable to the eye.

BENJN. FERREY.

DESIGN OF LODGES.

If you agree with me on the importance of the subject of this letter, you may think it well to bring it before the public in some suitable form.

I observe, not only in this country, but in others also, a studied misconception of lodges or gate-houses. They are, almost invariably, level with the damp earth, uncellared, with 7 ft. or 8 ft. ceilings, and windows too small for healthful ventilation.

Now, without considering the life, health, or usefulness of the occupants, I ask, Are not such structures miserable frontispieces to a handsome mansion and ornamented grounds? Will not good taste, if not humanity, reform this mistake? A.

AIRING HOUSES.

SIR,—Can any of your country or scientific correspondents kindly say at what point of outside atmospheric humidity it is not beneficial to open the windows of an uninhabited house in the country during winter? and which instrument, if any, is best for determining this humidity? The house is regularly fired, but the house-keeper, a gardener, seems to dread an open window.

COURTNEY HOUSE.

THE ELEVATIONS IN THE REGENT'S PARK.

Sir,—In the leases of the houses in the Regent's Park, the whole of which is Crown property, it is provided that no addition or alteration shall be made to the exterior of the houses; and so important was it considered at the time of laying out the park, that the architectural appearances of the terraces and blocks of buildings should not in any way be impaired, that it is also provided in the leases that the exteriors should all be painted at the same time and at certain periods, and at those times only; yet I perceive in one of the houses in Chester-terrace an extra story has been added, thus disfiguring the frontage of the terrace.

I consider that in making in the original lease the proviso that no additions or alterations should be made to the exteriors of the houses the public were taken into the compact, the park being Crown property; and I would ask, is it right that the appearance and architectural effect should be destroyed to accommodate any individual?

The terraces will soon become as disfigured and spoilt in appearance as Regent-street or Park Crescent; the Circus at Oxford-street may be cited as an effort terribly disfigured by additions,—but these are, I believe, private properties, and not Crown property.

As Parliament is up, there are no means of getting a question put to the "Woods and Forests" on the subject in the House of Commons; I therefore trust, Mr. Editor, you will call attention to it; a word from you will perhaps bring the attention of the authorities to the point, and either have the excrescence removed, or an intimation sent to all house proprietors in the Park that they are at liberty to make any and what additions they like to their properties.

HOTSP. PARSONS.

THE APPROACH STREETS, HOLBORN VIADUCT.

Sir,—“What's in a name?” “A rose with any other name would smell as sweet.” If little in a name, how much in an apology for a name? Does not the naming of these approach streets show a poverty of ideas somewhere? Should not such important thoroughfares be named after the great men of the world? Are there none to mark the era in which they are built? I presume there will be four approaches: why not “Napier,” “Magdala,” “Theodor,” “Abyssinia”? They would then commemorate the heroes of our age in modern history, one that shows that the age of chivalry has not passed. If the approach idea must prevail, why streets? Would not simply approaches be preferable?

ONLY A TAILOR.

BIRMINGHAM NOTES.

ATTEA depression in demand and prices extending over a period of nearly three years, the manufacturers of builders' hardware in Birmingham are beginning to experience a steady return to something like activity. This is just the commencement of the “season” for stove-grates, cooking-ranges, and other descriptions of foundry-ware fixtures, and already the workpeople are having full employment. Ornamental iron gates and palisades are in tolerable request, but Coalbrookdale takes the “cream” of the trade in the Lock department. The hinges, bolts, and latches are in fair demand both in this town and at Wolverhampton and Willenhall, where the ordinary qualities are most largely made. Wrought-iron bridge and girder making is occupying a greater number of hands than reported for two years past. Metal-ware is gradually improving in demand, but prices are remarkably low, and there seems to be no prospect of any immediate movement in this respect. Among the late arrivals in builders' hardware may be mentioned, iron-japaned finger-plates for doors, which are being produced by an enterprising firm in Willenhall at sixpence per pair. There are said to be equal to the china plates for which 1s. 8d. or 2s. per pair is demanded, and of course in point of endurance the latter will bear no comparison. A lock and finger-plate combined was also shown to us the other day, and his “invention” savours more of the curious than the useful. The increased application of machinery to the bolt trade is tending to improve the style and workmanship of those articles, besides facilitating production, and thereby lowering the price. The lock trade, which hitherto has not availed itself of recent scientific invention, is also taking a step in the same direction. Owing to a wages dispute in the “fine-plate” branch at Wolverhampton, some of the makers intend to render themselves less dependent upon the work people by introducing machinery on an extensive scale. This step will likewise benefit the consumer by reducing the cost of the article. The Birmingham people are favoured just now by the South Kensington department of the Civil Service. An extensive load of metal-work (chiefly Medival) has been made at the Free Library, where the collection of articles is now being exhibited. The locks, hinges, and bolts are especially fine, and there are several cabinets, and a *serre de fabrique* of the Middle Ages, which excel in design the elaborated door furniture of Haddon Hall.

NEW RELIEF OFFICES IN ST. PANCRAS.

In the *Builder* of the 15th August, were described the new Relief Offices and Dispensary for the parish of St. Pancras, situated in Compton-place, near Burton-crescent. The second of the series of four Relief Offices, designed for the parish in accordance with the provisions of the Poor Relief Act of 1857, has been completed this week. It is situated in Leighton-road, Kentish Town, occupying the house and grounds hitherto known as Bower Cottage. It differs from that in Compton-place in having no dispensary attached, though provision is made for the addition when required; while the ample site, which comprises an area of nearly half an acre, has afforded space for the construction of extensive labour yards, stone-breaking sheds, and oslum-picking rooms, for the employment of able-bodied paupers.

The old cottage, which is attached to the rear of the chapel buildings has been retained, with only such modifications as were found necessary to connect it with the new buildings associated with it. It is two stories in

height, and on the upper floor are the apartments of the resident superintendent. The committee-room is on the ground floor, and with the store-room adjoining, completes the accommodation provided by the old cottage.

What was formerly a dining-room is now divided longitudinally, forming separate paper entrances and exit passages to and from Leighton-road and the new waiting-room. Between the new waiting-room and the committee-room are situated the new relieving office-room and the bread-room. By the parallel passages or corridors, direct access is gained to the waiting-room, returning past the relieving office, bread-room, and committee-room, each of which communicates with this exit corridor, which is widened opposite the bread-room and committee-room, forming lobbies to the same in the order indicated. The waiting-room has a lofty open roof, lighted by a large lantern skylight. A portion of ground is fenced in to admit of the enlargement of the waiting-room as well as for the erection of surgeons' rooms and dispensary.

The labour-yard is reached by a road on the west side of the chapel, and is an open quadrangular yard, which measures about 125 ft. by 70 ft., and has been paved with Peunmaesur granite cubes by Messrs. Sewell & Son. On three sides of the yard stone-breaking sheds are ranged. These sheds are divided into double boxes by dwarf partitions, and afford space for ninety-four stone breakers. The sheds are tiled with corrugated red and white tiles, and present an effective appearance as they slope from the back boundary walls towards the yard, to which the boxes are open, east-iron pillars supporting the eaves-beams between each division.

The superintendent's office and implement store-room are placed in the centre of the range of boxes on the north side of the yard, immediately opposite the entrance road. On either side of the superintendent's offices are the entrance lobbies to the oslum-picking store-rooms, which are situated behind the boxes, the whole width of the northern side, or 137 ft. in length by 14 ft. wide. Accommodation is provided for all oslum-breakers in two long rooms fitted with tables and benches; between these rooms are the picked and un-picked oslum store-rooms. All these rooms are lighted by skylights, and carefully ventilated by louvre and oslum windows. The rooms are warmed by open fire stoves with warm-air chambers, through which the air from within is passed into the rooms and warmed in its passage.

The architect is Mr. E. G. Robins; and Messrs. Thomas & Son undertook the contract at the sum of 1,735l.

WORCESTER DIOCESAN ARCHITECTURAL SOCIETY.

ON the second and last excursion of this society for the season Alcester, Coughton Court, and the Marquis of Hertford's mansion at Ragley, have been visited. There was a large muster. By permission of Sir W. Throckmorton, bart., the fine old edifice of Coughton Court was first inspected, and the party then proceeded to Coughton Church, where Mr. Walker discoursed on the ancient history of Congiton, and Mr. Tomes criticised the old painted glass. Alcester was next visited. Luncheon had been provided at the Swan Hotel, and was presided over by the Rev. Canon Seymour. The party afterwards proceeded in carriages to Ragley, the neglected seat of the Marquis of Hertford, who has long resided in Paris. The visitors were escorted through the state rooms and library. Arrow church was next examined, and Mr. Walker read a paper detailing the history of the church. Mr. Walker announced that though the rector of Arrow, the Rev. Beauchamp Stannus, was prevented from being at home, yet he had invited the company to partake of tea and coffee at the rectory, and the day being so fine, it had been set out in the gardens. In the advancing evening the carriages were called for Redditch, where, safely arriving, the return was made by rail to Worcester.

AN ATLANTIC TELEGRAPH WITHOUT A CABLE.

OUR readers may recollect of the experiments, some years since, of a Dundee gentleman, now deceased, in course of which he was said to have telegraphed by electricity across Portsmouth Harbour by permission of the Government, and also across the Tay, without any apparatus except galvanic arrangements on shore at right angles to the course of the message. This gentleman (we forget his name) even maintained the possibility of so telegraphing across the Atlantic Ocean, only he stipulated the arrangement of transverse lines, that in Britain running north and south through a great part of the country. The same idea essentially has been taken up by a Mr. J. H. Mower, in America, as a discovery of his own. He is said by the *New York Herald* to have already telegraphed east and west across Lake Ontario—from a point near Toronto, Canada West, to one on the coast of Oswego county, New York—a length of 133 miles, transmitting his message, without a wire, from “submerged machine” at one end of the route to one at the other. The messages and replies were continued for two hours, the average time

of transmission for the 133 miles being a little less than three-eighths of a second. The npsnot of the discovery—on what principle Mr. Mower is not yet prepared to disclose—is, that “electric currents can be transmitted through water, salt or fresh, without deviation vertically, or from the parallel of latitude.” The difficulty from the unequal level of the tidal waves in the two hemispheres will be obviated, it is claimed, by submerging the apparatus at sufficient depth. The inventor is preparing to come to Europe to secure here the patent rights for which the caveats have been filed in the States. At the inconsiderable cost of 10,000 dollars he expects within three months to establish telegraphic communication between Montank Point, the eastern extremity of Long Island, and Spain, the eastern end of the line striking the coast of Portugal at a point near Oporto. The statement is enough to take away one's breath; but, with the history of the telegraph before us, we no more venture to deny than we do to affirm its possibility.

OPENING OF THE MIDLAND TERMINUS AT KING'S CROSS.

THE great terminal station of the Midland Railway in Euston-road, St. Pancras, close to the King's Cross terminus of the Great Northern, has been (somewhat prematurely) opened, although the works are still in a very immature state. The vast arched span of the station area is already roofed, or nearly so, but the frontage is not yet raised much above the hoarding. The whole range of houses eastward to the Great Northern station has been removed, as some time since suggested in the *Builder*.

FROM SCOTLAND.

Dumfries.—The *Dumfries Courier* gives a detailed description of Greyfriars Church, recently completed. The church occupies the site of what for nearly a century and a half was known as the New Church at Dumfries. A row of shabby buildings partially intercepting the view from the High-street has been removed. The style of the church is Second Pointed. The principal or entrance-front faces the High-street, and the central feature in the facade is a tower, surmounted by a spire, the height in all about 180 ft. The main tower is flanked right and left by small circular towers, in which are staircases leading to the galleries. These towers are interspersed with buttresses, surmounted with crocketed pinnacles. Adjoining the staircase towers, rise the angular gables of the aisles. The tower windows are filled with tracery, and the upper portion of these gables is filled with triple windows, the piers of which have pillars with enriched capitals. Between the staircase towers and the aisle gables rise octagonal spirals to the height of 80 ft. The interior is entered through a vestibule about 14 ft. square, with a groined ceiling. The building is seated for about 1,050, but a much larger number could be accommodated. The dimensions are about 70 ft. by 63 ft. The nave and transepts are each about 31 ft. wide, and the aisles 15 ft. wide. The clustered pillars which support the nave walls carry the gallery front. At the southern end of the gallery, and fronting the pulpit, are the magistrates' seats, the orchestra, and the organ-gallery. The large north-west window has been filled with stained glass, the gift of Mr. John Lindsay Scott. The window has six upright compartments, which contain illustrations of leading incidents in the life of our Lord. This work has been executed by Messrs. James Ballantine & Son, of Edinburgh. The whole of the other windows throughout the church are filled with cathedral tinted glass, having stained-glass borders, the latter being executed by the same firm.

Kirkwall Market-Cross.—The Market-Cross of Kirkwall, Orkney, was blown down during a recent gale of wind, leaving only a small stump standing above the steps. The Cross was a freestone erection, of about 6 ft. in height, and bore its date 1521.

The House of Airlie.—The Earl of Airlie intends, it is said, to erect another mansion, contiguous to the site of the famous old castle, “the bonny House of Airlie” of the well-known Scotch ballad. The new edifice will cost from seventy to eighty thousand pounds, and the work has been entrusted to an English architect.

CHURCH-BUILDING NEWS.

Heigham.—A meeting of the inhabitants of the new district parish of St. Philip, Heigham, has been held, for the purpose of considering the present entire want of church accommodation, and to take steps for the erection of a church. The meeting resolved that steps be at once taken to build a church to hold 800, at a cost of 4,000*l.*, and a committee was appointed to carry out the purpose of the meeting.

Rosemarket.—Alterations and improvements have been recently effected in the parish church of Rosemarket, Pembrokeshire, from the designs of Mr. E. H. Lingen Barker, architect, of London and Hereford. The chief additions consist of a western bell-tower and vestry. The execution of the works has been carried out by local tradesmen.

Alford.—The Church of Alford, which is of the time of Edward III, has been restored, and re-opened by the bishop of the diocese. The accommodation was very meagre, and the seats most uncomfortable. The restoration and enlargement, by building a new north aisle, have been carried out by Messrs. Haslip & White, under the superintendence of Mr. Geo. Gilbert Scott. The dimensions of the church are,—nave, 69 ft. by 20 ft., divided into four bays, by arcades of octagonal columns and deeply moulded arches, having north and south aisles, 59 ft. by 19 ft., and a new north aisle, 59 ft. by 16 ft. 6 in. The chancel is 44 ft. deep by 20 ft. wide, and the minister's vestry and organ-chamber are 29 ft. long by 13 ft. wide. The organ-chamber opens out into the chancel with lofty arches. The style adopted is Second Pointed, the windows and other architectural details being as nearly as could be ascertained of the date of the original building. The arches of the nave and chancel are moulded, having foliated capitals and moulded bases. The tower side of the chancel arch seems originally to have contained nine painted colours our Lord and the Twelve Apostles. The lower arch is of great depth. The large east window is of five lights, the upper part of which is filled in with tracery of elongated quatrefoils. On the north and south sides of the nave there are three windows of three lights each, square-headed, with perpendicular tracery. In the new north aisle the east and west windows are of four lights each, appointed, with perpendicular tracery. In the chancel there are one window on the north side, and two on the south side, with a low side window; when and why the latter was introduced is a question. The tracery in the chancel windows is to be filled in with the remnants of the old stained glass. The roofs are open, of high pitch, stained and varnished. The chancel roof is of stained Baltic oak, in the wagon-headed shape, and the principals are moulded and supported by carved figures. The chancel screen is one step, and at the end of the choir there is a rise of the steps, then other two steps for the sacristy, which is separated by carved oak balustrades. The seats are of Baltic oak, and open, with the ends carved, of three different designs, and fixed on a wooden floor. The middle aisle is flagged with ancient tombstones, the other aisles and tower-porch being paved with Godwin's red and black tiles to various patterns. The body of the chancel is also laid with the same class of tiles, and the upper part with Godwin's encaustic tiles. The windows are glazed with pale green cathedral glass, in small diamond lead quarries. The exterior has been eased with dark green sandstone from the Worlaby quarries, with the exception of the north, south, and east sides of the tower, which has been pointed only, to show the fact of the restoration. The roofs are covered with pale Westmoreland slates, having moulded stone ridges, and the gable-ends being surmounted by binnacles and crosses of various designs. The tower doors are of oak, and are hung on wrought-iron hinges from the Medieval metal works of Messrs. Peard & Jackson, of London. The gas standards are from the same works. The church is to be heated by four stoves. A memorial window is likely to be erected at the east end of the south aisle. The chancel stalls and screen are of wainscot. The accommodation in fixed fittings is for about 600, but the church is capable of accommodating about 750 persons. The green sandstone has been presented by Mr. Nelson, the light stone for the angles and windows millions, &c., is from the Ancaster quarries. The new gargoyles and heads on the corbel stones on either side of the doors and windows have been carved by Messrs. Ruddle,

of London, and the tracery under the spire of London, and the tracery under the spire of London, and the tracery under the spire of London.

Hailsham.—A committee has been appointed by the ratepayers to consider as to the dilapidated state of the parish church and its repair. From an estimate prepared by Mr. E. Christian, architect, it seems that about 1,000*l.* or 1,100*l.* will be required as follows:—South aisle, repairing roof, opening out and making good the timbers, and retiling, 165*l.*; repairs of south and west walls of the aisle, which require almost rebuilding, including the renewal of the windows in stone of proper character, 290*l.*; remodelling and repair of south porch, 65*l.*; opening and repairing roof of nave and joining new ceiling between the rafters, 185*l.*; repairs to roof of north aisle, 140*l.*; repairs to walls and restoration of windows, 96*l.*; opening out of the archway of tower, restoring the window, replastering walls, and renewing floor, 95*l.*

Waverley.—The foundation-stone of a new chapel-of-ease to Holy Trinity Church, Waverley, has been laid. It is to be called St. Bridget's. The proposed church will be surrounded on the west, north, and east sides by Bagot-street, Lawrence-street, and Thorneycroft-road respectively. The dimensions of the edifice are,—breadth, 60 ft.; length, 126 ft.; the east end terminating with a semicircular apse or tribune the full width of the nave. The nave will be 93 ft. by 34 ft., and 47 ft. high to the ceiling; will be divided longitudinally into nine bays, and transversely into three bays or divisions; the ceiling being horizontal, and partitioned into twenty-seven sunk and enriched panels, surrounded by a deep cornice. The columns in the nave and at the entrance of the tribune (eighteen in all) will have shafts of Irish red marble. The height from the floor to the springing of the arches above the capitals will be 17 ft. 6 in. in the nave, and 23 ft. at the opening of the tribune. The principal entrance will be in Bagot-street, through an arched opening 11 ft. wide, leading into a vestibule or narthex 37 ft. by 8 ft., which will be vaulted in brick-work and decorated with panelling. A tower to contain a peal of bells is proposed to be built at the north-west corner of the church. The vestries will be placed at the south-east, and separated from the chancel by an arcaded screen. The organ is proposed to be placed in the opposite bay or division, on the north side. The church proper will be lighted by forty-five windows, twenty-one occupying the clearstory, and they will be filled in with coloured glass. Arrangements will also be made for lighting the church at night. There are to be no galleries, but seats provided on the floor for about 800. The choir-stalls, desks, doors, and other joinery will be carried out in Dantzic oak. The characteristic features of St. Bridget's Church are based upon those exemplified in the basilicas at Rome, as affording one of the best means of accommodating a large congregation without interruption to the sight or ear. It is intended, so soon as the requisite funds are provided, to enrich the interior walls and ceiling with coloured decorations, and the architect has prepared a perspective view in water-colours, showing what is proposed to be done. The requisite designs for the building, with the window-glass, furniture, and decorations throughout, are being executed by Mr. Edward A. Heffer, of Liverpool, architect. The contract has been let to Messrs. Nicholson & Ayre, of Liverpool. The brickwork will be carried out by Messrs. Mackinson & Glover; masonry by Mr. J. Grindrod, slating and plastering by Mr. William Callaghan; the marble columns being supplied by Mr. Stubbs. The sum subscribed to carry out the design is 5,200*l.*, leaving about 1,400*l.* to be raised to meet the expense of the work.

ROMAN CATHOLIC CHURCH BUILDING NEWS.

Ross.—The school-chapel, at the rear of the Rev. Dr. Marshall's residence at the Crofts, Ross, has been opened for divine worship. The building, which is a very plain one, measures 50 ft. by 22 ft., and will, we understand, accommodate about 200 persons. The interior presents the usual appearance of a Roman Catholic chapel. The sanctuary is divided from the body of the chapel by a step and curtains. The altar is a temporary one, and over it is a life-size crucifix, made of Herefordshire oak, and presented by the Rev. Dr. Vaughan, of Belmont Priory. Mr. F. Vaughan has also presented statues of

the Virgin Mary and St. Joseph. The builder was Mr. William Parry, of Goodrich. The bell was obtained from the establishment of Mr. Smith, ironmonger, Ross.

Ancoats.—The corner stone of a new chapel has been laid on a site in George Leigh-street, Ancoats. The edifice will be a brick one, and the style Early English. The frontage will be in George Leigh-street, from which there will be three entrances, one to the nave and the others to the aisles. Over the centre entrance will be a large three-light window; there will be a two-light window on each side of the centre doorway, and a trefoil window over the aisle doors. A small bell-turret will surmount the western façade. At the east end there will be a three-light window, and also one looking into the Lady Chapel. The edifice will be also additionally provided with dormer lights along the aisle roof, and the clearstory windows will also afford some accommodation in this respect. The nave will be disposed into five bays, with pillars of polished red granite. The total length of the building will be 87 ft. 6 in., and the breadth, 61 ft.; while the height, from floor to top of belfry, will be 71 ft. 6 in. The Lady Chapel will be at the north-east corner, and the vestry at the south-east, and there will be accommodation for about 1,000 persons. The expenditure, exclusive of fittings, will be 2,000*l.*, and the land will cost 1,200*l.* The architect is Mr. W. Nicholson.

STAINED GLASS.

St. Mary's, Bury.—The stained glass with which the west window of the north aisle of this church has been filled is a memorial of the late Misses Harrison. The lights below the transom are occupied by one subject, the Last Supper. The upper lights are filled with representations of the following incidents preceding and commencing the history of our Lord,—namely, the arrival of Mary and Joseph at the inn at Bethlehem, the adoration of the Magi, and the flight into Egypt. In the upper traceries are angels bearing a scroll, and above these other angels holding musical instruments. The symbolical Alpha and Omega also appear, and the emblem of the Holy Spirit in the apex of the window. The window was supplied by Mr. H. Hughes, of London, the donor being Mr. J. Harrison Allan, who inherits the property of the ladies to whose memory it is inserted.

Leeds Parish Church.—A memorial window, of stained glass has been recently placed in the north corner of the west gallery of this church. The subject of the first light is the Good Samaritan; of the centre light, our Lord healing the Lame Man at the Pool of Bethesda; and of the third light, St. Peter raising Dorcas. The ground-work is composed of the passion-flower and leaves, and below is an inscription in memory of Mr. Samuel Smith, well known as an eminent practitioner, and for many years the senior surgeon of the General Infirmary at Leeds, a member of the congregation, and churchwarden of the parish. Messrs. O'Connor, of Berners-street, London, are the artists, and the window is presented by the sons of Mr. Smith.

Miscellaneous.

ACCIDENT WITH A BALCONY.—A Greek gentleman, the other day, was leaning on a balcony at Brighton, when it gave way, and he was precipitated to the pavement.

THE LONDON ARTISANS' CLUB AND TRADES' HALL COMPANY.—A public meeting on this subject has been held at the Cleveland Hall, Fitzroy-square, Mr. McCallagh Torrens, M.P., in the chair. There was a large attendance. The Rev. Henry Solly detailed the objects of the promoters of the company, who were all working men. It was proposed to lease or build a hall in a central part of London, capable of holding at least 1,000 persons seated, with library, reading-rooms, and refreshment-rooms, attached, for the use of trade, benefit, and other societies. The shares were 1*l.* each, payable by instalments of 2s. 6d. per month. Up to the present time 250 shares had been taken up by 140 persons, and as soon as 200 shareholders had been enrolled, a meeting would be held to elect the directors. A resolution approving the scheme, and pledging the meeting to its support, was unanimously agreed to.

THE MONUMENT TO ABRAHAM LINCOLN.—The National Lincoln Monument Association have adopted the design of the American sculptor, Larkin G. Mead.

PHOTOGRAPHS OF EGYPTIAN ANTIQUITIES.—The photographic mission sent by the North German Federation into Upper Egypt, under the direction of Dr. Dümichen, to take photographs of a series of antique monuments and inscriptions, lately left Cairo on board the *Aigle*, which navigated the Nile under the flag of the Confederation.

RE-OPENING OF THE CENTRAL EXCHANGE NEWS-ROOM, NEWCASTLE-UPON-TYNE.—This building has been re-opened on its restoration from the ravages of fire. Only few alterations have been made on it as left by the late Mr. Crainger, its architect. The light is a little stronger, and the room more lively. The massive pillars, formerly painted in granite, now represent marble. In a short time the triangular block of buildings will present its former appearance, and even the dome at the south-eastern extremity will, thanks, chiefly, to Alderman Dodds, be restored. The entire work connected with the restorations has been carried on in accordance with the directions of Mr. Wm. Parnell, the architect, by Mr. Francis Jackson, as contractor.

THE GREAT YARMOUTH SCHOOL OF ART.—The prizes awarded to this school at the annual examination in March last have been presented to the successful students at the Town-hall, by the Mayor. The honorary secretary, Captain Cobitt, said, with regard to the general progress of the schools of art and navigation, that in both a decided progress had been evinced during the last as compared with the previous year, both in the number of pupils and the results as exhibited at the last examination. In the school of art, the number had increased, especially of artisans. This was the more satisfactory to this school, for though used by all classes in the town, it was particularly designed for the improvement and culture of the artisan classes. Hitherto the school had not been used to the extent it was desired by this class, but, thanks to the present excellent master, Mr. Dornay, they had succeeded in attracting a very respectable number.

THE METROPOLITAN ASYLUMS' BOARD.—The board of managers of the metropolitan asylums' district met on Saturday for the first time since the vacation, at the board-room of the Metropolitan Board of Works, Spring-gardens. Dr. Brewer occupied the chair. Letters were received from the Poor-law Board, approving of applications to the Public Works Loan Commissioners for 15,500*l.* for the purchase of the site at Stockwell, and for 128,000*l.* (or 64,000*l.*, a moiety thereof) for the purposes of the Leavesden Asylum. The finance committee reported that having had under their consideration the question of the contribution to be assessed upon the several parishes and unions to meet the demands upon the managers, they recommended the levying of a rate of one-eighth of a penny in the pound, to be payable on the 25th December of the present year. The report was adopted.

GAS HEAT FOR STEAM.—In one of the piles of warehouses belonging to the London and St. Katherine Dock Company, in Cutler-street, steam machinery has been introduced, the different fire offices having approved Jackson's patent, by which the boiler is heated by gas instead of coals. The east area of the dock company's premises will henceforth be worked by the steam lift, without any additional premium being incurred by its adoption. The boiler is placed in a small house built out from the top floor between two warehouses; for there is this stipulation, that even the safe gas-furnace shall not be actually inside the walls, among the merchandise. A considerable length of pipe is therefore necessary through which the steam passes before it can be brought to bear on the engine; but the tube is covered with a coating which is so good a non-conductor that the radiation of heat is very trifling. The circular furnace beneath the boiler contains a series of burners which, when they are all lighted, will raise steam to 50 lb. from cold water in twenty-five minutes. The burners may then be extinguished with the exception of one or two, which are sufficient to keep the pressure-gauge stationary, until power is wanted, when instantaneously the furnace is rekindled, and the engine set in motion. The lift is 55 ft. from the ground below, and more than 500 chests of tea are raised in an hour.

UTILIZATION OF SEWAGE.—Mr. R. B. Grantham, C.E., has been commissioned by the British Association for the Advancement of Science, to draw up annual reports on the treatment and utilization of sewage in connexion with the drainage of towns, in order that such facts and information as may guide future operations may be recorded from time to time. He is requested to include in the details of each report—1. The special circumstances of each case, such as the extent of the district, the population, and the number of houses with or without the benefit of drainage. 2. The character of the sewage and water supply adopted in the district, and the quantity of sewage at disposal. 3. The mode of disposing of the sewage, with description of the works, and their cost. 4. The result pecuniarily to the district, and to those who are selling or applying the sewage to the land or otherwise, in any form whatever. We anticipate much advantage from this undertaking.

THE CONSUMPTION OF SMOKE.—A copy of Mr. Rawlinson's report to the Home Secretary of his recent inquiry as to the alleged neglect of the town council of Hanley to enforce the smoke clauses of the Sanitary Act, 1866, has been received by the town clerk from the Home-office, together with a letter from Mr. T. Taylor, who writes—"I am to request the early consideration of the report by the council, and to state that the clauses for the prevention of smoke, as embodied in the Sanitary Act, 1866, must be duly and properly enforced." Mr. Rawlinson reports that the allegations of the memorialists have been substantiated by the evidence adduced at the inquiry, and that the town council had taken no effective steps to enforce the Act prior to his first visit in July. They had now taken the preliminary steps, and had promised to carry out the Act as far as practicable. Time would be required to make certain structural and other alterations in furnaces and chimneys, and Mr. Rawlinson thinks that a year from the 1st of November next may reasonably be allowed for this purpose. Immediate action should, however, be taken to enforce the law against the worst cases, and this action should be continued. Mr. Rawlinson points out that the consumption of smoke has been proved to be practicable, and says where it is earnestly enforced, as in London and other places, the results are alike beneficial to the manufacturers and the general public. If the towns do not now act for themselves they may expect the interference of other powers.

THE WORKING CLASSES AND TRADES' UNIONS.—The proceedings at the late International Congress of Workmen give interest to an article entitled "*Les Associations Ouvrières en Angleterre*," by Dr. Montucci, which has just appeared in the September number of the *Revue Britannique*. We glean from it the following curious calculation, by which the author endeavours to show what the workman gains by contributing to a trades' union:—Taking the most common case, that of wages ranging between 30*s.* and 40*s.* a week, suppose the workman to pay into the savings bank the 4*s.* a week he now pays into the union; there his money will, at the lowest, produce 3 per cent. interest, payable every six months. As the workman gets nothing in that shape from his union, it is but fair to admit that, in the case under consideration, he leaves his interest to accumulate in the savings bank. Now, calculating the produce of his capital at compound interest, with the regular weekly increase of four shillings, the workman, at the end of twenty years will find himself in possession of a sum of 880*l.* Allowing for illness and other mishaps, let it be 800*l.* Now, it is clear that, with such a capital at command, a shop may be opened, some profitable business or other may be carried on by the wife, while the husband, not older than 50, perhaps, at the time, earns his wages as usual at his master's establishment, with the certainty of having secured comfortable means of living for his old age. Comparing this hypothetical state of things with the real one, the author of the article shows that the workman who contributes to the union fund at the end of the twenty years has nothing; that by belonging to the association he loses not only the 10*l.* a year to which his subscription amounts, but also, on an average, three months' work per annum, in consequence of strikes and other direct or indirect interference with the regular course of business; so that his means are reduced to 72*l.* per annum, instead of 110*l.*, as they would be in the former case.—*Galtgnani.*

THE CLOCK-TOWER, LEICESTER.—The Haymarket Memorial Clock-tower Committee, in closing their labours, have presented a report to their subscribers, congratulating them on the successful attainment of their object. The committee believe that the memorial "will bear favourable comparison with any similar architectural work in the kingdom, and which will thus prove a permanent monument to the honour of the four eminent benefactors represented on the building, as well as to the designer, the executors, the subscribers, and the town at large. The total amount subscribed was 872*l.* 2*s.* 9*d.*

EXPERIMENTS WITH SEWAGE AT WREXHAM.—Lenk's purifying process has been tried at Wrexham. It is one of precipitation, by means of sulphate of alumina with alum and water. The result seems to have been that the most offensive portion of the sewage was precipitated, leaving a milky solution of tolerable purity. This mixture is put to the sewage, one part to 1,000, and the cost is one penny per 1,000 gallons of sewage, which would amount to a considerable sum a year for the deodorization of the Wrexham sewage, towards counterbalancing the proceeds from the sale of the deposit. That, however, is not the chief consideration.

GENERAL UNION OF CARPENTERS AND JOINERS OF GREAT BRITAIN.—The members of the city of Gloucester lodge of this society have held their annual dinner at the Talbot Inn, Gloucester. About thirty members and friends attended. Brother England was called to the chair, and Brother Panter to the vice-chair. The usual toasts were given, and the toast of "Success to the General Union" was drunk with enthusiasm, and responded to by Mr. Robert Last, general secretary of the union. The toast of "Success to the City of Gloucester Lodge" was proposed, and responded to by the lodge secretary, who gave a financial report of the income and expenditure for the year ending July 31st, 1868, and stated that the lodge was making steady progress. "Prosperity to the Master Builders of Gloucester" was given, and honoured.

THE GOVERNMENT AND THE TELEGRAPHS.—At the last weekly meeting of the Metropolitan Board of Works, the clerk to the Board read a letter from Mr. Soudamore, of the General Post-Office, stating that the Postmaster-General (the Duke of Montrose) was now considering the arrangements which would be necessary to construct the system of Post-office telegraph communication contemplated by the Act of last session; and that it was believed that the subways and sewers belonging to the Board could be made use of to a great extent, and required the Board to favour his Grace with a plan showing the direction of any sewer or subway which might appear suitable for the purpose, and any suggestions. Mr. Pollard said that instructions had been given to Mr. Bazalgette to supply the plans asked for. Mr. Cyrus Taylor thought that they should receive in return facilities for communication between the various Fire Brigade stations.

PARIS ART SCHOOLS.—At the distribution of prizes to the pupils of the Municipal School of Drawing and Sculpture, M. Robert Fleury, who presided, said that up to 1830 only one school of art existed for the working classes, and that at the present moment there are fifty evening schools of art in Paris, where more than 4,000 pupils can study; the models chosen, with care, by a commission, are sent to all the schools; rewards are given by the municipal authorities; and the most meritorious pupils receive prizes of honour from the Emperor. The Prefect of the Seine has caused large school-houses to be built to replace those whose accommodation had become insufficient. The school of the Rue des Petits Hôtels, which is one of these, has room for 3,000 pupils. M. Robert Fleury referred to the courses of geometric drawing, sculpture, and elementary anatomy, established by M. Lequin, and said that the education given in these schools answered all the wants of the industrial arts. "Continue, then," said M. Robert Fleury, "to profit by the encouragement which is offered to you; make free use of the advantages which the country and the Government place at your disposal, and all difficulties will give way before your perseverance. Imbibe as much as possible of the spirit of the best models of antiquity and of the Renaissance; exercise yourselves in composition and invention; but remember that, though fancy is admissible in industrial art, it should never overstep the limits of good taste."

The Builder.

VOL. XXVI.—No. 1340.

"Social Science."



THE "Social Science Association" labours under a certain disadvantage. It is one, it may be, of annually decreasing importance, but yet it is not altogether to be overlooked. It is one, moreover,

which it is easier to point out than to remedy. It is the want of a name that should be at once appropriate and distinctive. A certain group of questions, of the utmost social importance, is gradually elucidated by discussion. But we are yet far from arriving at a result worthy of the name of science, and when sanitary organisation, educational organisation, criminal legislation, and the other subjects on which such valuable information is now being collected, shall have attained a development corresponding to that of the physical sciences, the respective students and doctors of these important branches of politics will be even less likely than at present to consent to their amalgamation under an inappropriate title.

In fact, the term "Social Science" has the objectionable character of ambiguity. The subject of the study lies half-way between two widely distant systems of philosophy, to neither of which it properly belongs. It looks backward towards the "politics" of Aristotle, and forward, or at least sideways, towards the "biology," or sixth science, of Comte. But the practical aim of the discussions at Birmingham is as unlike that of the final chapters of the *Physique Sociale*, as it is to the clear synthetic argument of the Stagyrite. Of the two, it holds much closer to the Greek than to the French method. The doctrine of Aristotle as to the State, and the rights and duties of the citizen, is reduced to that clear and systematic form which was proper to a mind that conceived of all exact knowledge under the general term of "mathematics." But while stating and demonstrating his propositions with all the rigidity of Euclid himself, Aristotle does not evolve his political doctrine from his own ideas of primary principles. He travelled much, observed much, and compared and classified all that he saw, before he wrote. He studied the working of the politics of his day before he spoke of the laws which regulated their working. The treatise of Aristotle was founded on the best statistics that he could procure; and that great philosopher adds to his other claims to the primate's throne of human intelligence that of having been the first statistician, as well as, in spite of the ungenerous efforts of Bacon to deprive him of the title, the first inductive discoverer. The main difference between a treatise on political principles written to-day (if by such a pen as that of the Stagyrite) and the Greek acroatic treatises, is to be found in the increase in the number of facts to be mastered. When the number of 50,000 inhabitants was regarded as the limit of a city, even Aristotle himself was unable to exhaust the case of a metropolis containing 3,000,000 of souls. In all that relates to the position of man as the questioner and compeller of nature, the greater part of the civilised

world of the time of Aristotle could be replaced out of the surplus population of our European cities, without the fact becoming known to the basier portion of the population.

England in 1868, then, differs from Athens in the age of Aristotle, to an extent that may be measured by the lapse of so long a chronological period. Where the Attic philosopher thought of thousands, we have to think of hundreds of thousands, if not of millions. But that part of the political science which depends on the stability of human nature remains unchanged. The ethics of the Greek master are as true to the life of to-day as to that of the age of Alexander. True it is, that the ablest writers on political science have dipped their pens in the inexhaustible source of Greek philosophy, and have been for the most part successful in their dealing with the facts of their own day, in proportion to their acquaintance with the course and the records of history.

The great French writer, on the other hand, looks at sociology from an opposite point of view. He will not allow the name of science to a tentative process, such as all our political action must long continue to be. He requires the student to exhaust the knowledge of the phenomena of inorganic existence, before acquiring that of the phenomena of organised bodies. This latter study—organic physics—he divides into the phenomena which concern the individual, or physiology; and those which concern the species, or sociology. At this last of all possible sciences man can only duly and satisfactorily arrive, after passing through the simpler studies. Thus it is only at some long distant and indefinite future that the positive philosopher can hope to arrive at the point where the basis of Social Science can be laid. And if we remember that M. Comte considers the mastery of any science to be unattained until the power of prediction is grasped by the student (as in the case of eclipses in astronomy), we must confess that all the positive writing on sociology intimately partakes of the nature of a shot in the dark.

Now, we hold that the aim and the useful upshot of such associations as that to which other references will be found in our columns, is very opposite to that of the positive philosopher. Nor do they properly include that political science which is historical in its character. An estimate formed, for instance, from an exhaustive view of the history of Spain, as to the course of the present revolution, would be out of place at Birmingham. Yet nothing would come more strictly within the province of the real political student. The part to be played by our Birmingham fellow-labourers is distinct from that of either of the above-named philosophers. We hold that part to be of no inferior importance, and to be especially germane to the genius of the English people. The main point is the collection of facts, the acquirement of knowledge that is positive, not in the sense in which that word is used by a school, but in that of the ordinary vernacular. It is not the object of the Association to support particular theories. We might say that it is not its object to arrive at theories; were it not that the apprehension of that true and ultimate theory which explains the law of facts is a necessary step in the perfection of knowledge.

The object, then, of such association is to curtail the province of opinion. It is to substitute the knowledge of what is known for the knowledge of what is thought or taken for granted. Opinion, after all, is only another name for ignorance. No person has any opinion as to the problems of Euclid. If one were to hear any individual express an opinion unfavorable to the truth of the forty-seventh proposition of the first book, it would not be the intellectual character of Euclid that would be in jeopardy. Now there are many subjects of the utmost import-

ance to our social welfare the leading principles of which are as fixed as the relations of the containing sides and the hypotenuse of a right angle, as to which nine people out of ten have not yet gone beyond the state of opinion. Many people have "opinions" as to inconvertible bank-notes. That is a case in point. It is one on which "opinion" means ignorance. Again, there are many other no less important points on which the most advanced of us are still in a state of "opinion." The vital question of the disposal of the sewage of great cities and towns is one of these. Our positive knowledge of facts is not yet quite such as to allow us to lay down absolutely the general principles on which this problem should be everywhere solved. But, mean time, there is much to be done by way of clearing the ground. In every science, as in every art, the first step to progress is, to know what is known. An immense amount of working power is frittered away from the simple fact that minds naturally fitted to originate, to improve, or to combine, are left in ignorance as to what has already been discovered in the province with which they seek to deal. Biography is full of instances of the kind, such as that of Ferguson, the astronomer. Those conversant with the business of the Patent Office are pretty fully aware how often the same discovery has been made and remade by persons entirely ignorant of the labours of their predecessors. They are also aware how often the same pseudo-discovery has been made,—how often an inventor has devoted years of life and hundreds of pounds to the prosecution of some supposed improvement, the design of which cannot be put on paper without evincing an entire ignorance of mechanical law. In such struggles in the dark the mind of the inventor may indeed acquire a rough and useful schooling, but, had the efforts thus made been preceded by the knowledge of how much was already known on the subject, the results would no longer have been purely subjective. It is society that is the greatest sufferer by the non-education of powerful and original minds.

In meeting that great want of the day, a want more obvious in our own country than in the more systematically educated parts of Europe, the association to which we refer has an important function to fulfil. To bring out clearly and distinctly into the light of day the actual state of the main questions affecting man as a citizen, is a far nobler task than to legislate, as we now do, from hand to mouth. The proudest triumph of a party leader is paltry and contemptible, when compared with the triumph of him who fully, clearly, and irresistibly first demonstrates a new truth. The minister may command his majority, or the opposition leader may overthrow the cabinet, by an effort of what we complacently call Parliamentary eloquence. What is the result? A. draws the quarter's salary which B. would otherwise have received. Ten or twenty years hence who cares which was which? But the man who clearly demonstrates a scientific truth, before unknown, obtains a triumph that endures for ever. True, his name may be forgotten, but his work abides. He has laid down a new stepping-stone for the human mind through the slough of ignorance. He has won a new district, be it large or small, from the cloudy and indistinct regions of opinion, and added it to the *terra firma* of real knowledge. Truth, once grasped by the individual mind, may, indeed, remain uncommunicated, and thus fail to benefit mankind. But truth when not only grasped, but clearly and plainly enounced and co-ordinated with other truths, is a permanent gain to the race.

In no group of social questions is this advance from the state of opinion to that of knowledge more discernible than in those which relate to sanitary regulations. What was the state of public opinion on this subject when the cholera

first visited our shores, some five-and-thirty years ago? What is it now? When we find, as was stated at the meeting, an undrained, unwholesome, uncleanly nook in the midst of a thriving town, and when a visitor calls attention to the fact, how is the announcement met? By the assurance, whether correct or incorrect we will not stop to inquire now, that the subject is on the very point of receiving some attention! How would Birmingham have greeted such an interference from a stranger in 1834? By a recommendation to mind his own business, and by an assertion that the midden-heap was as salubrious as it was convenient and prescriptive. The difference in the mode in which the subject is regarded is simply owing to the dissemination of exact knowledge on the subject. Opinion, indeed, is not yet altogether routed and destroyed. The cesspool and the midden-heap have still their patrons. It is likely to be long before a single abuse or evil that existed when the nineteenth century was young, will fail to find some advocates to palliate or to excuse it. But the majority of reading people have ceased to hold opinions on the subject. They know that the absence of sewerage means the presence of ill-health. They do not discuss; they seek to act. And, although the subject is yet very far from having arrived at a satisfactory state,—although the questions of river pollution, of earth-closets, of defecation of sewage, of surface- or sub-drainage, of rainfall, and the like, yet require much thoughtful study, we are yet gradually disseminating the knowledge of the truth that uncleanliness involves ill-health.

The same rule applies to the discussion of all questions that, to the exclusion of party squabble, are truly political; that is to say, that regard the well-being of man as a member of a community. Their principles are for the most part eminently simple; yet, simple as they are, they are so obscured by the mist of passion or of prejudice, that they have long formed the battleground of opinion. Gradually this must disappear. The first step is the collection of facts; the second is their due co-ordination,—a co-ordination which may be tested by the circumstance that anomalous and long-misunderstood facts find their explanation under the general theory. Then comes the dissemination of truth. Old "opinion" passes into the decrepitude of "old-fashioned prejudice," and the work of amendment becomes complete.

Thus to collect and thus to distribute the knowledge of what is known is the self-imposed task of the members of the Association. They may call themselves students of social science; they are labourers in the great field of political economy, or rather of economical politics, who deserve well of their fellow-citizens for their care of the common weal. But their work deserves to be called economical rather than political, since it regards not the special interest of the individual state so much as the general welfare of the habitable world.

SCIOGRAPHY.

A HUNDRED and fifty years ago the learned few who knew there was such a word as Scio-graphy in the world of words, attached a different meaning to it from that it represents in the present day. It was explained at that time as a profile or platform, or the first rude draught of a thing. It also represented the art of dialling or of showing the time of the day by shadows; and astronomers used it to express the art by which they found out the hour of the day or night by the shadow of the sun, moon, or stars. As far as it concerned architecture it simply meant the profile mentioned above, now called an outline, or a section, then described as "the draught of a building out in its length or breadth, to show the inside of it, as the conveyance of every room, with the thickness of the walls, timber works, floors, vaults, &c." So lately as the period of the compilation of Rees's "Cyclopaedia," scio-graphy and scio-graphy are both explained as "the profile, or section, of a building to show the inside of it." As with many scores of English words, however, we have sifted and shifted the meaning of these kindred terms, and they are not now by any means so interchangeable. Profile, in the architectural world, is extinct, though it still flourishes in the portrait-painter's studio; platforms, too, have vanished from the modern draughtsman's vocabulary, enticed, perhaps, by the high office held out to them at public meetings; and scio-graphy

no longer means the outline of a building, but the outline of the shadows that are cast from that building. As precision of terms is one means of progress, as well as one sign of it, we may congratulate ourselves upon being on the right road.

We have before us a work on this science of the projection of shadows by Dr. Puckett.* He tells us most of his text and many of his diagrams were prepared as blackboard lessons for the students of the Bath School of Art who are under his instruction. No progressive textbook being at hand, he called upon his own resources; and, aided by hints derived from the lectures on perspective at the Royal Academy by the late Professor of Perspective, J. P. Knight, R.A., and by thoughts suggested by Dr. Brooks Taylor's more advanced work upon the same subject, he has endeavoured to fill up this void for other teachers and pupils by placing his lessons in their hands. Before a student is in a position to be benefited by our author's labours he must be familiar with linear perspective; scio-graphy, from its very nature, cannot be more than a supplement to perspective. But to architectural students his work is likely to be of great use, as errors in shadows, their spendthrift profusion, and the idle withholding of them altogether are as pitfalls in their paths, into which they must certainly fall without a sound knowledge of the principles that govern them.

Dr. Puckett lays down the primary laws of shadows in these plain terms:—

"The direct shining of the sun, or other luminous body, is in the form of rays, or thin ethereal lines, each acting independently of the other; no such separation of parts is observable in common circumstances, in consequence of the diffusive properties of the atmosphere."

When the medium in which the rays of light move be of uniform density, they will always spread in straight lines from the luminous body which produces them.

In consequence of this directness, a shadow or darkened spot is observable behind any opaque object presented to the light. During night, we are in the earth's shadow; and this shadow reaches so far beyond us into space, that when the moon plunges into it in her course, she undergoes an eclipse.

In proportion as light advances from its seat of production it diminishes in intensity. The ratio of diminution is agreeable to that which governs physical forces,—i.e., the intensity of the light will diminish as the square of the distance increases, or at the rate of 1, 4, 16, &c. But in proportion as we lose in intensity, we gain in volume; the light is the weaker the further it is from the candle, but it is filling a wider space. This continual receding of the rays of light from each other, as the word implies, forms radii, proceeding from a centre."

Notwithstanding this radiation, the sun's rays, owing to the immensity of space they traverse, are conventionally divested of their almost imperceptible divergence, and considered to be parallel to each other. In accordance with this accepted fiction, the first lesson to be worked out by the student is proof of the fact that when the direction of the sun's rays to the plane of delineation is parallel to that plane, lines that represent rays of light must be drawn parallel to one another." Two corollaries are deduced from the problem in which this statement is proved: first, the shadow on a plane of any point must lie on the intersection with that plane of one containing the ray of light that casts the shadow; and, secondly, shadows thrown by lines upon planes parallel to such lines vanish to the vanishing point of the plane on which the lines lie. From this elementary platform, if we may use the expression, the pupil steps upwards to the consideration of more intricate shadows. Sometimes he is placed with his back to the sun, sometimes with his face to the great luminary, sometimes he is placed immediately under it so that its rays pour down upon his devoted head; and in all these varied circumstances he is instructed to take due note of the immutable mystery and certainty of the projection of shadows. There are twenty lessons in all, leading from shadows from planes, oblique and otherwise, and upon them, to shadows upon and from curvilinear and spherical surfaces. This is the mode in which shadows are thrown upon and from oblique planes. A truncated pyramid placed in perspective, making angles of 45° with the plane of delineation, casts a shadow upon an oblong figure with a gabled apex that is placed at a more acute angle with the plane of delineation, which, in its turn, casts a shadow upon the ground. It is necessary, to delineate the proper projection of these shadows, after determining the azimuth and the altitude of the sun, to find the axis of the pyramid. The student is then directed to draw a line by the vanishing point of the sun's rays upon the ground until it is intersected by

the ray of light from the luminary containing the apex. At its intersection with the vertical plane he is to draw a perpendicular line meeting the ray of light that tips the apex of the pyramid; and then lines drawn by the vanishing point of the sun's rays upon the horizontal plane through the corners of the base of the pyramid, and cutting the vertical face of the block, and carried to that just mentioned, will give the form of shadow. Without the author's diagrams, and his references to them, the process is more difficult to follow than with those aids. We must add, however, the vanishing point for the shadow thrown by the axis of the pyramid upon the oblique plane is obtained by the intersection of a line joining the accidental vanishing point of the oblique plane with V. P. 3, with the vertical trace of the sun's rays upon the plane of delineation. The shadow upon the ground is obtained by lines drawn by the vanishing point of the sun's rays upon the ground, and out by rays through certain points not to be indicated without the diagram.

By the time he has arrived at the seventeenth lesson the pupil is assumed to be proficient enough to understand the mode of finding shadows thrown by artificial light in the interior of rooms. Here we have a diagram showing a chamber, with a hookcase and a box in it, and a square plane suspended from the ceiling, with strong lights and shadows playing upon the whole. Dr. Puckett explains that the shadows cast by an artificial light are governed by the same principle as those that are cast by the sun, viz.: "the union of the luminary, the vanishing point of the plane receiving the shadow, with the trace of plane throwing the shadow." The luminous point, however, is always represented before the spectator. After going through all the shadow lines, and the means by which their exact position is ascertained, the author sums up with a remark to the effect that "the vanishing point for a shadow must be found upon the trace of the plane receiving the shadow; and the intersection upon this trace, obtained by the ray of light passing from the luminary to the vanishing point of line throwing the shadow will be the shadow's vanishing point." The eighteenth lesson brings us to the subject of reflections.

Whilst we are looking through the chapter on reflections, our author permits us to imagine ourselves seated in a boat on a lake, with the glorious hills and sky reflected in the water around us,—a delicious privilege for weary students,—for which they will gratefully thank him. Leaving them to contrast the brown rippled shadow of the boat with the radiant reflections of the light-clouded sky, we will make our more sombre way after Dr. Puckett. This is a sample of the way he treats his subject:—

"While the painter can scarcely be expected always to work out every appearance of nature with mathematical precision, the laws that govern such appearances should at least be thoroughly apprehended by him, that he may more closely imitate nature in all her diversities, and by the application of her laws be able to test the correctness of his work."

Light is diffused around us by the refractive power of the atmosphere, and therefore objects are quite visible though the rays of the sun do not strike directly upon them. The atmosphere being thus a vehicle of light, the rays of the sun must be regarded as travelling through immense regions of darkness before they reach our atmosphere, where they become diffused into that universal soft light which we observe around us. But besides being diffused by a pure atmospheric medium, light is greatly enhanced in brilliancy by reflection. If all the objects on the surface of our planet were to be black, which is the negation of all colour, the sun's light would be absorbed, or at least return no part of the rays which fell upon them, and we should, even while the sun shone, possess much less light than we now enjoy. Nature has avoided this calamity, and by producing all varieties of colours in objects, the sun's rays which fall upon them are less or more reflected or thrown back into the general mass of light. We then understand that any object we see reflects rays of light, and that these rays travel from the object to our eye as soon as we bend our vision upon it. Inasmuch, however, as a thousand or more individuals may see the same object at the same instant of time, it is evident that the rays proceed at all points, and fall upon eyes at every variety of angle."

Thus it will be seen that though it is impossible to say anything entirely new of facts that are, if not as old as Time, at least as old as our terrestrial globe, though only known to man after ages of self-culture, it is possible to state those facts in a plain manner easy to remember and understand, and that the author has done so. The students left in the boat are further told that a ray of light darting downwards in an exactly perpendicular direction to the surface of the lake will be thrown back in the exact path which it traversed in its descent, while another descending in an oblique manner will not return to the place whence it came, but will be reflected at

* Scio-graphy; or, Radial Projection of Shadows. By R. Campbell Puckett, Ph.D., Head Master of the Bath School of Art, London: Chapman & Hall, 1863, price 1s. 6d.

an angle exactly equal to that at which it descended upon it. The first-mentioned ray, or that striking the reflecting surface, is called the incident ray; the last-mentioned, or that which is returned from the reflecting surface is called the reflected ray. Further, the angle made by the incident ray with a perpendicular to the reflecting surface, called the angle of incidence, is equal to the angle made by the reflected ray, with the same perpendicular line, called the angle of reflection; and this fact affords a method of universal application by which, when the angle of incidence is found that of reflection is obtained.

The nineteenth lesson shows the method adopted of finding reflections upon a vertical surface, as a looking-glass. The pupil is required to understand that reflections upon plane surfaces always lie in planes at right angles to such surfaces, and contain the object throwing the reflection. To this end a mirror is drawn and a vase and frame placed sufficiently near it to be reflected upon it. Then follows the lineation which determines the position and extent of the reflections. The twentieth lesson illustrates the principles of reflection upon oblique planes. A lighted candle in a candlestick standing on a couple of books is placed before a swing looking-glass, the mirror of which is in an oblique direction forming an angle with the horizontal plane. The figures are placed at angles of 60° and 30° with the plane of delineation. As reflections always lie in planes perpendicular to the reflecting surface, it is necessary to find a vanishing surface, at right angles to the oblique plane. Our author then draws a line representing the trace of a plane upon the oblique surface of the mirror, which he continues until it cuts the produced axis of the candlestick. Then, he says, as the apparent distance of reflection behind the plane reflecting surface is always equal to the distance of the object from the reflecting surface, an angle must be constructed equal to that produced by the trace and the axis on the other side of the trace, the outermost line of which will give the axis of the object in the reflection. Four corollaries are deduced from the examples illustrating reflections—1. Reflections on horizontal surfaces will have the same vanishing points as the objects reflected; 2. The angle of incidence is always equal to the angle of reflection; 3. Reflections upon plane surfaces always lie in planes at right angles to such surfaces, and contain the object throwing the reflection; and, lastly, reflections upon plane surfaces will always appear to be at every point equi-distant with the objects casting the reflections to the reflecting surfaces.

The author has treated an intricate subject without entanglement, and the progressive manner in which he has arranged his lessons helps to facilitate an exact comprehension of them. Shadows are the inseparable adjuncts of realities; and we endorse his suggestion that sciography, as a means of expression of form, should be comprised in the programme of the studies of art-students.

THE NEW UNIVERSITY FOR GLASGOW.

The University of Glasgow is the second oldest university in Scotland. It was founded by Bishop Turnbull, in 1450-1, in virtue of a Bull obtained from Pope Nicholas V. and a charter granted by James II. For 100 years, however, it had no endowment. Queen Mary, in 1560, gave it a moiety of the consecrated church-property in the city; and subsequent monarchs, as well as the corporation, have increased the endowment. St. Andrews University was in existence forty years previously to that of Glasgow; but all the other Scottish seats of learning came afterwards: King's College, Aberdeen, in 1494; Marischal College, in the same city, in 1593; and the now famous Edinburgh University, in 1617. It was not until after the Reformation that Glasgow became a place of any importance, and its progress was mainly in connection with its church and university. The latter early acquired a reputation nearly equal to that of St. Andrews. Of the original building no traces now remain. The present edifice was erected between the years 1632-62; partly by public subscription, but chiefly through the magnificent benefactions of Zachary Boyd. Of this celebrated and long-winded divine the following story is told. In 1651, Protector Cromwell took up his abode here, and went one Sunday to hear service in the cathedral. Mr. Boyd officiated, and inveighed so uncompro-

misingly against Oliver, that Mr. Secretary Thurlow proposed to have the defiant and fearless minister shot. Cromwell's only answer was, "He's a fool, and you're another. I'll pay him out in his own fashion." So he asked Mr. Boyd to dinner, and concluded the entertainment with a prayer that lasted three hours. Glasgow University is the gloomiest of buildings, situated in the most squalid and unsavoury of streets to be met with from Land's End to John O'Groats'. At one time the favourite place of residence of Scottish nobility, — High-street, — with the once equally aristocratic Salt-market (where lived Bailie Nichol Jarvie), the Gallowgate, Bridgegate, and other contiguous thoroughfares, are now inhabited by a population whose counterpart is to be found in Drury-lane or St. Giles's. The buildings consist of two quadrangles, connected by a not unhandsome clock-tower; and to the north of these is a third, in which are the houses of the different professors. Over the entrance in High-street is a balcony, and the arms of the founder in basso-relievo gilt. The most noticeable feature of the outer court is a massive stone staircase leading to the hall, which is panelled with oak. Over the archway of the inner court is a carved effigy of Zachary Boyd aforesaid.

The general style of the college is a mixture of the Elizabethan with the peculiar architecture which Scotland borrowed from France in the seventeenth century. It has the balconies, the tall rectangular chimney-stacks, corner to corner, and the variously-decorated window tops of the former; while the narrow rocket-topped towers of the latter, polygonal or circular, are conspicuous in the quadrangles. Beyond the buildings comprising the class-rooms, stands the Hunterian Museum, a structure in the Grecian style, and, of course, not at all in keeping with the rest of the college. This museum was founded by the celebrated Dr. William Hunter, of London. It contains a splendid collection of anatomical curiosities, and a good one of coins, books, and paintings—the last including specimens of Rubens, Rembrandt, and Salvator Rosa. Not the least interesting of the objects of the museum is the original steam-engine which James Watt constructed, and by his experiments on which he made his great discoveries. This building was erected after a design by Stark, in the beginning of the present century, an annex having been added in 1838. The college possesses a splendid library of 50,000 volumes, and as a seat of learning it has long maintained a high position. The college green or garden, a large open space behind the museum, was the scene of the conflict in "Rob Roy" between Frank and Raskleigh Oshaldiston. Few cities in the Old World, who may safely he said, have made such rapid strides in physical development and commercial prosperity as Glasgow. In 1556, when the Scottish burghs were taxed by Queen Mary, Glasgow had a population of 4,500, and was only the eleventh city in the kingdom in wealth and population. In 1708 it was estimated at 12,776; in another century it had reached 83,769, and it has rapidly increased ever since. Thus, in 1823, the number of its inhabitants was 147,043; in 1841, 289,682; in 1851, 329,097; in 1861, 394,897; and it is now estimated that the population is half a million. The extension has been mainly westward and southward; and it has long been felt that the college was far removed from the virtual centre of St. Mungo, that its contracted limits were wholly inadequate to modern requirements, and altogether that the grim old pile, so ill-favourably situated, was unworthy of the commercial capital of Scotland. For more than twenty years has local agitation been going on, with a view to the erection of a new and more suitable *Alma Mater* for the city. So long ago as 1816, a Bill for the disposal of the present site and buildings to the Monklands Junction Railway Company, and the removal of the college, received the assent of both Houses of Parliament. Nothing came of the project, however, the railway company having failed to carry out their agreement; and, in consequence of which failure, they had to pay, we believe, some 10,000*l.* as "smart money." At length, in 1864, a sale of the college and grounds was effected with another railway company, the City of Glasgow Union, the price being 100,000*l.* With promised aid from Government, the University authorities found that they had at their disposal the sum of about 139,000*l.*, and they at once set to work to carry out the scheme of removal. The lands of Gilmore-park, an eminence separated from the west-end park by the river Kel-

vin, presented an eligible site, and accordingly these were purchased for 65,000*l.*, and adjoining ground to the westward, and also on the south bank of the Kelvin, for a further sum of 33,000*l.* The first stone of the new buildings was laid in April, 1867. Exclusive of the professors' houses, they will occupy nearly four acres on the summit of the hill. The style of the new university is that of the early part of the fourteenth century, as applied to collegiate structures. The buildings, when completed, will form an oblong rectangular pile, 600 ft. long by 300 ft. broad, divided in the middle by a building which separates two courts or quadrangles, each 180 ft. square, or nearly four times the area of the two original quadrangles of the present university. The edifice will have an imposing effect viewed from the higher portion of the west-end park. The main or south front consists of a centre and two wings, terminating in flanks, which latter project a little, and are elevated a story higher than the rest. A tower rises from the centre to a height of nearly 300 ft. It is 36 ft. square at the bottom, the walls in the lower part being 7 ft. thick. This is reduced to 4½ ft. at the bottom of the spire, which commences at a height of 178 ft. from the ground, and springs up 114 ft. higher. The tower itself is divided into six stories, lighted by arched windows.

Near the foot of the spire there will be a clock, the minute-hand of which will be 7 ft. long, and each of the numerals on the dial 20 in. long. The chief entrance pierces the centre of the tower, leading into the middle of the buildings. The various class-rooms need not be particularly described. We may mention, however, that the lower hall is 120 ft. long by 60 ft. wide, and 22 ft. high. The roof is supported by twelve fluted columns of cast-iron, united at top by ornamented iron girders. Above this is another hall, of similar dimensions, but open above to the arched roof of the building, 52 ft. from the floor. The common hall will occupy the centre building, which divides the two quadrangles, but only in its upper part. The ground-floor is to be fitted throughout its whole extent with arcades, affording communication between the two quadrangles, and also, along with the cloisters, shelter for the students. The grand stair will lead to the hall, the museum, and the library; and in the upper floor these three apartments are so arranged that on fitting occasions they can be thrown into one magnificent suite, capable of receiving several thousand persons. There will be no fewer than ten boilers distributed throughout the University in connexion with heating apparatus, pipes, and tunnels for heating and ventilating, permeating the entire buildings.

They are so far advanced that the workmen have commenced to roof in the east front, and it is expected that the south or main front will be ready for roofing in a month. There are no fewer than 750 men employed daily at the works, and it will be at least a year and a half yet before the university be completed. The stone is chiefly that of Giffnock quarries, in the neighbourhood, and of Dumfries, near Bannockburn; the flagstones for steps being Arbroath pavement. The woodwork is all of Dantzic red timber, and is stained and varnished, but not painted. The architect is Mr. G. Gilbert Scott. The contractor for the stone and wood work is Mr. Thompson, of Peterborough; Messrs. M'Elroy & Sons, of Glasgow, have supplied the ironwork. Messrs. Wallace & Conell are the plumbers, and Mr. Morrison the slater. Mr. Bradford is clerk of the works. The entire cost of the new university is estimated at about 200,000*l.* Such is a brief outline of the important work, the foundation-stone of which was yesterday (Thursday) laid with "all the honours" by his Royal Highness the Prince of Wales." The occasion was observed as a general holiday in Glasgow.

FORTUNATE ESCAPE OF ETON COLLEGE CHAPEL.

—On a recent occasion, when, for the first time under new regulations, divine service was to have commenced at 9.25 at Eton College Chapel, on the entrance of the choir and students it was discovered that the chapel was filled with gas, which had been escaping since the close of the evening service, through some neglect in turning it off. Prompt means were taken to expel the gas, but the morning service was dispensed with. Had the service been arranged to take place as on the previous evening there is every probability that the edifice would have suffered much injury.

THE MIDLAND RAILWAY STATION,
ST. PANCRAS-ROAD, LONDON.

The Midland Station, opened last week, as we then briefly mentioned, is unquestionably, as regards the length, width, and height of the roof, the greatest in the world. The roof is 700 ft. long; the rafters rise from the platform 100 ft., and the roof is 240 ft. in span. In London the only roofs to be compared with that of the Midland Station are those of Charing-cross and Cannon-street Stations, which are each narrower than the one in question. A peculiarity of the Midland Station roof is, that while it is the widest span of any roof in existence, the vast space under the ribs is unbroken by ties or braces, perpendicular, horizontal, or diagonal, common to other roofs. Cannon-street Station roof, which is 60 ft. less in span than that of the Pancras Station, is a segment. The Midland Station roof is Subdued Gothic, with segments meeting at its crown. There are twenty-five principal ribs in the roof, each of which weighs about 50 tons. Between the principals are three intermediates of rolled iron, which are borne upon latticed purlines. The station walls rise behind the spring of the principals, and the space at the top is filled with a sprandrel of open ironwork. The station roof covers an immense area of two floors, the basement being a carriage for storing pale ale and other goods. The floor of the station is supported upon plate girders, which are borne upon 600 strong cast-iron pillars. Under this basement the Midland connexion is carried to the Metropolitan system. Reverting to the station, it should be mentioned, that all the upper structure is borne upon lateral and cross girders, covered with Buckle's patent plates. The platforms and carriage-road are, of course, erected upon this. The platforms have dwarf walls, with sleepers on the top, and are covered with close-jointed red deal planks, with hoop-iron tongues. The edges of the platform are of dressed stone. The carriage-way is constructed of concrete in two arches, the centres shifted as the lengths are finished. The decorations in the station include a fine frieze about 2 ft. deep in Minton's enamelled tiles, and a dado round the base and foot of the principals. Space is provided for thirteen lines of rails, with platform accommodation available for nine lines. For the present the booking office, temporarily provided, is at the parcels office on the Skinner-street side, which has a good carriage-way and a plank footpath with side railing from Euston-road.

One cannot tell what the effect of this great pile will be from its present appearance; the principal front being only just above ground, and the whole of the end and side fronts concealed by hoardings. The hotel does not as yet show to the front. It will have its chief facade to Euston-road, but will have also side fronts to Skinner-street and inwards to the station approach.

THE TEMPORARY EMPLOYMENT OF
OPERATIVES.

The essay on "The best and most feasible plan for the temporary employment of operatives and workmen in casual distress," by Mr. R. Arthur Arnold, to which Mr. W. R. Lloyd's prize of 25*l.* was awarded, was read at the Birmingham Congress. In a discussion of the various plans which have hitherto been or which might be adopted in seasons of distress, Mr. Arnold narrows the subject so as to make it plain,—1st, that in seasons of temporary distress it is unadvisable to promote emigration; 2nd, that the production of saleable commodities cannot be undertaken; 3rd, that in any employment of persons so accidentally reduced to indigence it is absolutely necessary to provide such labour as that at which they can earn wages sufficient for their maintenance; 4th, that no more than the proper value of their labour should be given in payment for the execution of such work; and, 5th, that the labour of indigent persons during periods of temporary distress, employed by the guardians of the poor or any other local and corporate authority, must be confined to works which will come under the denomination of "public utility" or "sanitary improvement." Mr. Arnold's proposal is that a Public Works Act should be passed, applicable to the United Kingdom, limiting to 2,000,000*l.* the annual sum which the Treasury should be empowered to pay to the Public Works Loan Commissioners for the purposes of the Act, the special consent of Parlia-

ment being obtained if any further sum was required in any one year. A minister of public works should be responsible for the reorganised business of the existing Public Works Loan Commission; but so long as that remains without a chief directly subject to Parliamentary control, the advances for the purposes of the Act should be made by the Public Works Loan Commissioners, upon orders bearing the seal of the Poor Law Board and the signature of the president of that Board for the time being. Loans should be made to any local Board acting under the Local Government Act, 1858; to any local authorities invested with powers of town government and rating under any local Act, by whatever name such local authority may be called; to any commissioners or body of persons, or any other authority having power to levy rates for general or special purposes; and to any guardians of the poor who have authority to borrow. No previous limitation of borrowing powers by any local Act should affect the claim of any local authority to borrow, under the Public Works Act, a sum equal to one year's rateable value of the property assessable within the district, or parish, or place in respect to which the loan is applied for. Any local authority, having borrowed to this full amount, might again mortgage their rates and obtain a further loan, an equal amount of the original loan being already repaid. The repayment of the loans under the provisions of the Public Works (Manufacturing Districts) Act, 1863, was by thirty equal instalments of the principal, the annual diminishing interest being added. A better plan would be to calculate principal and interest together, in which case the annual payment for thirty years of about 5 per cent. upon the total amount of the loan would pay off both principal and interest, with the advantage to the local authorities of paying an equal sum every year. The security for the loans would be upon mortgage of the rates, and any property of which the local authority was possessed in the locality in respect of which the loan was applied for. It would be requisite that the works proposed to be undertaken should be of public utility or sanitary improvement; and the expediency of granting loans would be determined by the department charged with the administration of the Act, the minister at the head of such department being responsible for the loans, the grant of which would in every case bear his signature as authority for the advance of money. The loans must be exclusively devoted to the actual works in respect of which such sanction is given. The money would be advanced in such instalments as the Department charged with the administration of the Act thought proper to sanction, and the payment of any instalment might be postponed or withheld on notice being given by the Department to the local authority that the works were not being proceeded with in conformity with the plan proposed. But the Department should have power to sanction alterations of plans on the advice of their inspectors, at the same time having no responsibility in respect to the design and execution of the works, which, together with their superintendence, would be entirely committed to the local authorities and their officers. Having given some further details, Mr. Arnold observed that there is no city, or town, or district in the United Kingdom, in which there is no need for the execution of works of public utility and sanitary improvement. Many are wholly without sewers, or only supplied with old drains, which are nothing better than poisonous cesspools; many have no water supply but from polluted wells; many draw their contaminated supply from brooks full of sewage and other impurities; in many, the old streets are badly paved, and the new or bye streets are impassable in winter, their surfaces covered with putrid filth thrown out from the houses; scarcely a river bed is properly and periodically cleansed of the accumulations brought by storms, which, obstructed by the bridges and buildings of towns, are usually deposited in their neighbourhood. Near every town there are undrained lands injuriously affecting the health of the population, the fertility of which would be greatly increased by drainage. Upon the public highways, there are in every direction hills which might be levelled, and valleys filled up, with great benefit to the public convenience and reduction of the cost of cartage. The permanent works of highway improvement executed in several rural parishes, under the provisions of the Public Works (Manufacturing Districts) Act, 1863, effected a saving of 50 per cent. of the highway rates. The works executed

under such an Act are all of so beneficial a character, that their commencement before the occurrence of distress, or their completion after it has passed away, is thoroughly advantageous and satisfactory.

THE FOUNDATION
OF THE NATIONAL GALLERY, AND
SIR GEORGE BEAUMONT.

The following memoranda, now first printed, will be read with pleasure by all interested in the progress of art. They were written by George Agar Ellis, afterwards Lord Dover, touching Sir George Beaumont and our National Gallery. Lord Dover was a man of great taste, and it was mainly through his exertions and influence that the Angerstein collection was bought by Parliament:—

One of the objects Sir George Beaumont had the most at heart was the establishment of a national gallery for pictures. He was constantly, during the years 1821, 1822, and 1823, talking to me upon the subject, and urging the various reasons which rendered such an institution desirable in this country, in all of which I concurred. He frequently begged me to speak to Lord Liverpool, then Prime Minister, about it, and always assured me that he would give his own pictures to the nation as soon as he saw a place allotted for their reception. In consequence, took several opportunities of mentioning the subject of a national collection of pictures to Lord Liverpool, who always received the suggestion favourably, but generally ended by rather throwing cold water upon the project, on the score of expense. I also frequently urged the same points to Lord Aberdeen and Lord Farnborough, and Sir George did the same; but still nothing was done. At length Mr. Angerstein died, and it was understood that his pictures were on sale. This was in the year 1823, and great fears were entertained that either the King of Bavaria or the Emperor of Russia would buy them, and that thus they would be lost to this country. Upon this Sir George again spoke to me, and we agreed together that now was the moment to press for the gallery. I again urged Lord Liverpool, but nothing was done. At length, towards the end of the session of 1823, I determined, with the concurrence and advice of Sir George, to take some opportunity, as all other means had failed of bringing ministers to a favourable decision, to mention the subject of the National Gallery, and of the purchase of Mr. Angerstein's collection, in the House of Commons, as I thought that if the temper of the House declared itself in favour of the acquisition, ministers could not for very shame avoid making it. I do not mean to say that they were not favourably themselves to the plan, but they were so timid and frightened at France and the economists, that they could not bring themselves to a decision. Accordingly, on the 1st of July, 1823, I took occasion of a vote for money for the new library at the British Museum, to state how anxious I was to see a national gallery of pictures established. I then alluded to Sir George Beaumont's promise of giving his collection to the public, and eulogised his conduct, and afterwards gave some account of the Angerstein collection, and of the danger there was of its being taken out of the country; and finally gave notice that if the ministers did not in the meanwhile purchase it, I would myself make a motion to that effect at the commencement of the next session of Parliament. Mr. Stuart Wortley (now Lord Wharncliffe), Mr. Alexander Baring, Mr. Hudson Gurney, Mr. William Smith, and, I think, one or two others, spoke in favour of my proposition. The feeling of the House was so evidently with me that the point was gained. During the recess the Government bought Mr. Angerstein's pictures, and the National Gallery was established. I have gone into this detail in order to explain Sir George's letters, which were written subsequently to the discussion in the House of Commons, and which show his great anxiety upon the subject. I am, indeed, quite certain that without his persuasions and encouragement, and the permission he gave me to announce formally the donation of his collection to the nation, I should never have had the heart to do what I did, so discouraged was I by the delays and vacillation of the Government. I have been anxious that you should know the part Sir George had in this transaction respecting the National Gallery,—first, because it is

highly honourable to him; and, secondly, because it is something of an event in a life of such amiable and retiring tranquillity as his was. His allusions to the prints of Garrick relate to two engravings of Garrick, which were executed by Reynolds under his inspection and correction, and which he was anxious to have engraved, because he considered them the two best likenesses of that great actor extant. They are after Dance and Zoffani, in the characters of Richard III. and Abel Drugger.

George Howland Beaumont was born November 6th, 1753, and had an only brother Charles, who died an infant. His family, which is very ancient, derives its name from Bohemond, Count of Antioch, and is lineally descended from the royal families of France and England. By the death of his father, when Sir George was still a child, he was left to the care of his mother whose maiden name was Rachel Howland, a woman of extraordinary powers of mind, during the whole of her long life. She died in 1811, at ninety-six. She was ever regarded by her son with the greatest affection. He married, in 1781, Margaret, daughter of — Willes, esq., of Astrop, Northamptonshire, and granddaughter of the Lord Chief Justice Willes. It was during private theatricals at Mr. Bowles's, North Aston, that he first saw her, and was much struck by her great beauty.

As an actor he possessed great talents; and it has been even said in one or two characters nearly equalled Garrick. With this celebrated actor and many others he was intimately acquainted; and King bequeathed to him the Shakspeare cup he had himself received from Garrick.

With most of the artists and wits, and, indeed, distinguished men of all kinds, he was also on friendly terms. Sir Joshua Reynolds, Sir Eyedale Price West, Payne Knight, Colman, &c., may be mentioned.

Sir George's taste for drawing appears to have been first developed in the tour he made to Rome after his marriage. His first drawing-book (at Eton) is hardly so far advanced as usual with boys of that age. At Paris, during some of the early scenes of the Revolution, he had a narrow escape. He was walking with the late Lord Beverley, when they accidentally witnessed the execution of an unfortunate man by the populace *à la lanterne*; their look of horror attracted the attention of the furious people, and they were only saved by a *poissarde*, who, having taken some fancy to them, dexterously fixed the tricolour cockade in their hats and favoured their escape.

Early in this century Sir George determined on rebuilding the house on his estate in Leicestershire, Cole Orton, and employed the talents of Mr. Dance.

The amusement of laying out and beautifying the grounds, and improving the condition of the villagers, afforded him delightful occupation for the remainder of his life. In the country he always devoted the morning to painting, but so diffident was he of his own success that he destroyed many of his pictures, and would have destroyed many more had not Lady Beaumont removed them from his sight. He has left many unfinished from the impossibility of pleasing himself. To others, and to their productions, he was invariably kind and encouraging. Sir George made another excursion to Switzerland in 1819, and again to Rome in 1822. It was then by the assistance of Canova he succeeded in securing the *alto rilievo* of Michelangelo, which he left conditionally to the Royal Academy. His cousin, the present baronet, has since presented it unreservedly to that body.

Many of the earliest pictures of our best artists were purchased by Sir George,—Wilkie's "Blind Fiddler," Haydon's "Machbeth," &c. The paintings he presented two years before his death to the National Gallery were the collection of his life. Of the Narcissus he was so fond that it always travelled with him; indeed his admiration of Claude may almost be termed a passion. In his collection of drawings there are many of Gilpin, Alexander Hearn, Girtin, Dance, Cozens, &c. The beautiful group of Psyche borne by Zephyrus was executed for him by Gibson after his last visit to Rome; but he did not live to see it arrive in England, dying after a few days' illness, occasioned by cold, February 7, 1827, aged seventy-four. His widow survived him two years, dying in July, 1829, at the same age. At his particular desire a simple

tablet was placed in Cole Orton church, where he was buried, with this inscription,—

"Enter not into judgment with thy servant, O Lord."

Many of his paintings are still in the possession of his family; several were presented by his widow to various public galleries; among others, to the Academy at Rome.

His disposition was amiable and kind; his religious feelings were strong; his conversation was peculiarly interesting, possessing much quiet humour, and enlivened by a great fund of anecdote.

He appears to have been indefatigable in the pursuit of the art which was his engrossing passion, and has left an immense variety of sketches. It was with Sir George that the first idea of a public exhibition of Sir Joshua Reynolds's paintings originated, and to his exertions, which were most graciously encouraged by the late king, and kindly aided by Lord Melville, &c., that the public were indebted for the success of that idea.

LIGHT AND COLOUR.

My own hypothetical suggestions, both in the lecture and the several letters which have appeared in the columns of the *Builder* during the last twelve months, have been but mere addenda to their more important objects, and must await experimental proof. These more important objects have been to point out the constant confusion of the Newtonian and "undulatory" hypotheses and the neglect to take into account the physiological considerations necessary to a true comprehension and a putting together of the theory of light and colour by English writers, objections from which I do not consider Mr. Benson's letters and work are exempt. I know the difficulty of framing language strictly in accordance with pure theory; it is not easy to emancipate oneself from the common faulty habit of speech in these matters. I trust, therefore, that my observations will be received as actuated by a fair spirit of criticism, and a desire to attain to a more correct enunciation of the received theory, and not to detract from the object of Mr. Benson's labours, which are in part similar to my own. That Mr. Benson works from sheer devotion to and love of his subject may be gathered from the following passage at page 39 of his work:—"It seems clear that, strictly speaking, there can be no discord in colours," for such a conviction with most men would have deterred further prosecution of the subject.

In treating of so complex a theory, or a theory having so many ramifications as that of light and colour, it is better to keep special phases of it distinct, otherwise discussion is apt to run backwards, forwards, and across in inextricable confusion.

Definitions.

Light is a sensation, supposed by Newton to be caused by atoms projected from the sun* striking upon the retina; colours, sensations produced by the different velocities of these atoms. That every ray or beam producing the sensation of white light is compounded of, some of his expositors say, seven; others, an infinite number of rays of travelling atoms, of various velocities. Wave lengths are no part of this hypothesis. The undulatory or received theory supposes that light is a sensation produced by undulations on the retina; colours, by the different wave lengths and rapidity of those undulations.

Colours, therefore, according to either of these theories, has no objective existence, but is only a form of sensation. If it were objective and inherent in the atoms or the waves, the different velocities of the one and the wave lengths of the other theory would be superfluous assumptions. But Mr. Benson, in common with other authors on the same subject, is constantly giving objectivity to colour; for instance,—"The colours of all natural objects are merely the sensations produced by those of the incident rays,"—"the white light of the sun,"—"is the sum of the colours of all the component lights,"—"Green rays added to the blue." These are only a few out of many which could be enumerated.

Whilst, however, the Newtonian hypothesis has been abandoned in the main, its suppositions

* This definition might, of course, be framed to apply to all illuminating sources.

bundle of an infinite number of rays has been transplanted to the undulatory theory; and if it is cumbersome and improbable in its original domain, it is much more so, it appears to me, in its new soil. What is the diameter of that bundle? What its form of section? What the disposition of its fascioli? These questions lead to very important considerations, having reference to the integrity and truth of the general supposition, and are questions which I have never seen touched upon, much less solved. The Newtonian hypothesis in immediate reference to the prismatic rays is not the great discovery it has been proclaimed; it is a compound of fact and supposition which I, myself, feel convinced will be proved to be one of that intellectual giant's infelicitous conjectures. And as Mr. Benson is so wrapt in this "great discovery," I am not surprised to find him clinging to the ancient, instead of the more advanced physiological explanation of the *ocular spectra*, and this leads me at once to the subject of

Compensation.

To compensate is to make even that which is irregular, to counterbalance. Now the involuntariness of the fascioli, "infinite in number," composing the solar beam, which Mr. Benson so tenaciously clings to, precludes the possibility of any external compensation. The compensation, then, which we talk of in respect to the harmony of colours, is a readjustment in the sentient constitution of the eye itself. And what is our great experience of the nature of the compensation which is constantly going on in our sentient being? It is this. That after it has been moved from its mean or general state in any special direction, it has a reactionary tendency in the opposite direction. Indeed, this is not a tendency peculiar to our own, but to all nature, in confirmation of which a volume of instances might be cited. "Insensibility" is that state of the human system in which reaction is rendered either difficult or impossible. I would therefore venture to suggest the following as a law of compensation in reference to colour, viz.: *That in proportion as the retina experiences a colour of one kind, is its tendency to a sensation of colour of an opposite kind, or one which tends to balance and re-establish the equilibrium of the optic system.*

The "insensibility" of the eye to one colour, according to Mr. Benson, and some former writers upon this subject, is clearly, according to their own showing, a keen sensibility to another. But taking my own statement of the law which I have here ventured to intrude, the old-fashioned explanation of the *ocular spectra* might possibly pass; but unfortunately for the old hypothesis, the compensating spectra appear on closing the eye. The familiar experiment of looking at a window and then closing the eyes, will point the way in which this important fact may be best tested. In this case the reaction is merely from light to dark, and from dark to light, the glazed spaces after a while appearing dark; the frame, the sashes, light. If, however, instead of white glass we substitute coloured glass, the spectra will be coloured and compensating on closing the eye. If the eye be sensitive, the fact of the *ocular spectra* being reactions of the retina may be confirmed by the usual means, and, after intently gazing at the wafers or spots, closing the eye. If further proofs be needed I can give them. These experiments are not only conclusive regarding my statement in my last letter, that *ocular spectra* are due to nervous reaction, but that light and colour are sensations which may exist independently of any direct external excitement whatever.

It is very curious to observe that the involuntariness of the fascioli of the solar beam or ray which Mr. Benson so much insists on, is dead against his other notion of yellow being a secondary sensation, for every colour would then be caused by a particular primary, *inviolable* wave. Marked difference, as a colour, yellow has; it is therefore primary according to Mr. Benson's foundation doctrine, and for the only two reasons it is possible to call a colour "primary." There are two terms to the equation of compensation, and these are mutually compensating. A compensating colour, therefore, is not necessarily a secondary.

Newton's great discovery, says Mr. Benson,—

"Was, that the sun sent out an infinite number of different kinds of light, all differently refrangible, and producing different sensations of colour; and that the peculiar refrangibility, which gives to each kind its peculiar refrangibility, is invariable with the colour sensation which attends it. This is the very foundation of the science of colour."

Ergo, an infinite number of different kinds of light would include a yellow ray, pure, simple, uncompounded. Every ray is a primary.

"The whole essence of the theory is involved in the fact, that every separate wave maintains its own time invariable, and its own proper effect at every point of the ether which it reaches, whether such point is at rest or disturbed by any other wave or waves at the same time."

With this passage compare the following:—

"So that all the colours which lie in the spectrum between the first and second, and second and third of these may be produced by mixtures of these," &c.

In the former paragraph Mr. Benson says the waves preserve themselves invariable: are the waves still invariable when they are mixed, or does he mean that the sensation is mixed? There is such a thing as interference: are the waves invariable at the same point then? There is, too, such a fact as rays diminishing in power in a certain ratio to distance: are the waves of each ray the same at the sun as at the earth? Is it consistent with the simplest principles of dynamics that waves should be propagated through matter unaltered? I think not: there is a decadence in the wave as it progresses in time and space from the originating force, just as the waves of a bell after it has been struck pass in the resonance (I am told) to the third and fifth. The matter of naming a colour primary or secondary is of little consequence, but to have a clear logical exposition of theory is of the utmost importance.

On my own notions respecting the science of light and colour, I have in the main forbore to dilate in this communication; for the further exposition of these, and the details of an important experiment, I must beg Mr. Benson, and the readers of the *Builder*, to wait, on account of full occupation.

W. CAVE THOMAS.

THE ARCHITECTURAL ALLIANCE.

At the last meeting of this association there were present, for the *London Architectural Association*, Messrs. T. Roger Smith, T. M. Rickman (secretary pro tem. of the Alliance), J. Douglass Mathews, and R. Phéu Spiers. From the *Glasgow Architectural Society*, Messrs. Alexander Thomson and John J. Stevenson. The *Liverpool Architectural Society*, Mr. C. E. Grayson. *Manchester Architectural Association*, Messrs. Peter B. Alley, jun., and Alfred Darbyshire. *Northern Architectural Association*, Mr. R. J. Johnson. *Nottingham Architectural Association*, Mr. T. C. Hine (treasurer), and Mr. Kennedy, from Glasgow (not a delegate). Mr. T. R. Smith presided.

A paper by Mr. Hine was considered, proposing that the quantities should form part of the basis of contract, as much as plans and specification, and that the architect should be responsible for them, whether prepared by himself or by his surveyor. After discussion, it was resolved,—

"That inasmuch as the bills of quantities are now generally tacitly received as the basis of builders' contracts in the settlement of their accounts, in the opinion of this meeting it would be more just, both to client and builder, as well as more satisfactory to architects, were the bills of quantities formally recognised as part of the contract."

A deputation from the General Builders' Association were introduced, consisting of Mr. Whiteley, of Leeds; Mr. W. B. Briggs, of Birmingham; Mr. E. Johnson, of Manchester; and Mr. A. Maul, of Birmingham, secretary.

Mr. Maul proposed that their society and the London builders should meet a committee of the Institute and of the Alliance, to draw up a model contract. He also complained that throughout the country building contracts vary in their terms, and he argued that they should be specific in terms to a greater extent; that sometimes drawings offer very indifferent data for contracts, while many contracts are on the theoretical footing, that one party being the proprietor, the other the builder, the architect is independent; whereas they hold that the architect is not independent, but the nominee of one party, and that oftentimes builders are thereby inconvenienced and their interests prejudiced from the fact that the architect thus appointed is sole judge.

They want an ample arbitration clause on all subjects in dispute, but not upon material and workmanship. It was further urged, that there is a want of mutuality shown in the provision for taking the work out of the builder's hands for want of speed, while there is no counter provision as to want of funds.

There are also usually clauses relating to the bankruptcy of the proprietor; nor is there usually any reciprocity in the arrangement as to sureties.

The builders admit that a penalty for time should be part of contract, but they urge that the position of the architect should be more defined as to orders for extras.

In case of sealed contracts, they also urge that powers should be taken for variations, without the use of a sealed instrument.

And also that, as quantities are a definite part of the

contract, either builders should join in appointing the surveyor, or where the quantities are supplied they should form part of the contract, and that as to sums left in hand there should be some recognised limit; also some common understanding as to the ordinary terms and periods of payment.

It was resolved,—
"That the Alliance appoint their office-bearers as a committee to hear the representations of the General Builders' Association, and, in conjunction with any other bodies who may be interested, to endeavour to come to some agreement on the subjects submitted for consideration, and to report to the Alliance at its next meeting, or to the constituent societies at an earlier period."

Mr. Plevin's form of contract was then considered. Mr. Spiers reported a resolution from the Architectural Association against the scheme.

It was ultimately resolved,—
"That, as the whole of the questions covered by Mr. Plevin's form of contract are included in the subjects that will have to be discussed with the General Builders' Association, it will be premature to enter upon them at the present meeting."

As to architectural education, it was resolved,—
"That the secretary be requested to obtain information from the allied societies as to the facilities for architectural education now existing, and to report upon the subject to the next meeting."

MANCHESTER ARCHITECTURAL ASSOCIATION.

The annual meeting of the Students' Class was held on Monday evening, the 28th ult., at the Society's Rooms, Lord's Chambers. There was a good attendance. The secretary and treasurer's reports were passed; the latter showing a balance in favour of the society. Mr. Alley, jun., treasurer, and Mr. W. H. M. Ward, secretary, were re-elected, and Mr. Bedford was made the president in lieu of Mr. Batty, who retired. The society seeks to educate students in architecture in branches not ordinarily learnt in office routine. The construction class is held on Monday evening, under the supervision of Mr. Batty; the freehand drawing class on Friday evening, directed by Mr. Bedford; and the water-colour class on Saturday afternoon, by Mr. Bagot.

ARCHITECTURAL STUDENTS IN PARIS.

At the Palais de Beaux Arts in Paris the designs sent in competition by the architectural students for prizes were publicly exhibited on the 30th ult. The subjects were—1st, a church; 2nd, a hospital; 3rd, Hôtel de Prefecture. For the first subject there were sixty-eight competitors; for the second, twenty-eight; and for the third, eight; making together 104 competitors.

It would appear that the anæsthesia hurled by M. Viollet le Duc against all non-medæval art have had but scant influence on our artistic friends across the Channel, for of the 104 designs three only are in the Pointed style.

The 416 drawings completely fill the great hall of the Palais. Among them there are many good drawings, but only one medal was awarded.

CONSECRATION OF NEW CHURCHES AT WOBURN AND WOBURN SANDS, BEDS.

The new church erected at Woburn by the Duke of Bedford has been consecrated. The site is near the Woburn entrance to the dinal park. The edifice, which has been erected from the designs and under the superintendence of Mr. Clutton, of London, architect, at a cost of some 26,000*l.*, exclusive of the value of the ground, is built in the Gothic style of the thirteenth century, the materials being Clepham stone with dressings of Box Crowned stone for the exterior, and for the interior Cowham stone. The extreme height of the structure is 61 ft., and from the ground level to the top of the parapets the height is 40 ft. Projecting through the parapets are a series of gargoyles discharging upon iron traps beneath. The nave, which is 96 ft. long by 64 ft. in width, is supported by seven duplicate columns, with plain shafts and carved capitals, and is lighted by nine windows, five in one, and four in the other aisle, together with three windows and an oriel at the west end. The vaulted roof is carried level throughout, at an average height of 50 ft. from the pavement, so that by this arrangement there is no rooves. Instead, there is a flight of steps leading to the chancel floor, the level of which is some 3 ft. 6 in. above that of the nave. At the eastern extremity of the chancel another flight, consisting of three steps, leads to the area in which the communion-table is placed, the level of this portion of the chancel being 5 ft.

above that of the floor of the nave. The extreme length of the chancel is 52 ft., and the width 26 ft., the whole of the interior being vaulted with stone. The chancel has at each side three windows, and at the east two lancet windows, surmounted by a central oriel 13 ft. in diameter. In due course all the windows, according to our authority, the *Bedford Times*, will be of stained glass. Beneath the chancel there is a crypt, 72 ft. by 24 ft., vaulted with stone, and supported by two rows of columns. This is to be used as the future burial-place of the Dukes of Bedford. The tower, which is situated at the western end, is 28 ft. square, and, with the spire, reaches to the height of 185 ft. Probably the height to top of the copper cross which crowns the spire may be set down at 200 ft. It contains a new bell, weighing nearly 3 tons, cast (in C) by Messrs. Mears & Co., of London, and has a deep sonorous tone. The fittings are all of oak. At the western extremity of the north aisle, and fronting the font and main entrance, is the organ-gallery, supported on pillars, and ascended by a flight of spiral stone steps. The organ has been built by Mr. T. J. Robson, of London. In the west wall of the church, directly opposite the font, is inserted a slab of polished granite, on which is carved the following simple inscription,—“In the years 1856-56-57-58, William, 8th Duke of Bedford, built this church,”—under which, in small and unpretending characters, is a record of the architect's labours in the sentence,—“Operi et consilio Henrici Clinton, Archt.” The clerk of the works was Mr. J. Young.

The new church at Woburn Sands has also been consecrated. The edifice has been erected at the cost of the late Duke of Bedford. It is erected on the crest of one of the lofty ridges which skirt the main roadway through Woburn Sands, and is called St. Michael's-on-the-Mount. The building is erected in the Gothic style of fifteenth century; the materials employed being Cosgrove stone, with dressings of Box Ground stone for the exterior, and Cowham stone for the interior. The nave is 64 ft. long by 38 ft. in width, and is covered with an open timber roof, and the chancel is 20 ft. by 18 ft. At the west end of the structure a turret rises to the height of about 80 ft. The fittings of the nave are of deal, while those in the chancel are of oak, carved. The edifice has been erected from the designs and under the superintendence of Mr. H. Clinton, London. The cost is roughly estimated at 5,000*l.* The organ, which has been presented to the church by Mr. Steven, of Aspley Guise, was a family heirloom, supposed to have been built 300 years ago, by a German named Snatchel, and the principle on which it is erected is so peculiar that, on the organ being lately remodelled prior to its being set up in the church, it was supposed to be the only one of its kind in this country. The church is capable of accommodating about 500.

THE NEW INDUSTRIAL SCHOOLS AT KIRKDALE.

The additional industrial school buildings at Kirkdale, in connexion with that department of the Liverpool Parochial Vestry, and which have been rendered necessary in consequence of the over-crowded state of the existing schools, have just been completed, and will shortly be opened. The new buildings, which are quite distinct from the old schools, have been erected from designs by Messrs. Pictou & Son, of Liverpool, architects. They stand on high ground, in the immediate vicinity of the county prison. The style adopted is Gothic. The principal elevation, which faces the south, is 357 ft. in length, and 40 ft. in height to the battlements, and consists of three stories. In the centre is a tower, which rises 68 ft. above the battlements. Beneath this, and over the main central entrance, is a large, ornamental, oriel window, below which again there is a prominent three-light window. At each side of the main entrance there are two carved figures in stone, representing Charity and Mercy. At the east and west ends of the building respectively there are pavilion roofs, which rise to a considerable height. The east and west elevations of the building are uniform in design with the south front, the school-rooms, dining and play rooms, having mullion chancel windows. The rear of the building forms a large quadrangle, there being, in addition to the east and west wings, what may be termed a centre wing, containing school rooms, play rooms, and dormitories, uniform with the other portions of the

building. The main south entrance leads to a corridor, 7 ft. in width, which runs the entire length of the building, from which, in the front part, on the ground-floor, are approached the several day-rooms, teachers' rooms, offices, and other rooms in the master's department. From the opposite side of the corridor, in the centre, a play-room is entered, 73 ft. in length by 30 ft. in width, with an additional play-shed beyond it, 73 ft. by 30 ft. The principal school-room is in the east wing of the building, and is 83 ft. long by 30 ft. wide, and 36 ft. in height; whilst the dining-room, which is in the west wing, is 80 ft. long and 30 ft. wide, and uniform in height with the schoolroom. Two staircases, one at the east and the other at the west end, lead from the ground floor to the first floor, along which there is a corridor exactly uniform with that already described. The whole of the first floor is divided into dormitories of uniform size, for the use of the officials of the establishment as well as the inmates. The upper story is approached by a staircase similar in size to the one beneath it, and a uniform corridor leads to three large dormitories similar in size to the large school-room, dining-room, and play-room on the ground floor, in addition to which there are also a number of smaller dormitories. With the view of promoting ventilation there are iron gratings on each side of the entire length of the two upper corridors, by which a constant current of air is kept up from the ground floor, whilst for the entire ventilation and warming of the building throughout apparatus and machinery have been fitted up in the basement, under the immediate superintendence of Mr. Watson, of Halifax. Mr. J. Westmoreland, of Islington, is the sole contractor, and the building has been erected by him, assisted by tradesmen who have taken contracts from him in the several departments. The new premises are calculated to accommodate 700 children, which, with the capacity of the existing building, will contain shelter and education for an aggregate number of about 1,900.

ACCIDENTS.

Two serious accidents have occurred at the new Midland Railway Station, King's-cross. A labourer, employed by the contractors, fell from a high roof and sustained such injuries that he had to be taken to the Royal Free Hospital. Another labourer also fell from a roof, and was taken to the same hospital, suffering from concussion of the brain.

An inquiry has been held at St. Bartholomew's Hospital, touching the death of a workman who was at work on the roof of the new Southfield Market, when he fell, and was dashed to the ground. His skull was fractured by the fall. The jury returned a verdict of "Accidental death."

At the Lord Mayor's Court, before Mr. Sergeant Tindal Atkinson and a common jury, the case of "Vonder Heydo and wife v. Peters" has been tried. It was an action to recover compensation in damages sustained through the alleged negligence of defendant's servants. It appeared that on the 17th of August last a wagon belonging to the defendant, laden with scaffold-poles, turned into Red Cross-street, and the poles projecting behind swept over the pavement and struck plaintiff down. She was much shaken, and was laid up for some time. A City police-constable said the poles ground against the kerbstone for some distance, and then sprung up over the pavement, and struck down the plaintiff. He heard no warning given. It was admitted that the cart was the property of the defendant, but at the time of the accident it had been let to a railway company, and was then in charge of the railway company's servants. It was also mentioned that a proper warning had been given. Witnesses having been called for the defence, the jury found for the plaintiff, with 10*l.* damages. This case lasted over two hours, and the jury receive 2*d.* each for trying it.

While Sir John Trevelyan was addressing a large meeting at Bude the overcrowded platform gave way, and caused a scene of great confusion. Two men who were underneath at the time were injured, one seriously.

Two houses at Low Town, Holly Hall, Dudley, fell recently, and carried with them a nailer's shop and outhouse. The block thus destroyed was situated at the end of a ruinous row of building in what is called Bags Gutter, a part of the town thoroughly undermined by the neigh-

bouring pits. The lower extremities of two women were buried beneath a terrible load of bricks, timber, &c., but their heads and chests were protected by a joist which had fallen, but lay in a slanting direction across them. The poor creatures were released, after half an hour's hard labour. Two bricklayers employed in repairing a portion of the wretched premises were injured, though not in a very serious manner, one being thrown from his ladder, and the other cut and bruised by the falling material. The two houses are a complete wreck.

RAILWAY MATTERS.

The trial of Mr. Charles Kendall's atmospheric break has been in progress on the London, Chatham, and Dover Railway for three years. A novelty in working the apparatus for the instruction and amusement of a party on a trip from London to Margate and back was the placing full command of the break in the hands of the engine-driver. The driver, it is urged, is captain of the train, and should be entrusted with power equal to his responsibility. That he as well as the guard should have the means of checking or bringing to a stop the carriages in the rear of the engine is a condition fulfilled by the atmospheric railway break, which simultaneously blocks the wheels of the whole train, and which may be worked from either end. The first stop was between Sovenoaks and Farningham, on an incline of 1 in 100, the train being checked in a speed of 35 miles, and within a space of 823 yards. His second pull-up was on a level at Sole-street, when the train was going 40 miles an hour, and was stopped in a space of 220 yards. The third stop was, from want of time, not measured, but was judged between 160 and 200 yards, at the utmost, the speed of the train being at the time 55 miles an hour. Three more stops were made before reaching Margate, with increased success. Mr. Kendall's break includes a plan of communication between driver and guard, accessible only to passengers.

An experiment has been tried on the Manchester, South Junction, and Altrincham line, with Kearsley & Holt's railway carriage alarm signal. One of these signals was attached to the top of a first-class carriage. In each of the three compartments there was a light chain, stretching from side to side, attached to the signal. If a passenger wishes to give an alarm whilst the train is in motion, he has only to jump up and give any portion of the chain a pull. The pulling of the chain raises a semaphore on the top of the carriage outside, and uncovers a revolving wind-vane, which is then set in motion by the wind, and rings a large bell, which can be heard distinctly through the whole of the carriages in the train, as well as in deep cuttings and tunnels. The noise of the bell would instantly attract the attention of the guard and driver, the train would be brought to a standstill, and the semaphore which had been raised, and of which the driver could have a good view from the engine, would indicate the carriage from which the alarm had been given, and the reason of the alarm could at once be ascertained. At night the signal carries a white light, which is converted into the red or danger signal when the alarm is given. Tampering with the signal by a passenger when he has once given the alarm is impossible. When he once pulls the chain a small round ball descends from the roof of his compartment, which he cannot put back again, and this shows where the chain has been pulled. Such is the account of this signal, which we condense from a contemporary. Now suppose that one or two of the knocker-wrenching gentry happen to be amongst the occupants of a first-class carriage. The train comes into a tunnel during the day time, when there is no lamp lighted in the carriage. One of them pulls the chain quietly and the train is stopped. We may leave the result to the imagination of our readers. Or even let a nervous old woman, of either sex, conscientiously believe that there is an absolute necessity for stopping the train for some imaginary reason or other, would the punishment of such a person prevent the recurrence of similar *contertemps* in other cases? Communication between passengers and guards is most essential to the public safety, but no such "communication" can be effected in a satisfactory manner so long as the guard is fixed up in a box, or until he be enabled to communicate personally, and see with his own eyes and hear with his own ears, what it is that

requires the stopping of the train *before* it is stopped. The unnecessary and irregular stopping of trains would occasion not only delay but danger itself to the public. All short of this, we fear, is little better than ingenuity thrown away in order to save expense to railway companies.

BAY-WINDOW, RATHHAUS, RATISBON.

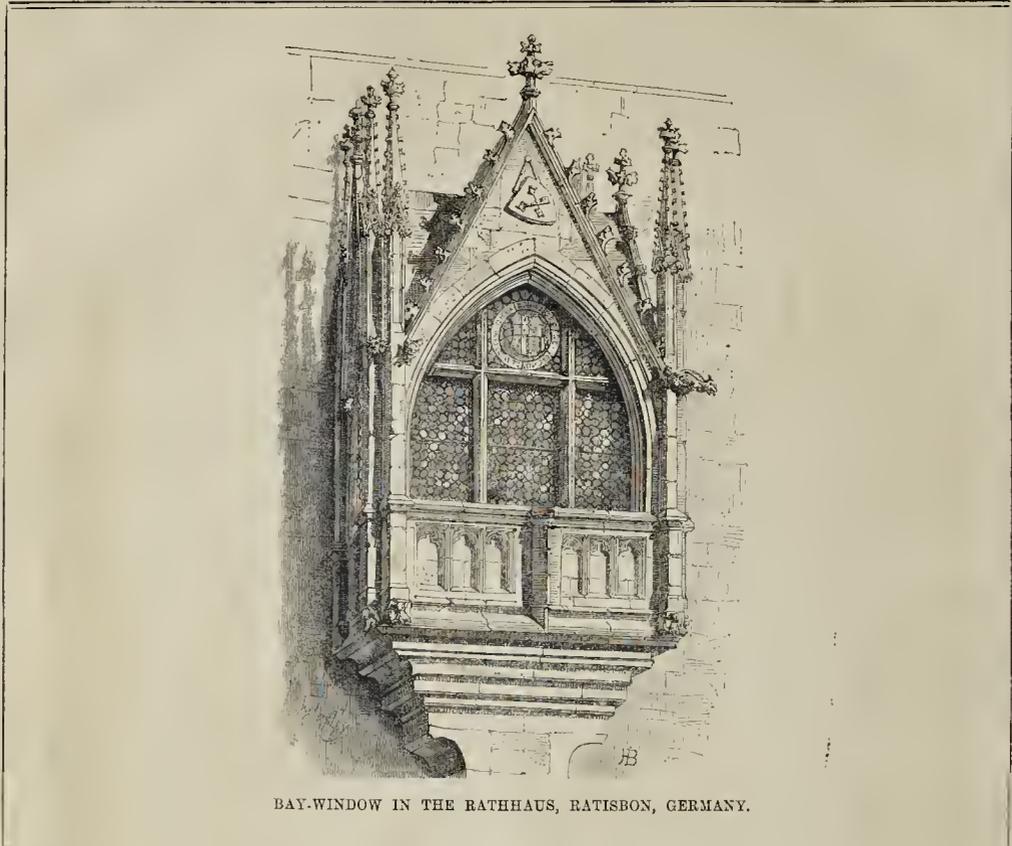
The Rathhaus at Ratisbon is a charming specimen of German Gothic of the end of the fourteenth century. The principal portion of the building consists of a large oblong structure, containing the council-chamber, entrance-hall, chief staircase, and below these a set of most dismal dungeons and a torture-chamber, with all its fearful machinery *in situ*. The most beautiful portions of the building are the porch, which has a very rich doorway; and the bay-window, of which we give a sketch. This bay-window projects from the centre of the east side of the council-chamber, to which it opens by a low arch. There can be little doubt that it originally formed a kind of chapel or oratory, and was separated from the council-chamber by a portable screen. On one side of the window, carried upon a panel, is the date 1400. It is doubtful whether the tracery is of the same date as the other portions of the bay window. It looks very like an alteration of the sixteenth century. It is, however, well moulded and of stone. Attached to the Rathhaus is a lofty square tower, with a clock and bells; and in one of the smaller chambers are some fine old tapestry, and a fifteenth-century "corona" for holding candles.

EASTCHEAP.

WHEN London was at once a fortress and a royal palace, Eastcheap, being the direct thoroughfare into the City, was a fashionable lounge, from the beginning of the thirteenth century down to the time of Henry VII., partaking of the character of the modern Pall-mall and St. James's-street, mixed with a strong flavour of what the Haymarket was a few years back before the night-houses were interfered with. It was here during nearly two centuries that the most fashionable traders displayed their goods; here the cooks and tavern-keepers, the predecessors of the modern club, had their ordinaries, and the ruyterers of the time held their carousals. Lydgate, the poet monk of Bury, and the contemporary and friend of Chaucer, in the preperations of his ideal character of Lackpenny, thus describes it in the reign of Edward III.:

"Then I eyed me into Eastcheap:
One cries rybis of befe and many a pye,
Pewter pottes they clattered on a horpe,
There was harpe, pype, and minstrelsy;
Yen by Cok, may by Cok, some beggers crye,
Some songe of Jenkin and Julian for their mede,
But for lack of money I might not spede."

The genius of Shakspeare has peopled this district with the creatures of his imagination, who are made by his magic to occupy as much of our memories as do the real characters of history, and the ideal characters dispute the places with the men and women who have actually lived and carried on the world's history. We know Falstaff and Poin, Bardolph, mine ancient Pistol, and Dame Quickly, as well as we do our familiar acquaintances; and it is doubtful whether the real characters of the contemporary history are as vividly brought into our minds when we think of the reigns of Henry IV. and Henry V. as the personages which poetry has given character and form to. What Shakspeare had begun, Goldsmith, in his essays, and Washington Irving in his sketches, have continued, and have made the whole of Eastcheap olivaceous ground. Stow, speaking of Eastcheap, mentioned an occurrence which took place here in the year 1410, between the two younger sons of Henry IV., Thomas and John, who had been carousing here "during the small hours of the night," until the morning, and with some of their friends had got into a quarrel, were taken by the City watch before the civic magistrates, and afterwards before Judge Gascoigne, which occurrence most probably, with its traditional festive reputation, has induced Shakspeare to lay his scenes of the revelries of the Mad Prince and his debauched companions at this spot. After the time of the first Tudor (who was the



BAY-WINDOW IN THE RATHHAUS, RATISBON, GERMANY.

last king that made the Tower a place of residence), festivity and fashion went farther west, and the shops of the Royal Exchange, with those of Cheapside and St. Paul's churchyard, became for a time the loadstone of attraction for the court gallants, the rich citizens, and their gayer wives. But what the world turns from, fashion turns to; so in time its votaries were drawn again still farther westward, and commerce filled up the void. Still in the time of Sir William Davenant it continued to be the abode of well-to-do citizens who, in his "London Vacation," narrates in verse the departure of a citizen and family from Eastcheap to Islington, to enjoy the country sports and pleasures. Eastcheap has, however, now entirely lost its ancient residential and minor business character, and as Thompson says,—

"There commerce brought into the public walk,
The busy merchant the big warehouse built;
Raised the strong crane, choked up the crowded street
With foreign plenty."

In fact, it has become one of the great centres of business for the colonial and wine trade. The ghosts of Falstaff and Pistol may still be supposed to haunt the scenes of their former revels. They may, as they were wont of old when out of purse, to only sniff the fumes of the sack as it rises from the cellars which spread everywhere underground, like the roots of the trees in a forest, filling all the spaces below, while the spice and ginger, which "is as hot in the mouth" as heretofore, rest in the warehouses above. But business, instead of pleasure, is everywhere; and the ancient Dogberry's office is now superseded by the City policeman, regulating the traffic during day, instead of quelling the disputes and taking roysterers into custody "during the small hours of night," which is now, by contrast, the only time that the neighbourhood is perfectly quiet and deserted.

The building which forms our illustration has been erected either upon the precise site or close upon that of the old Boar's Head Tavern, before

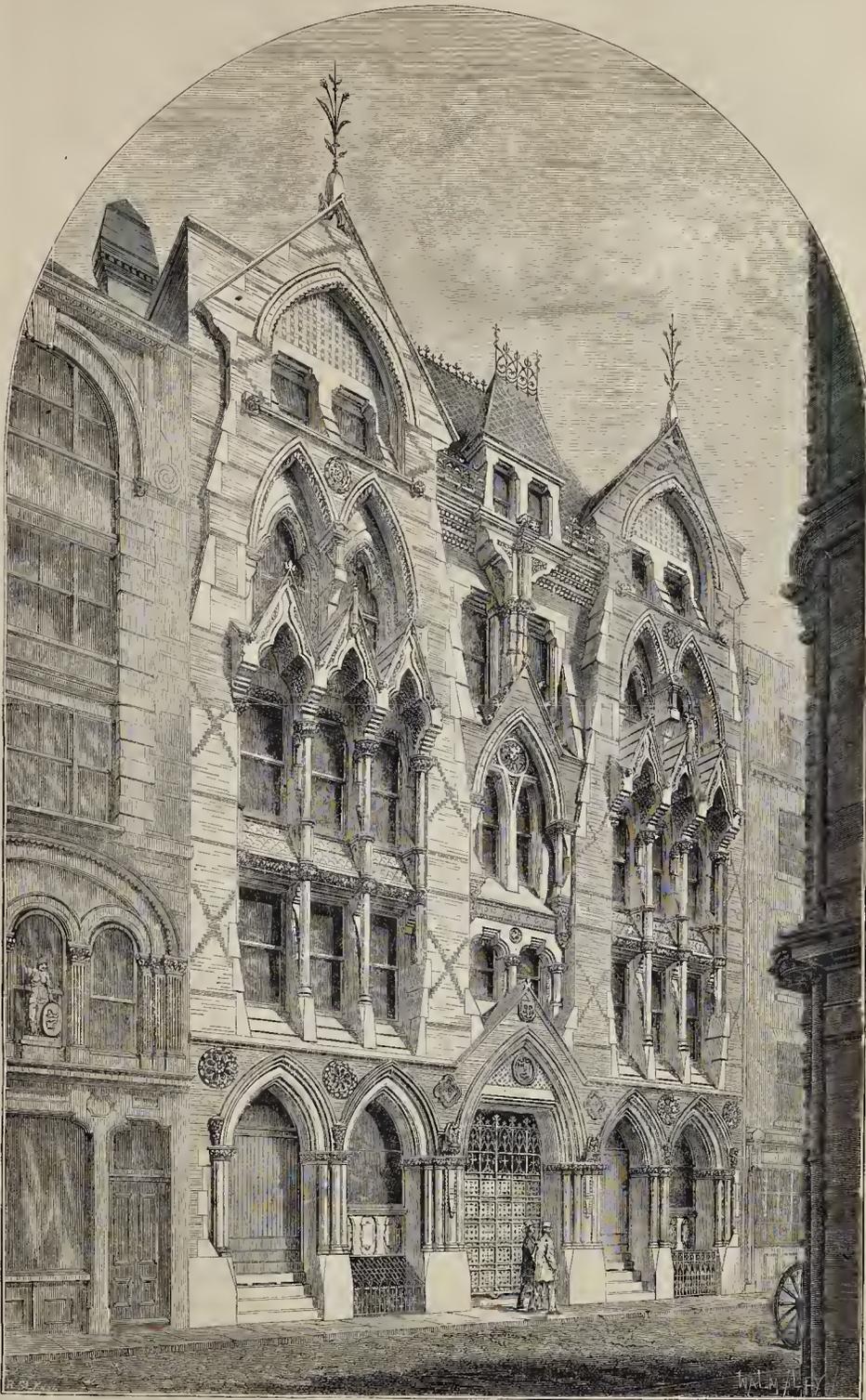
alluded to as mad-cap Henry's place of revel. It has been built by Messrs. Hill, Evans, & Co., British wine and vinegar manufacturers, of Worcester, for their London depot, their present offices and warehouses in Martin-lane, Cannon-street, being required for the extension of the Metropolitan District Railway, which, together with the increase in their business, necessitates their removal from their old premises to new ones.

The general idea which we are apt to entertain of the extent of the manufacturing industry of Great Britain is always a vague and limited one, however enlarged we may think it to be, and it is certain to be very much increased whenever we have an opportunity of being well informed with respect to some special business, however inconsiderable a section it may at first sight appear. The more we go into detail,—the more minute and precise our researches are,—the greater the extent embraced by trade will appear, and it will be only by taking as a datum what we do know of some businesses as an index to what we have not an equal opportunity of examining into that we are able to form an adequate idea of the multifarious ramifications of commerce. With regard to that simple article vinegar, we see it on the table in table-spoonfuls in the cruet-stand, and we know that it is largely used by the pickle manufacturers, and in a smaller way when that manufacture becomes domestic. But we are much surprised when we find that, at the last revenue return of the vinegar duties, just before that duty was repealed (in July, 1844), duty had been paid during that year by the vinegar manufacturers upon 2,828,043 gallons, and that they had at that time in store 3,901,568 gallons which had not paid duty. In looking at these figures the importance of this manufacture is manifest. Since that time it has much increased. The sale of vinegar by Messrs. Hill, Evans, & Co., at that time amounted to 153,375 gallons, and their stock in store to 291,689 gallons; but their manufacture and business has now increased,

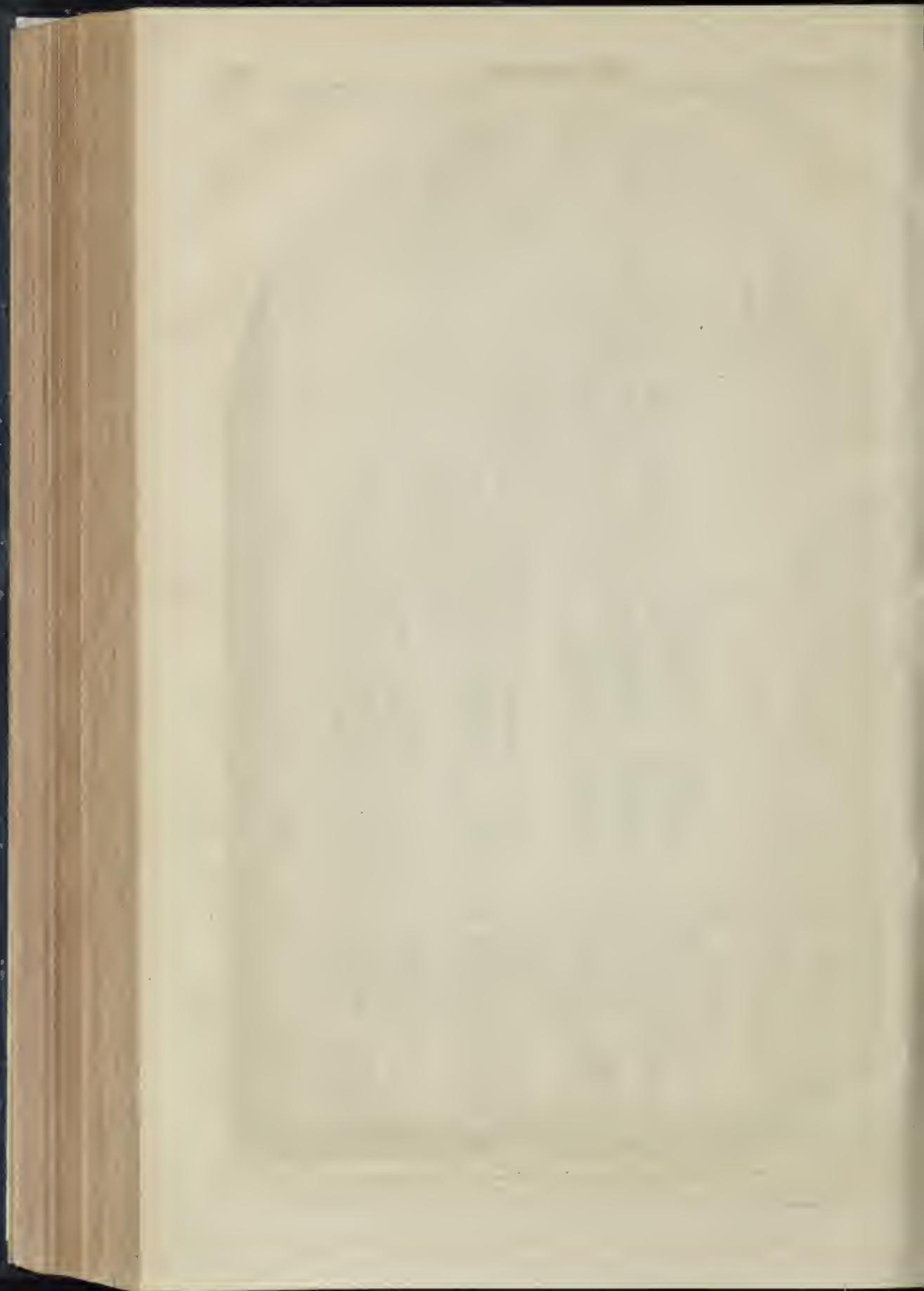
and to carry out the demands upon them they have almost entirely rebuilt their Worcester manufactory, so as to extend it upon a much larger scale, and it now quite rivals in the size of its buildings, vats, and machinery any one of the great London breweries. Their tun-room contains above thirty vats, the five largest of which will each hold 80,000 gallons of vinegar, and their present year's sale will amount to quite 2,000,000 gallons, being equal to considerably more than two-thirds of all the vinegar manufactured in 1844 by the whole of the trade.

Their building in Eastcheap has a frontage of 48 ft. on the street, by a depth of nearly 100 ft. It contains two tiers of cellars below the ground floor, and has four square floors above it, with some rooms in the roof. The style adopted by the architect, Mr. B. L. Roumieu, is the Gothic of the south of France, with a Venetian impress; and the design, if a little overdone, may be considered picturesque and original. As the rooms were intended for offices in a narrow street in a city having a dull atmosphere, large openings for light became a necessity, and have been provided. In this composition a depth of shadow is obtained by the thickness of the walls, and the variety which the contrast of colour here introduced gives it affords all the relief in that respect required. The materials used are red and black brickwork, the arching being moulded bricks; the stone is from Tisbury—the same as that used in Salisbury Cathedral; and the roof is covered with variegated slating.

The contractors are Messrs. Brown & Robinson, who are executing the Smithfield Market Improvements for the City of London Corporation. The carving was done by Messrs. Framp-ton & Williamson, from drawings by the architect, and is executed cleverly. Messrs. Simpson did the external and internal tile work, and Messrs. Peard & Jackson most of the ornamental ironwork, the whole of which was designed by the architect for this building. The amount of the contract was 8,170*l.*



WAREHOUSE, IN EASTCHEAP, LONDON.—MR. ROUMIEU, ARCHITECT.



THE CRAWLEY EXHIBITION OF PICTURES.

THE committee have succeeded in gathering together 136 paintings and drawings in water colour, the majority of them good works. Thirty-two of them are contributed by Mr. George Smith (of Pimlico, and known to many of our readers), from his handsome new residence in Worth, including an early picture by Constable, a "Water-mill" by Müller, a capital drawing by Paul Sandby, "Windsor Castle," and Mr. F. Chester sends a portrait of Mr. Mark Lemon, a clever work, though a little exaggerated. Mr. D'Nie's "Volunteer" is a striking feature; equally so his "Landing of the Princess Alexandra at Gravesend." Works of more or less importance, by Danby, Solomon, Miss Solomon, Miss Nutrie, Millais, Horler, G. Chester, E. W. Cooke, John Phillip, Creswick, F. Stone, Birket Foster, H. Warren, and other well-known artists, cover the walls. The next time an endeavour should be made to obtain a better lighted room for the exhibition.

CONDITION OF BIRMINGHAM.

THE importance of the object aimed at will sufficiently excuse us for reproducing the following articles:—

From the "Birmingham Daily Post."

"The discussion in the Health Department of the Social Science Association, on Thursday, returned upon a subject which has often engaged attention in this place, and as to which we have repeatedly censured the local authorities for want of public spirit. A paper was read 'On the Functions and Authority of Medical Officers of Health,' and its treatment led to the expression of opinions which, considering the sources whence they proceeded, ought to receive serious attention from the people of this town. In Birmingham we have no medical officer of health; and, notwithstanding repeated agitation of the question, the Town Council remain adverse to the creation of such an office. The members of that body—at least the majority of them—take refuge in the fact that the rate of mortality in this borough is moderate when compared with the scale prevailing in other large towns. As Birmingham people die on an average at the rate per annum of about 24 per 1,000, and in many large towns the ratio is higher, our aldermen and councillors appear to think that they stand well in the comparison, and that, therefore, they are not called upon to incur the expense of engaging a special officer to take charge of the health of the people. The mayor, on Thursday, put the case thus:— 'In Birmingham, the governing body paid a strict and critical attention to the demands of the public, and they wanted to be convinced by facts, as well as arguments, that some beneficial results would follow the appointment of such an officer as now recommended.' In order not to find these facts, they turn their faces, when seeking them, only in one direction. They look alone to other great towns, where matters are even worse than here, and find nothing that to be the case, they say Birmingham is already a model town in respect to sanitary condition, and no money ought to be thrown away on the folly of endeavouring to improve it. If they go even further than that, for some of their observations imply that, as people die faster here than in some towns which have a medical officer of health, the influence of such an officer appears to be the reverse of remedial. If, instead of this, they would look to the mortality of the country at large, they would find that the mortality of Birmingham ranged annually at about four per 1,000 above the average,—which signifies that about 1,400 more persons die every year in Birmingham than would die if the same people had not the misfortune to live in an overgrown, overcrowded, and unwholesome neighbourhoods. That Birmingham is as good as the rest of these towns,—or even a little better,—is no answer to the grave charge which these facts sustain. What the corporation should aim at is to make it as healthy as the general average of the country; and if they kept that object in view, they would inevitably be led to see the necessity of appointing to the charge of public health a more competent officer than they now belonging to their inspection staff. Examples of deleterious influences abound in every borough. Two at once present themselves to notice. The filthy stream entitled the river Rea,

and that other abomination, the Hockley Brook, are little better than two sluggish currents of poison. Not only does their quality show itself in the very look, but facts which should be notorious to the public show that their shores are the home and abode of disease. The inspectors of nuisances may answer very well for the purpose of discovering and prosecuting instances of individual neglect in regard to cleanliness, but wholesale propagators of disease, such as these two open drains, are beyond the functions of those persons. What we want is an officer competent and empowered to investigate remote causes of disease, and so to raise the sanitary condition of the place in a sensible manner. Compelling the removal of what are termed nuisances may prevent our getting worse, but in order to get better we must have the services of a man who can look deeper into the matter than a police-constable, and can make suggestions as to the attainment of radical improvements. An illustration of this difference is to be found in what lately occurred just on the outskirts of what is technically called the borough. In a part of the Balsall Heath district the people were found to be dying rapidly of fever, and the attention of the local Board being thus attracted to the spot, it was ascertained that the epidemic arose from the want of wholesome water. People whose business it is to hunt up cases of pig-keeping or ash-pit neglect would never have thought of this neglect had not the prevalence of a destructive malady forced it upon their attention. As a well-qualified officer of health would immediately lay his hand on such a want of sanitary provision, we say without hesitation that many lives have been sacrificed at Balsall Heath to the non-appointment of such an officer; for it must be remembered that the absence of good water had been long prey on the inhabitants before the febrile outbreak which led to its being remedied.

Some examples of the present condition of Birmingham were presented to the Section on Thursday, by one of the members of the Association. Mr. Godwin,—to whom the public are indebted for such useful service,—had personally visited, under the guidance of the chief of police, some of the central parts of Birmingham. The result of his examination is given in the following passage from his observations in the Section:—

'He did not wish to say one word that might be objectionable to the authorities of Birmingham, but he wished to raise his voice in favour of humanity. On the previous day, aided by the Chief of Police in Birmingham, he (Mr. Godwin) visited some of the districts in the centre of the town, which presented conditions that seemed to him most extraordinary, considering the very fair death-rate which Birmingham had been able to boast. In more than three-fourths of the width of the streets in the district he visited he found houses tumbling down, no windows, floors torn up, pavements retaining decaying matter, and of a character always to retain it; an utter want of close accommodation. In Balloon-street he found double houses, the rooms full of people, and the middens all full. In No. 6 Court, Brick-kiln-street, the neighbouring cess-pool of the court was some 3 ft. higher than the pavement, and the consequence was that the filth was constantly oozing through, and spreading over the floor of the court. The first woman he inquired of in one of the courts had three children living, and she said the locality was being very healthy. There she elicited from her that she had five children dead. Next door the woman had no children dead, but her husband, she added, had been invalided for many months. In a court in Stanforth-street, an open cess-pool was to be seen—that is, the closet ran into what was prepared to be a midden, but not being so used, was simply filled with fecal matter. Here again there was the same appearance on the part of the children—pale faces, sunken eyes, women worn and haggard, and throughout the whole of the inquiry he did not meet with a single child who was able to read. Here, then, was what he begged leave to point out to the authorities of Birmingham—an enormous population, living under conditions utterly opposed to anything like health. Whether any attempts were made to remedy this he could not say, but at any rate they must have been very insufficient. He could go through a large number of similar cases, but he did not think it necessary. Here, in these wretched districts, were growing up in ignorance and dirt girls and boys, with no other prospect than the streets for the one and the goal for the other. Where, he asked, had been the ministers of the Church? It was quite possible that he might expose himself to some obloquy for these observations; but the fact remained that there were hundreds of children growing up in a lamentable state of ignorance, and under a condition which ought not to exist.'

Having ourselves been instrumental in collecting and publishing numerous cases of a similar kind, both as to the town and the populous district adjacent to it, and having striven by every means at our command to impress on the local authorities the necessity of taking greater precautions than are possible under present arrangements, we rejoice at receiving this additional testimony from the independent inquiry of a competent visitor. We can only say further that, if the facts stated by Mr. Godwin, and the arguments advanced in the Section, do not obtain serious notice on the part

of our authorities, we trust that they will be well considered by the great mass of the persons by whom local authority is conferred.'

From the "Daily Telegraph."

"Sensational narratives of travel and adventure, such as those which are frequently related at the meetings of the Royal Geographical Society, are scarcely expected at the quieter gatherings of the Social Science Association. No tale of an African or Asiatic wanderer, however, can rival in pathetic interest the recital of certain recent explorations made by Mr. George Godwin, and reported by him to the Health Department of the great Congress now assembled at Birmingham. Mr. Godwin is an old and experienced traveller. Few men are more familiar with what may be called the savagery of civilization; few men have penetrated deeper into those foul regions which still disgrace our large cities; few men have devoted more energy and courage to showing one half of our English world how the other half lives—and dies. It is true that he has visited only Bethnal-green, not Borrioboolagah; true, that he is less familiar with Wbydah than Whitechapel. The 'natives' whom he knows are not black; they would even be white, if they had any water to spare for washing purposes; as it is, they are only dirty and grimy Christians, subjects of her Majesty Queen Victoria. Still, such as they are, they happen to be our fellow-creatures; and it may some day be admitted that they deserve almost as much attention as Sambo himself. To the praise of novelty Mr. Godwin's narrative can hardly lay claim. It is—to the shame of this country be it spoken—exactly like a hundred other reports, made by a hundred other explorers. As we examine its melancholy, squalid, repulsive details, the painful thought arises that we have heard them all before; that a story which ought to shock the conscience and awake the manhood of the whole land is really trite and stale, has been told over and over again, and will yet have to be repeated scores of times before the country is roused to anything like earnest action. Let us accompany Mr. Godwin on his latest excursion; and, revolting as the details may be, we must here use the plainest language, for that alone can convey the full truth. The traveller set out one morning, with a sergeant of police for his escort. Avoiding the main streets, the larger manufactories, and the comfortable hotels, he went into the heart of Timbuctoo—we beg pardon, Birmingham—and diligently examined two districts, about a mile in extent. So far as regards mere distance, therefore, the journey was no very startling feat; and yet the news that the traveller brought back ought to startle us, if it does not. For, in the centre of a thriving and busy town—one of the healthiest, for its extent, in England, and inhabited by a community which is eminently practical and enterprising—he found that the houses were miserably dilapidated, that the pavement was covered with decomposing matter, that the rooms were scandalously overcrowded, and that court after court was unprovided with the ordinary requisites for decent and wholesome living. In one of these places, the soil from an adjoining cess-pool was percolating through the boundary wall, and filling the air with a sickening and deadly stench. Of course, so experienced a traveller found little difficulty in communicating with the natives. The first to whom he spoke was a woman, and her story was as painful as it was significant: she had had eight children; three of them were living—but five were dead. The next had to say that her husband was invalided—and these were but 'samples' of many others. In one court the 'midden' was simply a great open cess-pool; and it is scarcely surprising to be told that the children here 'were pale and wan, with staring eyes'—a touch of reality which should surely bring the picture vividly before us. Do we require to add that these children, one and all, were unable to read? Turning these matters over in his mind, the audacious explorer was absolutely bold enough to say, 'Here, then, hundreds of children are brought up without health, without knowledge of anything but evil; and I feel bound to ask, not merely whether the authorities have exercised the powers they possess, but whether the clergy of the neighbourhood have done their duty.'

The audacious traveller ceased; and a mild, simmering murmur of discussion broke forth. We have said that, to us, the statements of Mr. Godwin are not particularly novel or surprising; but we are bound to admit that there was one

person to whom they seemed altogether fresh; and, strangely enough, the learner was none other than the Mayor of Birmingham himself. One might have thought that he, of all men in the world, should know,—nay, was bound to know,—the sanitary state of that town which he ruled as chief magistrate; and so, indeed, in a certain sense, he did. He knew,—for there were figures to tell him,—that Birmingham, as compared with other great centres of industry, was one of the healthiest places in England; but he did not know,—since something more than statistical tables would have been required to teach him the less paraded fact,—that large districts of Birmingham were still in a sanitary condition which was not merely disgraceful, but dangerous. To our mind, this amiable unconsciousness of the Mayor is the saddest as well as the strangest part of the whole story. Here is a gentleman,—presumably humane and intelligent,—who, from his official position, should know more about Birmingham than all other men; and yet he has to be told, by a stranger coming down from London on an entirely different errand, that all the elements and conditions favourable to pestilence abound in the very heart of the town which he governs. ‘The authorities,’ said the good Mayor, ‘were generally in favour of a recognised officer of health; but they had to economise the rates, and did not wish to adopt a plan on the subject until they were satisfied it would be attended by definite and satisfactory results.’ Is it safe to have a large open cess-pool in the middle of a crowded court? Perhaps not; but ‘we have to economise the rates.’ Is it prudent that we should offer a standing invitation to pestilence, keep typhus constantly among us, and assure cholera of a triumphant career when it arrives? Perhaps not; but then ‘we have to economise the rates.’ The true economy would be to disinfect those places with chloride of lime, to drain them thoroughly, and provide them with the ordinary appliances of decency; but no—the local authorities are saving the article of chloride of lime, and trusting to the chapter of accidents as regards the article of coffins.

We should be sorry to convey the idea that the mayor of Birmingham is one jot worse than his neighbour. In such matters, to quote Hood’s words, ‘Evil is wrought by want of thought, as much as want of heart.’ Apparently, the worthy gentleman had never given serious consideration to the subject; obviously, he was taken aback by Mr. Godwin’s explicit statement. And it is just the same, we are honestly convinced, with the authorities in many other towns. They know the main streets, the houses of the gentry, of the shopkeepers, and the manufacturers; but they far too rarely turn aside

from the chief thoroughfares into the dingy alleys and courts that lie apart. When those magnates are not wilfully obstinate, but merely ignorant, the knowledge that sanitary reform is wanted may lead them to bestir themselves. We are not, however, exceedingly sanguine of that result. In Liverpool, which is now sometimes cited as an example, years were allowed to pass before the authorities could be roused to anything like earnest action. The utiring industry, the indomitable perseverance, the dauntless courage of one man—Mr. Hugh Shimmis—at length bore fruit; but for years his statements were denied, his passionate earnestness was ridiculed, and his motives were malignised. Such is too frequently the reception accorded to the sanitary reformer. He has to brave danger of no light order; he has to undergo toils that are not merely arduous, but noisome; and his rewards are misconception, calumny, and abuse. Much, indeed, has been done of late years in the right direction, but in many cases it has only been done under the influence of alarm; and, as we look mournfully around us, and contemplate the immensity of the work which yet remains to be accomplished, there are moments when we almost apprehend that the only ‘Sanitary Reformer’ to whose teachings men will really listen is one whose visits, when they do occur, are long remembered,—Asiatic Cholera.”

PROVINCIAL NEWS.

Chesterfield.—The Sheffield Banking Company, who have for some time past had a branch bank in Chesterfield, purchased the old Manor-house, in the Market-place, and have rebuilt and remodelled it the better to accommodate their extending business. The architectural style of the old house, erected about the close of the seventeenth century, has been studied in the new building. The exterior is built of Darley Dale stone, the roof being covered with small green Westmoreland slates. The front, with three gables and tall chimney-stacks, has millioned and transomed windows and an arched and panelled doorway, with an oak door, panelled and countersunk. The banking-room is 27 ft. by 18 ft. It has a ribbed ceiling, and is lighted by three windows. There is a fireplace of Derbyshire marble. Adjoining is the manager’s room, with lavatory, fireproof safe, &c., and the house for the resident agent is comprised within the building. The staircase from the hall, leading to the upper floors, is a reproduction of the old one. It is lighted by a tall millioned window, filled with geometrical glazing; and a floor of mosaic tiles, executed by Messrs. Maw, from the

architects’ design, gives a finish to the whole. Mr. John Milner, of Sheffield, has executed the works from the designs and under the superintendence of Messrs. M. E. Hadfield & Son, of Sheffield, the architects; Mr. John Pearson having acted as clerk of the works.

Ipswich.—The new Roman Catholic Convent, dedicated to St. Mary, and situated on the grounds immediately adjoining the Roman Catholic Church of St. Mary, Woodbridge-road, Ipswich, has been opened in the presence of a large congregation, by whom the convent chapel was filled. The structure is about 130 ft. in length by 35 ft. wide, but when completed wings will be added on either side. That portion of the building which was opened, has been in course of construction for a year past. The style of the building is Gothic, treated with much freedom, in order to be adapted to the purposes for which it is intended and the requirements of the time, and there are large arched openings for light and air. The northern side of the building is occupied by wide corridors which run from end to end, and to which the rooms, all of which look to the south, open. At either end is a flight of stairs, whilst in the centre is the principal staircase. The lower corridor is lighted by shafted windows with arched heads and pierced tracery, and there is a large porch surmounted by a cross, and paved with Mosaic tiles. Bands of black bricks give relief to the red, which form the principal material of the building, the springings being of yellow in the cornices and window heads. The principal room on the ground floor is an exhibition-room, 50 ft. in length, and on the first floor are class-room, music-room, and infirmaries, the upper floor being devoted to dormitories, &c. Mr. Goldie, of London, was the architect; and Mr. R. S. Smith, of Ipswich, the contractor.

UNIVERSALITY OF DRAWING IN CONTINENTAL SCHOOLS.

SIR,—At the meeting of the Social Science Association at Birmingham for the present year, the Earl of Carnarvon remarked, in reference to education, that “if there be one branch of instruction more valuable than another to the artisan, it is drawing.” He might have said to all; and yet up to this present time drawing has scarcely been recognised at our public schools, except as engaging an hour on half holidays! I have been at the trouble of ascertaining how much time is given to the various kinds of drawing in some public schools on the Continent, and I send you the results in respect of four of them.

FELIX SUMMERLY.

VIENNA.—POLYTECHNIC INSTITUTE.

NUMBER OF HOURS PER WEEK DEVOTED TO DRAWING IN THE VARIOUS DIVISIONS.

	Preparatory Division.				Engineering Division.						Architectural Division.						Mechanical Division.				
	1st Year.		2nd Year.		1st Year.		2nd Year.		3rd Year.		1st Year.		2nd Year.		3rd Year.		1st Year.		2nd Year.		
	W.T.*	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	
Descriptive Geometry	8	8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Practical Geometry .....	...	...	6	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Machine Drawing .....	...	...	...	...	6	6	...	...	...	...	6	6	...	...	...	...	10	10	15	15	...
Building Construction .....	...	...	...	...	8	8	15	15	15	20	...	...	...	...	...	...	6	6	...	...	...
Architectural Drawing .....	...	...	...	...	...	...	...	...	...	...	8	8	11	11	15	15	...	...	...	...	...
Freehand Drawing	6	8	8	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Perspective .....	...	...	...	...	...	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

ZURICH.—POLYTECHNIC SCHOOL.

	1st Division.—Builders.						2nd Division.—Civil Engineers.						3rd Division.—Mechanical Engineers.								
	1st Year.		2nd Year.		3rd Year.		1st Year.		2nd Year.		3rd Year.		1st Year.		2nd Year.		3rd Year.				
	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.	W.T.	S.T.			
Descriptive Geometry	4	...	...	...	...	...	4	...	...	...	...	...	4	...	...	...	...	...	...	...
(1) Architectural Drawing	4	4	4	4	...	4	...	...	...	...	...	...	4	...	...	...	...	...	...	...
Landscape Drawing†	4	4	...	4	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...
(2) Building Construction .....	...	...	8	6	4	6	4	4	4	6	6	6	6	...	4	...	...	...	...	...
Ornament (Dessin d’Ornement) .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Figure (Dessin de Figure) .....	...	...	9	9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Perspective .....	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
(3) Machine Drawing	4	4	9	6	8	12	8	12
Plan Drawing (Dessin de Plans) .....	...	...	...	...	...	...	3	3	...	...	...	...	...	...	...	...	...	...	...	...
Map Drawing (Dessin de Cartes) .....	...	...	...	...	...	...	...	...	3	3	3	3	...	...	...	...	...	...	...	...

(1) In Architectural Drawing I have included “Dessin d’Architecture” and “Exercices de Composition d’Architecture.”

(2) In Building Construction I have included “Dessin de Construction” and “Exercices de Constructions.”

(3) In Machine Drawing are included “Construction de Machines,” “Exercices de Construction de Machines,” and “Dessin de Machines.”

* W.T.—Winter Term. S.T.—Summer Term.

† Not compulsory.

In the 4th Division—Chemists,—“Dessin Technique” is taught 9 hours W.T., 4 hours S.T., in the 1st year, and 4 hours W.T. in the 2nd year.

In the 5th Division—Foresters,—“Dessin de Plans” is taught 3 hours a week during the whole of the 1st year.

In the 6th Division—Natural Science,—there is only one year of study. In the winter term perspective is taught 1 hour per week, landscape drawing 4 hours, and figure drawing 9 hours; in the summer term, landscape 4 hours, figure drawing 9 hours, and ornament 4 hours per week.

[BERLIN.]

BERLIN.

For the Royal Trade Institute (Königliches Gewerbe Institut), which is equivalent to a Polytechnic School, there is no return of the number of hours per week devoted to the different subjects.

At the Berlin Practical School (Königstädtische Realschule) the number of hours given to drawing (no distinction between the different descriptions of drawing) in the respective classes is as follows:—

1st (or highest) Class (2 years)	3 hours per week.
2nd Upper (1 year)	2 "
2nd Lower (1 year)	2 "
3rd Upper (1 year)	2 "
3rd Lower (1 year)	2 "
4th (1 year)	2 "
5th (6 months)	2 "
6th (6 months)	2 "
1st Elementary Class (1 year)	2 "
2nd (1 year)	2 "

Total for the whole school nineteen hours per week.

STUTTGART.—POLYTECHNIC SCHOOL.

Number of hours per week devoted to drawing:—

Mathematical Division.	
First Class.	
Descriptive Geometry	6
Plain Drawing	2
Freehand do.	4
Second Class.	
Descriptive Geometry	4
Applied do.	3
Architectural Drawing	2
Freehand do.	4
Commercial Division.	
Freehand Drawing	2
Technical Division.	
Freehand Drawing	6
Ornament and Modelling	18
Machine Construction	18

MILFORD HAVEN AND ITS PROSPECTS.

In reading the article in the *Builder* of the 12th inst. respecting the failure in launching the *Bermuda*, I was forcibly struck with the feasible plan you recommended for the future construction of iron monsters, and of the appropriateness of the place you named for the purpose.

With regard to the latter—the place—I now wish to offer a few remarks. The vast water shed of Milford Haven is not only capable of any number of such structures being built in the manner you proposed ("floating on the surface of the water"), and leaving ample room for the whole of the traffic of the kingdom, if needs be, besides, but its banks on either side are filled with creeks, or *pills*, as they are termed in that locality, which are docks that are already formed by nature, from which the water might be excluded at a trifling cost for such purposes, and where the building of gigantic pieces of naval architecture could be carried on without inconvenience on the dry land, whence, after being completed, they could, without blow of hammer or strain of wedge, be floated gently into the bosom of the deep.

The situation of Milford Haven is adapted for each purpose on account of its proximity to the great iron districts of the country. Merthyr Tydvil is within easy distance by rail, and the whole country around it abounds with iron ore of the purest quality, that only wants enterprising capitalists to bring its entire manufacture, for the uses above named, on its very shores.

A few years ago a small iron smelting furnace was built at a place called Stepaside, fifteen miles from the banks of the Haven, where, from a native ore, iron is made that is not surpassed in quality by any in the kingdom. Hundreds of tons of the ore supplied to that furnace cost no further labour to procure than to pick it up from the contiguous beach. In a three-miles' walk along the shore from the beautiful and fashionable watering-place, Tenby, to a village called S Saundersford, which is in the neighbourhood of the Stepaside furnace, the pedestrian can see the sides of the cliffs teeming with iron ore, and under his feet lie thousands of tons smoothed and rounded into the form of pebbles by the motion of the tide. About two miles from Tenby, and nine miles from the Haven, a valuable vein of hematite ore has been discovered, which the proprietor of the Stepaside works has been for some time working. Coal, also, abounds in the neighbourhood, and it is the home of the moun-

tain limestone. All the buildings about that part of the country are constructed of the native limestone, so that the materials are all at hand and only want capital to develop them.

Besides iron, coal, and limestone, the district yields the finest black marble, which is procurable in very large blocks, clays from which very superior fire and common bricks are made, and a sand that has been pronounced excellent for making glass. Wages in that locality are lower than in any part of the country. We believe the highest class workmen in Pembroke Dockyard are not paid more than twenty-six shillings a week.

With all these advantages, and now that it has direct railway communication with all parts of the kingdom and a through narrow-gauge line to the North, Milford Haven must become a place of vast importance, and those who are there first in the race are the more likely to become the most successful men.

ONE WHO KNOWS MILFORD.

RAILWAY STATIONS.

The extension of the railway system has brought the stations so close together, that it becomes necessary, for the despatch of business, that even half-minutes should not be lost. Why should not all the employes at each station wear a band on their caps, with the name of the station legibly worked white upon black, or the reverse; and on long journeys, where intervals of sufficient time exist, why should not the guards, even, change their band, after passing each station, to the name of the next. The unintelligible manner in which the stations are announced in some districts warrants this simple expedient, which, I fear, is so simple that it will not be adopted. If objection be made that the porters are sometimes shifted, a remedy might be adopted in making the band removable, like the armband of the policeman.

Should not the names of all stations be placed at right angles to the road? and when the place is important, should not the name be painted in gigantic letters on each end of the station?

W. H. B.

GENERALISATION IN ARCHITECTURAL EDUCATION.

Sir,—Many thanks for the article on this subject, which I have read carefully, with much mingled pain and pleasure. With pain, because I once more see that others think as I do, viz. that I have been turned out ready to earn a living,—as my friends think,—without having learnt anything, but that I know nothing. With pleasure, because I trust that such articles as this will be the means of preventing others madly following in my steps.

The question which those who have blindly fallen into error want answered is, how are they to obtain the education which they require? Their education is supposed to be over; their friends say, "You must now support yourselves;" but they themselves see and know that they are altogether ignorant. They can copy and trace, and may be able to earn an honest living by hard work as draughtsmen; but they want to do more, they wish to live a pleasurable life: how is this to be done?

If a college were started, they would find it difficult work to persuade their friends to go to the expense of commencing their education again. Their fate is sad one, and they cannot see any helping hand outstretched to assist them. The Royal Academy offers them a studentship and prizes, but here its aid stops; there is no education except in perspective.

Where are they to look for light? If they are to remain in their present darkness, they are of all men the most miserable; but there is one who hopes for light, and believes it will not be long before it shines forth.

ADELPHI.

GOST OF CONCRETE TANKS.

Sir,—Can any of your readers give me an idea of the cost of constructing concrete tanks to hold 100,000 and 250,000 gallons respectively, and to be arched over.

J. A.

BIRMINGHAM NOTES.

THE makers of builders' hardware in Birmingham are receiving orders from the Northern and Eastern Counties, such as indicate a considerable improvement in building operations in those parts of the country. A fair proportion of these are railway and other engineering works, but all the railway-ironwork establishments are not yet employed to their full extent; and, indeed, one of the most extensive in the neighbourhood of Birmingham is only occupying about half its usual complement of hands. Among the recent novelties in the lighter branches of builders' hardware, may be mentioned a new and highly-decorated ceiling rose in stamped metal, introduced by Messrs. Winfield & Co. This artistic production will do much to favour metal roses in preference to those of Roman cement or wood.

The same firm have done much to facilitate the ornamentation of metal tubes, an operation now performed by

machinery by an almost instantaneous process. It is noticeable that Birmingham is making steady progress in the art-workmanship of its iron and metal wares; and although, perhaps, to a somewhat less extent, the same remark will apply to similar productions in the neighbouring district of South Staffordshire. Foreign competition in some branches continues severe, and a reduction in the cost of production has been the natural result. In one branch, for example,—metal cornice-poles,—which are largely made on the Continent, the Birmingham price has fallen 50 per cent. during the past few years.

BRICK-KILNS TO BURN THEIR OWN SMOKE.

At the Bradford Borough Court, the Town Clerk recently appeared in support of an information against Mr. Joseph Wilson (Messrs. J. Wilson & Sons, builders, White Abbey), for causing a nuisance in Carisle-road, Manningham, by the smoke from a brick-kiln. There was no difficulty whatever, he said, in bricks being made without causing the least nuisance if the necessary precautions were taken, and it was a mere matter of expense. An enclosed circular kiln could be formed, and when it was charged and fire applied to the first hatch it was allowed to get to a red heat; the other fires were then lighted, and the smoke passing from the kilns was entirely consumed, so that very little except vapour passed into the tall chimney. There was a kiln of this kind in full operation in the town, and he believed with these facts before their eyes the magistrates would see that the nuisance could be abated. He did not ask for a penalty, but for a prohibitive order, and the bench could fix the date when they chose. Evidence was led to prove that the kiln in question did not consume its own smoke, and that such smoke consumption was quite possible.

The mayor decided that the defendant be allowed to continue his works until the 1st of January, if a promise were given that no more kilns should be built, and the utmost vigilance exercised to render the smoke as light as possible.

It was agreed that this should be done as far as practicable; and an order was then made for abatement on the 1st of January, 1869, the defendant to pay the costs.

FEVER HOSPITAL COMPETITION.

A fever hospital is to be erected at Hampstead for the Metropolitan Asylum District, and a limited number of architects were invited to submit designs, namely, Messrs. F. Gordon Smith & G. A. Dunning, Saxton, Snell, Peckington; Brereton, Son, & Brereton; E. Fowler, and Edmeston. The designs are now before the Board. Other hospitals are about to be erected for the metropolis by the same Board.

PROPOSED NEW PIER AT SCARBOROUGH.

THE Scarborough Harbour Commissioners, in March last, advertised for designs for a new western pier. At a special general meeting last week, the first premium of 50*l.* for the best design was awarded to Mr. Charles W. Whitaker, of 28, Woburn-place, Russell-square; and the second premium, of 30*l.*, to Messrs. Stelford & Robinson, Victoria Chambers, Westminster.

FROM IRELAND.

Dublin.—The Roman Catholic church of Ballybollah, county Dublin, is to be remodelled internally, with alteration of gallery and addition of pews, &c.; also to have a new octagonal tower at south-east angle, surmounted by a timber and slated spire, terminated with ornamental metal vane. Mr. J. J. Lyons is the architect.

Sligo.—Farm buildings are being erected at Heapstown, county Sligo, for Capt. McTernan, according to plans, &c., by same architect.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

A GENERAL meeting of the friends of this institution was held on Monday, the 5th inst., at the offices, Bedford-row, to evidence its success by the election of the widows of two builders' clerks as pensioners on the relief fund. The chair was taken by Mr. S. J. Thacker (Messrs. Holland & Haumen); and the poll was opened (at 7.30 p.m.), the result of which is shown in the advertisement. It is rather less than two years since we had to record the founding of this institution by the public meeting presided over by Alderman W. Lawrence, M.P., and since then at various times appeals have been made to the trade and public on its behalf in our pages. The necessity that compelled the

committee to make use of the funds at the earliest moment prescribed by the rules shows that the institution has not been established at all too soon. The committee are now canvassing for and will gladly receive proxies for the next election at the Orphan Working School, Haverstock Hill.

CHURCH-BUILDING NEWS.

Crowmarsh Gifford.—The newly-restored church of Crowmarsh Gifford, near Wallingford, has been re-opened. The work of restoration has been carried out by Mr. Moses Winter, of Wallingford, under the direction of Mr. J. H. Hawkeville, of London. The cost of the work is about 600*l.*, and comprises the entire removal of the old roof, restoring the same, and making an open roof to the nave; putting in new lancet windows to correspond with the old Norman style of the building, removal of the gallery, taking out the large old pews, and reseating with benches of stained deal.

Llanbrynmair (Montgomeryshire).—The new church of St. John has been opened for divine service. The architect was Mr. David Walker, of Liverpool. The plan is that of a nave and chancel under one roof, the east end of the chancel terminating in an apse. The internal length, from east to west, is 68 ft., the chancel and sacristy taking up nearly one-half, and the width is 21 ft. 6 in., with a height, from floor to ridge, of 31 ft. There is a vestry on the north side. A dwarf stone screen divides the nave and chancel. The roof of the nave is open-timbered to the ridge, and plastered between the rafters. The chancel roof, which is of a polygonal form, is boarded, the intention being to decorate it in colour, when the funds permit of that being done. The church is fitted up with open benches of varnished deal, and kneeling accommodation is provided for about 230 persons. The central aisle to the nave is paved with 4-in. buff and blue tiles, laid to a design by the architect. The chancel tiles, which were supplied by Mr. Godwin, of Lugwardine, are of a more elaborate kind. The architecture of the external elevation of the church is Twelfth Century Gothic, and has much of the character of Early French work. For the walling, which is of broken coursed work, stone of a deep blue colour, obtained from a quarry in the locality, has chiefly been used, but bands of light blue stone are introduced. The nave windows are copied lancet lights, the heads and sills being of Cefu stone. The east windows, and that on the south side of the chancel, are two-light windows, filled in with plate tracery. The stonework of the west front is carried up above the roof, to a height of about 45 ft., forming a belfry, with space for three bells. Only one bell, however, has yet been provided, and that is of cast steel, from the foundry of Messrs. Vicars & Co., at Sheffield. The roof is covered with Machynlleth slates, ornamented by a red clay crest of peaks, manufactured from the architect's design. The chancel portion is of an enriched character, the apsidal end and the junction with the nave being marked by hip blocks and ornamental wrought-iron crosses. Provision is made for warming the church, in the cold season, by means of underground flues. The windows are glazed with Bowen's patent interlocking glass, in two colours, obtained from Messrs. Forrest & Co., of Liverpool. The church has been built by Mr. J. Harrison, of Newtown, under the superintendence of Mr. Walker, the architect. The cost will be about 850*l.*

Clifton (Bristol).—St. Paul's Church has been reconsecrated and reopened. The west end has been entirely rebuilt. The centre portion has been raised about 15 ft., and the pitch of the roof has been somewhat increased. The aisle roofs remain at the same pitch. Two projecting buttresses, with gabled heads, separate the nave from the aisles, and divide the front into three compartments. The principal feature is the grand-entrance doorway, projecting from the face of the wall, and finished with a gabled roof, surmounted by a carved finial; the jambs have triple shafts of polished granite with carved capitals. The arch is moulded, and has two rows of carved foliage. Above this doorway are two windows of two-lights each, with tracery, and in the gable a circular window containing three trefoils. The ends of the aisles have three-light windows and small trefoil gable lights. A new entrance, enclosed by a gabled porch, has been made at the west end of south aisle, thus giving additional means of ingress and egress.

This porch has been composed out of the old materials of the former porch. Other portions of the old porch have been used inside the building. The disparity in size of the tower and spire is rendered still more apparent by the additional height given to the nave. A new tower and spire, in proportion with the rest of the building, at the south-west corner, are recommended by the architects, and shown in the design first submitted by them to the committee. Beyond building on the old foundations, the interior may be said to be entirely new; all the old windows have been cut out and new tracery inserted; the inside arches of the windows have been changed and made more pointed. The greatest change effected is the raising of the centre roof and the addition of the clearstory windows. The next is the formation of a distinct chancel, separated from the nave and aisles by moulded arches, and furnished with stalls, sedilia, credence, &c. The nave arcade is executed entirely in stone; the shafts of the pillars are circular, of red Mansfield stone, with carved capitals. The chancel arch is carried up as high as, and agreeing with, the arched principals of the nave roof. The transept arches have been raised considerably, and rest in the centre upon a clustered shaft of red Mansfield stone, and at each end in small corbelled shafts of the same kind of stone, the whole having carved capitals. The floor is everywhere filled in above the brick vaults with concrete, and the chancel and passages in nave and aisles are laid with encaustic tiles; those of the chancel are by Messrs. Maw & Co., and the remainder by Mr. Godwin, of Hereford. The roof of the nave is open, having seven arched principals filled in with tracery, the whole being covered with diagonal boarding. The chancel has an arched ceiling of wood, divided into panels by arched mouldings, springing from a carved stone cornice. The aisle roofs are boarded, and have arched principals at every bay. The carving of foliage to capitals, cornices, &c., was executed by Mr. Margetson. The pulpit, font, and reredos, together with the sculptured tympanum of the west door, are the work of Mr. R. Boulton, of Cheltenham. The altar-rails, pulpit-guard, font, cover, &c., are by Messrs. Brawn & Downing, of Birmingham. The gasfittings were supplied by Messrs. Singer, of Frome. The church is heated by hot air, the apparatus being supplied by Messrs. Haden & Son, of Trowbridge, and placed in a vaulted chamber. Care has been taken to guard against a recurrence of the catastrophe which destroyed the church, and the whole area has been arched in with bricks. The architects were Messrs. Hanson & Son; and the contractors Messrs. Wilkins & Sons and Mr. H. Brooks. Mr. T. Lewis was the clerk of the works.

Alford.—St. Wilfrid's Church, Alford, has been re-opened. The sum of 6,205*l.* 2*s.* has been expended on the restoration and enlargement of the church. The work has been done by Messrs. Hasmy & White, of Alford, under the superintendence of Mr. George Gilbert Scott. The plan of the church comprises a nave 59 ft. long by 20 ft. wide, divided into four bays by arcades of octagonal columns and deeply moulded arches, having north and south aisles 9 ft. wide, and a new north aisle 16½ ft. wide. The chancel is 44 ft. deep, by 20 ft. wide. A tower stands at the west end of the nave, and is 17 ft. square within. The entire length of the church is 125 ft. 6 in., and width 62 ft. There is a large porch on the south side, with vestry above for choristers, &c. The style adopted is Second-Pointed; the windows and other architectural details being, as nearly as could be ascertained, of the date of the original church. The arches of the nave and chancel are moulded, having foliated capitals, and moulded bases. The tracery in the chancel windows is to be filled in with the remnants of the old stained glass. The roofs are open, of high pitch, stained and varnished. The chancel roof is of stained oak, in the wagon-head shape. The seats are all open, of pale oak, with the ends carved, of three different designs, and fixed on a wooden floor; the middle aisle is flagged with ancient tombstones. The other aisles are paved with black and red tiles, unglazed, from Godwin's works at Lugwardine, near Hereford, each in different design. The windows are glazed with pale green cathedral glass, in small diamond frames. The roofs are covered with pale Westmoreland slates, having moulded stone ridges, the cable ends being surmounted by pinnacles and crosses, of various designs. The new doors, of pale oak, are hung on wrought-iron hinges, from the Medieval

metal-works of Messrs. Peard & Jackson. The gas standards are also from the same firm. The new organ, by Messrs. Forster & Andrews, of Hull, has been erected in the new organ chapel, at a cost of about 400*l.*; the case is of oak, carved. The church is to be heated by four stoves. The east window in the south aisle is about to be filled with stained glass, by Mr. Lister Wilson. The dark green sandstone used is from the quarries at Worlaby, and has been presented by Mr. A. Nelson. The light stone for the angles, window-mouldings, &c., is from the Ancaster quarries. The new gargoyles, and heads on the corbel stones, on either side of the doors and windows, have been carved by the Messrs. Radlock, of Loudon. The accommodation in fixed sittings is for about 600, but the church is capable of accommodating about 750 persons.

DISSENTING CHURCH-BUILDING NEWS.

Huntingdon.—The site of the old Dolbin-yard, which for many years past had been a disgrace to the town, has now reared upon it a spacious and elaborate Nonconformists' church, known as Trinity Church. The structure is almost completed. The building is situated in about the centre of High-street, and the style is Early Decorated. The tower has four pinnacles and windows, surmounted by a spire, with carved arches, rising above the level of the pavement 190 ft. The contract amounts to 7,817*l.*, exclusive of warming and lighting. Mr. J. Wrighton, Godmanchester, has executed the mason's work. The church is arranged at present for about 720 sittings on the ground-floor.

Gainsborough.—A new chapel in connexion with the United Free Methodists has been opened in Hickman-street. The chapel is partially built of concrete, with brickwork here and there visible. It is 47 ft. long by 33 ft. broad, and will hold about 300 people. It is built from designs of Mr. T. Lister, architect, of this town, and the work has been carried on under his personal superintendence. Its internal fittings are not yet completed.

Mere (Wilts).—The foundation stone of the new Congregational Church, about to be erected by Mr. C. Jupe, as a memorial church, has been laid. The building will be in the late Early English style, and will have nave, north and south transepts, aisles, and polygonal apse at the east end, in which will stand the pulpit and communion-table. Galleries will be carried all round, except in the north transept, where the organ and choir will be placed. The clearstory will be carried on 6-in. iron columns. There will be three entrances, one by the south porch, one on the north side of the west front, and the principal one through a lofty porch, at the south-west angle of the church, so designed that it may be left as a porch, or form a suitable base for a tower and spire, should it ever be decided to build them. There will be accommodation for 350 persons on the ground-floor, and 220 in the galleries. The church will be heated by Messrs. Haden's hot-air apparatus. Mr. W. J. Stent, of Warminster, is the architect.

Devonport.—After undergoing extensive alterations and improvements, Princess-street Chapel has been re-opened. Two small galleries at the extreme end of the building which were almost useless have been removed, the porch has been widened by nearly 6 ft., and two rooms constructed on each side, one being for the minister's use, and the other intended as a class-room, separated from the chapel by a glazed partition. The pulpit has been entirely removed, and in its stead a platform erected, supported by ornamental pillars. The interior has been repainted, and the windows are frosted. The plans were supplied gratuitously by Mr. Andrews, who has also superintended the erection of the work by Messrs. Murch & Son, Stoke.

Hytha.—The new Congregational chapel has been opened for divine service. The amount of the contract was 1,925*l.*, but that sum will be increased by extras. The chief material of the building is rock, and the Gothic style of architecture has been adopted. There are two porches and a lobby at the entrance from High-street, and a dwarf wall, with iron railings and piers, extends along the front. The pulpit is formed by two raised platforms. Over the windows there is some ornamental scullioning. Mr. J. Gardner, of Folkestone, was the architect. Messrs. Gandy & Gibbs, of Croydon, executed the carving.

Willenhall.—The memorial stone of a new

Wesleyan school chapel, to be erected on the Walsall-road, Willenhall, has been laid. The cost of the property, and the erection of this "school chapel," together with boundary walls, &c., will be over 750.; but the building alone, which is to be of brick, and to accommodate about 250 persons, will only cost 300l. The building, as may be supposed from the cost, will be of a very unassuming character, and will be composed entirely of red brick, with facings of coloured brick; the only ornamentation being a front porch facing the road. The plans of the building were prepared by Mr. B. Baker, and the builders are Mr. John Taylor and Mr. Henry Hall.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

Market Basen.—The church here has been reopened. The addition and alterations have been such as to have left scarcely any trace of the old building, so that it may be called a new church. The architects were Messrs. Hadfield & Son, of Sheffield. The edifice consists of a nave and north and south aisles. The north aisle and the baptistry at the end were built at the sole expense of Mr. Arthur Young, of Kingerby. The south aisle is terminated by a saddleback tower, and rises to a height of more than 70 ft.; it is crowned by a figure of our Saviour on the cross in stone. The nave is divided from the aisles by pillars of stone with carved capitals. The arches are of brick in alternate bands of white and red. Over the high altar hangs a canopy, and at the back a large crucifix; the sanctuary is laid with encaustic tiles of simple design; the communion-rail is of oak with wrought-iron standards, painted and gilt. The gas standards are of nine lights each. At the east end over the lady altar is a window representing the angel Gabriel appearing to the Virgin Mary. It is from the works of Messrs. Laver, Barrand, & Westlake, of London.

STAINED GLASS.

Haberley Church.—This church has just had erected a new east window, the gift of Mr. F. T. Sparrow. The window is in the Early English style, consisting of three lights of stained glass, by Mr. Preedy, of London, and represents six scenes in the life of Christ, and that of the Virgin Mary. The subjects are as follows:—The Annunciation, the Nativity, the Presentation in the Temple, the Flight into Egypt, the First Miracle at the Marriage in Cana, and the Crucifixion. The stonework, also new, is carried through the thickness of the wall, and has been executed by Mr. R. Smith, of The Clive.

Miscellaneous.

CUMBERLAND AND WESTMORLAND ARCHEOLOGICAL SOCIETY.—A meeting of the members of this society has been held at the Crown Hotel, Penrith. Major Whitwell, of Kendal, occupied the chair. The Rev. J. Simpson read a paper sent by the Rev. John Mangham, on the "Supposed Roman Stations at Kirksteads, Burgh-ton-Sands, and Bowstead Hill." Dr. Michael Taylor then read his paper on "The Vestiges of British Occupation near Ullswater, and on the Discovery of Buried Stone Circles by Eamont side." The company afterwards lunched in another room. Nearly the whole of the ladies and gentlemen present then proceeded in carriages to Dacre Castle, where a descriptive account of the old castle was read by Dr. Taylor. After the reading of this paper, the company dispersed in various directions. The day was very favourable for the excursion, and all seemed to enjoy themselves. On leaving Dacre, the company drove over to Pooley Bridge, and ascended the famous Dunmallet, about which reference was made in Dr. Taylor's paper, and where there is one of those singular entrenchments, with a mound outside the ditch, which have been observed in other parts of the country, as in Cornwall. The Dunmallet earthwork stands on high ground, Dunmallet rising to a considerable height from the margin of a lake, and the ditch and mound occupying the summit. The company returned to Penrith, after spending a very pleasant and agreeable afternoon.

THE LATE SIR CUSACK P. RONEY. — The life of this gentleman was an eventful one, and, properly written, would be instructive. He was born in 1810, was educated at Trinity College, Dublin, and took his B.A. in 1829. He was a member of the College of Surgeons; secretary to the Royal Literary Fund, 1835-37; a clerk in the Admiralty, 1840-45; secretary of the Eastern Counties Railway, 1845-51; secretary of the Grand Trunk Railway of Canada, 1853-60; and was knighted by the Lord-Lieutenant of Ireland (Earl St. Germans), for his able management of the Dublin Exhibition in 1853. His skill as an organizer was great. His genial manners and ready kindness endeared him to a large circle of friends.

BOILER EXPLOSION AT WOLVERHAMPTON. — Inquests have been held on the bodies of six men who were killed at a recent boiler explosion at Moseley Steel and Iron Works, Wolverhampton. The jury returned a verdict of "Accidental death." The foreman of the jury also handed in the following recommendation: "We are of opinion that the explosion was accidental; but we think that if a proper inspection of the boiler had taken place the accident would not have happened. We are of opinion that a boiler of the same make as the one which exploded is not safe with the amount of heat which was worked into it. We think that proper steam gages should be used, and regular inspection of the boiler by a competent person should take place."

THE ATHERSTONE SEWAGE.—The local sewage committee have resolved, "That the tender of Messrs. J. & J. Smith, of Hanley and Newcaste, for contract No. 1, 2, 410l., be accepted, subject to the proper filling in of the schedules, and references proving satisfactory to Mr. Latham, the engineer;" also, "That the tender of Messrs. Skey & Co., of Whitecote, for contract No. 2, 558l. 4s. 11d., be accepted, according to the specification, upon the recommendation of Mr. Latham; and that Messrs. Skey & Co. be called upon to enter into a written contract according to their schedules of prices." It appearing that Owen-street was included in the system of the sewerage, it was resolved that the same be included, and that work be executed by the contractors, under Mr. Latham's direction, upon their schedule of prices.

MONUMENT TO THE LATE GENERAL BRUCE.—A monument to the late General Bruce, governor to the Prince of Wales, and brother of the late Earl of Elgin, who was plenipotentiary to China, is being erected in Dunfermline Abbey. It is an altar tomb, on the panels of which are commemorated, in bas-relief, the chief incidents of the journey to the Holy Land made by the Prince of Wales under the guidance of the deceased. One of the scenes portrays the departure of the pilgrims from home; the next indicates their arrival at Jerusalem; while in the third the Prince is tending the general in his illness while in Palestine. On the top of the tomb lies an effigy of the general, sculptured after the fashion of Mediæval church monuments. The figure of his widow is represented in the attitude of mourning. The Prince of Wales's plume, on the corner of the pillow which supports the head of the general, was suggested by her Majesty, to serve as a memento that the general had breathed his last within the precincts of St. James's.

STEAM FROM THE SUN'S HEAT. — Captain Ericsson undertakes to supply a new source of heat in place of coal, oil, &c. For several years he has been experimenting with the view of collecting and concentrating the radiating heat of the sun, with which, so to speak, to heat his furnace. At length, at the beginning of the present year, he was able, according to his statement, to construct three "solar engines," of which the first was driven by steam formed by the concentration of the heat of the solar rays; and the other two by the expansion of atmospheric air, heated directly by concentrated radiant heat. His experiments show, he asserts, that the concentration of solar heat on 10 ft. square, or 100 square feet of surface, develops a power exceeding one horse's power. We are curious to learn the exact nature of the concentrating mechanism. A Mr. Dellamater declares that the enterprise is already a success, and that, "before the termination of the present season, bread will be prepared from flour ground by the power of the 'solar engine.'" Hitherto, however, Captain Ericsson's ingenious calorific inventions have not been found available on a large scale as practical machines.

RE-OPENING OF THE PARISH CHURCH, TWYNING.—Two years ago the roof of this church was in a dangerous state; the walls were crumbling; the interior was filled with old pews of various sizes, heights, and patterns; the whole was dreary and comfortless; and there were no funds from which to repair it. A sum of 2,300l., however, has now been expended on the structure, which has been formally reopened.

INSCRIPTION ON A SUN-DIAL.—On a silver sundial, in front of Stanwardine Hall, in the parish of Baschurch, Shropshire, is the following inscription:—

"In the hour of death (Dial) For as tyme doth haste
God be merciful to me; (Dial) So lyfe doth waste."
"He that will thrive
Must rise at five;
He that hath thriven
May lie till seven;
He that will never thrive
May lie till eleven.
Anno 1569."

Stanwardine Hall is a remarkable old mansion.

THE PROPOSED MUNICIPAL OFFICES, BRADFORD.—At a discussion in the town council on this subject, wherein motions, amendments, substantive motions, and movements of adjournment, succeeded each other in such perplexing involution that not even the movers seemed to comprehend the actual fate of their own motions, it has been finally resolved,—

"That it is not expedient at present to proceed with the erection of public offices; and further, that it be an instruction to the Street Improvement Committee to offer for public auction, in such lots as they may determine, the land known as the Chapel-lane site, and that the resolution of the 3rd of September, 1867, with reference to such offices, be, and the same is, rescinded accordingly."

When the corporate wisdom had virtually brought the matter to this pass, the mover of the successful resolution rose, and said he should leave the game in the hands of his opponents; and he was on the eve of taking his departure at this point, when, amidst considerable laughter, he was made aware of his mistake. Some one should move a radical "amendment" of the council's mode of voting.

CHURCH WINDOW OPENING. — An apparatus patented by Mr. Beard, of Bury St. Edmund's, has been so fitted to St. Mary's Church in that town, according to the local *Pest*, that a lad or woman can now from the west end of either aisle open simultaneously and without noise ten of the clerestory windows to any extent that may be wished, and with equal ease shut them close and firm. A hollow tube of galvanized iron, about 1 in. in diameter, runs on the outside of the entire length of the clerestory windows along the sills, and is worked longitudinally by an endless screw, small iron roller-wheels being fixed at intervals to facilitate the motion. Upon the tube are affixed small jointed arms, which are attached to the windows, and acted upon with precision by the screw, the motion being conveyed by a weighted pulley and a cord, which passes from the roof to the floor of the church. In the case of St. Mary's, Bury, the length of tube on each side of the church is 130 ft., total 260 ft. The number of windows opened on each side is ten.

DISCOVERY OF ANOTHER ROMAN VILLA, NEAR PALNSWICK.—At a spot known as Highfold Farm (to be found in the Ordnance map), the remains of a villa have accidentally been discovered while ploughing. Mr. Adey, proprietor and occupier, has covered it in and levelled the ground again for the winter crop, purposing next summer to re-open it. A hypocaust was found, with square columns of brick (pilæ), supporting the incumbent floor, fine tiles (umaria), running up the side walls, and a tessellated pavement (tesserales), also roofing-tiles (tegulae), of pointed hexagonal shape of red sandstone. Mr. D. T. Nihlett, F.S.A., in writing as to the hypocaust, &c., discovered, says,—"I strongly suspect that these hollow floors, raised in this way upon piles of bricks, or short columns, and arranged for the circulation of hot-air beneath, were not invariably belonging to the bathing apartments, but, as frequently, to the ordinary day-rooms, or maybe these particular rooms were used for both purposes. Moreover, these hollow floors are the most highly ornamental ones throughout each villa. While on the subject of square flooring bricks (lateres, or laterculi) size, say about 1 ft. square and some 2 in. or 3 in. thick, I would call attention to their occurring in Gloucester Cathedral in several places, set vertically in the Norman work."

NATIONAL EXHIBITION OF WORKS OF ART AT LEEDS.—The visitors in the week ending Saturday, the 8th inst., numbered, by season tickets, 5,505; by payment, 24,605; total, 30,110.

LAUDY ISLAND.—The granite quarries in Laudy Island are now no longer worked, and the company is being wound up. The works were started in 1863, and 80,000 lb. have been expended upon them.

FEVER IN LIVERPOOL.—A sudden and extensive epidemic fever has broken out in country places near Liverpool, on the north bank of the river. The number of cases has, according to the *Medical Journal*, been very large. The deaths in the affected places, of which Bootle is one, have for the last six or seven weeks been nearly, if not quite, double the average.

PRESENTATION OF A TESTIMONIAL TO THE OXFORD CITY SURVEYOR.—Upon the removal of Mr. T. C. Clarke, C.E., the late assistant borough engineer of Portsmouth, to Oxford, in consequence of his election as the surveyor of that city, it was determined to present him with some suitable recognition of the services rendered to Portsmouth during his residence there. The testimonial, which consisted of a French clock and a purse of fifty guineas, was lately presented, after a dinner at the Bedford Hotel, Landport. The mayor presided. The guest of the evening, Mr. Clarke, occupied a seat on the right of the chairman.

THE LORD MAYOR ELECT.—Many of our readers will hear with great pleasure that Mr. Alderman James Clarke Lawrence will be the next Lord Mayor of London. His brother, Mr. Alderman W. Lawrence, M.P., was Lord Mayor in 1863. Mr. Alderman J. C. Lawrence became alderman of the ward of Walbrook upon the demise of Mr. Alderman Wire in 1860, and filled the office of sheriff two years afterwards. He is a very good speaker and a cultured man, and we have every reason to expect that the duties of his important office will be well and gracefully performed. He has the advantage of coming after a year of great fatness in the Mansion House.

THE ESTIMATE AND TENDERS FOR ST. SWITHIN'S CHURCH, LINCOLN.—The lowest tender having been found to be 1,059l. above the estimate accompanying the selected design of Mr. James Fowler, and above the sum proposed by the committee to be expended, three of the competing architects, Messrs. Goddard & Son, Drury & Mortimer, and Bellamy & Hardy, have written to the committee calling upon them either to return the selected plans to their author and make a new selection from the remainder, according to the instructions, or to permit them to furnish other designs to include the extra sum required to carry out the design selected. The three firms named also state in their letter that they believe their designs could have been carried out in their entirety, including the seats, for the stipulated sum. The tenders given in were as follow:—Patterson, Ruskington, 9,721l.; Wallis, Rason, 9,600l.; Slingsby, Lincoln, 8,600l.; Lovelee, Branston, 8,559l.

THE SCHOOL OF ART, BRADFORD.—The report of the School of Art Committee of the Bradford Mechanics' Institute, with which this school is connected, says,—"In presenting to you a report as to the art classes in connexion with your institution, under the charge of Mr. Sowden, we would first congratulate you on the greatly improved condition of the art education of the pupils as compared with last year. The collection of drawings and models which have been submitted to us is a remarkable proof of this, and not only is the general collection better, but the prize drawings are of a higher character than the prize drawings of last year. The numbers attending in several of the branches competition has been so close that it has been difficult to adjudicate between the productions of the competitors." It was stated at the annual *soirée* by the president, in reference to a project for the erection of a new building for the institute, that the entire estimated cost of the new enterprise was 25,000l. The sale of the old building and ground and other financial arrangements enabled the committee to see how the half of that sum could be covered, and they required 12,000l. or 12,500l. towards which their fellow-townsmen had already contributed 5,000l.

ROYAL HORTICULTURAL SOCIETY.—The Exhibition of edible and poisonous fungi, held on Tuesday last by this society, was most remarkable. Contrary to the expectations of the council, several hundreds of freshly-gathered specimens, in excellent condition, were sent for exhibition, nearly all the wholesome and deleterious kinds finding a place on the tables. Dr. Bull, of Hereford (in the absence of the Rev. M. J. Berkeley), delivered an able address on the subject, passing each species in review, both edible and poisonous, and giving his personal experiences of them. Prizes had been previously offered for the best collections by Lady Dorothy Nevill and Mrs. Lloyd Wynne. The first prize was awarded to Dr. Bull, and the second (that given by Lady Nevill) fell to the share of one of our contributors, Mr. Worthington Smith.

THE LIVERPOOL MASTER BUILDERS' ASSOCIATION.—The second annual meeting of this Association has been held in their rooms, South Crescent-chambers, Lord-street, Liverpool; Mr. Thomas Haigh, the president, in the chair. The report for the year just ended was read and adopted, and the course which the committee had pursued in reference to the late strike of operative bricklayers was approved, the committee being complimented upon the successful issue of a contest of the bricklayers' own seeking. It was stated that the operative bricklayers who are members of the trades union are now anxious to have arbitration, and to be reconciled to the employers, after framing another code of trade rules; but the time for these negotiations, it was conceived, had gone by. They were the terms which the employers offered, and the bricklayers refused last May. Now the masters' workshops are plentifully supplied with men, and if at any time either party desire an alteration of rules, they provide for arbitration. The present number of the members of the Association is 174, and they comprise nearly all the influential employers in the building trade of Liverpool. Mr. John Jones, of the firm of Jones & Son, was unanimously elected president for the ensuing year.

TENDERS.

For alterations and erection of chapel, at North Snarry District Schools, Anesley. Mr. J. Berney, architect:—
Sawyer.....£1,843 0 0
Faulkner.....1,769 0 0
George.....1,750 0 0
Baxter.....1,770 0 0
Crabb & Vaughan (accepted).....1,729 0 0
Housegood.....1,712 0 0
Wills.....1,721 0 0

For pulling down and rebuilding two houses in Dove-wood, Shoreditch. Mr. William Mundy, architect:—
Marr.....£1,266 0 0
Tolley.....1,907 0 0
Langmead.....800 0 0
Christoffer Brothers.....897 0 0
Higgs.....772 0 0

For Christ Church District Schools, Eastbourne:—
Ford & Atwood.....£3,767 0 0
Nightingale.....2,953 0 0
Dabbs.....2,547 0 0
Faller & Longley.....2,450 0 0
Peeries.....2,260 0 0

For new 7-in. water-main, for Chelmsford Board of Health. Mr. C. Pertwee, surveyor:—

	Pipes.	Labour.	Total.
Dence.....	...	...	£1,158 0 0
Weston.....	...	...	949 0 0
Everett & Son.....	£968 10 0	£249 10 0	619 0 0
Bugbird.....	645 0 0	224 0 0	869 0 0
Tanner.....	655 0 0	210 0 0	865 0 0
Coleman & Co.....	645 0 0	194 0 0	839 0 0
Dennis & Scruby.....	547 10 0	288 0 0	835 0 0
Christy.....	695 2 0	219 0 0	815 2 0
Thornton.....	656 0 0	159 0 0	815 0 0
Stevens.....	627 14 4	173 0 0	800 17 4
Wells, Smith, & Wright.....	673 5 0	...	...
Bailey, Pegg, & Co.....	638 15 0	...	...
Tice.....	620 15 0	...	...
Newton, Chambers, & Co.....	620 15 0	...	...
Butterley Iron Company.....	615 10 0	...	...
Begg.....	607 12 6	...	...
Warner & Co.....	607 12 6	...	...
Graham & Son.....	6'3 5 0	...	...
Roberts.....	601 1 6	...	...
Cockayne, Grove, & Co.....	594 10 0	...	...
Reidy & Co.....	590 10 7	...	...
Claridge, North, & Co.....	582 2 9	...	...
Laidlaw & Son.....	563 0 0	...	...
Bower.....	547 0 0	...	...
Chandler & Sons.....	...	189 0 0	...
Walker.....	...	185 0 0	...

* Accepted.

For a new Congregational church, at New Brompton Kent, for the Rev. J. Harasant. Messrs. E. Habershon & Brock, architects:—
Hastley & Rogers.....£2,620 0 0
Simpson.....2,523 0 0
Scrivener & White.....2,169 0 0
Taylor.....1,978 0 0
Nightingale.....1,972 0 0
Stamp.....1,950 0 0
Falkner.....1,734 0 0
Wilkins.....1,709 0 0

For the erection of a mortuary, for the guardians of the poor of the parish of St. Pancras:—
Turner (accepted).....£277 0 0

For new Metropolitan Police-court, Lower Kennington-lane. Mr. T. C. Sorby, architect. Quantities by Mr. John Scott:—
Hill, Keddell, & Waldram (accepted) £6,388 0 0

For new premises for Messrs. Negretti & Zambra, at Holborn Viaduct. Mr. F. W. Porter, architect. Quantities by Mr. James Williams:—
Yanson.....£6,635 0 0
Carter & Sons.....9,570 0 0
Mansfield & Co.....9,099 0 0
Farman & Fotheringham.....5,885 0 0
Jackson & Shaw.....8,660 0 0
Conder.....8,599 0 0
Piper & Co.....8,597 0 0
Hill, Keddell, & Waldram.....8,588 0 0
* Accepted.

For building new offices, for Messrs. H. & V. Nicholl, Lewisham. Mr. E. H. Badger, architect:—
Amer.....£685 0 0
Jerrard.....649 0 0
Pain & Baldy.....635 0 0
Beaton.....623 0 0
Penny.....555 0 0

For detached villa residence at Woodford, for Mr. Brascombe. Mr. G. B. Noble, architect. Quantities by Messrs. Linsdell & Giffard:—
Rivett.....£1,798 0 0
Piper.....1,723 0 0
Hedon.....1,680 0 0
Hill, Keddell, & Waldram.....1,637 0 0
Perry (accepted).....1,625 0 0

For repairing and painting the interior of the parish church, St. John of Wapping. Mr. S. M. Pipe, architect:—
H. & J. Johnston.....£298 10 0
Kells.....248 10 0
Jackson.....292 9 6
Thompson (accepted).....230 0 0

For the erection of a new wing and alterations to Park Villa, West Dumpton, Thauet, for Mr. Sinclair. Mr. John R. Collett, architect:—

	New work.	Old work.
Osborne.....	£294 0 0	£197 0 0
Kelson.....	289 11 4	179 0 0
Duckett.....	282 0 0	167 0 0
Wyde.....	212 10 0	117 0 0
Lawson.....	790 0 0	160 0 0
Elgar (accepted).....	744 0 0	150 0 0

For two semi-detached houses, Nottingham-road, East-wood. Mr. J. Zail, architect:—
T. & H. Herlett (accepted).....£320 0 0

For alterations, &c., to the Coopers' Arms, Silver-street, City, for Mr. Doughty. Mr. R. Washington Hart, architect:—
High & Lawrence.....£505 0 0
Kelly Brothers.....496 0 0
Langmead & Way.....458 0 0
Prince (accepted).....445 0 0

For alterations to the George and Dragon, New North-street, W.C., for Mr. Westbury:—
Knight (accepted).....£159 0 0

For additional works at the Norfolk Arms, Hart's-lane, Bethnal-green, for Mr. Keymer:—
Langmead & Way.....£196 0 0
Knight.....125 0 0

For enlarging and restoring Denver Church, Norfolk. Mr. William Smith, architect:—

	Oak Seats.	Deal Seats.
Bennett Bros.....	£1,623 0 0	£1,450 0 0
Brown.....	1,459 0 0	1,348 0 0
C. Bennett.....	1,450 0 0	1,200 0 0
Drake.....	1,395 0 0	1,296 0 0

Accepted for the erection of a Wesleyan chapel and school, at Redcar. Mr. J. Hunter, architect. Quantities supplied:—

	Bricklayer and Plasterer's Work.	Joiner and Carpenter's Work.	Mason's Work.	Slater's Work.	Painter, Glazier, and Gasfitter's Work.	Heating Apparatus, &c.	Painter's and Stainer's Work.
Scott.....	£319 0 0	439 0 0	435 0 0	175 0 0	87 14 0	57 0 0	39 0 0
Watson.....	435 0 0	435 0 0	175 0 0	87 14 0	57 0 0	39 0 0	29 17 0
Lord.....	175 0 0	87 14 0	57 0 0	39 0 0	29 17 0	29 17 0	29 17 0
Harrison.....	87 14 0	57 0 0	39 0 0	29 17 0	29 17 0	29 17 0	29 17 0
Kershaw.....	57 0 0	39 0 0	29 17 0	29 17 0	29 17 0	29 17 0	29 17 0
Cuninghame & Co.....	39 0 0	29 17 0	29 17 0	29 17 0	29 17 0	29 17 0	29 17 0
Cuninghame & Co.....	29 17 0	29 17 0	29 17 0	29 17 0	29 17 0	29 17 0	29 17 0
Guy.....	29 17 0	29 17 0	29 17 0	29 17 0	29 17 0	29 17 0	29 17 0

For building coach-house and stable at Leytonstone Mr. William Mundy, architect:—
Cains.....£265 0 0
Arber (accepted).....244 0 0

For harbour works, Cernarvon:—
Bugbird (accepted).....£244 0 0
The water and drainage works here, at a cost of 22,000l., have just been completed by the same contractor.

The Builder.

VOL. XXVI.—No. 1341.

Birmingham: Art, Health, Education.



WHILE the Social Science Association was in Birmingham a statue of James Watt was set up in the open space between the Town Hall and the Midland Institute; very awkwardly, by the way; for though it is probably the centre of the road if the Institute had a square corner like the Town Hall, it does not look to be so, because the Institute corner is largely rounded off to benefit the traffic. The result is that the statue, which is of Sicilian marble, 8 ft. 3 in. in height, and with its pedestal nearly 20 ft., looks as if it had been popped down temporarily, and was waiting for the carrier to take it

away again. That we may get rid of all our objections at once, let us add that the Darley Dale stone pedestal is of the egg-box family, and very insignificant, the designer having been trammelled probably by want of room. Watt holds in his right hand a pair of compasses, his left rests on the model of a cylinder, and his mind rests too,—rest and calm, indeed, characterise the statue. The attitude is expressive; the face admirable. Birmingham may thank Mr. Alexander Munro for giving them the only good statue yet in their streets. There is a meritorious figure of the Prince Consort boused in the Midland Institute, but this has not yet found a site, or been subjected to the test of an open-air situation. If money and sufficient space can be found, it ought to have a proper canopy. The statue of Atwood in New-street is a poor thing. Close by it a handsome new Bank is approaching completion,—a large stone-fronted building of two lofty stories, the upper one Corinthian. It carries Barry-like chimney-shafts at the angles, and will have an entrance porch or portico with marble columns in New-street when finished. It promises to be a very dignified structure, and very creditable to the architect, Mr. Holmes. The ugly brick flank wall seems to show that another building will butt against it. This is to be regretted: a structure of this kind should stand clear, and be in keeping all around,—a complete building, in fact, and not a couple of fronts. We cannot give Mr. Holmes equal praise for the Masonic Hall he is erecting in the same street. It has a carved stone doorway, not yet finished, but the rest of the two fronts (the Hall, like the Bank, is at the corner of a street, running backward to a considerable extent) is cemented. The details are poor; an ugly sentry-box is stuck over the angle attic window as a turret, and the whole pile can scarcely escape being called vulgar. A range of

shops in progress come very prominently into notice a little nearer the Town-hall. These call Mr. Plevins author; and are of red brick, with freestone dressings, in the mixed style, Italian and Gothic, we of these days know so well. The windows have segmental heads under pointed arches, and the whole is,—well, a trifle *bizarre*.

The Theatre Royal, here at hand, has been newly decorated, and looks very gay—rather too gay, indeed. The prevailing tint is a bright blue complemented with a light French pink, and gods and goddesses, nymphs, and Cupids are lavishly scattered about. The proscenium is most elaborately adorned both as to form and colour, and *per se* the whole has a certain degree of richness. But this strength of colour before the curtain is a mistake. The scene ought always to hold the prominent place, and when the note is struck so high in front to cap it becomes difficult. The form of the auditorium here is much flatter and shallower than is usual in English theatres, where the abominable long horse-shoe generally obtains; and the result in the Birmingham Theatre is that, so far as we could observe, every one seemed to be able to see and hear, though the house was densely crowded to enjoy Miss Bateman's "curse."

Over the way are the rooms of the Royal Birmingham Society of Artists, and the annual exhibition of modern works of art is now open. It is a very agreeable collection, and includes 647 paintings and drawings, and eight pieces of sculpture. Its principal features are, of course, known to London art-lovers,—"Herod's Birthday Feast," by Armitage; "The Sleep of Duncan," by MacIse; "Rent-day in the Wilderness," by Landseer; "The Tuilleries," by Elmore (the best picture he ever painted); "Before Waterloo," by O'Neill, and some others. The committee, by the way, give a good sentence, by Lessing, on their catalogue:—

"Art must paint as plastic nature conceived the picture; without the imperfection which resistant matter renders unavoidable, and without the injury which time works upon it."

Do the good people of Birmingham do as much for art as they should and might? Judging from what we saw and heard during a visit to the School of Art we are disposed to think not. The rooms are in the top floor of the Midland Institute, and it is no reproach to the architect when we say that they are not suitable to the purpose, and do not afford anything like accommodation enough. The gas having been burning for some time, the thermometer marked a temperature of 95°! The students were crowded together, and the classification was not what is desirable. At the present moment there are 750 students on the books, and there might be half as many more if the accommodation were sufficient and good. A large separate well-ventilated and well-lighted building should be provided, and the manufacturers should feel that it is their interest to support the school nobly. The town will reap a hundred-fold for all they sow in this soil. Let us also exhort the young that they avail themselves at once of such facilities as are afforded. The man who wants to learn will triumph over obstacles: will not give in because everything is not exactly as he would wish it. Industrial art offers ample scope for gaining fame as well as money. As Mr. Robert Flenny said the other day to students in Paris,—"Industrial art has the sympathy of all the world—the production of a potter of Athens finds passionate admirers everywhere. Any one may be proud to add his name to the long list of famous art-workmen. Believe me, industry offers a fine field for those who know how to distinguish themselves in it. Work, for labour is honourable; it renders men better, and therefore more capable of fulfilling all the duties of life. Develop your faculties by study, and raise industry to the level of art. Remember that the grand epochs which make the glory of nations

are also those in which art and industry were at their apogee."

We felt it matter for regret that so little was said on the subject of art-industry during the recent Social Science Congress. One of the ladies, however, who so ably took part in the proceedings, made this observation (and it ought not to be quite overlooked in Birmingham), that for want of artistic training women in Paris are now being largely superseded by men in the distinctly feminine employments, such as millinery and the dressing of shop-windows. Through want of artistic training, how many English men are superseded by foreign men! The Congress, we regret to hear, has not been a success, in a pecuniary point of view, though in other respects greatly so. The president and heads of departments made very excellent addresses. The discussions were valuable and well sustained, and much good seed, it may be hoped, has been sown, and will bear fruit in due season; but the population of Birmingham did not flock in to take tickets as they should have done.

The Rev. Dr. Hart Burges, vicar of Bishop Ryder's, Birmingham, has addressed to us a letter, which will be found on another page, commenting on the remarks the conductor of this Journal found himself compelled to make, at the recent Social Science Congress, as to the lamentable state of certain parts of the town. The assertions were, that a large population was living in the heart of the town under conditions inconsistent not only with health but with virtue; that in these wretched districts not one child to whom he had spoken could read; that girls and boys were growing up in ignorance, dirt, and ill health, with no other prospects than the streets for the one and the goal for the other; and he asked, looking at the state of the people as well as of the places, not alone whether the town authorities had used the remedial powers they possessed, but where had been the ministers of the Church,—where had been the clergy generally? The vicar takes no exception to the particulars given of the nunhousesome dens in which masses of his people are living,—if the word may be allowed. On the contrary, he fully admits "the incalculable injury to health and physical well-being" that is thus done; and is fully satisfied "that the generally wretched character of the dwellings of the poor, the absence of refining influences, and the miserable associations of poverty-stricken homes, courts, and streets, tend much to the inhumanising influence which, destroying the finer susceptibilities and blunting the better feelings of the heart, generally results in brutality and crime, a family plague and a social curse." "In the greater portion of Mr. Godwin's statements," says Dr. Burges, "I most thoroughly agree;" but naturally enough he would remove from the ministers of the church any reflection that may seem to have been cast upon them by the inquiry; and this he seeks to do by stating that "the educational necessities of the parish have not been overlooked;" setting forth the number of schoolrooms in the parish, and adding, "so strong is my sense of the deep need of the portion of my parish alluded to by Mr. Godwin, that the erection of a large ragged and infant school will be commenced (D.V.) within ten days." This is good hearing; Dr. Burges's warm interest in the matter is even better; but does it in the slightest degree show the impropriety of the question? We think not. Schools or no schools, here is the fact that hundreds of children in certain districts are growing up in a state of the densest ignorance. The fact is not denied; cannot be denied. In the course of two examinations not a single child spoken to could read. "You need not trouble yourself to ask;" the intelligent police-officer who was with us on the first occasion remarked, "none of them are taught anything but bad; and yet, as

I have often said, this is in England, and we send out people to teach the blacks!" The reverend vicar's statement is no more an answer than is that of the mayor to the objections to the sanitary condition of these parts of the town. The mayor says the town has spent on its present sanitary system within the last twenty-five years no less a sum than 200,000*l.*, and the death-rate is low compared with that of other large towns. It would be satisfactory to know the items of this expenditure. But, supposing the money has been wisely used, the amount is but small comparatively; and if it were five times as much, it would be no excuse for a community allowing in their very midst thousands of their fellow-creatures to be horrid together year after year under conditions which put cleanliness of mind or body out of their reach, and make health and virtue alike impossible. As to the general healthiness of the town, will the mayor tell us the death-rate in the summer months of these particular districts? It would be found frightful. More than one medical resident has told us that in some of the places visited fever has not been absent for years. Are these things to remain unchanged, because less unhealthy parts of the town admit of an average death-rate being stated not immoderate, considered with reference to some other towns, but still very large as compared with really healthy places? As Dr. Farr said, after the Mayor had spoken,—"It is little consolation to persons living in unhealthy parts of the town to know that others residing not far off are enjoying the advantages of salubrity."

While dense masses of people in the midst of wealthy communities are found ignorant and untended, growing up wholly to the bad, and supplying unintermittently the goals and hospitals, the inquiry will still be made, "Where have been the ministers of the Church? where have been the clergy generally? If it be the system that is at fault, not the individuals, they can at least say so, and demand from each pulpit and platform such arrangements as will give to every fresh-born fellow-creature the chance of health and parity.

It will not be supposed that we are speaking of Birmingham as if it stood alone. Other large towns, and our readers know how many we have personally and painfully examined, present the same dreadful condition of things. The right remedy is not merely of local interest; it is an Imperial question of the greatest and gravest importance.

HAMPSTEAD FEVER-HOSPITAL COMPETITION.

The plans of six selected architects mentioned in our last are now before the Metropolitan Asylum Board. A premium of 200*l.* is offered for the best design, 150*l.* for the second best, and the successful competitor if required is to carry out the works for a payment of 750*l.*, less the amount of premium; but he will not be entitled to any premium or payment unless a substantial contractor will undertake the work at a price not more than 10 per cent. above the architect's estimate, which is to be sent in with the plans. This seems to show that the Board contemplate an expenditure of some 15,000*l.*, as we can scarcely suppose that a metropolitan public body would take advantage of their position to assist in lowering the established remuneration of a not too highly-paid profession, especially as four out of the six competitors will get nothing for their labour in preparing designs. This proposed expenditure, however, would seem to be insufficient to supply what is wanted.

The instructions required,—That the building should be on the pavilion principle, with distance of 60 ft. between them, and provide for the accommodation of 104 patients; that no pavilion should have more than two stories; that the buildings should be so arranged as to admit of their future extension, and the ultimate addition of other pavilions; that the axes of the buildings should be north and south, if practicable, so that the windows on either side of the wards should face east and west; and that an adequate site should be left for the erection of a Small-pox Hospital.

The names of the competitors, and the sums at which they severally estimate the cost of carrying out their designs, stand thus,—

Messrs. Pennington & Bridgen	£15,500
Messrs. P. Gordon Smith & G. A. Dunning	19,200
Mr. Saxon Smith	20,000
(For 208 bed)	£27,000.

Mr. F. Fowler	£24,500
Amended to £20,500.	
Mr. Edmeston, No. 1	27,500
No. 2	29,000
Messrs. Beeston, Son, & Breerton	50,228

The reason why the last-named design should cost so much more in execution than the sums named by the other competitors is not obvious. The general arrangement is symmetrical, the material is red brick, and the style Jacobean. The sum stated, however, and the fact that the designers have not fulfilled the proper desire of the Board to place the pavilions north and south, will probably lead the Board to give little consideration to this design. As to the estimates generally, the Board ought to take it for granted that the sums named are simply "opinions." An actual estimate of any one of the designs would cost at least as much as the premium offered, and we suppose the Board do not desire that the sacrifice made by the competitors in their anxiety to get public business should go to that extent.

The section of the ground furnished by the Board shows a rise from east to west of no less than 53 ft., and this has increased the difficulties of the competitors. We may say at once that any attempt to make a long line of building follow this slope would produce a failure. The bad effect of this is shown in Mr. Edmeston's view of No. 1 design. His design No. 2 is much better, and deserves consideration. In this the isolation of all the pavilions by means of curved corridors leading from main corridor, so that the chance may be lessened of infectious atmosphere being generally disseminated about the corridors, is attempted.

Mr. Srell proposes to place the pavilions on different levels, and connect them by corridors sloped according to the natural inclination of the ground, but he does not show the effect of his arrangement in his drawings. This plan represents the building as extended for the reception of 208 patients, and rather mystify in consequence. According to his estimate, it seems that while a hospital with 104 beds costs at the rate of 192*l.* per bed, one for 208 patients costs only 130*l.* per bed. Mr. F. Fowler has evidently bestowed much pains on his design, and sends two arrangements, one of which shows a double corridor, with a view to separation. We should scarcely be disposed to recommend an arrangement by which all the pavilions are made to open into one long closed corridor, as shown in the design submitted by Messrs. Pennington & Bridgen. The closing in of the spaces between the pavilions by means of the projecting closet-buildings at the extremities, is also objectionable. They wisely urge the importance of confining hospitals for very infectious diseases to one story.

The greatest amount of sickness is proffered by Messrs. P. G. Smith & Dunning, who give a number of distinct buildings placed widely apart and *en echelon*, so as, ingeniously, to free them one from another. The covered ways for administrative purposes are on an incline. They divide the difference in the levels at the administrative department in the centre, and so dispense with steps on the lower floor of all the pavilions on each side of it. Although the buildings are necessarily scattered, by terminating the octagonal closet-buildings which are placed on each side of the end of each block with a conical roof, the connexion of the whole is seen, and some architectural effect obtained. We are but glancing at the drawings superficially, and cannot say how other requirements are met; but certainly one great desideratum is supplied by this design.

Many things will have to be considered by the Board before erecting, and in the course of erecting, such an establishment as is proposed,—the home of small-pox, typhus, and scarlet fever,—the disposal of the sewage, for example, will demand serious thought, or dire results may follow in the future. Indeed, a great responsibility rests on the committee who have this matter in hand, and we would strenuously urge them to call in a small mixed committee of architects and medical men who have given attention to the subject, to assist them not merely in selecting the best design from those submitted, but in rendering the design as free from objections as possible compatible with present knowledge. An additional 500*l.* thus used would show wise economy. The amount of good or evil that may be done by the intended hospital is enormous; and it cannot be too strongly impressed on each member of the Board that they have in hand a work that cannot be treated lightly,—a problem before them that cannot be rightly solved without the best knowledge and the deepest consideration.

THE VENGEANCE OF THE THAMES.

We wish to call the attention of those who are interested in the conservation of the public works of London, to one of those indications which it is well never to neglect. We do so neither as wishing to excite alarm, nor as speaking otherwise than hypothetically. Attention will not be thrown away if directed to the subject; and, if it prove that the warning is unnecessary, none will be more rejoiced than ourselves.

Many of our readers are familiar with the aspect of the quay wall of the Thames Embankment as seen from the river, as well as with the various picturesque scenes that open on the eye of the steam-boat passenger, or the pedestrian who passes along the boarded causeway of the Embankment. The northern arch of Waterloo Bridge is entirely occluded by the new roadway, and a pair of granite piers, designed in accordance with the architectural style of that noble structure, serve to unite the pier with the quay. The pier thus brought into line with the wall shows a serious crack, which, as far as we can ascertain, is entirely new. Supported as the work in which the defect occurs is, by the gault masonry on either side, this lateral movement is the more unexpected, not to say alarming. It is a subject to which a process of accurate investigation cannot be too speedily or too carefully directed.

The condition of the whole of the bed of the Thames, as far as it is affected by the tidal scour, has been interfered with by the works of the Embankment. How serious this interference has been, is a question which we should be glad to have elucidated. It is far from being a simple one; it is far from being unimportant. It is one on which we have at present a certain limited amount of information. It is essential to the maintenance of confidence in the Thames bridges that the subject should be thoroughly investigated and understood.

The level of the bed of the Thames may admit of considerable variation, without occasioning any apparent change on the surface of the river, except at very low water. The height of the high-water level depends on the state of the tides, on the winds prevailing, especially in the lower parts of the river, and in the obstacles offered, by bridges or other impediments, to the course of the flow. The effect of the combined ebb tide and current of the river will depend, not only on the actual quantity of water which is poured upwards through the arches of London Bridge by the flow, but also, to a great extent, on the form and character of the banks.

Now, the Thames Embankment, as it stands at present, has reduced the surface area of the river, above Blackfriars Bridge, by a very perceptible proportion. It may be urged that this scour of the downward current is diminished by the contraction of the area, as the water that would have risen over the shelving banks, now displaced by the embankment, is no longer sent there with the flow, to return with the ebb. But it must be remembered that the actual quantity of water thus displaced (if it can be proved to be kept below bridge by the change), is small in proportion to the surface area, as the shore in question was shallow and shelving. On the other hand, the bank of the stream on which the centrifugal, or rather tangential, force of the current and the ebb throws the most stress, is reduced in width; while the smooth, nearly vertical wall, affording much less frictional resistance to the stream than did the old irregular banks, is certain to produce a mining or burrowing action, of more or less intensity, during the ebb, and even, to some extent, during the flow.

Considerable obstruction to the flow is now occasioned by the enormous mass of piling that heaves the site of Blackfriars Bridge. In so far as this tends to retard the incoming tide, this obstruction may be held to diminish the scour. But every other alteration which has taken place between the banks of the river, since the building of the new London Bridge, may be regarded as having a tendency to narrow and deepen the channel, and to increase the force of the scour. The iron cylinders which support the railway bridges have this effect, and the result of the change effected by the completion of the quay wall must be something very serious.

The important requisite is, to ascertain with scientific exactitude what are the actual facts of the case. We should be glad to know what observations have been made as to the effect of these works on the bed of the river. Sections

ought to be on record, taken from time to time, so that the scientific man may know clearly what action has already taken place, and thus may come to some satisfactory conclusion as to the future.

The whole question of the state of the Thames is of the utmost interest to the inhabitants of the metropolis.

As to a large portion of the sum expended in the improvement of the Thames, it is pretty clear that we have not heard the last word. It is not so very long since people began to put the question, how far it was wise, with a view to the purification of the river, to collect all the sewage of the metropolis, in order to pour it into the stream at a fixed point,—far enough, it might seem, below bridge, but still within the neap flow of the tide. Strange and ugly stories were told of the evil that was being silently but swiftly effected at Barking Reach. They were contradicted even more loudly than they were uttered.

We should be glad to believe that the alarm was unfounded. Still the fact stares us in the face that an immense amount of fecal matter is daily poured into the lower portion of the Thames, that the solid portions must be deposited somewhere, and that this deposit, if less serious an obstacle to navigation than an equal quantity of sand or gravel, is of a putrescent or putrescible quality. We must reserve the valuable elements of sewage manure for the purposes of agriculture, and allow nothing but water to return to our river channels, whether it be at Oxford, at Reading, or at Barking Creek. As to this there is but little room for doubt. If so, then our great metropolitan sewage works are but in a provisional and temporary state.

The past summer has afforded an unusual opportunity for gaining information, both as to the state of the bed of the Thames, and as to the minimum quantity of water that flows through the metropolis in a dry season. We should be glad to learn that advantage has been taken of the opportunity to secure this important information. The coming winter may enable us to make corresponding observations as to the maximum flow of the river; and in both cases the action of the scour on the bed of the stream should be accurately noted.

It is well known that the rebuilding of London Bridge had a distinct and appreciable effect on the tidal flow, and that the result of the change has been the deepening, in some places, of the bed of the river, the undermining of Westminster and Blackfriars Bridges, and the final destruction and removal of those structures. The Thames is no longer the noble stream, of which the salmon fishery was granted by the Prince of the Apostles to the mitred Abbots of Westminster, but it is still a river of sufficient volume and velocity to take its own way, which is pretty much the wont of all rivers that are not very tenderly and very skillfully dealt with. The bridges of Rennie have long been the pride of the profession of the Civil engineer, not only for the architectural merit of their elevations, for the boldness of their spans, and for the convenience of their level or easy roadways, but also for the soundness of their foundations, and for the unshaken homogeneity of every part. A crack in a pier of Waterloo Bridge is not, therefore, an unimportant affair. It is a fact which would have caused the builder to shake his head. It can arise from but one cause, namely, an undermining, more or less dangerous, of the foundation. The evidence of such an action at the very edge of the now quay wall, is a circumstance that should call attention to the state of all river foundations,—in fact, of the entire bed of the stream. It is not beyond the bounds of possibility that the question may be raised as to throwing an invert under portions of the Thames.

We desire to speak with all the reserve that becomes public writing. We wish to raise no sensation, to excite no undue alarm. But we cannot refrain from calling attention to an indication, slight as it may be, that the Thames is following the wonted habit of great rivers, when their course is in any way interfered with. They are accustomed to help themselves to an equivalent for that which is taken from them. Narrow their channel, and they will themselves deepen their bed. Such is the very first postulate of hydraulic engineering. Since the ancient bridge that laden with houses, and upborne on piers that must have occupied more than a fourth of the waterway, kept back the flow of the tide from the shores of the Strand and of Lambeth, has been replaced by the present noble structure,

we know that Thames has deepened his bed. More water comes up with the flow, now that the incoming tide is no longer strangled by piers and starlings. More water has to sweep down with the ebb; and in deepening its channel the river has already caused the removal of two bridges. In presence of this known activity of the stream, we have greatly contracted its width, and given it a quay-wall along which the tide and current may rush with the least possible littoral friction. That the result would become apparent *somewhere*, on the bed of the river, any engineer might have foretold. What and where that result will be, is the question that it is now important to solve.

We are not speaking from hearsay or from gossip, but from actual observation. Two gentlemen long familiar with the locality, one an engineer and the other an architect, observed the black gaps in the courses of the pier, in which the ebbing tide left a slimy deposit only a day or two since. "Do you observe that mark?" said one. "I was just looking at it," said the other. "I never saw it before: did you?" "It seems quite new," was the reply. "It must have appeared since we passed under the bridge a month or two ago. It is impossible we could have overlooked it." "It must be a settlement," said the engineer. "It is only the other day that attention was called to the fact of the perfect freedom of Rennie's bridges from cracks or settlement. The apparent support given to the pier by the granite masonry of the quay-wall on either side, makes the movement that has taken place more conspicuous." The steamer went on with a rush, and turned out its passengers to change boats,—a proceeding which the steam-boat managers seem to have adopted in the direct interest of the railway and omnibus companies. It is not any very precise information that can be gleaned on such a transient glance; but the indication, however slight, is positive.

We cannot, therefore, hesitate to form the opinion that it has become a matter of importance to ascertain the nature of the change which has taken place, and is taking place, in the channel of the Thames, in consequence of the recent structural modifications of its course. It must be borne in mind that when the thousand and one piles, and props, and struts that make the site of Blackfriars Bridge look like an immense workshop, erected in and over the river, are removed (which we hope will be the case before the close of the present century), the self-adjusting action of the river is likely to be intensified. At very low tides, years ago, it was apparent that two or three channels towards the centre of the stream took the main scour. Where that scour now lies,—whether in the old channel or alongside of the quay-wall, it is essential to ascertain. Great depth of piling appears to have been employed for the foundation of the embankment wall itself, but then it must be remembered that the foundation of Waterloo Bridge has long been considered *à fabricis* of any possible action on the bed of the river. If a pier of this structure is now on the move, the whole system of our river foundations must require reconsideration.

Nor is the question confined to bridges and quay walls alone. St. Paul's is said to be built on the gravel, and its foundations are on a level considerably above that of the Thames. In all cases where a drain or outlet is cut lower, the filtration and drainage from a pervious bed, if such a stratum is passed through, has a tendency to produce surface movement. The finer particles are gradually washed away by the action of the deepened outlet; the coarser follow, and subsidence may eventually succeed. It may seem, for the moment, wild, to speak of a possible movement in the dome of St. Paul's Cathedral as a sequel to a trifling displacement in a pier of Waterloo Bridge. We rejoice to believe that such a probability is, to say the least, extremely remote. But we are speaking not of inference or of opinion, but of the action of known mechanical law. The burrowing power of water respects no architectural beauties. This action, in the case of the Thames, has taken place, is taking place, and ought to be prevented; but precaution must be taken in time.

There can be no doubt that the action of the river is, at the present moment, perfectly within the control of the engineer. But to be so controlled, it must be foreseen and provided for. If we allow one engineer to build a bridge, another to raise a wall, and another to plant the water-way with a forest of timber,—in short, if we allow each man to do what in itself may be

well advised, but what, as part of the *ensemble* may prove formidable, the Thames will give us trouble. It is only by an exhaustive method of dealing with all the requirements of this portion of our river system, that our results will be either satisfactory or permanent. On such considerations it will depend, whether the Thames shall prove the greatest ornament and advantage of that picturesque line of buildings, almost daily increasing in beauty, which stretches from the Cathedral Church of St. Paul to the Abbey Church of St. Peter; or whether, neglected and ill-treated, the angry river shall prove the most relentless foe to the architectural excellence of London. It will be an evil day for the metropolis if we provoke the vengeance of the Thames.

ART-NOTES IN MANCHESTER.

The New Exchange in Manchester has not yet risen above the ground; and the only indications of its progress at present consisting in the large deposits of brick walling which form the basement. The site of the other great building in contemplation, the Town Hall, is cleared of houses, and exhibits at present a waste of land varied with heaps of debris. A definite commencement, in the shape of laying a foundation-stone, will be made before long. Some of the first competitors who may not have seen the site would, perhaps, be surprised, could they see the narrow and mean-looking street (Princess-street) towards which they proposed to erect such splendid and ornate flank elevations. As the land is at present, the front towards Alhott-square will be the only one that will be properly seen from a sufficient distance to take in the general effect of the design. The two large buildings being in this initial state, we are free to turn our attention to what architectural developments we may find, on a smaller scale, scattered up and down the streets of Manchester.

These are not at present very numerous, nor on the whole of very much interest, though there are two or three which are worth a pane to look at. Of these the most important, and one of the largest, is the new warehouse in Portland-street, now in course of erection from the designs of Mr. Waterhouse. This is one of those large buildings, almost peculiar to Manchester, which the necessity for the storage of valuable goods in great quantities has called into existence. It is in a round-arched Gothic style, the doors and windows on the ground story forming a series of semicircular-headed openings, with flat soffits having a bold roll-moulding at the angle, stopping on a square impost supported by a shaft; the actual window-opening being formed by an inner recessed jamb, with a second roll-moulding continued down to the sill without any break. When the impost, now in the rough, are carved, this ground-story will present a very good effect of combined richness and sobriety, quite in keeping with the object of the building; though, owing to the fact that the crown and springing of the arches have been kept at the same height throughout, while the openings are of varying width, the narrower arches are necessarily silted to a degree not at all agreeable to the eye. Above this the majority of the openings are of that square-headed form, with angle-shafts on the chamfer-plane of the jamb, which Mr. Waterhouse is so fond of using, and which is indeed to be found in nearly all his latter designs. At each end of the front is a projecting angle bay, carried on a heavy stone corbel. Except at the back, the building is entirely faced with ashlar work of, apparently, a Yorkshire stone; a rusticated basement being formed of stone of a greyer tint; and internally the whole bearing of the floors will be on a system of cast-iron beams and columns; but what is to be the construction of the floors themselves does not yet appear. So far as the building has progressed (it is up to the level of third floor) it is a design very well adapted to its purpose; solid and durable, and not incongruously overlaid with ornament. Are the small panels over first-floor windows to be carved in the centre? At present they have a rather hard and bald appearance. A little way off, in the same street, is another still larger block of building, recently finished, of brick with stone dressings, which we shall perhaps not be wrong in ascribing to Mr. Salomons, partly because it resembles nothing else, and this gentleman seems to go in for a new style in every building he erects. There is an angle porch, internally circular on plan, flanked at the entrance by octagonal columns of

a most indescribable design, with very novel and not ineffective capitals, but too much bedizened with ornament about the base. The general design may be described as clever, but wanting in breadth of general effect and in refinement of detail,—too much cut up into little bits, and too full of conceits and oddities; in these qualities contrasting unfavourably with Mr. Waterhouse's simple and unobtrusive building just mentioned. The hands of incised stone ornament over first-floor windows are very pretty and effective, in that flat style which Mr. J. K. Colling has set the example of. Opposite this large building is a small "front," just finished, of detestable design, with stone piers between the windows of about the tenacity that would befit a design in cast-iron. Possibly they are strengthened by iron in the rear; if not, the stability of the structure is doubtful.

Opposite the Free Trade Hall is a large square block of Classically just completed, with a ground story of rusticated masonry, forming a series of circular-headed openings, which has a solid, sensible look enough, but would have been better with a deeper reveal, to give more look of weight and strength, considering the size of the superstructure. Above the first-floor string there is nothing to praise. There are three stories of windows of the most common and conventional Classic type, a string course of the same section (and a very weak and ineffective section) forming a continuous sill to each range of windows, though the design of these latter is different in each story. The neglect of the point and expression which may be given to a building by a judicious contrast in the size and profile of the string-courses speaks only too surely of the absence of true feeling for architectural design. If Messrs. Grey & Knowles, to whom persons wishing to rent these offices are referred, were the architects thereof, we cannot congratulate them. Close to this is another block, of brick with stone dressings, less pretensions and a little mere architectural in the treatment of the windows, but still very commonplace. As a curious contrast to these we may mention the large block of shops and offices just completed in John Dalton-street, for the perpetration of which, we believe, Messrs. Speckman & Charlesworth must be answerable. Many of the Manchester architects seem to know no medium between dry Classicity and the wildest vagaries of Gothic out-Gothicised. We are always glad to see attempts to do something with brick in an artistic manner; but it is quite another thing to see a building covered over with large panels in recessed and projecting brickwork; and, as in the second story of this building, a ragged mass of double-recessed brick arches over the windows, the outer arch segmental, the inner circular, all springing from a stone shaft of disproportionate lightness. The application of panelling to the main piers of brick, which run up nearly the whole height of the building between the groups of windows, is most unhappy, since it gives an appearance of lightness and weakness to the very part which is constructively most important, and which ought consequently to appear heaviest; but as one of these main piers comes right over the crown of the semi-circular-arched doorway, it may be as well that it has been made to look a little less crushing than it otherwise would have done.

There is also an angle doorway, with two shafts supporting immense chimney-looking corbels projecting towards each other at right angles, the under side of each forming a segment of a circle; while above they support an oblique lintel, forming the head of the entrance. The under side of each corbel is covered with a sort of pie-crust foliage, quite out of place in a situation where every line ought to indicate strength and bearing capability; in short, taken as a whole, this doorway is one of the worst architectural features we have seen for a long time. There is a small shop, however, erecting in Princess-street, for Messrs. Palmer & Howe, which within a small space is even more extravagant than the last-named building, and may be called Manchester Gothic run mad. The whole principle of architectural design is inverted here; there is a very heavy corbelled brick cornice at the top; then thin brick pilasters, carrying pointed arches run through two stories, and resting upon a mass of horizontal stonework at the level of the first floor, under which a sham stone corbel and short shaft, supporting nothing, lead the eye down to a thin spiral shaft, forming the outer edge of an iron standard, which shaft, so far as the design is concerned, carries

the whole superstructure of stone and brick. Of course, it is common enough to see a shop-front standing upon nothing apparently but plate-glass, and bad enough it is; but here the matter is made worse by the jugglery of the apparent corbel-shaft brought down upon the iron one, to cheat one into the belief that the support is in front and visible—a sort of prevarication, which is worse than the downright lie of the plate-glass. Of a very different class to the two last is the building in Cross-street, called Commercial Chambers, and which contains the new Stock Exchange. This is carried on solid piers from the ground; the ground-story pier being made, we suppose, as wide as the demands for shop-light will allow them to be, but not as wide as they ought to be to give the proper stability of appearance to the design. The building is in a round-arched style, the leading lines horizontal, and some details, as the archivolts mouldings of the windows, partaking of the Classic type, while the carving of the caps, and the proportion of shafts and caps to each other, are decidedly of Gothic character. On the whole, the elevation is a very successful specimen of general Classic form, or, we should prefer to say, horizontal form, with details of that boldness and depth of shadow which characterise the best Gothic work. The front is in two differently coloured stones, harmonizing very well now while they are new, but we should fear not sufficiently strong in contrast to retain their effect for long in smoky and rainy Manchester. One defect in the design is that the doorway is badly placed, not being centrally under any other feature; and a pier on the first floor comes just over the haunch of the arch, which, of course, is bad both constructively and artistically. But this is the only positive fault we should find with the building. Internally, there is a good and well-lighted staircase; and, as a whole, this building is a credit to its architect, whose name we did not learn.

To turn from one art to another, we must confess that the Manchester Picture Exhibition this year, though a large one numerically, is not in point of quality so good as might be; not so good certainly as one or two that we have chanced to see there before. There seems to be a pretty large proportion of paintings by local artists, some of no small merit, and two or three of the best pictures from the Royal Academy we noticed during a hasty survey. Following "the line" round the room, it would be difficult to conjecture upon what principle pictures have been selected for the post of honour, save on that of giving an equal representation to all schools and styles.

Before quitting our subject, we are tempted to ask, when do the good folk of Manchester mean to do anything to render their principal and busiest thoroughfares, Market-street, less architecturally uninteresting? Half the rebuilding seems to go on in back streets; and here in the main street of the city is all the ugliness of the most debased period of jerry building. There will be the New Exchange presently, certainly, but can no enterprising person start a better and more artistic class of buildings for shops in that locality? But let it be noted that when we say "artistic," we do not include under that term any of those fire-work designs in brick for which some Manchester architects have shown such a predilection; more particularly do we denounce these when they come out in parti-coloured brickwork, giving the idea of having been copied from Manchester coloured prints. Whenever any part of Market-street may be rebuilt, let those who do it choose a sober, well-considered, architectural style of treating the buildings, as they value their commercial prosperity; for a whole street built of shops, like the one we mentioned in Princess-street, would be enough to frighten away all "buyers" from the city of cotton and calicoes.

PORTSLADE-BY-SEA, BRIGHTON.—A deputation of the members of the late Brighton Mechanics' Institution, with their secretary, attended, by invitation of Mr. Henry Scrase, one of their former colleagues, at the recent opening of an assembly-room, which that gentleman has built at Portslade-by-Sea, for the purpose of holding meetings, lectures, concerts, readings, and for religious worship, as well as for the establishment of a reading-room and library for the inhabitants of that thriving suburb.

AT THE SOCIAL SCIENCE CONGRESS.

As president of the Health Section, Dr. Ramsey delivered, during the recent meeting in Birmingham, an able address. We print one portion of it touching

The Air of Towns.

Although much has been learnt from the study of death-rates, I have for some time past scrupled to quote them in support of sanitary dicta. With all respect for the Registrar-General, and for my learned and distinguished friend, Dr. Farr, I find these statistics full of fallacies, especially in crowded towns, where the figures give by far too favourable an estimate of that mortality which is strictly due to town life. I need hardly say that the death-roll does not reveal the actual loss of health among town masses, nor does it record the multitudes disabled by a host of diseases and casualties which may not at once destroy life, though they ravage the territory of labour and duty, and levy a heavy tribute upon produce and property. For this we need an official registration of sickness attended at the public cost. Professor Haughton has shown that, on very simple mathematical principles, the density of a population would be a factor determining the ascent of the curve of increase of an epidemic. This would apply to the case of the distribution of poison by a water company. "I believe," adds Dr. Morris, in his very remarkable essay on germinal matter, "that bad sanitary state of any kind would be equivalent to greater proximity." All other sanitary appliances and reforms being equally adopted or equally neglected, it is certain that close proximity of dwellings over an extensive area is *per se* a cause of unhealthiness and deterioration of race. It is not fair to compare a well-regulated town population, having, perhaps, only eight square yards for each person to live upon, with an ill-conditioned dirty population in the open country. For all this vitiation of air caused by town life there appear to be three natural remedies of different values in different cases,—motion of air, diffusion of gases by natural law, the presence or introduction of active oxygen. Now (1) the mere motion of air, if it be natural motion, *i. e.* wind, is occasional and variable, while the generation of morbid causes is constant, the remedy cannot be relied on, for the air is often stagnant in circumstances of the greatest danger. The motion of air in towns is impeded by the proximity and height of buildings probably as much as by insufficient openings in rooms. Nor do we know that, without the admixture of pure air, foul air can purify itself by simple motion. If the motion be artificial, it may be excessive or ill-timed, but of this again. 2. The diffusion of gases is necessarily limited by space, and mainly by superficial space; for their diffusion in a vertical direction, *i. e.*, into the upper regions of the atmosphere, we know little, and that little (depending partly on diminution of temperature according to height of aerial column, and partly on the relative specific gravity of gases) does not favour the hypothesis of an effectual change. Gaseous diffusion is also impeded by the very circumstances which impede aerial motion. And these circumstances are most potential in towns. 3. But the presence of active oxygen in sufficient quantity—and sufficiency here means abundance—were that possible in dense populations, would be the real remedy. Oxygen I take to be the burning and purifying principle of nature, represented by the elemental fire of the ancients. For flame is but luminous combustion. Professor Tyndall has shown by his curious candle-burning experiments in the Vale of Chamounix and on the summit of Mont Blanc, that the quickness and intensity of combustion, such as takes place in vigorous oxidation, is, in general, incompatible with that brightness of flame which depends on the presence of carbon or other inflammable matter. The purer the fire, the more invisible is the fire, yet the more effectual the burning. The proportion, chemically determined, of oxygen in air may not be much altered in towns, though it is sometimes found to be less; but recent discoveries tend to prove that its energy depends on the conversion of a portion of itself into another form, which, when obtained artificially, we call ozone. Since the most delicate tests fail to detect anything like ozone in the air of our crowded towns, we infer that in these places our great benefactor is "used up;" and that without his presence and aid, oxygen itself fails to purify. Practically, then, the most essential measure of sanitary legislation and ad-

ministration would be, not merely to purify as far as possible the air of towns, but also to provide better air than towns supply to the people. These objects may be accomplished by three methods:—(1) speedily removing all the débris of animal life, and everything which by decomposition can corrupt the air; (2) promoting the free circulation of air into every quarter, through every court and alley, into every house, every room, in the inhabited area,—in a word, ventilation; (3) enabling every person to breathe a sufficient quantity of good air, i.e. air having the properties of ozone. Our sanitary laws, if properly carried into effect, which they are not at present, may exceed the first object. The second is a very vexed question. What is sufficient ventilation; and how is it to be obtained? The verdict in each case must depend on circumstances which in different cases are most diverse and complicated; for, on the particular temperature of the climate, the season, the house, the workshop, the chamber, depends the demand for the more or less rapid circulation of air. In winter, or at night (exhalations being more readily condensed in cold air), several persons might remain not seriously injured in a room, the atmosphere of which would be dangerously vitiated by one person in a hot summer, or within the tropics, when and where the exhaled organic matter is volatilized and thus prepared for quick re-admission into the living body. The question of temperature is so intimately connected with that of air-circulation, that a long and complete series of scientific observations, in a great variety of places, would seem to be necessary to frame even elementary formulæ of ventilation. If old-fashioned people are more anxious to warm their houses and rooms than to secure purity of air, advanced sanitarians are, perhaps, sometimes too eager to ventilate without sufficient attention to warmth. Both extremes may be avoided. An authorised allowance of cubic space might be insufficient for healthy existence without the introduction of currents of air so swift as to injure the weaker inmates of the house. Women, children, and the sick especially, would then be the chief sufferers. But, in crowded cities, the free circulation of pure air is simply impossible. The air outside the house—i.e. the air to be admitted for ventilation—is often, as we have seen, only a few degrees less vitiated than the air to be expelled. The air which sustains the life of 200 or 300 persons on every acre of a large district (including, for instance, more than a square mile), can never act properly upon effete organic matters; while invading currents of air from the open suburbs very rapidly lose their power to oxidise. Existing legal provisions against overcrowding in single houses and rooms—good as they are, and better as they might be—only touch the surface of this tremendous question.

Masters and Men.

Mr. A. J. Mundella read a paper, in which he traced the history of labour in this country to the period when masters and workmen were free to combine for their own benefit, and wages became a matter of bargain and sale between them. He then referred to trades' unions, which, he said, numbered no less than 700,000 members, who, with their families, represented about 3,500,000 of the industrial classes. The objects of these unions was to adjust the rates of wages, to aid members when out of work or in sickness, and to help in burying the dead, and they must exercise great influence upon society for good or for evil. The question now was, were they a blessing or a curse? He thought that, notwithstanding many faults, they had proved beneficial both to the working classes and the nation. There could not be the slightest doubt that the condition of the mechanics, who formed the staple of the members of the unions, was infinitely better than that of agricultural labourers. It was not to legislation, but to the good sense and good feeling of employers and workmen, that they must look for an effectual remedy for strikes. He had no faith in any arbitration, by persons who were unacquainted with and not interested in the trade in which the dispute arose. Arbitration, to be effectual, must be the result of a system of open and friendly bargain between masters and men meeting together, and talking over their common affairs in an amicable manner. Mr. Mundella gave an interesting sketch of the Board of Arbitration and Conciliation of the hosiery and glove trade at Nottingham, which consisted of an equal number of manufacturers and operatives, and, with its branches, governed 140,000

persons. He showed that the board had always been successful in settling disputes and preventing strikes, and said that the result of his experience, as president for eight years, was the conviction that nothing could be more conducive to the benefit of any trade, or to the growth of a kindly feeling between all engaged in it, as the existence of such a representative and legislative body.

Mr. W. Gilliver, on behalf of the Birmingham tradea council, composed entirely of working men, read a paper on the same subject. He said there was often a difficulty in getting employers to discuss, with the representatives of a union, a trade dispute in a friendly way, and he suggested the appointment of a board or council of conciliation, composed of an equal number of members of the chamber of commerce and the trades' council in a town.

Mr. Kettle gave an account of the court of arbitration at Wolverhampton, which had succeeded in putting a stop to disputes and strikes in the building trades in that town, and the principles of which had been adopted by the same trades in Manchester and Salford. The difference between the Nottingham board and this court was that the awards of the latter could be legally enforced, the workmen agreeing to work upon the terms adopted. It was a matter for discussion whether that plan was the best, or whether the Court of Arbitration should rely solely upon the influence of public feeling for the carrying out of its judgments.

Mr. Samuel Morley, as a manufacturer, gave his entire adherence to the Nottingham system, which he said had been a great success, and presented a solution of one of the most important questions of the day. That system was entirely a voluntary one, and he thought that if the law or force of any kind were introduced, it would collapse. He admitted the perfect right of working men to combine for the purpose of getting the highest price for their labour, but he denied their right to coerce their fellow-labourers, and trusted the Legislature would take most determined measures to punish such tyranny.

Mr. Alfred Hill, chairman of the Birmingham Chamber of Commerce, said that in the case of the Birmingham stonemasons an attempt last summer at conciliation had failed. The men objected to piecework, to the subletting of contracts, to wrought stone being brought into the quarry (they wanted the stone to be brought in a rough state from the quarry), and to arbitration. A committee, composed of three members of the Chamber of Commerce, three members of the trades' council, three operative masons, and three master builders, was appointed to settle the dispute; but after meeting three or four times they separated without coming to an agreement.

Mr. Jesse Collings read a paper

On "The State of Education in Birmingham."

He said the Birmingham Education Society—originated by Mr. George Dixon, M.P., in March, 1867,—had ascertained the educational condition of the manual labour and the poorer classes in Birmingham with an exactitude which had never been equalled in any other town in England. House-to-house visits were made in 754 streets out of the 1,027 in the town. The remaining 273 streets were of a class that did not require visiting. The total number of children visited was 52,573. Of these 7,517 were under three years of age. Of the remaining 45,056, those who had been at school at some period of their lives numbered 32,997, and 12,059 had never been to school. This was stating the case in the most favourable light possible, because the number of children which had been at school included those which had attended for any space of time, however short, and to any school, including dame schools. The average time of each child at school was consequently very short, and altogether useless for the purpose of education, being for boys a year and three-quarters, and for girls two years and a quarter each. The actual number of children at school at the time of the inquiry was,—boys, 8,587; girls, 8,436; total, 17,023; or a little less than two-fifths of the whole number of children over three years of age. The educational state of the 45,056 children was as follows—13,380 could read and write; 5,482 could read only, leaving 26,194, or more than one-half, who could neither read nor write. This was stating the case far too favourably; because a large number of those who were said to be able to read and write did so in such an imperfect manner that the

acquisition would be of little or no practical value to them in after life. Many children between the ages of nine and fifteen, who were stated to be able to read and write well, were found on examination hardly able to write an easy paragraph in legible hand, or to read the same without spelling several words. Of the children actually at school, by far the larger portion were very young. Of the whole number, 10,890 were between the ages of three and nine, while only 6,128 were between the ages of nine and fifteen. There were 1,136 between three and four. The largest number (2,220) were between seven and eight, after which age they gradually fell off, till between eleven and twelve there were only 1,148, and between twelve and thirteen only 715. These tables showed at what a very early age the children left school. It would be a mistake to suppose that the children not at school were at work, because as a matter of fact only 6,337 were at work, thus showing to a certainty that 21,696 children out of 45,056, between the ages of three and fifteen, were neither at school nor at work. Of the 6,337 children who were at work, 2,044, or not 35 per cent., could read and write, while 926, or about 16 per cent., had never been inside a school. These tables indicated so clearly a lamentably low state of education among the grown-up persons of the working classes, that the committee resolved to test, by individual examination, the state of education of the young persons between thirteen and twenty-one, employed in the various factories in the town. The test used was the Fourth Standard of the Committee of Council on Education, which consists of reading an easy paragraph, writing the same, and doing the simplest sum in arithmetic, in which money was used. This standard was so low that its attainment was scarcely worthy the name of instruction; yet only 41 out of 908 young persons, or about 4½ per cent., could pass. Many of these young persons had been to school a considerable time; nearly half of them for a period of more than three years. The total amount of school accommodation in Birmingham (excluding private schools and the Free Grammar School) was for 29,275 children. The average attendance was 18,531, leaving vacancies for 10,742. The whole accommodation, even if properly distributed, would leave 15,781 children unprovided for. But it was very unequally distributed, varying from one in seven of the population in St. Mary's Ward to one in twenty-eight in St. Paul's. Duddleston, for example, containing about 48,000 inhabitants, had only school accommodation for about one in seventeen of the population. There were in Birmingham sixty-three schools under Government inspection and receiving Government grants, with an average attendance of 15,276 children. The children's school fees amounted at these schools to 7,035l. 15s.; subscriptiona came to 2,868l., and the Government grants amounted to 6,144l. 12s.; total, 16,048l. 17s. There were twenty-seven schools not receiving Government grants. The children's fees in these cases amounted to 743l. 2s.; subscriptions at least, 632l.; total, 1,375l. 2s. The number of children on the books of night schools in November last was 2,679; but the average attendance was only 1,640. Fees in night schools, 307l. 17s.; subscriptions, 90l. 12s.; Government grants, 210l. 17s.; total, 608l. 10s. Total from all sources spent on the schools in Birmingham, 18,033l. The Free Grammar School had very little influence in the education of the poorer classes in Birmingham. The New-street school had been used principally by the children of the middle and upper classes, and even the elementary schools belonging to the charity had been for the most part filled with the children of small tradesmen, foremen, and the better class of artisans. Those who had most need, the poor children, who could not, through poverty, be sent to school, had not any share in that wealthy institution, the Free Grammar School. A study of the evidence given before the Royal Commissioners led to the conclusion that education in Birmingham would have been as good if the Grammar School had never existed. Mr. J. S. Wright said, in his evidence, that "the effect of this school has been to destroy nearly all the private schools in Birmingham. My own feeling is that if there had been no charity of this kind the people of Birmingham would not have been worse educated." The head-master himself said:—"The system of admission by nomination, and that of gratuitous education, have been most injurious to the cause of education in the town.

I believe that together they have acted as a positive blight upon the preliminary education of the children of nearly 300,000 people." Nearly all the children in the school belonged to parents who were able and would be willing, in the absence of the Free Grammar School, to pay for the education of their children; and these parents, waiting year after year for a nomination to the Free School, too often neglected the education of their children. Mr. Collings considered that there was little hope of education advancing satisfactorily under the present system. He advocated an insectarian system, with compulsory attendance, and under local management and Government inspection.

Dwellings of the Labouring Poor in Birmingham.

The Rev. Micaiah Hill read a paper on this subject. He said they were better than in most other large towns and cities. There were no inhabited cellars. Nevertheless, excluding three or four principal streets, there was not one without courts on the right and left, where pure air could not possibly circulate; and in summer the inhabitants were seen coming to the main street to catch a breath of air. The practice of taking in lodgers led to overcrowding; the rooms were very small, and the habits, prejudices, and ignorance of the inhabitants rendered ventilation impossible. The uncleanness of the poor was due rather to poverty than indifference. Scrubbing, brushes, towels, and soap were luxuries which the poor could not always afford. The fact that sitting, sleeping, cooking, washing, drying, and nursing had all to be done in one room accounted for much untidiness and much mismanagement and unthrift at home, and for habits of intemperance on the part of the husband, soon followed by the withdrawal of the children from school. Should the husband be taken ill, his wages ceased with his labour. Furniture, clothing, even bedding, then went to the pawnshop. Murmuring, strife, and violence followed. The house agent or rent collector then came with the bailiff to take anything that remained, and the wretched family, stripped of everything, might soon afterwards be traced to a low part of the town, occupying a dilapidated house, without an article of furniture—husband, wife, and children huddled together in a little straw on the floor. Refinement, sensibility, modesty, could not be expected to flourish in that atmosphere. The wife, perhaps, sank into an untimely grave, and was succeeded by an unmarried person. The children were driven from home by cruelty to lead a life, the chief events of which might be learned at the workhouse, the police court, and the gaol. He would be a sanitary enthusiast who should affirm that good drainage and ventilation, and interior structural arrangements, could have prevented these evils. He would be an educational fanatic who should maintain that compulsory education would render such a career impossible. He would be a religious bigot who could maintain that tracts and Bibles, Bible women, missionaries, and Scripture readers would have proved an antidote to the sanitary, social, and moral disadvantages to which the family were exposed. To no one of many causes could the downward career be traced of those who gravitated towards the lowest sub-stratum of society; and yet he knew little of human nature, and less of the temptations of the working man, who could hesitate to attribute the physical distress, social degradation, and moral ruin of multitudes in a great city to a combination of the influences described. The progress of improvement in the town was letting in light and air to quarters which had been the hotbeds of disease and crime; but the classes were not improved—they were merely displaced, to crowd localities which had hitherto enjoyed a more healthy reputation. To receive these persons long ranges and blocks of building had been put up, in the south-west, on the very boundary of the borough, between two great thoroughfares, dotted all along with villas and commodious shops and dwelling-houses. Drainage, water supply, and other sanitary wants, were unprovided for. Not less than 1,000 houses were erected within the borough of Birmingham annually—not a few for immediate sale—and the health and morals of the public were not items which entered into the calculation of profits. Houses let for immoral purposes constituted a better pecuniary speculation than any other, except public-houses. Hence, the man who consults public health and morals must sacrifice personal gain, and where personal gain was the sole motive, accommodation should be provided for drunkenness and

prostitution. The labouring poor were utterly helpless to avoid localities where fever was chronic, and poverty and squalor indigenous, and where immorality saturated the social atmosphere. Even superior workmen could not always avoid these localities. Not able to build their own houses, they took them as provided by men who thought only of their own interests, and spent more upon an attractive exterior than upon substantial means of comfort. Houses were crowded together in blocks that defied light and ventilation; and almost every new street continued for months, sometimes for years, unpaired and undrained. Greater earnestness on the part of the authorities to interfere with what were assumed to be the rights of property, and more extended powers to insist on the observance of the approved principles of construction and of sanitary arrangements, would go far towards correcting some of the evils affecting Birmingham in common with all great seats of industry. There was a district on the confines of this borough where the water was intolerably bad, where fever had been domiciled, and where the inhabitants were idle, squalid, and intemperate. Three consecutive rainy days reduced them to the greatest straits, and three weeks of snow to the pawnshop, the workhouse, and the cemetery.

The Industrial Progress of the Black Country

was treated of by Mr. J. C. Tildesley. Having traced the history of mining in South Staffordshire from remote times until the invention of the steam-engine by James Watt, Mr. Tildesley proceeded:—At the dawn of the present century the number of collieries in the district was 160, and the average yield of coal 500,000 tons per annum. In 1815 the collieries had increased to 200, and the annual yield to 800,000 tons. At present there are 540 collieries, yielding annually 10,206,000 tons, and employing 26,620 persons. This enormous supply is, however, in proportion to the number of collieries, lower than that of other English coalfields, owing partly to the intermixture of ironstone in the coal-beds of South Staffordshire, worked by the same shafts, and partly to the great number of small collieries, locally known as "Jackey Pits," worked on the old-fashioned whimsical principle. It is estimated by Mr. Hill that the ungotton coal in this district exceeds 950,000,000 tons, which, at the present state of working, will require 200 years to consume. The iron trade of South Staffordshire, from its commencement in the reign of Edward VI., when blast furnaces were invented through its successive changes under the enterprise of Lord Dudley, Abraham Darby, Cort, and Foley, was next reviewed. In the year 1796 there were only 14 blast furnaces in the district. In 1806 the number had increased to 42, and in 1829 to 123. There are now 167 furnaces, of which only 80 are in operation. The present production of pig-iron in this district is 10,000 tons weekly, of which about one-half is made from native ores. It is, however, in the production of finished iron that South Staffordshire excels. There are in the district 102 forges, containing 2,100 puddling furnaces, and producing annually 855,000 tons of finished iron. It is estimated that the Black Country contributes half the entire production of finished iron in Great Britain. The district has, however, recently lost ground in the race of competition, the modern and improved scientific arrangement of the works in the Cleveland district and in Belgium having placed the South Staffordshire ironmasters, with their old-fashioned works and appliances, at some disadvantage. South Staffordshire will do well to confine its energies more to the quality than to the quantity or cheapness of its finished iron. There are in the aggregate 20,000 persons employed in the iron trade of the Black Country, the number being more than doubled since A. D. 1800; but there has been no increase during the past ten years. In the hardware produce of the district is exemplified to a remarkable degree the principle of the "location of trade." Every town and village has its own particular department of smallware, with which its neighbouring town, though baply divided only by a scoria mound and a couple of "swags," does not presume to interfere. In Elizabeth's time the district could boast craftsmen of considerable skill,—worthy descendants of Tubal Cain, "the inspired artificer in brass and iron." Some of the earlier crafts are now obsolete. Sword-hills and chains, curiously carved, which would have done credit to Andrew Ferrara, were made two centuries ago at Wolverhampton. Silver buckles were made at Walsall until the

invasion of "Wellingtons and Blachors" revolutionized the livery of the country squires. Other branches, like the pottery trade of Wednesbury, have been transferred to other districts. The production of locks and keys at Wolverhampton and Willenhall has increased fourfold since the commencement of the century. The present weekly production of these articles exceeds 400,000, and the number of workpeople is 5,000. Chain-cable and anchor making around Dudley commenced in the year 1824. Over 60,000 tons of chains and 5,000 tons of anchors are annually produced by 4,500 workpeople. Saddlery and harness making has been the staple craft of Walsall from time immemorial. The rate of production has doubled since 1849. The aggregate number of workpeople, of whom a large proportion are females, is 4,200. Japanned and tin ware making in Wolverhampton and Bilston employs 2,000 workpeople, the number having increased by one-third during the last twenty years. Wrought nail making in East Worcestershire is, owing to the introduction of machines-madonnals, doomed and decaying industry. In 1830 the craft employed not less than 50,000 workpeople. Now there are only 20,000, and the number is fast decreasing. Glass-making is an important branch of local industry. There are three large plate-glass factories—two at Smethwick, and one at Stourbridge. The reduction of the duty in 1845 increased the production of glass-plate in England from 7,000 ft. to 140,000 ft. per week, a progress in which the Black Country has largely participated. The annual production of plate, sheet, and crown glass in this district is 17,000 tons, and the number of workpeople employed 2,500. There are also thirteen works in the neighbourhood of Stourbridge for the manufacture of flint and bottle-glass, employing 1,500 workpeople. The production of iron-foundry, boiler-plates, edge-tools, galvanised iron, tubes, railway and engineering work has increased during the last twenty years at rates varying from 50 to 70 per cent. The total number of workpeople engaged in the fabrication of hardware in the Black Country is estimated at 80,000, being an increase of 30,000 since the Great Exhibition of 1851. Foreign competition is severe. America excels by an extensive application of machinery; Germany, by the cheapness of labour. In facilities of production the Black Country is making little progress. The recent encroachment about "Technical education" was, so far as the art-workmen of this district were concerned, a false alarm. In the more intricate departments of hardware the Black Country workpeople are able, for ingenuity and chasteness of design and execution, to hold their own against all comers. It is only when a profusion of gaud and glitter is required for the palaces of imperialism that they can be at all outvied by French and German workmen. Our local artisans chiefly require their efforts to be supplemented by mechanical appliances, to reduce the mere drudgery of their toil, and leave them free to exert their ingenuity in the higher and more inventive branches of handicraft. Mr. Tildesley, after referring to the improved social condition of the workpeople, concluded his paper by severely condemning the injustice of the Factory Acts in their present partial application to this district.

NEW PAINTED WINDOW IN THE PARLIAMENT HOUSE, EDINBURGH.

The only part of the old Parliament House in Edinburgh which escaped the destructive fire of 1824, which consumed the square in which the building was situated, as well as great part of the High-street, consists of a hall 122 ft. in length by 40 ft. in breadth. This apartment is used as an ambulatory in connexion with the Courts of Law, and is one of the objects of attraction in the northern metropolis. It is spanned by a heavy oak roof, having large gill pendants, and is lighted on the west side and south end by elliptical arched windows fitted with perpendicular tracery. Statues and busts of eminent judges and lawyers are ranged around the floor, which is of inlaid oak, and the walls are adorned with portraits.

The exterior of this edifice, which was erected in 1632, was a picturesque and richly-decorated example of Late Scottish architecture; but after the fire it was replaced by a classic façade entirely out of keeping with the interior as well as with the exterior surroundings.

The great south window, which is of five lights, was filled with a representation of Justice, surrounded by masses of murky clouds, and was, as a work of art, thoroughly contemptible. This glass has been replaced by an expensive specimen of the art of glass-painting from the celebrated manufactory at Munich, designed by Herr von Kaulbach, to whom drawings were furnished from the office of her Majesty's Works.

The upper part of the window is sub-divided in the usual perpendicular manner, and is filled with armorial bearings, upon an enamelled groundwork of foliage, and the under part of each light has a square panel similarly treated. The great central part between these is occupied by a large painting, which stretches from side to side, without regard to the four mullions which intersect it, although the design has been adjusted, so that they interfere as little as possible with the composition.

The subject represented is the inauguration of the College of Justice, by James V., in 1532. In the centre of the picture the young king is seated on his throne, and in galleries to the right and left are the ladies of the court, while in front of the throne are grouped ecclesiastics, nobles, and judges in their robes of state. The moment chosen for representation is that when the president of the court has received from his sovereign the royal sign manual, and the archbishop is in the act of giving his benediction, while the spectators look on with intense interest. The whole picture has somewhat of a melodramatic effect, the action of the archbishop being particularly so, but, as a picture, the grouping is artistic and the drawing excellent. As a stained-glass window, however, it is not to our liking; the treatment is not architectonic, and it has none of the brilliancy and sparkle found in the best examples of the art. But even as a picture, it has the defect of having no middle tints. The figures in the galleries are about one-fourth the size of those in the foreground, and yet have the appearance of being close beside them. Indeed, we doubt if it is possible to overcome this defect in pictures of the kind, and it is one of the chief objections to this manner of treating subjects in glass. Much enamelling has been used in order to tone down the accessories, so as they may be subordinate to the main incident, but there are rich masses of colour in the robes of the principal figures. It appears to us that the result aimed at would have been more successfully attained in a mural painting. It is, however, the finest thing of the kind in this country that has come under our notice. Herr von Kaulbach has only used the drawings sent him as suggestions, and the whole design bears the impress of having been the work of a foreign artist. The window was fitted up under the superintendence of Mr. Charles Heath Wilson, of Glasgow, whose connexion with the windows in the cathedral in that city is well known to our readers; and that gentleman made the arrangements with the authorities at Munich for carrying out the design.

The cost has somewhat exceeded 2,000*l.*, which sum has been voted by Parliament on account of this service.

NEWS FROM ABROAD.

Berlin.—Those of our readers who have visited Berlin will remember the Brandenburg Gate. Its general character, the style, and the situation (at the end of the Linden and leading to the Park), all helped, in all probability, to remind him of the Arc de Triomphe at Paris, whilst the Quadriga on the top is further associated with that city as having been carried thither by its Napoleon, but brought back and restored to its original position after the peace. To this gate colonnades are now being added, flanking it on either side. The designs are by Professor Strack, and the works will be finished before the winter. Forty-four designs have been received for the cathedral to be built here, and these will be publicly exhibited as soon as the Annual Autumn Exhibition of the Royal Prussian Academy is closed. The plans include several from English and French architects (two from Toulouse), and seventeen from Berlin.

The New Polytechnic School at Munich, for the building of which one million florins, about 55,000*l.*, were voted by the Bavarian Parliament some years ago, was to be formally opened on the

15th instant. It stands opposite to the well-known Pinskiötheke.

In Vienna, as in London, the reform of the Patent Laws is being agitated. Whilst some are, of course, for the preservation of the existing laws, others are for mere registration; a third party is for the American and Prussian system (examination of patent claimed by a committee or council); whilst a fourth party would see the entire system abolished.

Cavaliere Canzio, professor of the fine arts at Florence, died in that city on the 3rd September last, at the age of 84. His best known work of art is the statue of Columbus on the Piazza dell' Acquaverde, at Genoa. "Villa Vermont," the house in which the Grand Duke Nicholas died at Nice, was bought by the Emperor of Russia immediately after his death, and was cleared away for the purpose of erecting a chapel upon the site. The chapel is in the Byzantine style, of polygonal shape in plan, and about 90 ft. high. A handsome portico of Carrara marble, surmounted by a fine mosaic from Rome, representing St. Nicholas, leads to the interior, which is lighted by ten round-arch windows, filled in with red glass and yellow rings. The walls are built of dark red stone, with banks of a paler tint, whilst the interior is lined with white marble. The centre of that part of the chapel to which the congregation are admitted, is occupied by a black marble slab, about 8 in. high, of the exact size, and on the exact site, of the bed on which the Grand Duke died. The rest of the floor is laid in mosaics, of various coloured marbles, and the walls around are further decorated with niches, containing twenty-four pictures of saints, with the background always in gold. The pomegranate trees which surrounded the house, have been removed, and turf and evergreen shrubs help to set off this very handsome little chapel. More frescoes have again been discovered at Pompeii. Two of these are remarkable as being the first discovered which were evidently intended as portraits. They are those of a man in the senatorial toga, and of a woman holding a pencil in one hand and tablets in the other.

THE FAIRFORD WINDOWS.

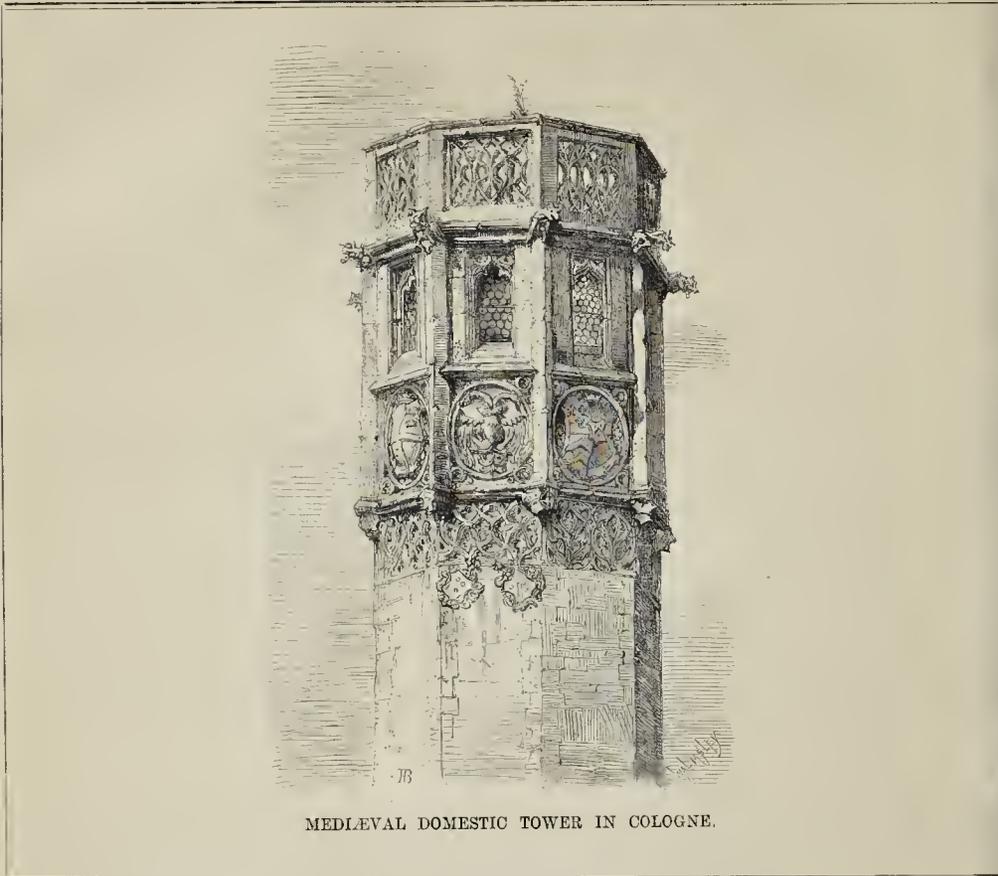
HAVING recently visited Fairford Church, and put the windows to the test of an immediate comparison with the known works of Albert Dürer, I beg to submit to your readers the result; for it is only by such a test that the debated question can be decided. On entering the church and giving the subjects a superficial glance, I must confess to my disappointment on not detecting a single trace of the special style of Albert Dürer as known to us by his numerous engravings. I should have rejoiced to have been able to acknowledge that we had such a glorious treasure in England; but I had brought with me a number of the wood-engravings known as the "small Passion," works executed in the purest manner of the master, and I proceeded to compare them one with another. If I had had even a lingering doubt before, it would now have been dissipated. Over and over again did I make the comparison, with this inevitable conclusion, that if one was by Albert Dürer the other was not. But as general terms do not carry weight, I will proceed to analyse and compare the two, and will begin with the east window.

Now, had we only this remaining, it would have been impossible for any one, however hindered by his enthusiasm, to have ascribed it to that great man's hand. First, the subject of Christ entering into Jerusalem. The engraving shows as a simple, but beautiful, composition: the figure of Christ, in ample drapery, finely arranged, the hair falling in ringlets over the shoulders,—a very constant habit with the master,—the ass upon which he is riding well drawn after nature, and the whole composition free from ancient conventions. In the window the subject is treated according to early conventions: the figure is draped in a very simple manner, almost to poverty; the hair is lank and ungraceful, and the ass a very ill-drawn, wooden representation. "The Agony in the Garden" in the engraving is one of the most beautiful and touching of Albert Dürer's designs; indeed, I do not know of any master who has thrown more feeling into this subject. The window is utterly unlike it in character and treatment, and still more unlike the larger engraving on this subject. I pass by the other subjects of this window, as not calling for particular

notice, to "The Crucifixion." Here the first thing to be noticed is the very bad and wooden drawing of the horses, utterly irreconcilable with anything of Albert Dürer, and the composition, from beginning to end, has not a single trace of the master's style. Carrying on my comparison, I take the subject of "The Annunciation," and will point out the figure of the angel as being especially unlike what we know of Albert Dürer: and here let me observe, this is a strong point, for figures of angels abound in his works, all having a general agreement in style, but totally differing in every respect from that in the window. I point out also "The Harrowing of Hell," "The Incredulity of St. Thomas," "Christ in the Garden," "The Adoration of the Shepherds," "Pilate washing his Hands," "The Supper at Emmaus," "The Last Supper," "The Resurrection," "The Entombment," and "The Pentecost," with other examples, to the number of twenty, of the small Passion, in which not a single trace whatever in style, composition, or costume agrees with the same subjects in the windows. On the other hand, these quite agree in all these particulars with the larger work of A. Dürer on the same subject. One of the most important facts, however, which ought at once to settle the question in dispute is the drawing of the nude. I take the whole of the figures, without any exception, which display anything of the made, beginning with the large figure of Christ in the "Doom," and will also add the extremities, particularly the feet, in all the subjects from beginning to end. The figures are ill drawn, the anatomy imperfectly understood, especially the articulation of the joints; and the feet are large, ugly, the toes without form, and weak. This, of itself, would dispose of the question of these windows being executed from Albert Dürer's drawings; for these very points are characteristics of another school; and it would be an insult to the great master's memory to attribute to him works which contain these imperfections. The large figures of apostles and prophets which fill the windows of the two aisles, fine figures as they are, may also be criticised for weaknesses in drawing of the hands, though in general we have here the best work. But it is remarkable that four of these figures, side by side, are studied closely from the same model. I should lay no stress upon this point alone, but Albert Dürer is remarkable for his luxuriant variety, and I believe his judgment, as a great artist, would have taught him to avoid this monotony.

There is a fine and interesting set of figures in the north chancel, interesting, especially, on account of the rarity of the subject, viz., "The Persecutors of the Church." I challenge any one to produce a parallel from the works of Albert Dürer which assimilates to any one of them. They mark a distinct school, which school is manifest throughout the whole series of subjects. I now draw attention to the architectural details, especially to the canopies of the large figures. Here we should certainly expect to see a decidedly German type in works attributed to Albert Dürer; the more especially as he indulges in a very free use of the florid crocket-work that marks the school, whenever he deals with Pointed architecture. Now, there is nothing whatever of this, but the style is altogether that which marks the Flemish school, and it is to that school, so unmistakably indicated in the general character of the work, that these windows belong. In the details of costume, the angular drapery, the faulty drawing of the nude, and the observance of ecclesiastical traditions, we recognise the early Flemish school, and had these works been assigned to any follower of the school of Van Eyck, the disproof would be exceedingly difficult.

Some, who have written upon this subject, appear to be entirely ignorant of that traditional mode of representation which was a law in ecclesiastical art. Hence they have ascribed to an individual the treatment of a subject that not only did not belong to him, but not even to his school, but which was generally obeyed by all the artists of the Middle Ages. The great artists of the sixteenth century broke from the trammels, in a more or less degree, and Albert Dürer among them. He rarely uses the *nimbus* in his compositions, and disregards, whenever it suits him, all conventional treatment. His luxuriant fancy made him impatient of restraint; hence he is the most picturesque of designers. He never repeats himself, but his style is so strongly defined, that there ought not to be a moment's question as to whether the Fairford windows should be or not attributed to his hand. These



MEDIÆVAL DOMESTIC TOWER IN COLOGNE.

who will have it so, do it at their peril. They must credit Albert Dürer with imperfections which his known works never exhibit. Among the many details that have been appealed to to prove these works to be by A. Dürer are the scroll inscriptions and a monogram. As regards the first, we are told they exactly coincide with the alphabet called A. Dürer's. I plead to an ignorance of this special alphabet; but having had thirty years' experience of Mediæval alphabets, and possessing a collection of inscriptions from the thirteenth to the seventeenth century, I failed to see any speciality whatever beyond that perfectly familiar to me. As regards the last, I admit it was a very great discovery. It was not, indeed, our familiar friend A. D., but A. T. Nevertheless, with wondrous learning and research, we are told that Dürer was Thürer, and that he might spell his name with a T, just as the respected Weller, sen., spelt his name indifferently with a *vee*. How can we withstand such learning and research? Surely this ought to clench the whole affair, and loud praises of triumph ought to have been awarded the discoverer, only he had been beforehand with us, and sounded them himself. One trifling fact, however, is wanting, not perhaps important, but some people will cavil,—viz., that there is no A. T., but simple, modest, unpretending letter A. This letter is on the sword-hilt of the executioner of St. John the Baptist, close against the hilt. It is, therefore, more likely to be a final than an initial letter; and as the colour is gone beneath it (a defect seen in many of these windows), it is probably only a part of some inscription. Of all places, it is the most unlikely one for an artist's monogram to be placed; for swords are often inscribed, and this may be merely the final letter of an appropriate legend, such as "IRA," or "LUXURIA," most likely the latter, in allusion to the immediate cause of the death of

the saint. But whatever this may be, the only true signature of an artist's work is in itself. To appeal to petty details to decide the artist's hand when such abundant materials exist, savours somewhat of impotence. And as to the traditions, one and all, let them be dismissed to the land of dreams whence they came, and to which they appropriately belong. In conclusion, I must state that, although the Fairford windows are not quite up to the standard of Albert Dürer's genius, they are, nevertheless, fine works of art, and their completeness is such as should make it a matter of national importance to insure their due preservation.

J. G. WALLER.

DOMESTIC TOWER, COLOGNE.

IN the Middle Ages, Cologne was celebrated for the number and beauty of its towers. So striking was the effect of this city that the Pope, Æneas Silvius, is said to have declared it to be the most striking in Christendom. And notwithstanding the destruction of more than fifty of its churches at the revolution, and modern "improvements," few cities have a more picturesque "sky-line." It is probable that originally most of the larger and more important houses (as well as the churches and public buildings) of this city were furnished with one or more towers. Eight or ten of these towers still exist in various parts of the town. They are all of a similar character, and consist of a lofty octagonal shaft, perfectly plain from the base to the height of the roof of the house, and crowned with a very elaborate top story and open parapet. The best examples are near St. Mauritius Church (of which we give a sketch), in the Neü Strasse, Neü Markt, and Jesuiten Gasse.

FROM MELBOURNE.

A STAINED-GLASS window has been ordered by the Rev. Mr. Parle for the chancel of St. Patrick's (R.C.) Church, Belfast, from Messrs. Ferguson, Urie, & Lyon, of Melbourne. The design for the four lower or principal openings consists of the Nativity, Baptism, Death, and Resurrection of our Saviour. In the large circular opening in the upper portion of the tracery the Ascension is the subject; and in the intermediate openings other scenes in the life of our Saviour are represented. The upper portion is complete, but temporary windows of plain cathedral glass will be inserted in the lower portions. The cost of the window when completed will be 250*l*.

Collingwood.—The new Foresters' Hall in Smith-street, Collingwood, has been opened with a *conversazione*, attended by about 200 of the members of the order and their friends. The ground cost 602*l*. 10*s*., and the building 2,500*l*. The whole work has been done at the cost of the Court Perseverance 2,727, a sum of 1,000*l*, having been appropriated from the court funds, and the remainder of the amount was borrowed on mortgage. Two shops form the front part of the premises. The architect of the building was Mr. F. H. Thomas, and the contractor Mr. Edward Galbraith. The gas-fittings were by Mr. Stieh, with whose patent reflectors the hall is lighted. An excellent piano, of colonial manufacture, has been supplied by Mr. Blazey, of Richmond. The hall, including a gallery at the west end, will seat about 400 persons.

Ballaarat.—There is to be a public park for Ballaarat East. The council having decided to ask for the reservation of Mount Xavier, a picturesque spot situated between the Melbourne-road and Eureka-street, this will be the site of the park if it be obtained.



THE NEW TOWN-HALL, MELBOURNE.—MESSRS. REED & BARNES, ARCHITECTS.

THE NEW TOWN HALL, MELBOURNE.

The foundation-stone of this handsome structure was laid on the 29th of November, 1867, by His Royal Highness the Duke of Edinburgh. At about four o'clock His Royal Highness, accompanied by the Governor, Viscount Newry, and Lieutenant Haig, arrived in a carriage and four, with outriders and postillions, escorted by a great number of troops. In a second carriage were Miss Manners-Sutton, Miss M. Manners-Sutton, Mr. Brierley, and Mr. Manners-Sutton; and in a third were Lieutenant Rothwell and two younger sons of his excellency. His Royal Highness was received by the mayor, the aldermen, and councillors, at the threshold of the temporary building, and conducted to the council-chamber, thence to the platform, where the ceremony was performed. Messrs. Reed & Barnes are the architects; Messrs. Lawrence & Cain being the builders. The trowel used was of solid gold. The building is progressing rapidly, and when finished will be one of the principal features in Melbourne.

GLOUCESTER CATHEDRAL.

The restorations on the southern side of this cathedral are making progress, and the exterior of the south transept is complete, except a few finishing touches. The open parapet which had been removed from the sill of the great south window has been replaced, and a panelling beneath has been recovered. Below this a small niche has been discovered. As the back and sides are each painted with a black St. Andrew's cross on a red ground, it is probable it contained a figure of that saint, and this supports the opinion that the south transept was originally called St. Andrew's aisle. The window is temporarily closed, but will be filled with painted glass, the gift of Mr. T. Marling, of Stroud. The restoration of the south porch is the next work on hand. It had originally been intended to do this with Anston stone, the same as that used for the Houses of Parliament; but, after having been quarried some time, it was found difficult to work, and Bath stone is to be substituted. An addition has just been made to the painted glass in the cloisters. Over the lavatory are ten two-light windows, with traceried heads, one window at each end, and eight in front. These have just been filled with painted glass by Hardman, of Birmingham, the gift of Mr. G. Bonnor, of Kensington. Of course the subjects are all Scriptural, and include a representation of the miracle of turning water into wine, Christ walking on the sea, the miraculous draught of fishes, Christ washing the feet of his disciples, the division of the waters, Christ and the woman of Samaria at the well, the cure at the pool of Bethesda, Christ teaching from St. Peter's ship, &c.

THE NEW LONDON MEAT AND POULTRY MARKET.

Mr. H. LOWMAN TAYLOR, chairman of the Markets Improvement Committee, has brought up a report to the Court of Common Council of proceedings relative to the construction of the Metropolitan Meat and Poultry Market, and recommending that the Coal, Corn, and Finance Committee be authorised to negotiate for a loan of 85,000*l.* to meet the necessary expenses in connexion therewith. Mr. Taylor said the court would remember that, as far back as December, 1865, authority was given to the committee to obtain estimates for the erection of the market upon designs which had been furnished by the architect. The committee wrote to a number of first-class builders, and the lowest tender received was from Messrs. Browne & Robinson, a very respectable firm, who agreed to do the work for 134,400*l.* The highest tender was from an equally respectable firm, Messrs. Ashby & Sons, and the sum they asked was 170,000*l.* Messrs. Browne & Robinson's offer was accepted, and the works were now being carried out by them in a way that would do credit to the corporation, and there was every reason to suppose that the market would very soon be completed. The architect's estimate of the cost of erecting the market was 200,820*l.* The works, however, would be carried out at something like 12,000*l.* or 13,000*l.* below that estimate. They had had authority from Parliament to raise 200,000*l.*, and they had raised that sum, but they should

only spend 188,000*l.*, and it was thought advisable to reserve the balance to meet the interest on the loan of 200,000*l.*, already amounting to 5,888*l.*, and other incidental charges. The contract with Messrs. Browne & Robinson was signed on the 22nd of December, 1866, and at that time these gentlemen ought to have had possession of the site, but they did not get possession till some time afterwards, and the last portion was not given up to them until the 26th of March, 1868. They were thus put to great inconvenience, and could not complete their works within eighteen months as they had contracted; and as, in accordance with the provisions of the agreement, they could not be called upon to have the market ready for some considerable time, and as the committee were desirous of having the building finished as early as possible, they had come to an equitable arrangement with Messrs. Browne & Robinson to add the sum of 4,200*l.* to their contract, on condition of their completing the works, and giving possession of the market, by the 14th of November next, and also as some compensation for the increased expense incurred by them from the delay in obtaining the site. The court would see that it was a matter of pecuniary importance to have the market completed as soon as possible.

It was originally contemplated to have cast-iron columns and girders and brick piers; but it was subsequently considered advisable to have the whole of wrought-iron, and no amount of money could be thrown away in a matter of this sort to give strength to the building. To erect a market above a railway station was a thing unprecedented and not to be carried out without great care and consideration; and, as the architect and engineer recommended the alteration, the committee were most anxious to give effect to it. Anticipating the opening of the market in November, the committee thought the ceremony should take place in the most public manner possible; and they were anxious to obtain some person of considerable note to open the market, knowing that when the Cattle Market was opened they had the lamented Prince Consort, who kindly attended on that occasion. Therefore, if the court would leave this matter in the hands of the committee, they would bring up a recommendation which he believed would be acceptable to the members. The report also recommended that the committee should have authority for dismarketing Newgate Market. It was very gratifying that the new market every shop and available space was disposed of and allotted; and they had been obliged to refuse further allotments. At each of the corners there was an elegant refreshment-house for the accommodation and convenience of people frequenting the market, and these also had been let, one at a rental of 470*l.* and the other three at 500*l.* each. The market revenue would be upwards of 40,000*l.* In conclusion, Mr. Taylor moved that the court agree with the committee in their report.

The report of the committee was agreed to.

WORCESTER GAOL ENLARGEMENT.

THE works consequent on the amalgamation of the county and city prisons have been commenced, and will occupy twelve months in the completion. Mr. Rowe's estimate of the entire cost, including purchase of cottages and land in Easy-row, was 10,000*l.* The six cottages to be removed at the north-west angle of the row cost about 1,400*l.*, and Messrs. Wood & Sons' estimate for their portion of the new works was some 5,000*l.* in round numbers. To set against this expenditure, there is the sum received for the site of the old city gaol, so that the total outlay will be under 8,000*l.* The new works will be a continuation and extension of the north-west radiating wing of the old county gaol, and the new boundary wall will extend to the high-way in Easy-row, in length enclosing the space occupied by the six cottages and their gardens. This wall will be of brick, and is to be 23 ft. high, having on its top two courses of loose brick, surmounted by a stone coping. At its north-west end will be an entrance doorway, under a pointed arch, of sufficient width and height to admit of the prison van being driven in and out, for the removal of prisoners without exposure to spectators. The space enclosed by this outer range of buildings forms a large airing ground, in the centre of which will be erected the new block of prisoners' cells. This new block

will consist of a basement and three tiers of cells above, the cells being forty-eight in number. In the basement will be the warming and ventilating apparatus (by Haden, of Trowbridge), also baths, washing places, and store-rooms. The first tier of cells is approached from a central corridor, and the other two tiers by galleries; each cell to be separately supplied with water, gas, means of ventilation, water-closet, and all the other appliances, to correspond with the most modern arranged cells in the old building. The corridor of the new building, being in a straight line with that of the old, will be under the same inspection and control of the officers.

A NEW SYNAGOGUE, ROCHESTER.

THE foundation stone of a new and handsome Jewish Synagogue, which is about to be built and endowed by Mr. Simon Magnus, merchant, Chatham, was laid by that gentleman on Monday, the 5th of October, at Rochester, Kent, in the presence of the mayor, and a large number of spectators. The building and house adjacent for the residence of the Rabbi form an extensive frontage in the High street. The site was purchased from the governors of St. Bartholomew's Hospital, for the sum of 1,500*l.* The new synagogue will be built from the drawings of Mr. H. H. Collins, under whose superintendance the buildings are now in course of construction by Mr. J. G. Naylor, builder, Rochester, and with the sum appropriated for endowment will cost 7,000*l.*, the whole of which will be defrayed by Mr. Magnus.

SEWAGE EXPERIMENTS IN ESSEX.

THE report of the experiments with sewage irrigation made at the Lodge Farm, Barking, by the Metropolitan Sewage and Essex Reclamation Company, for the year ending on August 31, has been presented to the directors by the manager, the Hon. H. W. Petre.

He commences by stating that one-fourth of the Lodge Farm has been during the last two years devoted to the growing of Italian ryegrass. This has been attended with a somewhat less favourable result than last year, as regards the weight of the crop. Whilst, however, the area of grass cut this season was five acres less than last year, and the quantity of sewage applied to the whole farm up to the 20th June this season was 204,000 tons, producing 892 tons of grass, in addition to other produce, the 273,000 tons applied to grass alone last year yielded up to the same date 769 tons only. The value of sewage-grown grass is beginning to be appreciated, and the demand for it now exceeds the supply. In addition to feeding from fifty to sixty milking cows entirely on sewage-grown grass with most satisfactory results, two young steers had been fed exclusively on that grass from 18th May. On 7th August their respective live weights had risen from 7½ cwt. to 9½ cwt., and from 6 cwt. to 7½ cwt. The results of some interesting and successful experiments with wheat, oats, rye, cabbage, and mangold are given in the report. Some experiments on a smaller scale are then given with canary seed, linseed, parsnips, potatoes, sugar-beet, red cabbage, onions, &c., and with great success in all cases, especially with cabbages. Perhaps the most satisfactory result is that with the mangold wurtzel, though quite expected, from the experience of the crop of last year on a smaller scale.

The report contains an account of the cultivation of the rest of the farm, consisting of about 100 acres. On this the only manure applied is salt and the sawdust litter used in the cow-houses and stables. Mr. Petre then institutes a comparison between the sewage and other manures. No amount of ordinary manure, he remarks, could produce six or seven crops of grass in a season, weighing from six to twelve tons each. In the case of mangold, also, the knowledge that two dressings or floodings of sewage, consisting of 200 or 300 tons per acre each, is capable of producing a crop of from 50 to 60 tons per acre, enables a comparison to be drawn with the ordinary crop of 20 to 25 tons produced with a good dressing of farmyard dung. The crop of wheat grown last year without any manure was about 3½ qrs. to the acre; this year the yield with sewage was 5½ qrs. The land is a poor gravel. In conclusion, Mr. Petre says:—"Although, per-

haps, a larger return might be obtained by cultivating only the most profitable crops, it must be remembered that this farm was established with a view of testing the real practical value of town sewage in ordinary agriculture and exhibiting the results, more especially to the farmers of South Essex, the company's future customers for the whole of the sewage of North London, not more than a 350th part of which is used on Lodge Farm in a year."

THE ARCHITECTURAL MUSEUM.

The Council announce the near completion of the premises in Bowling-street, Westminster, and are inviting the subscribers to call and inspect the new home for the collection about to be removed from South Kensington. Much has yet to be done, but they say that nearly the whole of the decorations have been promised by various workers in the architectural arts, who have generously come forward with offerings. It is proposed to open early in 1869. The fund subscribed is now exhausted, and 1,000*l.* more are required to pay the balance due to the contractor.

THE TRADES MOVEMENT.

The whole of the masons in Aberdeen have struck work on account of the masters refusing to continue payment at the rate of 5*d.* per hour. Some time ago the masters, in agreeing to an advance on the then rate, did so on the ground that when the trade got dull the wages would be lowered. Now, when that arrangement was to be put in force, the men would not submit, and consequently struck work. Several masters agreed to the terms sought by the men, and it is believed the strike will not be of long duration.

The Congress of the German working men has taken place at Berlin. Dr. Schweitzer presided, and made a long speech in favour of establishing trade unions throughout the country. He is of opinion that strikes alone will not greatly improve the position of the working men, but that they are useful sometimes, and that the fear of strikes, when once vast combinations have made them dangerous to the masters, will often make the actual strike unnecessary. A violent quarrel arose at one of the meetings, which led to the accession of a large minority. Since then, the latter party has also been holding a series of meetings, and a great part of the time of the rival parties has been taken up with defending themselves and abusing each other. It, therefore, seems not improbable that the result will be the establishment of two opposition central associations, of which the one will adopt Schweitzer, and the other Schulte-Delisch, or at least his principles, for their guidance.

TESTIMONIAL TO A GOOD STEWARD.

Mr. LEWIS KENNEDY having been upwards of fifty years factor upon the estates of Perth, a desire was entertained by the tenantry to express their respect for him in his official capacity and as a private gentleman. That desire took action, and not long ago a meeting was held in Crieff, when the necessary arrangements were made to give the proposal a definite shape. In such cases there is usually a good deal of trouble connected with such a matter, but on this occasion the duties have been comparatively light. The proposal was entered into enthusiastically; the money came in in a stream; and in a marvellously short time the committee had the handsome sum of nearly 300*l.* at their disposal. It was decided that the sum collected should be expended in procuring three fine silver vases; and Mr. G. P. Kennedy, architect, Glasgow,—one of Mr. Kennedy's sons,—prepared by request of the committee of management appropriate designs, which were executed by Messrs. D. C. Rait & Sons, jewellers to the Queen, Glasgow. The presentation took place last week at Crieff.

The chairman of the meeting, in handing the vases to Mr. Kennedy, said, "Mr. Kennedy, some fifty-two years ago, came to this part of the country for the purpose of laying out the far-famed Drummond Gardens. These gardens are the pride of our parish, for they have gone far to

make Crieff a favourite resort for health and pleasure-seekers; they have feasted the eyes of many a visitor, from many a country, and of all ranks, from our beloved Sovereign downwards. With regard to the tenants, Mr. Kennedy was always their true friend, ready to mix mercy with justice. He could not be expected to give the tenants all they wanted, but was ready to give them what was just. So far back as I can remember, in drinking his health on a rent-day, the remark was always made, 'He is a very honest man,' and we all know what Robert Burns says of such a man." Mr. G. P. Kennedy also came in afterwards for a share of praise.

LORD MAYOR'S SHOW.

A CORRESPONDENT, "P. E. M.," writes,— "Considering how very rarely we have anything like a public show or ceremony, I, for one, shall be very sorry for the time-honoured Lord Mayor's Show to lapse into desuetude. The innocent enjoyment of the common people ought, I think, to be considered by those in authority, a little. The great objection made to the usual procession is the stoppage of street traffic. But now that the Thames Embankment is open, affording accommodation for many thousands, why not reintroduce water processions, which would not be open to the objection named? Such might be made eminently showy and graceful, and interesting even to people of refined taste. I hope the Lord Mayor elect will look round on his architectural acquaintance, and see if he cannot find a worthy successor to Inigo Jones in the designing and getting up of a fitting and appropriate water pageant for the approaching Lord Mayor's Day, something which shall be had in remembrance in years to come. I hope the matter, Sir, will have the aid of your advocacy!"

The retention of the show has always had the aid of our advocacy. The abandonment would be a matter for great regret. Some years ago, when Alderman, afterwards Sir John, Muggrove had been elected to fill the office, we published some suggestions for the improvement of the Show, which had a wide currency at the time. We hope Alderman James Lawrence will not aid in diminishing the ceremonial. It has its value even beyond affording amusement and matter of interest to many thousands of persons not too constantly supplied with it,—not a trifling thing itself.

SIR DAVID WILKIE'S LETTERS.

SIR,—My attention has been called to the *Builder* of August 15th, in which are published some letters from Sir David Wilkie to my father. I beg leave to correct a statement which is not exact. The portrait was not "painted unknown to him."

I well remember going over many times with my father to Phillimore-place for the sittings, at which I was present. It was never quite completed, the hands not having been finished.

I have no doubt that the letters came into your possession in a legitimate manner; but some one, through whose hands they have passed, has obtained them surreptitiously.

The letter dated January 10, 1826, in particular, was not to be found, though anxiously sought for after my father's death, when I printed his "Autobiography," for private circulation. I thought it had undergone the fate of many valued papers, and had been used by the cook to light her fires. It seems it had a different fate. M. T. S. RAINBACH.

THE ESSAYS ON THE TEMPORARY EMPLOYMENT OF OPERATIVES.

SIR,—Although I believe most people will agree that competition is the most efficacious way to bring out latent talent and encourage advancement by the offer of money,—that passport by which man calls his fellow-creatures to his assistance,—yet I cannot but think that the benefit which may be derived from it is only felt when aided by the press.

Reading from time to time in the *Builder* your description and criticism on the merits and demerits of the various plans submitted in any important competition, I have observed how many you favour with your notice,

although only one perhaps can gain a prize; thus extracting and bringing to light for the benefit of all whatever is meritorious and ingenious in the labours of those gentlemen who had devoted their time and thoughts in endeavouring to obtain excellence in what they had undertaken; and nothing, Sir, can be more certain than that your criticisms are most beneficial to those who compete, and are highly valued by all.

There has just been competition upon a most important subject at the Social Science Congress, viz., "Employment during Casual Distress." I understand nearly eighty competed, and circumstances lead me to believe that some of the papers were by men occupying such a social position that some bright thought or useful piece of information would be sure to be gleaned from them. But, as in a written paper only the one gaining the prize is made public, would it not be well to invite those gentlemen to publish together their papers, that no useful thought or calculation once conceived should be lost to the science of economy? And I must say I consider that the Government should become fully acquainted with every circumstance which could be brought to bear on the subject of unemployed labour, that they might take the initiative in whatever is done.

I understand that the competitors have had their papers returned, and therefore this course would not interfere with the rules of the association. R. F. D. C.

THE CONDITION OF BIRMINGHAM.

SIR,—My attention has been called to a statement made by Mr. Godwin in the Health Department of the Social Science Congress. The statement alluded to was to this effect: That aided by the police, he (Mr. Godwin) had visited a certain district, including certain streets mentioned by name, situated in the centre of Birmingham. The state of the district he thus sums up:—

"In more than three-fourths of the whole of the streets in the district he visited he found houses tumbling down, no floors, no windows; floors torn up, pavements retaining decaying matter, and of a character always retaining; an utter want of closest accommodation. In Balloon-street he found back-to-back houses, the rooms full of people, and the middens all full. In No. 6 Court, Brick-kiln-street, the neighbouring cesspool of the court was some 3*ft.* higher than the pavement of the court; and the consequence was that the filth was constantly oozing through, and spreading over the floor of the court. The first woman he inquired of in one of the courts had three children living, and she praised the locality as being very healthy. Then he elicited from her that she had five children dead. Next door the woman had no children dead, but her husband, she added, had been invalid for many months. In a court in Blauforth-street, an open cesspool was to be seen—that is, the closet ran into what was prepared to be a midden, but, being never so used, was simply filled with fecal matter. Here, again, there was the same appearance on the part of the children—pale faces, sunken eyes, women worn and haggard, and throughout the whole of the inquiry he did not meet with a single child who was able to read. Here, then, was what he brings before you, point out to the authorities of Birmingham—an enormous population, living under conditions utterly opposed to anything like health. Whether any attempts were made to remedy this he could not say, but, as any rate, they must have been very insufficient. He could go through a large number of similar cases, but he did not think it necessary. Here, in these wretched districts, were growing up, in ignorance and dirt, girls and boys, with no other prospect than the streets for the one and the goal for the other. Where, he asked, had been the ministers of the Church? Where had been the clergy?"

As the above statement refers chiefly to my parish, in which the streets named are situated, I trust to your courtesy to allow me a word in reply. In the greater portion of Mr. Godwin's statements I most thoroughly agree. The state of Balloon-street, Brick-kiln-street, Hen-street, and a portion of St. Andrew-street is truly wretched, and many of the houses almost unfit for human habitation. But Mr. Godwin asks, "Where have been the ministers of the Church?" "Where have been the clergy?" I am afraid the poor clergy have sometimes rather a hard card to play. If they do not interfere, for instance, in sanitary matters,—more properly the business of the lay authorities,—they are brought to book. If they do interfere, they are going out of their province, and had far better confine themselves to spiritual matters, and leave all secular work (education, perhaps, included) to the laity. However, as I look upon education as an integral portion of a clergyman's work, and consider the preservation of its religious character indispensable, I will venture so far to inform Mr. Godwin that the educational necessities of the parish have not been overlooked. In addition to the ordinary school departments, there has been in

existence since 1861 a ragged school, twice enlarged to meet the exigencies of the case. There are four large principal school-rooms and five class-rooms, and there were present in the day and night schools, in July last, at H.M.'s Inspector's examination, 1778 children. This is, of course, independent of the Sunday day and Sunday night schools; and I may further say, so strong is my sense of the deep need of that portion of my parish alluded to by Mr. Godwin, that having at length secured the old police station in Staniforth-street, the erection of a large new ragged and infant school will be commenced (D.V.) within ten days, although after troublesome bargaining, I still require over 700*l.* of the estimated sum for the purchase of the site and erection of the school. I may honestly say, I do not think, considering the wretched poverty of the parish, and the difficulty of obtaining money, more could have been done than has already been effected in an educational point of view.

I trust to be able to open the new school (D.V.) in the first week of January next.

With regard to the sanitary aspect: It has long been my wish to erect a row of model labourers' dwellings, and lodging-houses, both in the neighbourhood of Balloon-street, and also in Old Cross-street and Vauxhall-street. I have mentioned the matter frequently to several laymen in the town; but the great impediment—money—still stops the way. However, I do not despair. Of one thing I am satisfied, from a long service in poor parishes, that the generally wretched character of the dwellings of the poor, the absence of refining influences, and the miserable associations of poverty-stricken homes, courts, and streets, tend much to the inhumanising influence which, destroying the finer susceptibilities and blunting the better feelings of the heart, generally results in brutality and crime, a family plague, and a social curse. Of the incalculable injury to health and physical well-being it is, perhaps, not my province to speak.

May I also add, in reply to Mr. Godwin's question, "Where are the clergy?" one word on their behalf. The statistics of the educational bazaar will abundantly show that, in spite of many difficulties, the clergy have steadily pushed forward in the great educational work of the country. Conscious of its necessity, they have spared neither labour, anxiety, nor money in its prosecution, and they alone who have been engaged in the work can form any adequate conception of the difficulties which attend it. I am sure Mr. Godwin, when the facts of the case come under his notice, will kindly withdraw the reflection he has hastily cast upon me, and believe not only of me, but of my brethren the clergy of Birmingham, that we are, one and all, most anxious and earnest in our efforts to provide a good, sound, and cheap education for the working classes of the town.

J. HART BURGESS, D.D.,
Vicar of Bishop Ryders.

CONCRETE BUILDING.

SIR,—In the *Builder*, page 699, *ante*, a notice is given of certain patented improvements in concrete building; and, in justice to the building public, as well as to the patentees, I am desirous of pointing out that in each of the sections described as "first," "secondly," "fourthly," and "lastly," there is no novelty, nor anything that has not been in use previously to the date of the patent. Therefore, it is needless to attempt to claim a patent for them. From July to December, 1867, being at the time manager to Mr. Tall, I made a great many specimens of concrete, to show to persons interested in the matter what it was possible to do in concrete building. Some of these specimens had the fine concrete face cast on; some had the triangular and other shaped recesses; and some the ornament in relief. Several of the specimens were exhibited at the Architectural Association, December 6, 1867, and are mentioned in a printed paper. The casting of concrete cornices, caps, string-courses, cills, &c., in place, is notoriously old. As the son of a builder who was very partial to the use of concrete floors, skirtings and hearths, chimney-pieces, and cills, they are among my first recollections. Indented string-courses were designed by Mr. T. Hayter Lewis for some cottages now building at Staplehurst; and string-courses, cornices, &c., indented and in relief, were designed by Mr. G. Woodhouse, architect, of Bolton, for a large school now building with my patent apparatus. The

use of T-iron for concrete chamber floors and roofs is also old.

As to section "thirdly," there is nothing in the notice to enable me to judge of its merits. However, if the patentees will take the trouble to make inquiries, they will find that my statement as to the other sections is accurate.

CHAS. DRAKE.

SIR,—I beg to bring to your notice the partial (I am afraid it will turn out to be total), destruction of a large house building in the above material, at St. Margaret's, Twickenham (see *Builder*, 19th September last, page 639). The walls, 12 in. thick, have been carried up to a height of about 35 ft. The whole of the front wall of one wing from top to bottom, with all its window and door frames, and a portion of the side wall, have fallen down, and are now a heap of ruins, with dangerous cracks in other portions of the building. There has been much talk lately about this kind of work, and I trust that the cause of this failure in a material of which we were beginning to have some faith, will be fully explained.

WILL WATCH.

SIR,—I write you a few facts respecting my block concrete system. I have erected at West Bank, New Hampton, Middlesex, a pair of houses. I claim,—first, my walls are totally free from moisture; secondly, my blocks will stand the fire, which may be seen of the house that has been burnt out at Northfleet, leaving all the walls and chimney now standing which I built some time ago; thirdly, I will guarantee to build and complete a pair of houses, that is to say, if all my blocks be ready before I begin laying them, with two layers, and complete the whole then.—Build all walls, slating, plastering, stoves, copper, fit for habitation within one month with ease. In my block system the walls contain nothing but gravel and cement, showing in blocks on the face of the work the natural material itself, saving the cost of and requiring no plastering ever afterwards. Some have said that the block system is as dear as brickwork. I differ in opinion, as the following item will prove to you of one day's practical test:—

Thus, in casting my blocks of September 12th,—

	£	s.	d.
One man preparing gravel	0	3	6
Two men making blocks	0	7	0
One man laying down moulds ready to fill up	0	3	6
One cast of Robins's Portland cement	0	7	0
Total cost	£1	1	6

Number of blocks made, 424 in nine hours, being equal in bulk to 3,392 stock bricks. Compare the cost for bricks and my blocks, which proves its economy to you at once. I am using Hobias & Company's Portland cement for making my blocks, and I advise your readers, if they think of employing concrete, to use it. First, you can depend on its durability; secondly, it will set like a mass of rock in a very short time.

W. MAX, JUN.

GLAZING.

SIR,—I have an iron skylight glazed with glass, 1 in. thick, 63 in. by 23 in., the squares of which are all broken by the contraction and expansion of the metal. They were bedded in putty, and the skylight had an iron capping fitting on the rebates, but not touching the glass, the space between being filled up with putty. I should be obliged if some of your readers who have experience in the matter, would suggest a plan by which the leakage may be prevented. Would a thin layer of wood or cork prevent the damage?

B. P.

WASH THE HOUSES.

SIR,—You have frequently drawn attention in your columns to the neglect of sanitary matters by the St. Pancras authorities, and you should let your readers know that during the late hot weather, a suggestion made in your columns, viz., washing the exterior of the houses in the many courts and alleys, by means of stand-posts with a hose attached, was carried out. In the East, or Somers-town district, alone, fifty-six confined and densely populated courts have been repeatedly flushed, much to the comfort of the poor inhabitants, and amongst the number—

A WORKING MAN.

LIABILITY OF SUB-CONTRACTORS FOR WAGES.

AT Worship-street Police-court, Messrs. Browne & Robinson, builders, of Worship-street, were summoned by James Vesoh, a bricklayer, for the sum of 1*l.* 13*s.*, wages due for work and labour done for them. The complainant stated that he was engaged by a man named Elliot, who was pointed out to him as being the foreman of some works being carried on in St. John-street-road, Clerkenwell, and to whom he had applied for work, as a bricklayer, at 8*d.* an hour, to help to run up a brick wall. On Saturday, the 10th, there was owing to him 1*l.* 17*s.* 6*d.*, of which he received 1*l.* from Elliot, who stated that he could not get him more, as the firm (Browne & Robinson) had not sent him enough money. He went to Messrs. Browne & Robinson, and was informed that Elliot was a sub-contractor, and therefore liable. In answer, it was contended that the contractors were not liable, inasmuch as they had underlet their contract for this particular work to Mr. Joseph Elliot, who had

failed to carry on the work, and had overdrawn his accounts. A stamped agreement between Elliot and Browne was handed up to the magistrate.

Joseph Elliot, builder, Merton, Surrey, was produced, and he swore to the agreement. As a sub-contractor he had engaged the complainant, gave him directions, and set him to work. He was not able to pay the men on the 26th, as Messrs. Browne had only sent him 10*l.*, with which to pay 2*l.*

Mr. Newton said that being so he had no course left but to dismiss the summons.

PAINTING HOT-WATER PIPES.

SIR,—Some few months ago I read in the *Builder* (I think), of a material for colouring or painting iron stoves and hot-water pipes, that would stand the heat, and would not throw off the disagreeable effluvia arising from ordinary oil paint, Brunswick black, or Japan varnish. It was, if I recollect right, composed of water-glass, mixed with lamp black, or other colouring matter. Can any of your correspondents inform me what the materials are, how and in what proportions they should be used, and where they are to be obtained?

A SUBSCRIBER.

RESPIRATION.

ACCORDING to the most reliable experiments, a man makes sixteen respirations per minute, and he draws into and expels from his lungs 30.51 cubic inches of air at each respiration, consequently the quantity of air that he respire per minute is equal to 488.16 cubic inches. The expired air contains 4.6 per cent. of carbonic acid; and, as the atmosphere consists of one-fifth by volume of oxygen, four-fifths of nitrogen, and .04 per cent. of carbonic acid, the quantity of the different gases that a man inhales and exhales per minute, is exhibited in the following table:—

A Man inhales per Minute		A Man exhales per Minute	
Gases.	Cubic Inches.	Gases.	Cubic Inches.
Oxygen	97.5020	Oxygen	77.1852
Nitrogen	393.3728	Nitrogen	393.3728
Carbonic acid ...	0.1952	Carbonic acid ...	20.5929
	493.1600		488.1600

JOHN PHILLIPS.

PROVINCIAL NEWS.

Kettering.—The contract for the erection of a new banking-house and manager's residence for the National Provincial Banking Company, to be built on the site of the late Three Crows Hotel, in Granby-street and Horsehair-street, from a design and plans by Messrs. Mallicott & Smith, of this town, architects, has been taken by Messrs. Osborne, Brothers, masons, &c., of Leicester. The style of architecture adopted is a mixture of Classic and Elizabethan.

CHURCH-BUILDING NEWS.

Churchill.—A new church, built on the site of the old parish church of Churchill, has been consecrated by the Bishop of Worcester, and opened for divine worship. Mr. W. J. Hopkins prepared the plans, and the work has been executed by Mr. Warner, of Malvern. The edifice is in the Early Decorated style, and is built of dark red sandstone, obtained from a quarry on Lord Lytton's estate. It consists of chancel, nave, and tower, the latter of which it is hoped at some period to add a spire. There are tracery windows to the chancel and nave, and on the one side they are of varying sizes. The chancel roof is panelled, and the nave has an open-timbered roof. There are sittings for about 120 persons in the church. The cost is 1,800*l.* The length of the church is 73 ft., and the breadth 22 ft.

Hednesford.—A new church has been consecrated here. The building is of stone. It is in the Early English style, is plain, in parts almost to baldness; but the design is only partially carried out, provision being made for a tower at the west end, and the pillars and arches for a north aisle have been built and enclosed with a thin wall, which, on the addition being made at any future time, may be readily removed. The chancel has a semicircular termination. There is a south transept for the children, and the building will seat 500 persons. The inside of the walls as well as the outside is of smoothed

stone. The cost of the structure (exclusive of the site, which is given by the Marquis of Anglesea) will be about 3,000. The architect was Mr. W. Rushworth, of London; and the builder Mr. M. Anderson, of Cannock.

Boughton.—The new church and the addition to the graveyard have been consecrated by the Bishop of Lincoln. The new church is built of Steely stone, with ashlar of Ancaster stone. The interior is faced with red brick, handed at intervals with stone and black bricks. The style of architecture is Early Geometrical. The builder was Mr. Hopkinson, of Retford. The church will seat 200. The architect was Mr. Fowler, of Louth.

Hyde.—St. Thomas's Church, Hyde, has been consecrated by the Bishop of Chester. It is very simple, both in general arrangement of plan and in details. There is accommodation for 600 people, on the ground-floor and in a small west-end gallery, for the sum of about 2,300. The walls are built and faced with rubble stone of the place, pointed on the outside. The coigns, cornices, strings, and more ornamental parts are of red stock-bricks, the colour of which contrasts with that of the rubble walling. A little ashlar stone is used where constructionally needed. The principal entrance is through the west door. There is a wooden porch, the inner doors of which open into the central passage of the nave. The nave is 72 ft. by 43 ft., divided into five bays by timber-framed principals: it is 40 ft. high. The chancel is 26 ft. by 20 ft., and not quite as high as the nave. The north chancel aisle opens by wide arches into chancel and nave, and will contain the organ. The western bay of the nave is galleried. The gallery-stairs are on the south, and the font on the north side of the west porch. The seats are low open benches. The chancel has longitudinal stall-like benches. The glass is arranged in different forms and devices. The east window has a floral ornament and a little colour. The whole of the walls are covered with a warm tint. The windows, arches, &c., are also brought out in different tints from that of the wall. The east wall of the chancel is decorated in colours and gold, by Mr. R. Park, in devices designed by the architects. The belfry, which surmounts the west gable, is of moulded brick and stone. The bell, cast by Mears, has the motto "*Cum voco venite.*" The churchyard is surrounded with a wall of brick and stone. The builders were Messrs. J. Robinson, of Hyde; and the architects Messrs. J. Medland Taylor & Henry Taylor, of Manchester.

Cornforth (Durham).—A new church, dedicated to the Holy Trinity, has been consecrated at Cornforth, near Durham. The edifice is built from plans by Mr. Pritchett, of Darlington, the estimated cost being about 2,000. It holds about 300 persons.

Manchester.—The additions to St. Oswald's Church comprise a tower and spire, which has just been completed. The tower is divided into four stages, with buttresses at each angle, with canopied heads. The tower is faced with Yorkshire parapets with ashlar dressings. The spire is of dressed ashlar with gurgoyles at the springing of broaches, with ornate lucarnes, and relieved with bands of Runcorn stone, terminated with gilt vane, rising to the height of 150 ft. The outlay is 1,300. Messrs. Ellis & Hinchcliffe, of Manchester, were the contractors, and Mr. J. Lowe, Manchester, the architect.

Patricroft (Manchester).—Christ Church, patricroft, has been consecrated. It is in the Early English style, and comprises nave, 82 ft. by 30 ft., with north and south aisles; chancel, 30 ft. by 20 ft., with stalls for the choir, with vestry and organ-chamber adjoining. The chancel is laid with encaustic tiles. The principal entrances are at the west end. The nave has an arcade of six arches of moulded bricks of varied colours, with pillars of Mansfield stone and carved caps of Bath stone, which support the lofty clearstory. The roof has open-framed principals of high pitch. The west elevation is pierced with a large circular window, and from the gable springs a lofty belfry, terminated with a gilt cross. The pulpit is of Caen stone at the north-west angle of nave. The font is near the west entrance. All the seats are open stained and varnished. The church is faced externally with Yorkshire masonry, relieved with bands, &c., of different colours. Accommodation is provided for 600 persons, of which 318 are free. The works have been executed by Mr. Southern, of Salford, at an outlay of 3,900, under the direction of Mr. J. Lowe, architect, Manchester.

Exeter.—The Church of St. Michael and All Angels, which has been erected at a cost of 20,000, and is the gift of Mr. W. Gibbs, of Tyntesfield, Somerset, formerly of Blamhead, has been opened. In addition to this gift, and an endowment of 80*l.* a year, Mr. Gibbs has built a school-room, near the Church of St. Michael's, for the boys of the parish, and also a vicarage-house; he has also built a chapel of ease at Cowley Bridge. The new edifice is in the Gothic style of the Early period. It will accommodate 650. The east window cost 650*l.* The organ cost 800*l.* The church is built of Westleigh stone, with Hamhill dressings. The spire overtops everything of the sort in the city or neighbourhood; the entire height is 233 ft. It is a pretty close imitation in style of the spire of Salisbury Cathedral. It has a hell weighing over a ton.

Bedale.—Several improvements have recently been made in the interior of Crakehall Church. It was formerly, in many respects, one of the most mean and squalid churches in the diocese. The chancel and sacristy are laid with encaustic tiles, and the latter guarded by a rail. There are a new prayer-desk and pulpit, lectern, and choir seats. The woodwork is light and open, and has been well carved by Mr. C. Palliser, of Northallerton. The lectern and communion rails are by Jones & Willis, of Birmingham. The altar furniture, hangings, &c., are by Browne, of Manchester. The architect employed was Mr. G. T. Jones, of York.

Norton.—The foundation-stone of the new chapel about to be erected in the parish cemetery at Norton has been laid. The plot of ground secured is 6*l.* acres in extent, and cost 2,000*l.* It is situated on an elevation in Derbyshire-lane. It is intended to consecrate only about two acres at present. Messrs. Flockton & Abbott, of Sheffield, are the architects of the chapel, and the builder is Mr. John Camm, of Norton. The chapel, which will be Gothic in style, is to be built of stone from the neighbourhood, faced with Burbage and Grenoside stone. It will be 30 yards by 20 inside.

Bewdley.—The church of St. Leonard, Ribbesford, has been re-opened after some considerable repairs and partial restoration. It is well known to archaeologists as presenting an open arcade of timber work in pillars and arches in the nave; but several discoveries have been made: for instance, the flat framing stones in the lintels of two windows (having been denuded like the rest of the building of a coating of rough cast and whitewash, and restored to the original pale cream of red sandstone), prove to be carved in an original pattern; the door of the roof-turret, marked by a buttress, and its newel staircase, the base of the roof-loft, and two niches in the east wall of the south aisle have been found. The latter are deeply recessed: one probably held the death-light for the cemetery, like one in a somewhat similar position at Ashford: the other may have been used for a similar purpose. It retains red colouring in distemper powdered with crayons of five points, like those worn by saints in Mediaeval illuminations, and on one side a fragment of the upper lid of a diminutive coffin of the fourteenth century date, with the words "*Ben Henri*," in Lombardic letters, and a flowing ornament, has been built into the south jamb. The trefoiled waterdrain of the lady chapel, at the east end of the north aisle, has been laid open, and like the two canopied niches, supporting like corbels, the wall plate of the roof coloured in distemper. Several texts of the early part of the seventeenth century have been retouched. The pulpit has been lowered, the "three-decker" replaced by an open reading-stall. The whitewashed ceiling has given place to open woodwork. The sanctuary has been lined with old carved oak, and the Jacobean credence-table is once more, after long disuse, placed on the north side. The "horse boxes" and "pens" in the nave are abolished, and additional room obtained for the congregation. Mr. Baker, of Kidderminster, was the architect employed. The Rev. Mackenzie Walcott (cousin of the rector) is, we are informed, the gentleman to whom the restoration is due.

Hanford (Staffordshire).—The old church at Hanford has been reopened for divine service. The old edifice having for some time been in a dilapidated condition, and quite inadequate to accommodate the increasing congregation, was pulled down last year, with the exception of the chancel, which had been rebuilt and enlarged. The rest of the church has now been entirely rebuilt, and the number of sittings increased from 200 to 450. Its plan comprises a nave

67 ft. by 21 ft. 4 in.; north aisle 67 ft. by 8 ft. 8 in.; south aisle, 61 ft. by 8 ft. 8 in.; a south porch, a gallery at the western end of the nave capable of holding seventy children, a vestry to the north side of the chancel, and a bell-turret at the north-west corner of the south aisle. The nave is of five bays, and has a clearstory. The whole of the building is of the most simple character. The walls are of plain red bricks, faced with the same, both externally and internally, stone-work only being employed sparingly, as a frame for the glazing of the windows. The constructive timbers of the roof are all exposed to view internally, and the ceilings are formed between the rafters. The arcades of the nave have cylindrical piers with stone caps and bases very plainly moulded, and blue brick shafts. These bricks are made for the purpose and set in cement. The arches are of brick, chamfered on the outer edges, and have keystones. The passages in the floor are paved with Minton & Co.'s plain square tiles, and the spaces where the benches are placed are boarded. The glazing throughout is fixed in lead lights, in varied patterns, and is of crown glass, slightly relieved by the introduction of green-tinted patterns. The nave is fitted with new open benches, and the aisles with the benches of the former church. The gallery has new seats for children, and the chancel new stalls for the choir. The pulpit has been refixed on the south side of the nave, and the prayer-desk on the north side, and a new lectern has been provided. The font is the gift of the architect, and is constructed of blue and red bricks put together with cement, the bowl being lined with lead. The amount of the contract was 900*l.*, exclusive of the benches, gasfittings, and heating apparatus. Mr. Alfred Barlow, of Stoke, was the builder; and Mr. Charles Lynam, also of Stoke, the architect employed.

DISSENTING CHURCH-BUILDING NEWS.

Derby.—The memorial stone of the United Presbyterian Church at Derby has been laid. The building occupies a site at the junction of Green-lane and Gower-street. The plan is arranged to accommodate about 500, with minister's vestry and session-room, heating chambers, and other offices in the rear of the church. The style of architecture adopted is English Gothic of the thirteenth century, and the material for the walling externally is white Coxhean stone, the window tracery being of fine Hollington stone. The principal front towards Green-lane has a high pitched gable, containing a five-light window, with tracery geometrical in design, and is flanked on either side by the entrance porches. The doorways to these have moulded arches supported on shafts, with moulded caps and bases. Between the centre gable and the north porch an ornamental spire rises to a height of 70 ft. The front next Gower-street is divided into five bays, the easternmost bay projecting as a transept, and containing a two-light traceried window. Each bay in the body of the church contains a couplet of cusped-headed lancet windows. Internally the church is divided into nave and side aisles by two rows of light iron columns supporting the arched ribs of the roof. The ceiling of the roof is divided into panels by timber ribs, stained and varnished. The contract for the building has been taken by Messrs. T. & H. Herbert, of Leicester, at the sum of 2,150*l.*, and the works are being proceeded with. The architect is Mr. J. Tait, of Leicester.

Bristol.—The chapel which has been erected by members of the Baptist persuasion, just beyond the site of the old White Ladies' turnpike, has been dedicated to public worship. The building is from the plans of the late Mr. S. Hancorn, of Bristol and Newport, architect. The design is in the Decorated style of Gothic, and includes the chapel, with transepts; vestibule, with two lobbies; open porch; chancel, with baptistry underneath, and organ recess on one side of the same; minister's and deacons' vestries and private entrance; ladies' vestry, with private entrance. An end gallery is erected over the vestibule and lobbies, with stone staircases. A tower is included in the design, but it has as yet only been carried high enough to receive the stairway therein. The chapel is lighted with five three and two light traceried windows, of cathedral glass, in two tints. The walls of the chapel, internally, are stuccoed, and the elevations are faced with Pennant stone in random

ranged courses, knick pointed. The floors of the vestibules and lobbies are paved with encaustic tiles. The chapel is heated and ventilated by Messrs. Haden, of Trowbridge. The work has been done by Messrs. Marquis & Munroe, general contractors; Mr. Tuckey, plumber; Mr. Gay, glazier; Mr. Leman, smith and gasfitter; Mr. Rice, staining and varnishing; Mr. Marjotson, stone carving; and Mr. Houghton, wood carving. The expense incurred has been about 7,500l.

Books Received.

A Manual of Practical Assaying. By JOHN MITCHELL, F.C.S. Third Edition: Edited by WILLIAM CROOKES, F.R.S., &c. London: Longmans, Green, & Co. 1868.

The first edition of this almost standard work was extensively sold, and a second edition followed. The rapid progress of science soon renders a metallurgical work antiquated, and it therefore became necessary to rewrite some parts of the work and modify others. This has been done by a highly competent and able editor, Mr. Crookes, who in this third edition has incorporated all the late important discoveries in assaying made in this country and abroad. Most of the chapters are entirely rewritten. The old equivalents, however, are retained, as they are more generally understood by students of science who do not make chemistry their chief study. Special care has been devoted to the blowpipe assays, as well as to the important volumetric and colorimetric assays; but the chapter on crystallography is left out altogether, as a subject only remotely bearing on assaying. The work may well be said to be far better than ever it was.

Miscellaneous.

OLD PAVING.—A contract has been entered into with the city of Paris to buy up all the old paving stones for the purpose of shipping them across the Atlantic, where they are to be used to pave the principal thoroughfares of Buenos Ayres and Monte Video.

FATAL FALL FROM A HEIGHT.—A labourer of Bradford, employed at Heaton, in a stone quarry, was engaged wheeling a loaded barrow along a plank, which spanned a deep chasm of the delph, when he lost his presence of mind, became dizzy, and fell off the plank, the barrow falling on one side and he on the other. He alighted on his head, which was fractured, the depth of his fall being 24 ft., and was killed on the spot. The coroner's jury gave a verdict of "Accidental death."

COMPLETION OF THE GREAT RAILWAY BRIDGE ACROSS THE MERSEY.—The deviation line from Ditton, in Lancashire, to Dutton, in Cheshire, on the London and North-Western system, is seven miles and a half long, and has been in course of construction since 1863. In this length is included the stupendous iron girder bridge across the river Mersey at Runcorn. It consists of three spans of 305 ft. each, besides four arches, which rise out of the bed of the river on the Lancashire side. The bottom of the bridge is 75 ft. above high-water mark, and in order to attain this elevation, which was necessary to keep unimpeded the navigation of the river, viaducts have had to be erected on both sides, and in these are no less than ninety-four arches. The whole line has cost 250,000l. Messrs. Cochrane, Grove, & Co., of Dudley, are the sub-contractors for the bridge, under Messrs. Brassey & Ogilvie, who accepted the contract for the whole line. A footway runs alongside the bridge, supported on cantilevers, and this has been opened so that the many inconveniences of the old ferry are done away with. The line itself will, it is expected, be opened for traffic early in December. It will save between nine and ten miles in the journey between Liverpool and London, which it is intended to accomplish in a little over four hours. The carriages for this special service will be built somewhat upon the American principle, for which we have so long contended while trying communication between guards and passengers, through a passage up the centre, and they will be provided with retiring-rooms for passengers. Arrangements, we are informed, will also be made for the supply of refreshments during the journey.

LIVERPOOL ARCHITECTURAL SOCIETY.—The members of this society held their first sessional meeting of the year at the Royal Institution, Colquhoun-street, on Wednesday night, the 7th inst. The opening address was delivered by Mr. Francis Horner, the president, who referred to some of the most important questions occupying public attention in reference to science and the fine arts.

THE TIMBER TRADE.—Messrs. Barnes & Sons' circular says:—"Our market continues to improve in tone, and there is not that entire stagnation we had to report a few months since. The importation compared with the corresponding month last year is 6,074 tons register less, and for the year to this date 6,681 tons less. This deficiency is on the following descriptions, viz., Quebec about 4,000 tons, St. John's and New Brunswick 6,800 tons. But the increase on Baltic goods and United States timber is sufficient to reduce the total falling off in importation for the year to 6,681 tons. Canadian woods: The demand for pine timber is dull. Baltic goods: There is a good supply of Memel timber, but the stock of Swedish is light. Pitch pine timber, &c. The stock is large, the demand continues dull. Mahogany: the supply is equal to the demand."

TELEGRAPHS IN THE SUBWAYS AND SEWERS.—At the last meeting of the Metropolitan Board of Works it was stated that, in reply to a communication from the Postmaster-General with reference to the Board's subways and sewers being used for receiving the wires of the Post-office telegraphs proposed to be constructed, the Works Committee submitted a letter stating that it would afford them great pleasure to assist the Postmaster-General in any way, and with that view had prepared a plan of the Board's subways and sewers. Mr. Collinson moved that the letter be approved. He considered that it would be a great convenience to have the telegraph wires in the subways, as it would greatly facilitate the transmission of messages to and from the Fire Brigade stations, and would get rid of the telegraph wires which London was now disfigured. The motion was unanimously carried.

THE TENDERING SYSTEM.—At a recent meeting of the Metropolitan Board of Works reference was made to the proceedings of contractors. At the previous meeting of the Board tenders were opened for the construction of a sewer in the Belvedere-road, Lameth, and one of them being lower by 20,000l. than some of the other tenders sent in, it was accepted, subject to the usual inquiries. The surveyor now reported that the gentleman whose tender had been accepted at the previous meeting had since withdrawn. The next lowest tender was that of Mr. Pearson, which amounted to 26,900l. A lively discussion took place respecting the contracts of the Board, in the course of which the conduct of the contractor who sent in a tender 20,000l. less than one of the others, and afterwards withdrew without explanation, was remarked upon. The result of the discussion was the formal approval and acceptance of Mr. T. Pearson's tender.

THE NEW NORTH STAFFORDSHIRE INFIRMARY.—This building, which has been erected at Harts-hill, near Stoke-on-Trent, and the foundation-stone of which was laid by the Prince of Wales, in June, 1866, was informally opened on the 6th inst. The total cost of the new infirmary, including site, &c., is 33,704l., and towards this sum 23,951l. have been already obtained, and there are assets estimated at 5,573l., leaving a deficit of 4,180l. The removal of the infirmary has been caused by the deterioration of the present building through undermining, and the injurious effects of ironworks and ironstone calcination in the immediate vicinity upon the patients, rather than by the want of a larger establishment, although more room was required, and has been for a long time. It has been built, at a cost of 27,000l., by Mr. Alfred Barlow, of Stoke-on-Trent, from the combined designs of Mr. C. Lynam, of Stoke-on-Trent, and Mr. Nicholls, of West Bromwich. The pavilion principle is adopted by the architects, and the main building will afford room for 167 beds, 1,500 cubic feet of air being allowed for each patient in the ordinary wards, and 1,875 cubic feet in the "special cases" wards, and in the fever hospital, which forms a detached block. Another separate building is an asylum for incurables, founded by Mr. Smith Child, at a cost of 1,000l.

ARCHITECTURAL ASSOCIATION.—The opening conversations will be held at the House in Conduit-street, on Friday evening, the 30th inst.

NEW TOWN-HALL, MANCHESTER.—The first stone of the proposed new building is to be laid by the mayor, Mr. Robert Neill, on Monday, the 26th inst.

NATIONAL EXHIBITION OF WORKS OF ART AT LEEDS.—The visitors during the week ending Saturday, the 10th day of October, numbered, by season tickets, 5,296; by payment, 21,563, making a total of 26,859. Very little time now remains for those who would visit this important collection of works of art.

OPEN SPACES IN LONDON.—Mr. J. Runtz, a member of the Metropolitan Board for the Hackney district, stated last week, at the meeting of the Hackney district board, that the committee of the central board, to whom the matter of the preservation of open spaces in and around London had been referred, had prepared a scheme for the enclosure of Blackheath, and were giving every attention to the general subject. He counselled the committee of the Hackney district board, to whom had been referred the question of the preservation of London-fields, Hackney Downs, Hackney Common, &c., to arrive at some early conclusion as to the course they would wish to be adopted, and then to press upon the Metropolitan Board the bringing in of a scheme founded thereon. The committee, it was stated, would shortly commence active steps with this view.

THE SHEFFIELD WATER SUPPLY.—Extensive operations are being carried on in the neighbourhood of Bradfield, where four great reservoirs are in various stages of completion. The reservoirs are the Agden, the Strines, the Dale Dyke, and the Dam Flask, all made on the streams which converge in the Loxley, and all constructed on the principle of blocking up a valley by a great embankment. The Agden is on the point of completion. At Strines, it is expected that the works will be completed in a year or eighteen months. At Dale Dyke a great chasm has been dug in search of suitable foundation for the erection of a new embankment, in place of that which gave way on the 12th of March, 1864. The Dam Flask works can hardly be said to have commenced. The whole of these works have to be completed by the year 1873.

THE NEW VIADUCT ON THE MIDLAND EXTENSION TO BARNSELY.—The new viaduct at Barnsley crosses the valley of the Dearno. At the lowest part, where the new line from Cudworth to Barnsley crosses the turnpike, the viaduct is 1,087 ft. long. It is composed of three stone piers—two 40 ft., one 41 ft., and another 10 ft. long, which form the end supports of the girders. The space from one abutment to another is supported by fourteen iron piers, which are bolted together, and, although light in appearance, seem to form a safe and firm structure. The contract for the masonry work was taken in March, 1864, by Messrs. Nicholson & Son, of Leeds. The iron-work has been executed by Messrs. Butler & Pitt, of Stanningley, near Leeds. Mr. John Sidney, of Crossley, is the engineer to the line, which is nearly finished, with the exception of the station. The work has, it is estimated, cost over 30,000l.

THE GAS QUESTION AND THE METROPOLITAN BOARD OF WORKS.—Messrs. Newton & Richardson have given notice of motion, "That in the opinion of the Board it is expedient that the manufacture of gas should, as far as practicable, be removed from the populous districts of the metropolis; that the Board should promote a Bill, empowering them to supply gas to the metropolis; that if it be desirable to take the existing gas companies, they should be compensated, the terms of such compensation to be, if possible, agreed on between the Board and the companies; and that the matter be referred to the Special Gas Committee, with authority to obtain the useful advice and take the necessary steps for the preparation of Parliamentary notices and of a Bill to be introduced into Parliament during the next Session; these powers, however, not to be sought if the companies will agree on such a price and such regulations as to the supply of gas as shall be satisfactory to Parliament." Mr. Evans gave notice that he would move as an amendment, "That in the opinion of the Board it is not advisable to take measures to promote a Bill in relation to gas supply during the ensuing Session of Parliament."

THE MEYRICK COLLECTION OF ARMOUR AND ARMS.—This unique collection, we are happy to hear, is being brought from Goodrich Court to the South Kensington Museum, as a loan. It will be set up, we believe, in the gallery adjoining the Horticultural Gardens, which lately contained the Portrait Exhibition.

NEW LETTER-STAMPING MACHINE.—Mr. Pearson Hill, a son of Sir A. Rowland Hill, has invented a machine for facilitating the stamping of letters in post-offices. It is self-inking, and impresses the two requisite stamps at once, to obliterate the postage-stamp and give the time and place of stamping. As many as 218 letters have been single stamped, and 180 double stamped, by help of this machine, in one minute, test time.

PROPOSED BOTANICAL GARDENS FOR PLYMOUTH. A scheme is in progress for the establishment of Botanical Gardens for the three towns—Plymouth, Devonport, and Stonehouse,—similar to those at Bath and other large places. A piece of ground, planted with trees, situated between Argyll and Collingwood Villas, Stoke, has been selected. Most of the land in the vicinity of Plymouth being intended for building purposes, could not be obtained without giving the building lot prices, and Stonehouse was so confined that there was no available place to be found there. The Steward of the Lord of the Manor of Devonport has met the views of the committee. The cost of fencing the ground is roughly estimated to be 200l. The committee would erect a building with wood, having a slated roof and glass sides, which would cost 400l. With cost of planting, &c., 1,200l. to start with would be required. A committee has been chosen to further inquire into the matter.

NEW MODE OF VENTILATING MINES.—The Incorporated Association of Mine Agents of South Staffordshire recently made an excursion to Homer Hill Colliery, near Cradley, in order to inspect and test one of Guibal's new patent fans for ventilating mines. The fan is 16 ft. 8 in. diameter, 5 ft. wide, enclosed in a brickwork casing, and connected to the top of the upcast shaft by a tunnel of 35½ square feet sectional area. It is driven by a small ten-horse power high-pressure horizontal engine, connected with the winding-engine boilers, and the whole, when once started, requires little or no attention for days together. The air is drawn from the mine up the upcast shaft, and driven by the fan up a short chimney, much wider at the top than the base. Near the bottom of this chimney is fixed a sort of Venetian shutter, for the purpose of regulating the quantity of air. At an experimental trial, the engine making sixty-five strokes per minute, the fan changed 37,500 cubic feet of air per minute. When at its greatest speed it was scarcely possible for the party to stand upon their feet. It was clearly shown that it only took about twenty seconds to increase the ventilation from a state of stagnation to that of 50,000 cubic feet per minute. The total cost of engine and fan complete has been about 500l.

THE PROPOSED NEW BUILDING FOR THE BRADFORD MECHANICS INSTITUTE AND SCHOOL OF ART. At a meeting of the committee of the Institute, the designs for the new building, prepared by Messrs. Andrews, Son, & Pepper, of Bradford, architects, have been finally approved, and instructions given to them to proceed with the necessary works forthwith. The advantages of the proposed edifice over the present will chiefly consist in a larger lecture-hall, in the number and size of the class-rooms, and the addition of galleries for exhibiting drawings, casts, and other works of art. The site is bounded on three sides by main thoroughfares. The principal front being towards the Bowling-green, and the flanks to New Market and Tyrel streets, each of these fronts will have a spacious entrance and staircase. On the first, or principal floor, below which will be shops, will be the reading and news room and library, about 85 ft. by 40 ft., in the rear of which will be placed the lecture-hall. This room, about 80 ft. by 50 ft., and 30 ft. high, will, with its galleries, comfortably seat upwards of 1,000 persons, and extends through the first and second floors. The front part of the second floor will be occupied by the principal class-rooms, and the whole of the third floor, which is concealed by the parapet, will consist of class-rooms and the galleries before mentioned, all lighted from the roof. The style of the building will be modern Italian. The cost will be 12,000l.

THE PROPOSED AQUARIUM AT BRIGHTON.—The Brighton Town Council have sanctioned plans for a large salt-water aquarium at Brighton, and have agreed to contribute 7,000l. towards the cost of a projecting sea wall that is to be built.

HENLEY-ON-THAMES.—Mr. Ferrey, having been called in by the churchwardens of the parish church of Henley-on-Thames to report upon the damage done by lightning to the building during the storm of the 20th inst., reports that beyond the destruction of the south-east turret and injuries to the roofing, &c., caused by the fall of the stonework, the tower has sustained no other fracture or settlement, and that the necessary repairs can be made at a comparatively moderate outlay. Such was the force of the lightning that it scattered the stonework far and wide, some fragments falling on the roof of the Red Lion Hotel, and portions even, it is said, into the Thames.

THE METROPOLITAN CATTLE MARKETS BILL. The report of the Markets Committee, with reference to the proceedings in Parliament in relation to this Bill, has been again brought up for consideration in the Court of Common Council. The committee recommended that they should be authorised to inquire into the whole subject, and report to the court the best course to be pursued in order to meet the requirements of the cattle and meat trades, and prevent, as far as might be practicable, the introduction of the cattle plague, and, whilst protecting the fair and proper interests of the corporation, to promote the advantage of the public. The committee also asked for authority to confer upon the subject with her Majesty's Government, and such other parties as they might consider advisable. The adoption of the report was finally agreed to in the face of an amendment to the contrary.

FURNACES FOR SMELTING GLASS.—An improvement in the method of creating draughts in glass furnaces has been patented by Mr. James Davison, of Bishop Wearmouth. At present, long caves are placed under glass furnaces, and large cones of brickwork above them, in order to get the sufficient amount of heat requisite for the perfect fusion of the materials used in glass-making. Mr. Davison's invention does away with these expensive and inconvenient draught creators. He employs steam, which is generated in any suitable boiler, and which is injected into small flues, chimneys, or chimneys by steam-pipes or jets. In each flue or chimney the steam pipes or jets may be either fixed or portable; they are provided with stop-cocks, so as to regulate the supply of steam, and in this manner a draught is created and the heat of the furnace increased and regulated at pleasure. The flues may also be so arranged as to consume the smoke from the fuel.

TENDERS.

For new wing to the Norfolk County Asylum, near Norwich. Mr. R. M. Phipson, F.S.A., architect:—	
Nightingale	£4,689 0 0
Sabberton	4,180 0 0
Nelson	4,062 11 0
Balls	3,983 0 0
Gibbons	3,948 0 0
Newell	3,822 6 0
Downing & Hood	3,640 0 0
Youngs	3,605 0 0

For drainage works at Horley, for the Local Board, Reigate. Mr. J. F. Matthews, architect:—

<i>For Materials and Labour.</i>	
Symonds	£925 0 0
Woodman	890 0 0
Ayers	749 17 0
Pitt (accepted)	743 0 0

<i>For Labour only.</i>	
Woodman	£490 0 0
Keward	415 0 0
Collips	192 10 0

For tavern at Southend, for The Commonwealth Land, Building, and Investment Society. Mr. Iron, architect:—

Jobston	£1,485 0 0
Gann	1,475 0 0
Lark	1,410 0 0
Wood	1,363 0 0
Kilby	1,353 0 0
Hearle	1,325 0 0
Crabb & Vaughan	1,295 0 0
Wicks, Baugh, & Co.	1,250 0 0
A. & J. Smith	1,247 0 0
Hubers	1,235 0 0

For alterations Nos. 27 & 25, Oxford-street. Mr. S. C. Capes, architect:—

Mann	£628 0 0
Manley & Rogers	607 0 0
Kelly, Brothers	558 0 0
Scrivenor & White	559 0 0

For rebuilding the Bramley Arms, Notting-hill, for Mr. J. Empson. Mr. Alfred Stoner, jun., architect. Quantities supplied:—

Bishop, Ashford, & Co.	£1,587 10 0
Patrick	1,490 0 0
Gammou & Sons	1,368 0 0
Aspin	1,350 0 0
Wheeler	1,300 0 0
Langmead & Way (accepted) ..	1,250 0 0

For building two ale stores at the Ransgate Brewery, for Messrs. Tomson & Wotton. Mr. B. Adkins, architect:—

Goodchild	£1,977 0 0
Crockett	1,693 0 0
Belsey	1,638 0 0
Wilson	1,493 0 0
Epps	1,183 0 0
Sollitt (accepted)	1,187 0 0

For a villa residence, London-road, Enfield, for Mr. T. F. Clunie. Mr. F. Cushing, architect:—

Holbard	£978 0 0
Patman	944 0 0
Bayes	930 0 0
Brown & Son	883 0 0
Fairhead	870 0 0

For a dwelling-house, Sidney-road, Enfield, for Mr. S. Hatland. Mr. F. Cushing, architect:—

Bayes (accepted)	£285 0 0
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For three cottages, Medcalf-road, Enfield, for Mr. Turner. Mr. F. Cushing, architect:—

Bayes	£398 0 0
Ranson	342 10 0
Holbard	315 0 0

For four cottages, Putney-road, Enfield, for Mr. Brown. Mr. F. Cushing, architect:—

Ranson	£300 0 0
Holbard	500 0 0

For parsonage-house, St. Mary Cray, Kent:—

Hollis	£1,575 0 0
Hill, Clunie, & Co.	1,779 8 0
Wright	1,745 0 0
Keys	1,700 0 0
Vanhan	1,474 0 0
Francis (accepted)	1,375 0 0
.....	1,125 0 0

For church restoration, Barrow-upon-Sea. Messrs. Stevens & Robinson, architects. Quantities supplied:—

<i>Tower.</i>	
Past	£438 12 0
Elliott	378 7 0
Moss	489 0 0
Firn	404 0 0
Roberts	319 18 10

For alterations to 32, Gough-street, Gray's-inn-road (beer-house), for Mr. Tomkins. Mr. C. F. Crapp, architect:—

Terry	£399 0 0
Langmead & Way	517 0 0
Hughes	549 0 0
Colen	484 0 0
King	379 0 0

For the erection and completion of a villa residence in Withshire-road, Angel-town, Brighton, for Mr. Thomas Sbw. Mr. Charles Bows, architect:—

Lathey, Brothers (accepted)	£545 0 0
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For building new school and master's house, St. Saviour's Church, Horse Hill-road, Brighton. Mr. W. Trickett, architect. Quantities supplied by Messrs. Batstone & Hunt:—

Lathey, Brothers (accepted)	£1,493 0 0
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For finishing two villa residences, West-hill, Sydenham. Mr. William Mundy, architect:—

Webb	£1,735 0 0
Lark	1,390 0 0
Lark (accepted)	1,347 0 0

For alterations to two houses in Gil-street and Red Cow-yard. For Mr. W. William Smith, architect:—

Nash	£745 0 0
Cole	730 0 0
Mann	594 0 0
Sharpe	584 0 0
Clark	581 0 0
Fletcher & Caghey	540 0 0
Goodman	487 17 0
Staines & Sons	488 0 0
Crabb & Vaughan	489 10 0
Blackmore & Morley	430 0 0
Waters (accepted)	445 0 0

For the erection of a stable in the Seven Sisters'-road. Mr. William Smith, architect:—

Bradley	£337 0 0
Fletcher & Caghey	396 0 0
Crabb & Vaughan	408 0 0
Briley	344 13 0

For residence at Chertsey, for Mr. J. Madocks. Mr. T. Wonnacott, architect:—

Britton & May	£2,208 0 0
Foster	2,116 0 0
Duke	2,109 0 0
Knight & Sons	2,081 0 0
Simpson	1,800 0 0
Miles	1,815 0 0
Harris	1,887 0 0
Turner	1,787 0 0
Nightingale	1,777 0 0

For House at Wood-green. Mr. F. A. Klein, architect:—

<i>Deduction.</i>	
Bayes	£2,687 0 0
Axford	2,985 0 0
Charlton	2,809 0 0
Nightingale	2,777 0 0
Perkins	2,614 0 0
Goodman	2,590 0 0
Dann	2,570 0 0
Carter	2,570 0 0
King	2,487 0 0
Coole	2,243 0 0
Baker	2,190 0 0

The Builder.

VOL. XXVI.—No. 1342.

Architecture and the Tenure of Land.

T occurs at times to the technical, or to the scientific, writer that a subject foreign to his usual studies forces itself suddenly on his contemplation. Politics may be forbidden ground, and yet some great political change may take place, which altogether disturbs the course of business. Or some popular mania may arise, some period of unhealthy and gambling activity, or of unreasonable despondency, the cause of which is matter of no slight moment to all who live by the clink of the trowel.

It is thus that matters which are, strictly speaking, non-architectural, may at times assume considerable prominence in an architectural and social journal. The relations of the architect are so numerous that it is hard to draw the line, and to tell him with what subjects he is unfitted professionally to deal. Few kinds of study, for example, can be more distinctly separated than are architecture and physiology. Yet the laws of health require to be studiously studied by the architect. The ventilation and warming of buildings, the construction of hospitals, the eradication of fever-heds and pest-plots in crowded cities, bring the builder into intimate relation with the physician.

Again, the subject of finance is one which comes home to every one. Want of money has been called, with much justice, the only engineering difficulty. The nobler labours of the architect are eminently expensive. Private opulence may at times seek to build for itself an appropriate home; but public buildings,—ecclesiastical, forensic, municipal, regal,—are those which demand the chief attention, and require the most cultivated skill of the designer. It is thus that the builder comes in contact with the stock-broker, and that the course of the speculative fury of the day, the fall of banks, or the nursing into life of credit companies, has direct relation to industrial progress.

One of these occasions has lately arisen. The subject may at first seem non-technical; but it can only be so regarded on the view, that it is purely visionary. If we were to consider it, as many will do, as not entitled to receive serious consideration, we could find no room for its discussion in our columns. But the names of some of those who, with grave faces, and the formulae of reason, urge the most novel argument against civilization, are too well known, and, we may add, are some of them too much respected, to allow us to pass by their views in silence, on the sheer ground of inherent self-contradiction. We allude to the theory that land cannot rightly be held as private property.

Were it possible for the hypothesis to which we refer, to take actual, practical form, it would be an evil day for the craft of the builder. Architecture would founder, like a stricken vessel in a storm, beneath this heavy blow of the political economist. For the first requisite of the architect is the land on which to build. A firm hold on the soil is essential to the builder. Ownership, property,—call it by what name we like,—the old phrase, *cujus est solum est usque ad cælum*, is as sacred to the man who would build a house, as it used to be to every man who regarded the freedom of his native land, and the unshaken stability of her institutions.

It is always a suspicious circumstance when a bald and imperative logic is brought to bear on an ancient opinion. The process of the logic may be unexceptionable, but fallacy usually lurks in the premises. The great probability has in the first instance to be dealt with, that the habits and customs of our ancestors, as far back as we can distinctly trace them, are more true to the wants of our common human nature, than is the assumption, that all these habits are wrong, and that their origin is false and unnatural.

Instinct, in this matter, is at one with history. Nor is the instinct merely human,—it is common to all the higher forms of animal life, to most beasts, to many birds, even to some fishes. The instinct which leads the eagle to retain and to defend its eyrie, or the fox its den, is, of course, widely different in its development from that in accordance with which man, emerging from barbarism, throws the shelter of law around his home; but the wide and imperative rule of the instinct cannot be disregarded by those who ask, "what is the teaching of nature?"

To occupy a portion of the earth's surface, to the exclusion of all other occupants, is the first step towards civilization. Nomadic tribes exist which have never struck root in the earth, but which, nevertheless, guard their hunting-grounds, or fishing waters, or pasturages, with jealous care. The Scythians are reported by Herodotus to have made their homes in wagons, so that they could be shifted at the desire of the occupant. The historian goes on to add, that the idea of the family, among these cryptogamic people, was as undeveloped and as uncomfortable as the idea of a home. The very act of sowing the ground implies the expectation of retaining its possession till the harvest.

The advocates of radical change in this matter reply, that the land is the property—not of the individual, but of the nation. Propose to them the historic investigation of a rather unintelligible claim, and they decline to meet you on that ground. They are not concerned, they will tell you, with what is, or what has been, but with what ought to be—at which they arrive by logic.

This, then, is the argument. The only ground of claim to private property in anything is, that it has been produced by labour. No man has made the land: therefore it is no man's private property.

Two methods exist of dealing with a theory. One is to examine its origin, the other is to trace its consequences. If the latter involve the impossible, either the reasoning or the premises must be false.

Now to refer the origin of private property to labour, is, at all events, to beg the question. It cannot be proved that such was ever historically the case. The assumption is contrary to much that we know of human habit and of animal instinct. The proposition, then, can only be supported by some proof of its innate truth.

The idea of ownership is only a part, or a case, of a more general idea, that of right. Ownership of land means a right to its occupation and enjoyment, to the exclusion of every one else. Now, to say that all rights are created by labour alone, is pure nonsense. No one could gravely sup-

port such a thesis. The basis of right, in many, if not in most, cases, is contract, more or less explicit. Such, to say nothing of a higher sanction, is the marriage contract. The mutual right of husband and wife to the mutual enjoyment of each other's intimate society and fellowship, holds good against all the world. Is this a right created by labour?

As with the hed, so with the hearth. The first requisite for the establishment of the family is the roof-tree,—the spot on which the settler may rear his hut, if it be only one of logs. When the settler ceases to be solitary, he adds to the need of shelter, that of a temple for his faith, and a spot sacred to the repose of his dead. He acquires this by the same simple methods to which he has recourse for the supply of his other instinctive wants. In that primary state of society which always reappears where the proportion of inhabitants to soil is that of the unit to the million, man takes possession of a homestead by discovery, by occupancy, by enclosure, or by cultivation. Prescriptive right is of rapid growth in lands in which all that is not the scene of private cultivation is the hunting-ground of the wild beast; and prescriptive right to territory once created, its demise from occupant to occupant, or its transfer from owner to owner, is simple matter of contract. We may at this moment see, in the vast western wilds of America, how landed property originates.

All cases of oppression and injustice on the part of the owners of this description of property come under the same law with those of the abuse of wealth or power of any kind. The rich man owes an exact account of his stewardship, a more exact one than any earthly tribunal can demand. Whether he own acres, or ships, or mines, or gold, the principle is the same. The exactments of conscience are stern; but to carry them out, is beyond the power of the execution that issues from any human court. The interference of the State must, at all times, stop far short of the full demand of right. While property exists, bad men, as well as good men, will do as they like with their own; nor is the tenure of property likely to be destroyed because such is the case.

As, then, the tenure of land is, in its origin, like that of many other descriptions of property; and as it is, in its present state, dependent, like all other property, on the sanctity of contract; the only ground on which society can be asked to interfere with the law of so ancient a tenure is the public welfare. If the advocates of any agrarian redistribution (a word which recalls the Roman troubles in the time of the Gracchi, just 2,000 years ago), call upon the Legislature for aid, it can only be by showing, at the same time, the practicability and the necessity of the reform which they propose, or the certain and absolute amount of good, to the whole community, that will follow on the interference with the prescriptive rights of a portion of it. *A priori* right to interfere, there is none. The historic title of the landowner, his contract right to his land, the instinctive force with which man has ever clung to the soil, the fact that civilisation (as its name imports) is the work of the builder, and that the work of the builder depends on the tenure of the soil,—all these things are against the innovation. The would-be reformer has no shadow of an argument to adduce, if he be not the *Salus populi suprema lex*.

What, then, is the practical nature of the demand? What will the claimant have, if he obtain all he asks? Re-distribution, pure and simple; confiscation, with or without compensation, of the property of the present landowners, for the advantage of some undetermined future landowner. "The State is to be the owner," says the agrarian reformer. How will the action of the State take effect?

Let us confine ourselves, in the first instance,

to the subject of land used for building, or in immediate connexion with residential purposes. What induces a man to build? The desire for a home for himself or for others. The purchase of land means, that the house which the purchaser builds on it shall be his castle. If his hold be for such a limited term as that of three generations, a ninety-nine years' lease, the mode in which the builder sets to work is feeble and unsatisfactory. Compare the stucco villas run up on property of this description with the houses that a man builds for himself. What sort of cathedral, or palace, or court of justice, or gallery of art, or market, or school, or hospital, or important building of any kind, can be secured without a firmer hold on the ground than that of such a lease? How, moreover, is the State—the proposed universal landowner—to secure the builder? It will give him a lease. What are to be the terms of that lease? To ensure building of an architectural character, it must be a perpetual lease. How is the State to be remunerated? Is it by a yearly payment? Suppose the tenant to be a permanent defaulter, is the State to have the power of ejection? If so, who would build? If not, who is the proprietor? Possession, in such a case, would be not only nice, but ten, points of the law.

Say that the State is to be secured by the payment, in the first instance, of a sum adequate to the redemption of a perpetual ground-rent. What is this but purchase of land? The State will have been made to intervene as the seller, and a new property will have been created for a new set of owners. That is all the difference. The builder must have a *HOY STO*—with no land, no building, no ownership of land, there will be no building beyond the shanties of squatters.

It is perfectly true that instances may be pointed out in which the competition for a special site, for residential or for business building, is so keen, that large sums of money may be expended in the erection of houses subject to a heavy ground-rent; but the risk in these cases is considerable. The constant ebb and flow of fashion or of business may convert the Belgrave-square of to-day into the Leicester-square of 1888. No description of property, forty years ago, would have been thought safer than a good roadside inn on one of the great lines of metropolitan communication. What is such property worth now? The piercing of a new street, the adoption of an improved mode of travelling, the mere unchecked expansion of a great capital, may at any moment, and probably will, sooner or later, so change the residential, or raise the business, value of certain localities, that the householder will be unable to find a tenant at the mere rate of ground-rent and taxes.

Nor, were the risk less, and were the exception to prove the rule, can it be shown that any advantage would accrue to any one from the fact that the State was ground-landlord. Most tenants would think the reverse would be the case. As a source of public income, ground-rents would be expensive in collection, troublesome, and hazardous; in short, a bad form of tax. As respects the occupier, the only benefit he would derive from paying rent to the State instead of to an individual, would be the chance of being less strictly looked after.

The erection of houses is only a portion of the labour expended upon land, which will be ill, or not at all, attempted, without the existence of a firm, definite, sacred, tenure of the soil. Great works of all kinds,—docks, harbours, canals, roads, railways,—require to strike a root as deep as the very basis of society itself. Drainage and irrigation demand permanence of tenure for their execution. The application of steam to agriculture has led us to turn over a new page in the true book of political economy. The workmen who met at Brussels the other day were by no means blind to the fact that the peasant proprietor is anything but a national benefactor. The perpetual *amortissement* of land, which Napoleon pointed out to Eugene as a sure method of reducing the mass of the country population to political subservience, is inconsistent with the use of the steam-plough. High farming, it is now fully admitted, can only be applied to large farms. A certain amount of agglomeration of land is necessary for every kind of culture, except that of the spade; and for the engineering of culture,—for all comprehensive and efficient draining, irrigating, sewage manuring, and thorough application of the steam cultivator, to answer, the size of a farm must be considerable. Then, again,

it may be readily shown, that no legislative interference on the part of the State can actually amount to anything, except confiscation and resale. Landowners may be extinguished; hut, if so, it can be only to reappear; unless cities and towns, public buildings and private enterprises, the routes of inland commerce, and the improvements of modern agriculture, are all to disappear with them.

When, then, a writer on political economy, even if he be one who is justly regarded as entitled to respectful attention, permits himself to say that the appropriation of land "is at the first aspect a usurpation on the rights of other people," and when he adduces as reasons for such a dictum the statement that land is "a thing which no man made, which exists in limited quantity, which was the original inheritance of all mankind, and which whoever appropriates keeps others out of its possession," he not only argues with equal fairness against anything like a sacred tenure of most sorts of property, but, as far as he has any influence, strives to stop the progress of the builder. The objections are not special to land. "No man made" coal, though man wins it by labour. "No man made" timber, though man grows it on his land by care and patience. "No man made" the water-fall, which has been appropriated to drive a mill; and whoever appropriates the return of the seed which he has himself sown "keeps others out of its possession." Wild and sweeping statements, put forth with the assumption of logical exactness, that involve self-contradictions of this kind, bring contempt on the study of political economy, or at least on some of its students.

For all great works of modern civilisation, tenure of the soil is the *sine quâ non* condition. For all domestic architecture, for all attempts at climatic improvement, by action on rivers, fens, forests, lakes, and the like, the case is the same. For all farming worthy of the name, not only the definite tenure of property, but the tenure of property to a considerable amount by the same holder, is requisite. It will hardly, we suppose, be argued, that our present cities, towns, and detached dwelling-houses, are numerous and durable enough to serve the needs of our descendants for all time. Yet the opponents of landed property, if they had their way, would go far to make their renewal difficult, and their increase impossible. To the fancied syllogism, "no man can own anything that he has not made; no one made land; *ergo*, no one can own land," must be added the corollary, "But no one can build without owning land; therefore no one must build." The same result will follow from the other clauses of the argument. For as "no one made" timber, and therefore as no one can own timber, no one can have a right to huy or sell timber, and therefore no timber is to be forthcoming for the builder. And as no one can appropriate even the manufactured article of brick, without keeping some one else out of possession, it is evident that we shall be reduced to living in tents, if our friend whom we have quoted has his way.

It is a painful and humiliating reflection that public speakers and public writers should gravely bring before the minds of the less instructed masses of society fallacies so transparent. From the very strength of the instinct with which man clings to the soil, any theory that appears to promise land for the million will be sure to stir very deeply the minds of the poorer and more dependent. We have, as we before hinted, two thousand years of experience on this head. But for men to make speeches in Parliament, and to write pamphlets and articles in newspapers, assuming, with all the forms of reasoning, the truth of statements that are not only unproved but incapable of proof,—not only unproven but false,—is an evidence of the extremely fragmentary and imperfect character of the education of some of our educated men. When a man feels impelled to ejaculate,—

"The world is out of joint. Oh, cursed spite,
That ever I was born to set it right!"

he should, in the first instance, be very careful to take nothing for granted; and, above all, not to beg the principal question on which he founds his views. The lucid clearness of the first great English writer on the sources of national wealth was present in his thoughts, and, therefore, was evident in his style. Men have found it far easier to imitate, to some extent, the trenchant language of Adam Smith, than to emulate his patient and modest labour; but when such pseudo-logical statements encounter the calm

good sense of the practised man of business, they find their natural level. He may be unable to expose their logical inaccuracy, but he is aware of their practical absurdity. Tell the man who is about to build a mansion that he can have no property in the land on which he is about to erect it, and he will desire his architect to seek another locality. The architect requires his *HOY STO* as implicitly as does the geometriician. Tell him he shall not have the land, and he will reply that those who deny it to him oppose the very basis of civilisation, and would push back the European citizen to the wigwam of the Indian, the tent of the Arab, or the wagon of the Scythic nomad.

SKETCHES ON THE TWEED: KELSO.

The traveller who penetrates into the old Scottish Borderland by the North-Eastern Railway via Berwick-upon-Tweed, will traverse a tract of country rich, indeed, in natural beauty, but richer still in its historical monuments and battle-fields, with all their teeming elements of romance and all their stirring incidents of legendary lore. For some miles the railway route runs on the south bank or English side of the noble river, and here we pass, first of all, the ancient and ruined castle of Norham, its soft red freestone gradually crumbling into dust, but still standing boldly out and in high relief against the horizon of the Cheviot hills. A few miles further on, close under the magnificent site of Twizell Castle, the ancient bridge across the Till (which here falls into the Tweed) is still seen standing, by which the English army, under the Earl of Surrey, crossed to the battle of Flodden Field. Then we come on the northern bank to the pretty village of Goldstream (with its splendid stone bridge), suggestive of the name of a well-known regiment of Guards which General Monck raised here some 200 years ago. Between Carham and the Tweed, again, on the English side, stands Wark Castle, now the seat of Lady Waterford, one of the strongest and most celebrated of the Border fortresses.*

But, leaving these memorials of bygone ages behind, the traveller will, in process of time, arrive at the little Border town of Kelso, five-and-twenty miles or so from Berwick,—a town which is better known in English history than many a manufacturing burgh ten times its size and importance in the present day. Lying out of the ordinary track of the traveller and the tourist, Kelso is not so much known or visited, we think, as it deserves to be; for it is unquestionably an interesting town,—both from its historical relations and its present condition. One of the gravest faults we shall have to find with it we may as well dispose of at once. The railway station is miserably inadequate. This may be owing most probably to the fact that it is the common terminus of two companies—the North British on the north, and the North-Eastern on the south. But surely some extra provision in such a case ought to be made. It appeared to us that there were not sufficient shuntings for the separate trains coming, stopping, changing carriages, and returning; and it does seem strange, surely that no provision is made on an important line like this for a thorough system of traffic. We suppose these things will be adjusted some day or another by the companies who are interested; although it may not be, perhaps, until two rival directors come into fatal collision, and are killed on the spot. But to proceed.

The first and most conspicuous object which meets the eye after crossing the magnificent bridge over the Tweed and entering the town, is the ruin—now, alas! sadly diminished and broken down—of the ancient abbey which gives the name to Kelso.† This celebrated monastery was founded by King David I. in 1128, and it

* Wark Castle was given by Edward III. as a marriage present to the Earl of Salisbury; and was defended by his handsome countess against King David II. Edward arrived to relieve it after the Scots had raised the siege; and fell in love with its beautiful defender. The story is told at some length by Froissart.—*Murray's Handbook for Scotland*, p. 27.

† The etymology of the name is somewhat obscure. The accurate author of the *Caledonia* derives Kelso, originally from *Calico*, *i.e.*, a sandhill; in the Celtic language.—(*Chalmers's Caled.*, p. 211.) In the celebrated letter of the Community of Scotland to Edward I., taken from Rymer (*Fodera*, vol. ii., p. 371, New Ed.), the abbots of Kelso and Melrose spell their names in the Welshish Latin of the period, De Kelgou and De Meurois.—See Tytler's "History," vol. i., p. 354 (Edin. Nimmo, Edinburgh; 1864), where the letter is printed.

was so far completed as to receive the tomb of the founder's son, Earl Henry of Northumberland, who died in 1152. The monks were of a reformed class of the Benedictines originally established at Tiron in the south of France; hence they were commonly styled Tironenses. Fifteen years before this foundation, King David, while still the Earl of Huntingdon, had imported these Tironian monks into Scotland, and had settled them near his castle in Selkirk. But the principal residence of the Scottish kings at this period was the castle of Roxburgh; and accordingly when David succeeded to the crown, on the death of his brother in 1124, he soon removed the convent from Selkirk to its present site at Kelso, on the banks of the Tweed, and within a how-shot of his royal castle. In consequence of its vicinity to the English border, Kelso suffered severely during the wars of the Succession; and it was reduced to its present, or rather its more recent, yet less ruinous, condition by the English troops under the Earl of Hertford in 1545. Although the Abbey was never of any great size, the abbots of Kelso long asserted and claimed the precedence in the hierarchy of Scotland, and even contended for superiority, as we learn from an able writer,* with the parent house of Tiron, to which this northern daughter had given more than one ruler. But we need not pursue its history. We have only to add, that after the Reformation, it came into the family of the Kers of Roxburgh. A low gloomy vault was thrown over the remains, after the fashion of the period, into a presbyterian church. But owing to the ominous fall of a piece of plaster from the roof, and to the existence of an old prophecy of Thomas the Rhymer, that the kirk should fall when it was full of people, the congregation deserted it in the year 1771. Afterwards it was converted for some time into a joiner's shop. Eventually the ruins were disencumbered of the rude modern masonry by the good taste of William, fifth Duke of Roxburgh. In 1823 the decayed parts were strengthened and repaired by subscription, and finally, about two years ago, the present duke had the ruins thoroughly repaired; and the tower which showed signs of decay over the principal archway, was strapped with strong iron rods.

The style of Kelso is that which it seems was usually adopted by David II., a mixture of Norman and Early Pointed. The church originally consisted of chancel, with aisles 60 ft. long; a nave about 30 ft., transepts, and central tower, about 90 ft. high. There are at this moment left only two arches of the south side of the chancel, the walls of the nave, with part of the west entrance. The main feature is the central tower, which was supported by four magnificent arches of Early Pointed age, two of which are still standing entire, and are at least 40 ft. high. The rest of the architecture is Norman; and the building is one of the few, we are informed by Mr. Billing,† in which the head of the cross lies to the west. One of the most remarkable features is the entrance to the north transept, which has a porch containing a small room, and this porch was the principal entrance to the parish church when the chancel was roofed in. Above the arch, which is deeply recessed and exquisitely moulded, there is a row of interlacing arcades, surmounted by a tympanum, of which the face is intersected in lozenge shapes.

Upon the whole, however, we must say that the architectural student will probably be disappointed in the study of what is left of the ruins; which, notwithstanding the efforts to preserve them, are gradually crumbling into dust. "Kelso Abbey," says the editor of its chartulary, "stands alone like some antique Titan predominating over the dwarfs of a later world." If simplicity of style and construction be any proof of this Titanic character, the learned editor may be correct, for in our opinion it is certainly the least crutide, if not the rudest, specimen of ancient ecclesiastical architecture we have seen in the whole Borders

* *Vide the Quarterly Review*, vol. LXXV., see also, "The Monastic Annals of Teviotdale," by Rev. Jas. Morton. This well-known author, although one of the prebendaries of Lincoln, was a native of Kelso. Compare Haig's "History of Kelso," and the able article, "Kelso," in the "Edin. Encyc.," by Sir D. Brewster, who was a native of Jedburgh.

† In his "Ecclesiastical and Baronial Remains of Scotland." The dimensions and description are quoted at greater length than we have done in Mr. Murray's excellent "Handbook of Scotland," which we can cordially recommend. It is proper to mention that we have also derived some assistance from Black's "Picturesque Guide."

with the exception of Jedburgh. But "the churches of Jedburgh and Kelso as we now find them," says Mr. Fergusson, "belong either to the very end of the twelfth or to the beginning of the thirteenth century. They display all the rude magnificence of the Norman period—used in these instances not experimentally, as was too often the case in England, but as a well understood style, the features of which were fully perfected. The whole features were used with a Doric simplicity and boldness which is very remarkable; although it must be confessed that this independence of constraint was sometimes carried a little too far, as in the pier arches at Jedburgh where these are thrown across between the circular pillars without any subordinate shaft or apparent support. This was," he adds, "a favourite trick of the later Gothic architects of Germany, though seldom found at this early period. Here, however, the excessive strength of the arch in a great measure redeems its want of perpendicular shafts." We cannot, at present, dwell longer on the ancient abey; we must proceed to say something about the town itself.

The town of Kelso is charmingly situated on the north bank of the Tweed, nearly opposite, or rather just below, the point of its confluence with the river Teviot. It lies, in fact, in the central plateau of a richly-wooded amphitheatre. It consists of four principal streets, and an open square or market-place in which are situated the Town-hall and the principal buildings. Like most towns which lie on the banks of a winding river, its thoroughfares are tortuous and irregular. But the principal square of the town is one of the finest and most spacious market-places we have seen in Scotland. The shops are also very good; and the houses throughout the town are generally built of the light pink-coloured sandstones of the district, and roofed with blue slate, imparting to its aspect, on the whole, a certain degree of architectural elegance and superiority, which vindicates its title to be regarded as a "pretty market-town"—a character which was ascribed to Kelso by Patten so long ago as temp. Edward II.* This character it still supports by a weekly corn-market, a cattle-market, and a wool-market, and four annual fairs. Indeed, it is a rather celebrated emporium for agricultural produce.

Kelso seems to occupy the site of what had been originally an inconsiderable village, a kind of suburb—as Gattonside is at this moment to Melrose—to the once important burgh of Roxburgh, which then lay on the opposite bank of the Tweed. It began to acquire more importance after the foundation of the abbey. During the reign of Robert I. it had increased so much as to consist of two parts, Easter and Wester Kelso; and on the final destruction of Roxburgh by James II., it naturally took the place and assumed the prominence of that celebrated burgh. The connexion of the town with the abbey necessarily made it a sharer in the fortunes of that ill-fated monastery; and, in fact, its history from the fifteenth century down to the era of the Reformation consists of nothing more than a detail of successive sieges and conflagrations. Whenever the abbey was assailed the town was attacked; whenever the former was set on fire the latter was sure to be burnt. Nor is there anything in Border history more remarkable than the manner in which its buildings (no doubt constructed chiefly of timber) were continually repaired and restored, so as to constitute the materials of so many and so closely consecutive conflagrations. Better days, however, dawned for Kelso. A new source of prosperity was opened up, and a new element of security obtained in the fostering care of the family of Roxburgh, who succeeded not only to the revenues of the abbey, but also to the seigniorial jurisdiction of the abbots. All the benefits of a princely expenditure; all the advantages of a steady and impartial administration of justice, speedily followed. By the time of the Revolution Kelso had become the principal market-town of the south of Scotland, the chief resort of the neighbouring gentry, the seat of an eminent grammar-school, and a place of reputation as a seat of learning. It is now a rather busy, improving, and wital genteel country town, totally destitute of manufactures, yet ambitious of distinction; and not so notorious for ecclesiastical history as some of the towns we could mention of equal size and importance in the northern part of Scotland. Indeed, the Kelso people, for what reason we cannot tell, unless it be due to their

* See "The New Statistical Account of Scotland," vol. III., p. 239.

Border history and connexions, have always had a greater reputation for business than devotion. Thus Sir Walter Scott says of them on one memorable occasion:—

"The Kelso men all slunk away;
They liked not much to hymn and pray,
Nor like they'st much unto this day!"

On the other hand, it must never be forgotten, that Kelso can boast of being the first provincial town in Scotland to adopt the printing press; and that it was here where John Ballantyne printed "sixty years since" the first edition of the celebrated "Border Minstrelsy," then unobtrusively announced "with notes and illustrations" by Walter Scott, esq. "How strange and unfortunate that a connexion so proper in itself and so romantic in its nature should have at length terminated so disastrously for them both!

We have already mentioned in terms of approbation the celebrated bridge which Sir John Rennie built across the Tweed at Kelso. There can be no doubt that it is one of the very best of our modern bridges in point of design; and had it been constructed of granite, or even of the hard Whinstone rocks of the district, it would doubtless have proved more lasting than the material, a soft and rather friable sandstone, which was actually employed, and which, we regret to record, even now shows evident symptoms of decay.

The view from this bridge is singularly beautiful. The junction of the Tweed and the Teviot on the left lends an imposing character to the broad and stately flow of the river, which is at this point 300 ft. in breadth; the lovely foliage of Sir George Douglas's seat of Springwood Park; the romantic old-fashioned town on the right, with the picturesque mansion of Ednam facing the bridge; and, lastly, the splendid architectural object of Floors Castle in the distance, surrounded with its towering trees and closely-shaven lawn, sloping to the very edge of the river,—all this constitutes a picture for which poor Leyden could find a parallel alone in that classic vale of Thessaly which the ancient poets have agreed in describing as the most delightful spot on earth:—

"Green swarded plains to dimpling lawns succeed,
And Temples rise on the banks of Tweed,
Blue o'er the river Kelso's shadow lies,
And copse-clad isles amid the waters rise."

Close to the bridge on the left is a massive gateway in the form of a triumphal arch, imitated, we suspect from the Marble Arch at Hyde Park, which guards the approach and avenue to Springwood Park. It is chiefly noticeable as a piece of masons' work; and it was executed, we understand, by the Messrs. Waddell, who are, or were at one time, great builders in these parts. A little higher up we observe a group of very tasteful cottages, with heavy triangular Gothic timbered roofs and finials on the gables. The walls are constructed in the old-fashioned method of timber-framings, in squares of about 4 ft., filled in with random rubble, partly-coloured and elaborately pointed. This, we observe is a growing taste on the part of cottage builders in Scotland. These are very nice examples of suburban cottages, and are obviously of English design,—at least, we never happened to see such designs proceed from a Scottish architect. But, after all, on this point we may remark that Kelso is much more like an English town, as far as its buildings are concerned, than a Scotch one. Whether this be due to the peaceful progress of "Anglo-Saxon civilization," which Mr. Matthew Arnold loves so well, we will not pretend to say. A more proximate cause, perhaps, resides in the inevitable results of the long centuries of Border warfare; but, at any rate, it is curious that there are no flats or common stairs in Kelso. Even in the poorest districts of the town, such as the Coal-square, the old houses appear to be constructed after the well-known English model, although we are afraid that more than a single family inhabit a single house. The ordinary plan of houses in the Market-square and Roxburgh-street is also that with which we are familiar in England,—a shop on the basement, cellars beneath, drawing-room on first floor, and bed-rooms above.

The modern churches of Kelso are either beyond or beneath criticism. The parish church, for example, is a hideous pentagon of some sort, covered with a circular roof like a Chinese pagoda. Compare this with Mr. Pilkington's ambitious effort in the Free Church, with its tall spire, its licentious treatment, and its elaborate naturalistic ornament, and one cannot resist

* "Scenes of Infancy," p. 172.

the conclusion that with all their genius and resources the Scottish Presbyterians have sought for true architecture in their temples, but they have not yet found it.

The only public building worthy of notice in Kelso is the Court House and Exchange, which occupies the northern side of the Market Square. To the right of this building runs a street called the Horse Market; and on the left a parallel street called the Hay Market. From the Market Square runs a long straggling street called Roxburgh-street, almost equal in length to the celebrated long town of Kirkcaldy, where Adam Smith was born. Passing up this street, close to the Free Church we come upon a most intolerable stench, proceeding, as we were told, from a "skimery," whatever that may mean—certainly it has no connexion with a tan work, we should imagine. In this same quarter we also observed the ruins of the reservoir—a large cast-iron tank, which burst and did great damage some time ago. We were surprised to see it still unrepared. Several narrow dingley alleys lead out of Roxburgh-street to the banks of the river; but near its western extremity we come suddenly upon the old-fashioned yet stately gates, the pillars surmounted with the ducal coronet, which guard the noble avenue to Floors Castle.

The day was far spent ere we could tear ourselves from that splendid mansion and those beautiful gardens. On returning to the railway station we took a last look over Kelso Bridge, and a passing glance at the massive archway of Sir George Douglas. Here we paused for a moment to observe the sculptured arms in the centre; two winged horses—the Pegasus—supporting the escutcheon of the well-known bloody heart; and the grim motto, "DIE or DIE," reminded us that we had been travelling with much pleasure in peace and security through a district of country where this was at one time impossible.

STRATHEDEN HOUSE, KNIGHTSBRIDGE.

THOSE who recollect Stratheden House, when "plain John Campbell" lived in it, would scarcely recognise the interior now that it has become the residence of Mr. Mitchell Henry, the well-known wealthy and discriminating lover of the fine arts. Under the direction of Mr. Thomas H. Wyatt, as architect, and Mr. Frederick Sang, as artistic decorator, the rooms have been fitted up and furnished very elaborately, and, we may add, magnificently. In the Hall, which is still, unfortunately, low, the ceiling and frieze are appropriately embellished in encaustic colour, and a handsome tile pavement has been laid by Maw. A dual head, Diogenes and Socrates, a fine antique bust of Agrippa, and the Florentine Dogs, in Serpentine, are amongst the works of art it contains; while the walls of the staircase are hung with pictures, some of them originals and others copies of paintings by good masters. In the Dining-room the walls are covered with silk brocade; a lofty chimney-piece, of carved oak, in the style of the sixteenth century, has been built up, including some beautiful carving of the period. The ceiling, modelled in the same style, is embellished with allegories, Raffaellesques, and gilding. The woodwork of the Library is chomized, with gold mouldings and ornaments. The ceiling, cornice and frieze, Venetian *Cinque-cento* in style, are partly on gold, partly on turquoise-blue ground. The penciled compartments contain arabesques in the borders and portraits of philosophers and poets. The walls are hung with heavy green silk from Lyons, as are those of the drawing-room. For the latter, the furniture, tables, chairs, consoles, and frames were modelled and finished in Rome and Florence after originals in the Palazzo Pitti and in the Vatican. The walls of the Billiard-room are pale sea-green in colour, the woodwork being dark green with gilding. The ceiling, cove, and cornice are very elaborately embellished, Italian *Cinque-cento* in style. There is a remarkable carved settee in this room that once adorned a ducal mansion in Florence. The design of part of it is ascribed to Giulio Romano. A recess of this room, between marble columns, the back-ground of which is a positive Pompeian red, contains a statue of a flower-girl, by Wolf, of Rome. Other statues by the same sculptor, and a "Puck" by Lough, will be found elsewhere. As among the heat things in the rooms we note a remarkably fine tea service of Sevres china, painted with portraits, and originally a present from Louis XIV. to a member

of the Visconti family. It is an exquisite result of the union of Art and Industry.

The principal addition to the house is in honour of sculpture,—a temple-like apartment or shrine, formed to receive Melly's noted group, "The Pompeian Mother," which was for some time one of the lions of modern Rome. The statue represents a woman who, unclotched, with the exception of some wind-pressed drapery behind, and holding her child in her arms, strives to escape the horrors of the destruction of Pompeii by Vesuvius. Her figure recalls Rubens rather than Raffaello,—power rather than refinement; but any objection to this being yielded, the work must command great admiration. Rumour gives 8,000 guineas as its cost.

This temple and its approaches have been painted in the Pompeian style. The greater part of the back-ground is red and black, with animals, birds, scrolls, a rich frieze, a gilt dome, and a mosaic pavement by Minton. It is scarcely necessary for us to add that a very large sum has been expended on the works in Stratheden House.

POPLAR AND STEPNEY SICK ASYLUM COMPETITION.

THE Poplar and Stepney Sick Asylum is to be built in Bromley, Middlesex, just opposite the Stepney Union Workhouse, a commodious structure, erected not long ago from the designs of Mr. Henry Jarvis. The Board of Management having invited a certain number of architects to compete, eleven have sent in designs for the proposed hospital, and the drawings are all very fairly hung in a room at the workhouse. The instructions required accommodation for 255 men and 345 women, on the pavilion principle; fifteen of the women being lying-in cases, and fifty of each sex being Foul cases. The instructions were in accordance with modern hospital principles, but the competitors were to suggest anything they thought desirable. The chief premium offered was 100*l.*, to merge into the commission, if the design he carried out, with 80*l.* to author of second best design, and 40*l.* to each of the other competitors. If we understand rightly, a reduced commission is offered to the architect who may be engaged, but of this we are not certain. We will hope we are misinformed. The site is a long narrow awkward piece of land, bounded by the Tilbury Railway on one long side, and by houses of very poor character on the other; and this, doubtless, increased the difficulties of the architects. The following is a list of the competitors, with the sum they put down as the estimated cost of their design:—

Messrs. Hills & Fletcher.....	£ 39,000
Messrs. Giles & Biven	34,000
Mr. Wilson, Design A.....	35,000
" Design B.....	50,000
Mr. Bressy.....	50,000
Mr. Worthington.....	50,000
Mr. Scott, jun.....	50,500
(Add 1,500 <i>l.</i> for Parian cement, deduct	
500 <i>l.</i> if floor in pine instead of oak)	
Mr. T. Blashill.....	50,000
(Including machinery and lifts)	
Messrs. Hammack & Lambert	56,500
Mr. Morris.....	57,952
Messrs. Harston.....	68,000
Mr. Bracebridge.....	72,000
(Exclusive of engineering works,	
fitting up laundry and washhouse,	
hydraulic lifts and fittings, laying	
out garden, &c.)	

Examiners of the drawings would fail to find the reason why the last-named design should cost more than double the sum put down for some of them at the top of the list, or why it should cost even one-third more than most of the other designs. The fact is, however, as we said in our last, speaking of a similar competition, these amounts are simply opinions founded on more or less previous experience.

The designs from which the managers will probably select the first two are those by Messrs. Harston, Messrs. Hammack & Lambert, and Mr. Wilson, (B.) Mr. Wilson's plan, at the closet end, is somewhat close and confined. Messrs. Hammack's elevation is poor. Messrs. Harston's is superior in this respect, as in some others, and if the apparent difference in price be reconciled may come out first, a result we should scarcely feel disposed to term erroneous, so far as we may depend on a superficial examination.

Mr. Thos. Blashill has sent two designs, on which he has evidently bestowed much thought. The plan is very good in several respects.

Mr. Worthington, by placing main corridor in

centre, renders his wards too small for economical working. His elevation is agreeable. Mr. Bressy in designing a long ward, for bedridden patients, without a day-room, throws a doubt on his knowledge of the actual requirements of such an establishment as this.

Mr. Scott, jun., has given his buildings such an ugly aspect that his plan was probably less looked at than it might otherwise have been. Messrs. Giles & Biven, who have the whole matter at their fingers' ends, are less happy here than in some of their other designs. By placing the day-room at the side of the ward, and separating it from the latter only by a low partition, they not only take away a window from some of the beds, but give the same atmosphere in the day-room as in the ward. Mr. Wilson also in his general plan shows the day-room at side of ward, but a large alternative sheet with referenceto this arrangement probably saved him from objection on that score.

ON MEGALITHIC MONUMENTS.

AT the annual meeting of the Northampton Architectural Society, held recently, Sir Henry Dryden made some *vivâ voce* observations on

The Megalithic Monuments of Brittany.

The province of Brittany, he said, consisted of five departments, and if they looked at the map of France they would see that it constituted the great western promontory of France; and it was no doubt owing to its particularly promontorial position that so many of these ancient monuments had been preserved, for the arts of civilisation had not so readily obtained a position there, and therefore could not work in so destructive a spirit as in other parts of France. Of these departments Finisterre and Quiberon were the most rich in these monuments, although they existed in the other departments. The part in which he had been at work with Mr. Lukis was in Quiberon. The province of Brittany contained a large number of these megalithic remains. There were four kinds of megalithic monuments; first, *Menhirs*, which meant tall stones or pillar stones, of the tallest of which yet found he exhibited a drawing. The second kind were the *Dolmens*, which were chamber tombs, of which he only exhibited a drawing of one specimen. Thirdly, there were the *Circles*, of which there were several. He exhibited plans of the three principal—the circle of *Ménec*, the circle of *Kairverin*, and the circle of *Kerlescant*. There were a few more, but not many of them—perhaps one or two more; but he supposed there were not a dozen circles altogether in Brittany. Then there were the monumental lines of Erdeven, the principal part of which was near Carnac. The lines of *Ménec* were eleven in number, the lines of *Kairverin* ten, and the lines of *Kerlescant* thirteen. Now there was a very important point in the nomenclature of these things, which was very bothering. If they had to do with French antiquaries and their works they would find this difficulty. What we call a *cromlech*, the French call a *dolmen*; and what we call a *circle*, the French call a *cromlech*. These monumental remains had never been planned to any extent, and never been properly described. The number of people who had visited them was extraordinary, and therefore it was the more surprising that so little had been done to make them understood. He believed he had seen everything that had been written on the subject, and there was not a single thing to be relied on. His friend, Mr. Lukis, had seen more of the remains than he had. A strong reason why they should be planned was, that they were being destroyed as fast as they could be. He was in the district in September, 1867, and when he went again this year he found that many of them had been destroyed, and one of the most curious *dolmens* was being carted away. They were breaking up some of the others whilst he was there. As the plans he had taken were accurate, they would be of great use eventually. Very few of these remains were marked on the French ordnance maps, and not nearly so much interest had been taken in them by the French engineers as was the case in England. He should not say anything about the *dolmens*, for his friend, Mr. Lukis, had written a good many things about them, which would ultimately be published. They were chamber-tombs, and were all inclosed in immense mounds of earth first of all. There were lines and circles in other parts of Brittany,

but he should only describe those about Carnac. He had only planned part of these, for it would take two or three lives to measure and plan many of them. Some of these sets of lines had circles at the head, whilst others had not; but he could not say that there had not been circles at the head of the others. For instance, *Kerlesant* had one which was not placed symmetrically with regard to the other; and then *Kairverin* had no circle, and he did not think it ever had, because in the other cases the circles were on the highest ground, but in this case the lines went up to the point, and the ground began to sink directly after. Therefore he considered it never had any circle, as did Mr. Lankis also. As for the *Kerlesant*, the enlightened owner was carrying it away as fast as he could; and since he had planned it much of it had gone. A good deal was carried away in the interval between his two recent visits. *Ménez* consisted of eleven lines, and no doubt never had more than eleven. *Erdevén*, he should think, consisted of eleven lines. The drawing which he exhibited represented the circle of St. Pierre. The distance between the circle and the corner of the lines was 290 ft., and the diameter of the circle was 180 ft. *Ménez* was very nearly a mile long, but *Kairverin* was the longest of them all. St. Barbe was about 900 ft. only in length, but they did not know exactly whether that was the complete length. They believed, however, that it was, and up at the top of it there was no circle now, but there were three enormous blocks which stood up at the head. Whether they were part of a circle, or whether they were only three blocks put at the top, one could not determine, but there was nothing like a circle. Neither was there anything like a circle at *Erdevén*, but there the circle, if one ever existed, might have been destroyed, because in making the Imperial road some of the end blocks had been mutilated, so there was great confusion; but still he thought there never was a circle. Some of the end stones of the circle of St. Pierre had been eaten away by the sea, for they had found some of the fragments on the beach. The circle of Ile Lanic was on a small island about a quarter of a mile from the coast, the whole of which was covered with Roman pottery. All along the little cliff which was only some 4 ft. or 5 ft. in height, there were numerous specimens of Roman pottery, and other similar antiquities. Flint heads and arrow heads, and many such things, had been found, and no doubt others would be found also. The sea had encroached very much there. Mr. Lankis said it was very odd how so much pottery should have accumulated on a small island, and he raised the question, why did the people go there? He supposed it was likely it was once part of the mainland, and especially when they found, on sounding, that the channel between the island and the mainland was quite shallow. It appeared, therefore, highly probable that the sea had burst over the land, made the projection an island, and washed the circle away. It was not very different in diameter from the circle of St. Pierre, it being some 165 ft. All the writers who had made mention of those lines had treated them as if they were so many parallels, and Dean, in his "Serpent-worship," wanted to make out that all these lines favoured the hypothesis that they were temples for serpent-worship; but that argument would not hold water. In the case of every set of lines, the head was wide and the tail small. They began with big stones, and tailed down to little ones. The stones began by being some 8 ft., 9 ft., or 10 ft., in diameter; and towards the end they gradually became smaller, till the diameter, perhaps, was not more than 4 ft.; the spaces between the stones and the lines remaining but slightly different. None of them were set out with mathematical regularity, but they were very wavy. The circle-stones in all these cases were smaller than the line stones. Mr. Lankis wanted to know which were first erected,—the lines or the circles; whether the circles were added to the lines or the lines to the circles. They first of all thought that the circles, being the smallest, were first erected, and that the lines were afterwards added; but against that supposition was the significant fact, particularly in the case of the *Kerlesant*, that the circle—which, by the bye, he should have explained, was a horse-shoe shape,—was flattened to receive the head of the lines. That was conclusive against the circle being made perfect at first, and the lines being tacked on to it. It was much more likely the circle was tacked on to the lines, although the stones were much smaller. The Great Menhir, Locmariaquer,

was 67 ft. 5 in. in diameter by 13 ft. 6 in. wide. This was the largest in Brittany, and he supposed in France. The oddity of it was that, when it broke, the two fragments fell in opposite directions, as represented in the diagram. In one *dolmen* a gold collar had been found; and that single fact had done more harm to antiquities, and had resulted in greater destruction to the monuments, than the ravages of 200 years. Various questions were put to Sir Henry, and in answering them he stated that the celts he had produced were undoubtedly later than the *dolmens* in which they were found. In many of the *dolmens*, Roman statuettes, coins, and other antiquities had been found. He further stated that in Constantia, Algiers, there were thousands of these *dolmens* only a few feet high. Some of them were 8 ft. high, 17 ft. wide, and 65 ft. long.

Monument in Scotland.

Mr. Samuel Sharpe described a *cromlech* or *dolmen*, which had been recently discovered in Scotland, and which he had visited, and sectional drawings of which were exhibited. He was visiting at a place in Airlry, Forfarshire, where in the course of some agricultural operations a slash was turned up, which led to an opening with steps, which led down some 10 ft. beneath the surface. Immediately at the foot of those steps the passage curved and widened out, and extended to a distance of about 50 ft. or 60 ft. beneath the crown of the hill. They penetrated to the end, and in the course of conversation in which he inquired whether any inscriptions had been found in the *cromlech*, he was informed there had been none found. The extremity of the place was perfectly dark and dripping with water. It was almost like the dripping well at Knaresborough. But before they got out a stone was discovered. He should say that the width of the cavity ranged from 5 ft. to 8 ft. or 9 ft. The stone he had mentioned was about 8 ft. in length and 5 ft. in the other direction. Figures appeared on the stone. There was a large-sized serpent and a smaller one at right angles with that, and then there were several lines and the figure of a rudely-marked letter F, with other characters which were undecipherable. On the wall beneath this stone was a smaller one, upon which was the figure of a circle between two lines, and other lines similar to those which occurred in the *cromlechs* of Brittany, in greater or less number. On the floor were the remains of charcoal or other burnt material. It was stated that the *cromlech* had been discovered some hundred years previously. He should suppose that at that time it was closed up and covered with earth, and lost sight of altogether. It was known to be somewhere in that locality; and, from the description of the old and the character of the newly-discovered *cromlech*, he should think the two were identical. Near the entrance and on either side was a fireplace, with a chimney from 15 in. to 18 in. high. The stones were more clumsy than represented in the diagram, and had two uprights with a passage traceable from the bottom to the top into the open air. In the course of looking about he discovered a fragment of a quern, or hand-mill to grind corn, an illustration of the passage in Scripture, "Two women shall be grinding at the mill," &c. The suggestion which offered itself as to the reason of those remains of domestic habitation was this. The object of the *cromlech* in the first instance was a sepulchral one, and after being used by those who built it for that purpose it was doubtless discovered by other people and utilised by them so far as to make it a habitation; and hence the fireplaces, and the domestic utensil, the corn-mill. With respect to the lines, he regarded them as an evidence of the extension into Scotland of serpent-worship, as carried out on the greater part of the continents of Asia and Europe. With regard to the other characters, nothing was known except that, perhaps, they were intended to indicate the number of the members of a family that were deposited in the urn or burial-place. Possibly the F might be an indication of the family, but that was merely conjecture, and the same remark applied to the diagram of the other stone.

KITCHEN BOILERS.—By the explosion of a boiler in the kitchen of the United Hotel, Charles-street, St. James's, five female servants were seriously injured, and great damage was done to the premises. We postpone observations, in the hope of an official inquiry.

NEW BUILDINGS IN EDINBURGH.

It is a somewhat singular fact that amongst the numerous Gothic churches erected in Edinburgh within the last quarter of a century, there are only two possessed of really good Gothic character; and these two were designed by non-resident architects. This peculiarity may be accounted for from the circumstance that the local architects who have acquired a position, and to whom, as a matter of course, works of importance are entrusted, have been educated in the Classical school, which obtained a firmer footing in the "modern Athens" than in any other city in the empire. The Gothic revival has never been heartily acquiesced in by these men; it is as a new language to them, the grammar of which they have not mastered.

West Coates Church, Roseburn.

We some time ago gave a description of a Free church erected in the newly-created western suburb, called Roseburn; and our attention is now directed to another church in course of erection there in connexion with the Establishment. It is situated immediately to the east of the grounds of Donaldson's Hospital, and consists of a nave and transeps, with a spire in the centre of the nave gable, which faces the south. At the angles formed by the junction of the spire and nave and the nave and transeps, are octagonal turrets, which lead to galleries. The tower and spire will be 130 ft. high, and pierced by a three-light traceried window immediately above the doorway, and in the upper part by triplet lancet-windows. The spire is pierced by two tiers of gables, and surmounted by a large finial and vane. The nave is lighted by double lancets, and in the north elevation is a rose-window of plate tracery, beneath which is the vestry; and on either side are two light traceried windows, and at the angles are massive buttresses, corbelling, and other features peculiar to Scottish Gothic are introduced.

The general arrangement and distribution of the parts show that a picturesque and grandiose effect has been aimed at; but the result is not quite satisfactory; the outline is rigid in parts, and the detail a mixture of various periods not happily combined. The church will accommodate 900 sitters, and the cost is about 8,000l. Mr. David Bryce is the architect.

Free St. George's Church.

That Mr. Bryce is more at home in the Classical than in the Gothic style, is shown by Free St. George's, which is situated within ten minutes' walk of the church above described; here all the details are thoroughly correct, although there is little originality in their application; and the faults are those inherent to the extreme Pallasian. The site is at the angle of Stafford-street and Shadwick-place; the main entrance, which faces the south, being from the latter; the north elevation abuts upon a stable lane, and the east one is not visible from the street: the latter have not therefore been treated architecturally. The whole of the site has been built upon, and measures 78 ft. from east to west, and 125 from north to south. The principal entrance is flanked by coupled attached Ionic columns surmounted by a broken pediment, from the centre of which a great sprawling device crops out; above this is a range of arched windows with projecting keystones. On the side is a slightly projecting wing with a three-light square-headed window on the ground floor, and an arched window in the upper story; massive Corinthian attached columns rise from the basement story to the architrave, which, with the dentilled cornice, breaks over them. The wall head is finished with a balustrade, having pedestals at intervals to sustain vases. The tower is placed at the south-west angle, and is divided into four stages. The basement stage is 25 ft. in diameter, is rusticated at the angles, and rises to the main cornice, where it terminates in semicircular pediments embracing clock dials, which are ornamented with festoons of fruit and flowers, and a vase is placed at each angle. The next two stages consist of open arches supported by Corinthian columns and pilasters surmounted by enriched cornices; from the upper of these springs a pyramidal spire pierced with circular openings, and at the springing of the spire vases are again introduced. The west elevation consists of a centre having two ranges of rusticated windows, flanked by wings having attached Corinthian columns surmounted by triangular pediments, the outer mouldings of which are broken off before reaching the apex.

The interior contains, besides the church, committee and waiting rooms, and in the basement is a residence for the head, &c. The church proper is divided into a centre and aisles by iron Corinthian columns, supporting a series of arches upholding an elliptical ceiling, divided into square panels, with bosses at the intersections. There are galleries in the aisles, and at the south end opposite the pulpit. The ceiling over the galleries is divided into a series of domes.

The preaching platform occupies a small apse at the north end, and in the apse are three windows to be filled with painted glass. The roof of the apse, which is a semi-dome, is supported by granite pilasters, with foliated caps. Accommodation is provided for a congregation of 1,800, and the entire cost, including 13,000*l.* for the site, is about 30,000*l.*

The original Free St. George's, which was displaced by the operations of the Caledonian Railway Company, has been rebuilt at Stockbridge, with the addition of a tower, having a high-pitched slated roof. With this addition, and in its present situation, with meager surroundings, the building has a much better effect than it had on its former site in the Lothian-road.

Bank of Scotland.

The scaffolding has now been removed from the Bank of Scotland, presenting the whole facade to the spectator. The transformation is complete; the once clumsy, badly proportioned building is now one of the most picturesque and imposing in the city. With its broken skyline of domes and groups of statuary, and standing as it does on neutral ground, between the old and new towns, it forms a link between the modern and formal architecture of the one, and the more irregular and ancient style of the other. The sculpture is not at all to our mind, and is much inferior to that on the Bank of the British Linen Company, which was designed by the same architect, Mr. David Bryce.

Castle Terrace.

The first instalment of the new buildings designed by Mr. James Gowan, in his own peculiar style, is now completed, so far as the elevations are concerned. The peculiarity of the style consists in the ignoring of every known detail and the application of mouldings more suited for execution in wood than in stone, the profile only of which is generally presented to the spectator. Much of the construction is false,—e. g., arches are cut out of the solid and provided with stone tie-beams, where there is ample abutment. The general effect produced by the number of gables, moulded chimneys, and statues breaking the skyline, is striking and picturesque. Mr. Gowan, who is both architect and proprietor, deserves to be complimented on his pluck. He is feeling his way, and may improve as he proceeds.

Fruit and Vegetable Markets.

The new markets at Princes-street are progressing. Whatever objection may be made to the propriety of establishing markets on so fine a site, it is already evident that the rescuing it from the state of chaos it has presented for many years will be an improvement.

BRICKMAKING, AND DESIRED IMPROVEMENTS.

The committee of the "Manchester Society of Architects" has just now made a report on this subject, which, though to some extent local in its interest, has much in it that will be found generally useful, and is, therefore, placed before our readers.

The report was produced in consequence of the Master Builders' Association having requested the Society's opinion as to the desirability of introducing brickmaking machinery into Manchester, or rather machinery of a certain description; and it is signed for the committee by Mr. W. R. Corson, president, and Mr. J. Murgatroyd, hon. secretary.

The committee appointed on the 13th April, 1868, to consider and report on the methods of brickmaking in this neighbourhood, and to make suggestions with the view of obtaining better bricks than those generally in use, beg to submit the following report:—

They have examined and tested bricks from various crofts near Manchester, and several

machine-made bricks, including those presented to them by the Master Builders' Association. They have also visited works at Bradford near Manchester, where one of Bradley & Craven's machines is making bricks from coal shale; and also the works of Messrs. Platt, Brothers, at Oldham. They have had interviews with a deputation from the Master Brickmakers' Association, and with one from the Operative Brickmakers' Union.

Their inquiries led them to investigate particularly the following points in connexion with bricks and brickmaking:—

1. Regularity of shape.
2. Uniformity of size.
3. The size to be recommended as a standard.
4. Uniformity of material.
5. Density.
6. Power of absorbing water.
7. Ditto of retaining it.
8. Methods of manufacture.
9. Price.

Your committee has not thought it necessary to make experiments on the weight required to crush any of the bricks they have examined, such experiments on individual bricks giving no reliable data for calculating the weight that would crush a mass of brickwork.

Your committee may observe that the best stock bricks made in this neighbourhood seem nearly all that can be desired as to colour, regularity of shape, and quality, though the subsequent remarks will apply to them also, under the heads 2 and 9; and they have, therefore, more particularly directed their attention to the improvements necessary to produce the best common bricks for general use.

In the whole of the experiments your committee has used bricks of good, though not specially selected quality.

TABLE I.—Showing average Size and Weight of Bricks, with Quantity of Water absorbed. The results are the averages of several specimens of each kind by total immersion.

Description of Brick.	Contents in Cubic Inches.		Weight in Pounds.		Water Absorbed by Total Immersion.		Per Centage of Water absorbed to the Volume of the Brick.
	lb.	oz.	lb.	oz.	cu. in.	Per Cent.	
Common hand-made, ten samples from various crofts near Manchester	103.5	8 2.25	109.75	11.8	20.75	19.8	
Builders' Association, machine-made	149.12	8 12.5	119.6	19.7	34.9	24.29	
Platt's machine-made	116.04	8 4.5	123.39	12.5	21.6	18.6	
Hutchinson's machine-made	114.85	7 15.5	129.60	9.575	17.0	15.0	

1. *Regularity of Shape.*—This is a most important point when, irrespective of appearance, the greater liability to fracture is considered, when the points of contact in built work are few. In this respect the machine-made bricks alone can be said to combine the qualities of true and parallel surfaces and general rectangularity, though they seldom maintain a good arris. The hand-made bricks are almost all defective in the above requirement, a large proportion being warped, bulged, rough-faced, and with very irregular arrises, proceeding partly from indifferent tempering of the clay, neglecting to pick out stones, the use of so soft a material in moulding that it becomes distorted in handling, the rough surface of the drying-ground, want of protection in drying, and the haphazard modes of burning.

2. *Uniformity of Size.*—This has an important bearing on the cost of brickwork, the number of yards of work set by 1,000 bricks being much less with bricks made from a stiff clay (which, from the quantity of water used in the manufacture, shrink in drying to a small size) than with those made from a more sandy clay, and when no difference in price is made on account of the increased or decreased size. Much difficulty and annoyance are also caused when calculations on bonding-faced work and ashlar dressings, that have been based on one size of brick, become nugatory on account of that size being used up, and when bricks from another kiln, and therefore probably of other dimensions, are brought to the building.

The method of manufacture is entirely to blame for this fault. From want of protection in drying, some bricks are partly washed away by the rain, often unequally so, or more on one edge than the other. It is also obvious that different-sized moulds should be used for different kinds of clay, so as to produce bricks, when burned, of uniform size with others. This matter appears to be entirely under the control of the master brickmakers; for, although the operatives have, very properly, a standard maximum size, beyond which they will not mould bricks (10 in. by 5 in. by 3 in.), they have no objections to use smaller moulds; and, if their maximum

size be used for stiff clays, others smaller should be used for more open ones. There is, however, a strong temptation not to do so, as full-sized moulds will produce a large brick from open clays that will be preferred by certain classes of builders. The introduction of machinery, without graduating the sizes of the moulds, would therefore not obviate this objection; and to introduce larger moulds than the maximum standard in one locality would only lead to their being used elsewhere, and thus the spirit of competition would unceasingly increase the size of bricks till they became too unwieldy for bricksetters to handle. It is a question for consideration whether stiff clays might not be rendered more open by an analogous mode to that followed in the Midland Counties and London, by mixing a more loamy clay, or breeze, or sand with them.

It is also well known that different-sized bricks can be made even from the same clay, under different conditions of tempering.

3. *The Size to be recommended for the bricks when burnt, so that all shall be uniform, from wherever procured, should be one that would not be too large nor too heavy for a bricksetter of average strength to handle, and such that two brick breadths should, with the mortar joint, equal one brick length, and three thicknesses, with the joints, equal to the same dimension; and taking into consideration the size that can be procured from stiff clay, it would appear that 9 in. by 4½ in. by 2½ in., or 110 cubic inches, would be the best for general use, and such bricks would set, exclusive of waste, exactly 11 yards of 9-in. work per 1,000. Some bricks, made from stiff clay, are a little less than this; but a proper amount of attention in tempering the clay stiffer would no doubt bring it up to the size required, if so managed that the freshly moulded brick should contain about 27 per cent.*

of water instead of 33, which it often does now. We may here mention that the cubic contents of the bricks made in the neighbourhood of Manchester range from 94 in. to 115 in., averaging about 104 in.; that Messrs. Platt Brothers' bricks average 116 in.; the sample bricks submitted by the Master Builders' Association, 140 in.; and Mr. Hutchinson's, 115 in.

4. *Uniformity of Material.*—Want of attention to this requirement is the cause of many of the faults alluded to under No. 1. We find stones not properly picked out of the clay, and bricks hurst or halged in consequence. There is also frequently an incomplete mixture of clays of different strata, with bands of sand or other foreign materials in them, and consequently a varied mechanical and chemical composition of different portions of the same brick. A more effectual sorting of stones, &c., out of the clay, and more careful casting and tempering, whether by means of a pug-mill or otherwise, are absolutely indispensable to achieve improvement in this respect, whether the bricks be intended to be made by hand or by machinery. Grading the clay by means of rollers would not seem to be desirable where limestone is present; to crush up which amongst the material would only be to more thoroughly disseminate centres of destructive force, ready to hurst the bricks on the admission of moisture.

5. *Density.*—While on the one hand it is desirable that appreciable hollows should not exist in the texture of a good brick, neither on the other is it desirable to so compress the material as to totally exclude air, and thereby not only render its proper burning difficult, but also make it so heavy in proportion to its cubical capacity as to be tiring to handle, expensive in carriage, and the cause of increased outlay where structures are to be carried on iron beams, or for arching, &c. The bricks submitted by the Builders' Association compare well in this respect, the weight of a cubic foot being 110½ lb., while the average of hand-made bricks is 109½ lb.; of Messrs. Platt's, 123½ lb.; and Mr. Hutchinson's brick, 120 lb.

Hardness is not necessarily commensurate

with density. The Builders' Association brick, though little removed in density from the hand-made one, is very considerably harder, while the most dense of other machine-made bricks appear rather wanting in toughness. It appears, indeed, to your committee, that the more the tempering and kneading manipulations of the clay are dispensed with, the less probability is there of a tough homogeneous brick being produced.

the desirableness of applying pressure, in moulding, in a different direction to that in which it is generally done. In testing the facility of parting with water, the bricks, after being saturated, were left to dry at a natural temperature. Messrs. Platt's and the Collyhurst bricks lost in the four hours and a quarter only about half of what the others had done; in four days they were all nearly on an equality, and after that time the Builders' Association brick and Messrs.

with layers of fuel, appears particularly objectionable and wasteful, giving uncertain and incommensurable results for the fuel used, besides certain distortion and inequality of colour.

The systems of burning at Messrs. Platt's and at Messrs. Livesey & Johnson's, at Bradford, by kilns built in compartments, the latter being "Hoffman's" method, and the former an approximation to it, so that the waste heat from one division may be turned into the adjoining ones before commencing to apply them with fuel, both point to drying or completing the drying of the bricks by means of waste heat, and both seem to be economical and satisfactory in results. Your committee is well aware that either system is beyond the means of most brick-makers, and would only be remunerative where a very considerable quantity of clay is at hand. But it seems a question for fair consideration, whether bricks should necessarily be made and burned in immediate proximity to the spot where the clay is obtained.

It is not at all improbable that the additional care and attention shown to be requisite can be carried out without enhancing the price of hand-made bricks. They are at present sufficiently dear; and if machinery could produce an article superior in the most important requirements, and but little inferior in others, at a much lower price, its introduction would no doubt be welcomed by all engaged in building operations, to whom a reduction in the price of material would be some compensation for the constantly-increasing cost of labour. It must, not however, be forgotten that the increased care recommended would diminish the enormous waste and the difference in number between the quantity of bricks actually moulded during a season, and the number that are ultimately delivered to the consumer fit for putting into a building, and would thereby bring a proportionately greater profit and reduction in price at the same time.

Bricks of good quality should be of a uniform size, say 9 in. by 4½ in. by 2½ in., and should weigh at the rate of about 110 lb. per cubic foot, or about 7 lb. each.

They should be rectangular, with true faces, and only the sides and ends need be smooth; the arrises should be sharp and straight.

No print sinking on either face. They should not absorb, when saturated, above 20 per cent. of their bulk of water, and should absorb it reluctantly, and part with it with facility at ordinary temperatures.

They should be uniformly burned, and have a metallic clang when struck together.

They should be tough and "pasty" in texture, and not granular, so as to require repeated blows to break them, rather than one single hard blow. Superiority in this respect will cause the bricks to retain their entirety and sharpness of their arrises in carting and handling.

The hand-made bricks cannot, as at present made, be relied on for complying with the above requirements, though some closely approach the standard of size, weight, powers of absorption, and toughness; but they are unequal even when from the same ground, and very much so when those from one ground are compared with another; in the other requirements they are generally very deficient.

With regard to the machine-made bricks, Messrs. Platt's process would not appear to be practically introducible in the neighbourhood of Manchester for they might be produced by it at a low price and of generally uniform quality, yet its merit consists as much in the preparatory processes as in the moulding machine; and the immense extent and cost of providing for these, places it beyond the reach of any but those possessed of considerable capital; and it might be necessary, where the beds of clay are thin, to bring the material to the manufactory from a considerable range of ground.

The bricks presented by the Master Builders' Association comply with the majority of the qualifications, and in most respects are superior to the bulk of hand-made ones; but they should be made smaller, to comply with the standard size, and their somewhat granular texture, as well as the friability of the arrises, and immense absorptive powers, point to the necessity of some method of improving the tempering of the clay.

The bricks made by Mr. Hutchinson's process seem, in many respects, the best your committee has had the opportunity of examining. They are sound, homogeneous, not granular, and possess a surface well adapted for making a good mortar joint; their low absorptive power is also

TABLE 2.—Rate of Absorption, the Bricks placed on Edge in ¼ in. Depth of Water.

Description of Brick.	In ¼ in. Depth of Water.			
	In ¼ Hour.	In 1 Hour.	In 2½ Hours.	In 4 Hours.
A particularly good brick from Bradford, near Manchester, absorbed of the total quantity (8½ ozs.), which it took up ultimately.....	44	55	70.6	100
Builders' Association brick (2½ ozs.), ditto.....	30	56	85	100
Platt's light-coloured (12½ ozs.), ditto.....	41	75	88	100
Hutchinson's machine-made (8½ ozs.), ditto. (Saturated in thirty-eight hours).....	33	36.4	50	75.75
A good hand-made brick from Hulme (8 ozs.), ditto.....	47	59	68.75	90.5
A good hand-made brick from Collyhurst (14½ ozs.), ditto.....	49.75	64.4	95.0	98.4

TABLE 3.—Showing the actual Quantity of Water absorbed per Cubic Foot of Brick at stated Intervals the Bricks being placed ¼ in. on Edge in Water.

Description of Brick.	Weight per Cubic Foot Dry.	Contents.	Quantity of Water absorbed per Cubic Foot in				Full Saturation.
			¼ Hour.	1 Hour.	2½ Hours.	4 Hours.	
			oz.	oz.	oz.	oz.	
Platt's machine-made.....	123.167	117.00	73.85	132.93	177.24	180.93	189.93
Builders' Association do.....	114.0	106.4	76.014	139.35	219.51	253.38	256.54
Hutchinson's do.....	118.75	111.64	38.69	46.43	58.943	66.73	127.62
Bradford, near Manchester, hand made.....	111.65	109.6	61.41	81.58	103.056	145.996	150.29
Hulme do.....	113.60	105.8	67.73	85.85	109.41	131.043	144.0
Collyhurst do.....	112.94	109.4	105.26	139.5	240.95	249.65	253.80

TABLE 4.—Rate of Drying at about 65 Degrees Temperature.

Description of Brick.	In ¼ Hours.	In 1 Day.	In 2 Days.	In 3 Days.	In 4 Days.	In 5 Days.	In 6 Days.	In 11 Days.
The Builders' Association brick had lost of the total volume it had absorbed (20½ oz.).....	8.6	32.1	50.6	69.1	81.4	86.4	90.1	96.3
Platt's light-coloured (12½ oz.).....	4	34.7	61.2	75.5	81.6	85.7	89.3	96
The hard Bradford brick (8½ oz.).....	8.57	42.9	63.6	75.0	81.0	82.9	...	94.3
Hutchinson's brick (8½ oz.).....	...	60	63.6	73.7	79.4	78	82	82
Collyhurst ditto (14½ oz.).....	3.4	39.5	54.2	74.8	81.3	86.4	88.8	91.5

6 and 7. Power of Absorbing and Retaining Water.—The annexed table will show the relative values of different bricks in this respect. For the purpose of securing dryness of dwellings, &c., the brick which imbibes the least moisture, and that the most slowly, and which parts with it most rapidly, is the most desirable: not only will there be less probability of driving rain penetrating walls under such circumstances, but the action of frost must be less injurious than when it attacks a material whose pores are filled with moisture. It will be observed from the experiments with bricks laid on their edge in water, that all kinds except Mr. Hutchinson's will become saturated for all practical purposes within fourteen hours—Messrs. Platt's, indeed, and one from Collyhurst, in two hours and a half,—that the quantity of water absorbed is not, as might have been expected, in inverse ratio to density; Messrs. Platt's, the most dense, absorbing 18.6 per cent. of their bulk of water; Mr. Hutchinson's 15 per cent.; the Builders' Association brick 24½ per cent., and the hand-made bricks varying much, but averaging 19.38 per cent. The rapidity with which the water was absorbed was most contradictory; the Builders' Association brick, which in the first quarter of an hour had absorbed 30 per cent. of its total quantity, as against 47 per cent. of that of the Hulme brick, had at the end of two hours and a half surpassed the latter in the ratio of 85 per cent. to 68½, though even then far behind Messrs. Platt's, which had absorbed 98 per cent., being nearly saturated. It will be observed from the tables 2 and 3, that some bricks, though they absorbed in a given time a larger proportion of their total capacity than others, yet where that capacity was small the actual quantity taken up might be less, and as the penetrating effect of damp must be gauged by the latter characteristic, it will be seen that the position of the different bricks as to quantity absorbed in a quarter of an hour, one hour, two hours and a half, and fourteen hours, was pretty uniformly thus—1st. Mr. Hutchinson's (least); 2nd and 3rd. Hulme and Bradford; 4th. Messrs. Platt's; 5th. Collyhurst; 6th. Builders' Association (most). The majority of the bricks, when immersed, absorbed the water more rapidly at their sides and ends than at the top and bottom beds, as shown by the air-bubbles: this would seem to point to

Platt's surpassed the others in rapidity of drying.

In the earlier stages of the drying process, the order in regard to rapidity is—Hutchinson's, Bradford, Platt's, Association, Collyhurst; and in the latter stages—Association, Collyhurst, Platt's, Bradford, Hutchinson's. Thus the bricks which parted most eagerly with their moisture at first, were the longest in drying, and vice versa. At the end of eleven days none were perfectly dry, from ½ oz. to 1½ oz. water being retained.

8 and 9. Method of Manufacture.—Price.—From the foregoing remarks, it appears that the following points require attention to improve the character of the common brick:—

- Greater care in cleaning the clay, and in thoroughly tempering it.
- Variation in the size of moulds, so as to produce uniform-sized bricks from various clays.
- Moulding the bricks with material of anob consistency that it may not become misshapen by the effects of its own gravity.
- Greater regularity of surface of the drying-ground.
- Protection from extreme variations of temperature and rain in drying.
- Less frequent and more careful handling in the process of drying, so as to preserve the edges.
- A means of burning whereby the amount of firing shall be under control.

On points e and g, it would appear that wherever onlay has been made by brickmakers towards this end, whether by covering the "walled" bricks in drying by boarded copings, roofing over the clamps to protect them from rain, or shielding them from the action of the wind, a proportionate improvement in quality of the bricks, and a diminution of waste, has followed. Attention should, however, be directed to still greater protection during the earlier stages of drying, and to some method of burning in properly-constructed kilns, where the amount of firing shall be under control, and the "live holes," or firing-up apertures, so shielded from the wind that the heat may not be driven here and there uncontrollably by it. The present system of burning common bricks by so-called "close fires," where the bricks are interspersed

a recommendation, and they present a good surface when cut and rubbed, and we understand that they can be produced at a reasonable price. They are somewhat heavy, and would, we think, when required for fire-proof floors or walls supported on iron beams, be improved by any treatment tending to lighten them. The process also requires improvement to secure greater regularity and uniformity of burning.

Your committee might have extended this report by giving various details of the different modes of manufacture, but they are of opinion that the immediate object of their appointment will be secured by the particulars they have given. It now rests with the manufacturers to determine in what manner effect may be given to these recommendations, bearing in mind, however, that though lowness of price is an important consideration in itself, yet that equality of size of bricks and reliable excellence of material are of much greater importance to architects.

THE "BUILDER'S" LAW NOTES.

Alteration of Drains.—In a case where the vestry or district board of a parish or district, under the powers conferred on them by the Metropolis Local Management Act, substitute a new sewer in a course different from that of an old one, and think proper to divert house-drainage (not in itself deficient or insufficient) from the old sewer to the new one, they are bound to provide new drains for the old ones so diverted, and are not entitled to call upon the owners of the premises to pay the expense of such new drains.—*Vivet v. Vestry of Marylebone.*

Repair of Sewers.—The local authorities of a district are bound to lay down a sewer in such a district when necessary, and to keep the same in good and serviceable repair. It has been decided that the expression "repair" does not mean the reconstruction of a sewer which has been originally defectively made, but the keeping of the original sewer in proper repair. When, therefore, the Court of Queen's Bench issued a mandamus requiring certain guardians to put a sewer within their district in good and serviceable repair, it was held to be a sufficient answer that the sewer which had originally been constructed by another board had been defectively made; that it was, and that in consequence of its defective structure it could not be put into good and serviceable repair.—*The Queen v. The Guardians of the Epsom Union.*

Taking Possession of Houses.—The Commissioners of Sewers cannot take compulsorily the whole of a house unless they have first in due form adjudged that possession of the whole house is necessary for the purpose of executing their powers in the best manner.—*Thomas v. Dav.*

Public Health.—A mandamus directed to a local board of health stating that a sewer is in such a state as to be a nuisance, and commands the local board to cleanse it, cannot be enforced, as it does not show, according to the "Public Health Act, 1848," that the person causing the nuisance, or the owner or occupier of the premises where it exists, has failed to comply with notice to remove it.—*The Queen v. Godmanchester Board.*

LIGHT AND COLOUR.

I SHALL willingly wait for Mr. Thomas's exposition of the views he entertains on light and colour; and would he among the first to congratulate him if his promised experiments add anything to the discoveries of previous observers. At the same time I do most sincerely entreat him to make himself more fully cognizant of the truths which are known respecting light and colour, or (if he prefers the expression) of the principles of the undulatory theory. It surely must be worth while for any one who proposes to publish his own thoughts on such a difficult subject, to know accurately those conclusions at which the best philosophers of the present century have arrived, especially when we know that the most brilliant discoveries of the age have arisen, directly or indirectly, out of that theory, which now seems to promise more than was ever before hoped from it. Who does not admire the new and refined method of chemical analysis, by examining the powers which different substances possess of destroying waves of light of particular periods faster than others, as indi-

cated by the absorption-hands in the spectrum of the light they transmit? Who would have supposed, a few years ago, that the nature of many of the constituents of the sun, and even of the distant stars and nebulae, would have been revealed by the mere fact that their light is deficient in waves of certain periods? Or that whether a comet or other heavenly body shines by its own or by reflected light, should be seen in the directions of the vibrations of which its light consists? Yet the truth of these and many more such results depends entirely on every separate wave being preserved—doctrines which Mr. Thomas seems unwilling to admit, though their rejection would make as great a muddle of the whole science of light as he seems to suppose the various distinct vibrations to compound in the pure ethereal firmament.

When one of the scientific observers now so ardently engaged in following up the clue lately given by the science of light to find out some of the mysteries of the universe, receives through a narrow slit a beam of light from a distant nebula, causes it to pass through a train of prisms till, as he supposes, its various component rays of different wave periods are widely but variously bent from their initial direction, and diverge from each other sufficiently to allow of the accurate determination of their positions in the spectrum; and when viewing their spectrum through a telescope, he finds that these rays are (for example) precisely the same as the peculiar rays emitted by incandescent hydrogen and nitrogen gas, and thereupon announces that the said nebula consists of such incandescent gases; or finds that its several rays are each slightly more refrangible, or less refrangible than certain corresponding rays emitted by the same gases, and therefore calculates, that if the nebula consists of those gases, we are approaching to, or receding from, it at a certain rate; always relying implicitly on the doctrine that the rays he operates upon have retained their wave-periods invariable ever since the waves first started on their marvellous journey of perhaps a thousand years;—may we believe him? Or must we think, with Mr. Thomas, in his last letter (October 10), that the supposed great discovery of Newton about the prismatic rays is but one of his "infelicitous conjectures," and prefer with the same writer in his former letter (September 19), to believe that not separate vibrations issue from the luminous body, but only "a general vibratory motion of the elastic medium, which modified by the prism or other means produces in us all the varieties of light and colour?"

I can hardly believe, however, that one who shows such a liking to science as Mr. Thomas does should really mean to dispute any of its great fundamental principles, though his language implies as much. How could he hope to explain the magical influence by which, for instance, one and the same prism could modify any single kind of general tremor in so many ways, and cause it to produce in us such various sensations of colour, with such wonderful constancy, when we examine with it the light that proceeds from different bodies? What would be the use of so Quixotic an enterprise as to attempt the overthrow of a science built up by such slow degrees, with painful labour of thought and patient observation, by the masterminds of the last two centuries? Would it in the least forward any theory of numerical proportion being at the root of chromatic harmony? Would it not rather take away the only means of proving the existence of such a proportion? It seems more likely that the difficulty felt in accepting this part of the undulatory theory arises from an imperfect acquaintance with it; and the manner in which Mr. Thomas writes again in his last letter about rays, asserting that

* The demonstration of this, on dynamical principles, in respect of waves in general, was first given by Newton, who also showed that their velocity in any medium depended on the ratio of its elasticity to its density, and that their intensity diminishes as the square of their distance from their origin increases. Unfortunately, perhaps actuated by some jealousy, for he was not exempt from human weakness, Newton too hastily refused to admit the possible application of the undulatory hypothesis to light when suggested in an imperfect form by Huyghens; though in his most ingenious endeavours to apply a corpuscular hypothesis (always treating it as an hypothesis only), he was forced to call in the aid of ethereal vibrations, to account for effects now known to arise from the interferences of waves.

Newton's "supposititious bundle of an infinite number of rays has been transplanted to the undulatory theory," where it appears to him much more "cumbersome and improbable" than in its original domain; and asking, "What is the diameter of that handle? What is the form of section? What the disposition of its fasciculi?" shows that he has no accurate conception of what is intended by those terms, especially as he adds, "These arc questions which I have never seen touched upon, much less solved." Let me then again state that rays, in the undulatory theory, are nothing but imaginary lines, everywhere perpendicular to the advancing surface of the wave; and as every wave, so long as the medium through which it travels is of uniform density and elasticity, must spread with equal velocity in every direction from its origin, and therefore preserves a spherical form, these rays must also so long continue to radiate in straight lines from their source. But if part of a wave enters a medium which it cannot traverse with the same velocity, its surface is necessarily broken, and loses the spherical form, and the rays are bent accordingly from their original direction according to the law of refraction; and a reflected wave is also sent from the second medium back again into the first, causing rays to return according to the law of reflection.

Having acquired the idea of a single ray of light as the line perpendicular to the surface of the wave at a certain point, and indicating the direction in which the disturbance which constitutes the wave at that point is propagated, it is not difficult to explain what is intended by a beam or pencil of rays, simple or complex:—

First, suppose a single wave, or a succession of hundreds of waves, all of the same period, given out by a single shaken or vibrating atom, in the luminous body, just as a struck nail, or ball, may send out a single wave or a succession of waves of sound through the air.* The lines drawn from this atom to all points on the surface of the pupil of the eye, or in the orifice of an opening through which the light emitted by the atom shines, will be a bundle or pencil of homogeneous rays, which if the atom is distant may be regarded as parallel.

Next, suppose the same effect to take place in a great multitude of similar atoms, near together. The pencil of nearly parallel rays will now be composed of a number of subordinate handles or "fasciculi," each proceeding from its own distinct origin. It will, however, still be a pencil of homogeneous light.

Thirdly, suppose that these several atoms do not all vibrate with equal rapidity, but at two, three, or any number of different rates. Our complex pencil of rays will now be heterogeneous, composed of a number of subordinate handles, each of which separately would excite the sensation proper to its wave-period, but which altogether excite the sensation, either of whiteness or of some other colour, in which all the sensations proper to the separate handles of rays do in fact co-exist. When such a complex beam traverses the prism, the several subordinate handles of rays of which it consists, being differently refrangible, diverge at different angles from their original direction, and give us the spectrum proper to the peculiar light emitted by the congeries of atoms from which it proceeds.

Lastly, suppose a constant succession of shocks agitating the same set of atoms or other sets which come (one after another) into nearly the same positions, without which our light would be like that of a lightning flash, which does not continue for the hundredth part of a second, though the sensations it excites continue much longer. We have then exactly the case which is commonly presented to us in nature. Take a portion of the flame of a burning candle. A stream of atoms of incandescent gases sends out waves of some particular periods, which excite the sensation of blueness perceived in looking at the lower part of the candle-flame, and give a spectrum consisting of a few bright lines, separated by dark spaces; but the myriads of incandescent particles of carbon, like those of other solids, send out waves of all periods, and the more intense the heat of the flame the greater is the proportion of the shorter waves, as Professor Tyndall has lately so clearly pointed out. Hence the part of the flame where they abound gives a continuous spectrum, in which

* Mr. Airy, in his treatise on the undulatory theory, supposes that there are always a succession of some hundreds at least from each centre of disturbance.

(as might be supposed from the colour of the flame) the rays which produce the sensation of red are most intense or numerous, and the more refrangible rays occur in proportions far less than in the Hime light, the magnesium light, or the solar light.

None have yet attempted to number the colours of the waves, or successions of waves, of light that may originate in ever so small a portion of a luminous body in a second of time; but the period of the longest of them is known to be so short that they may be thousands of billions, without even two starting together; yet suppose as many as we please to be contemporaneous, however they might interfere with each other, the very manner of their interference ensures that in the whole there can be no loss of force in any wave, and therefore no loss of light. At particular points interference may destroy light, but then it will increase the intensity fourfold at other points, the whole effect remaining constant.

Perhaps the above slight attempt to explain a matter which is not in general very clearly stated in popular works, may lead some to regard with more respect a science which displays such marvellous perfection in the works of the Great Creator, and leads to such sublime considerations; a science whose evidences none can understand without a thorough conviction that every attempt to overthrow them must be futile.

With regard to the physiological considerations to which Mr. Thomas refers, I will only say that if Newton has satisfactorily shown that all the colours in nature are but compounds of the colours of the prismatic rays, and if Maxwell has satisfactorily shown that these prismatic colours are identical with the colours that may be produced by combinations of three of the prismatic rays, namely, those which excite the deepest sensations of red, green, and blue, then there is satisfactory reason to consider the sensations excited by those three rays as the nearest possible approach to three simple or elementary colour sensations, of which all possible colours are compounded. And if, according to modern custom, we use the term *primary colours* to mean simple or elementary colour sensations (in which sense it was used first, I believe, by the German astronomer Mayer, a century after Newton used it to denote the prismatic colours), then these three colours have a claim to be so called in preference to any other. To inquire in what manner those sensations are produced by the action of the various rays, may be interesting and useful, but is no more essential to the theory of colour, strictly so called, than is the inquiry into the nature of light. I myself incline to think that the optic nerve is so framed as to admit of three, and only three kinds of vibrations, and that these are severally excited with greater force by rays which more nearly accord with their several periods than by others. Some homogeneous rays, for instance, excite the sensation of red most powerfully, others that of green; while a third kind, of intermediate wave-period, excites both of these sensations equally at once, and thus produce the sensation of yellow.

This is no suggestion of mine, though the particular analogy, the possibility of which I have suggested in my book may be new. Aristotle himself, the first and best of the ancient observers of nature, whose writing have come down to us, had a similar idea about the relations of the principal colours; and Newton himself (whose most infelicitous conjectures are well worth our study, makes the following queries in his *Optics* (book iii.) :—

“Do not the rays of light in falling upon the bottom of the eye, excite vibration in the *tunica retina* which vibrations, being propagated along the solid fibres of the optic nerves into the brain, cause the sense of seeing

“Do not several sorts of rays make vibrations of several bignesses, which, according to their bignesses, excite sensations of several colours, much after the manner that the vibrations of air according to their several bignesses excite sensations of several sounds? And particularly do not the most refrangible and especially the shortest vibrations for making a sensation of deep violet, the least refrangible the largest for making a sensation of deep red, and of several intermediate sorts of rays, vibrations of several intermediate bignesses to make sensations of the several intermediate colours?”

“May not the harmony and discord of colours arise from the proportions of the vibrations propagated through the fibres of the optic nerves into the brain, as the harmony and discord of

sounds arise from the proportions of the vibrations of the air? For some colours, when they be viewed together, are agreeable to one another, as those of gold and indigo, and others disagree.”

Young, in his *Lectures on Natural Philosophy*, seems to have been the first to apply the notion to the theory of three simple sensations. I cannot but remark that had Newton's and Young's suggestions on this point been considered as they deserved on this, we should probably never have had so many fanciful and groundless analogies proposed between colours and musical notes, as may be met with in subsequent works.

With respect to regular spectra, I hope Mr. Thomas will carefully reconsider what I have written in the chapter on the optical modifications of colour, and try the simple experiments there mentioned, without any undue excitement of the eye, and with strict adherence to the cautions mentioned. I shall be disappointed if he does not find out that the doctrine I have laid down is correct. Having examined many memoirs on the subject, I am surprised that he considers it not in accordance with the “more advanced physiological explanations,” and should be glad to be informed where these may be found. But he misunderstands my doctrine when he says “the insensibility of the eye to one colour, according to Mr. Benson and some former writers upon this subject, is clearly, according to their own showing, a keen sensibility to another.” I only show that the excitement of any one of the simple colour-sensations tends to deaden for a time the sensibility of the eye for the same, leaving its sensibility for the others unimpaired.

Before concluding this already too long a reply, I must gently protest against what seems (but I am sure is not intended to be) a somewhat disingenuous attempt to fasten upon me the absurd notion that colour has objective existence, though my treatise begins by declaring “Colours are merely sensations produced by the action of light on the nervous tissue of the retina.” When I say (in a sentence imperfectly quoted by Mr. Thomas) “The colours of all natural objects are merely the sensations produced by those of the incident rays which they send to the eye,” my expression certainly admits of improvement, but their sense is obvious,—produced by such of the incident rays as the object sends to the eye; and not, produced by the colours of the incident rays. To find fault with such terms as “white light,” “colours of lights,” seems rather hypercritical when the meaning is plain, and both whiteness and all other colours are treated throughout as sensations alone. I thought I had said enough on this point in my letter of September 26th. We cannot always use an awkward periphrasis, such as “light exciting the sensation of white,” or “a green-producing ray.” But Mr. Thomas, I think, commits a much more serious fault when he defines light as a sensation only, ignoring the universal and principal use of the term to express that which proceeds from the luminous object and produces the sensation; and especially when he words his definition so as to make a distinction between light as a sensation and the sensation of colours, as if there could possibly be any sensation of colours which is not light. For in this sense “light” is a mere generic term, including all possible sensations of colours.

W. BENSON.

ON WRITING-DESKS.

THERE is a piece of furniture which is gradually becoming extinct; and which may be looked for in vain at Mech's, Parkin & Gatto's, or any other fashionable purveyors of writing materials; it is the large, plain, heavy, old-fashioned writing-desk, at which our grand-parents used to sit, with a business-like, and often gloomy countenance, so inexplicable to the young, whose cheerfulness seemed to receive a sudden check from the time that desk was opened, till the sound of the little click announced the key at length turned upon its mysterious contents!

What could those odious desks contain to occasion such long and serious faces? the deep thought, the frequent writing, the search amongst letters and memorandum-books—old, old papers—little packets unfolded, and again carefully replaced.

It makes one shudder to recall those times, which passed as a cloud, more or less dense, over the sunny brow of hopeful youth! Years have, however, revealed to us the secret, and we find ourselves growing old, with

writing-desks, which, notwithstanding their pearl, brass, or ivory dressings, wring from us every sentiment of pleasure and pain to which the heart of man is heir! Yes; we, too, now have desks, and will speak out that they inclose, and hold in a solid form, each transient joy and poignant grief of our lives, of which the outward world has, in comparison, witnessed but the passing shadow. In them lie concealed—yet ready to be brought before us at any moment—all the emotions that over disturbed the heart or pleased the imagination. Treasured up within their narrow limits, hallowed reminiscences are packed side by side with angry words, cold rebukes, claims of money, sympathy, or love! What a medley! Truly, O Desk, thou remindest one of the human heart itself! To ransack thy stores is to lay open the secret recesses of that vital spring, whereby we may trace the character and past life of thy owner! No wonder thou art kept locked! No one likes his inward soul to be invaded, the sanctified precincts of thought, words, and works to be entered by other than one's own self! The older we become the more tenuous are we of such infringements, and the more have we to stow away in those silent nooks.

But although the desks of our forefathers are gradually passing away, come to lumber-rooms, others to second-hand furniture shops, and the like, their descendants are numerous, elegant, and often costly in appearance; one can scarcely believe they contain aught but the most charming subjects for contemplation.

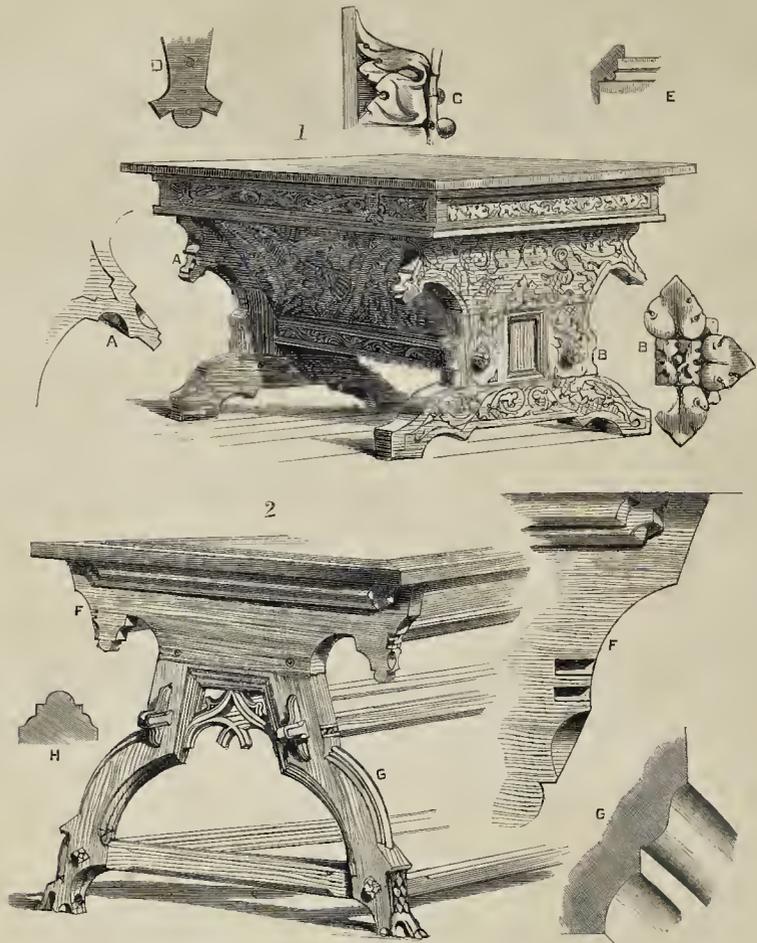
Children, too, in these days have their desks, and how simple and childlike are the contents! Their pure and unsophisticated minds are surely reflected in their little desks, the interior of which, in the genuineness of their nature, they display with such delightful frankness. Smooth and spotless as the bordered white paper they hand you to admire, is the dawn of those impressions which, coming in contact with this frail world, need so much skillful guiding,—bright and sweet as the little gilded scent-packets which accompanies the paper, imparting its fragrance to all around, are the hope and its fragrance which pervade that developing mind! In one corner may be seen the silkworm's golden skein, occupying a place that in after years we find devoted to some loved lock! An intricate puzzle net turns up! To us does it not portend difficulties to be encountered? While the paper-flower, concealing riddles within each leaf, speaks of hidden problems yet to be unraveled, the gay pen-wiper with its coronet of beads, almost too smart for use, dare it but admonish, would say,—“Use me'er the pen has defaced the fair sheet with discord, and remember that kind words echo kind feelings.”

All these, and many more, simple, yet to the contemplative mind, soul-stirring objects, are to be found in the child's desk; objects in which young eyes merely see an outward beauty, but into which the thoughtful penetrate, and behold the shadowy future.

The age of “toens” has, generally speaking, no desk; its substitute is the gay paper-case, iridescent with flowers of mother-of-pearl: if there be an unsettled and doubtful period of our lives, it is surely during those years from twelve to twenty, though it is then one looks around and beholds nothing but varying colours of brightness, warmed with life's meridian sun, our real mission lying in the grey undiscernible distance. True to the age is this gay, and in some measure, useful receptacle,—the paper-case. Open it, and the interior corresponds. What have we? Various coloured papers; scraps of poetry in German, French, and English; half-finished notes (of course we will not read them); “card of dances” at last ball; concert programmes: not that the owner is without many little treasure besides, but those are scattered in jewel-cases, glove-boxes, drawers. None, however, are in the paper-case. No concentration of feeling has yet taken place; time and circumstance alone bring that; and in doing so impart accordingly, strength and firmness to the character.

It is after twenty that the first firms of thought gather; these become united by thread-like intersections, which afterwards swell into channels through which a more or less healthy circulation deposits, as it flows, those useful resources which constitute the marked difference observable between one individual and another.

From that time those various accumulations unite, by slow degrees, till at length they swarm, and become, by some means or other, *used*, in that presence-chamber of our souls,—the desk! And



ANCIENT TABLES IN THE RATHHAUS, OCHSENFURTH, BAVARIA.

who can look over its contents free from excitement? Who can repress the strong feelings which rise or fall with the touch of every fresh packet? The vilest heart occasionally shudders at what it there encounters; for the writing-desk, though it be the hiding-place of many foul deeds, keeps no secrets when opened. The hese transactions of the swindler stare him in the face, and sinners look up therein traces of their own guilt! But, let us leave the contemplation of human nature in this its worst form; many a sweet souvenir draws us, like an overpowering magnet, into communion with our own desks; and although, while diving into the past, we may inadvertently open a partially-healed wound, close by will be found that remedial balm, the solace of friends, which, in their own handwriting, assures us of their sympathy and love! Not far from this source of comfort lie the rich anburn—the black—ah! and the grey curl—all that remains of dear ones that are gone! On these we like occasionally to look; and, allowing our thoughts full freedom, they fly swiftly over years that are past; halting only here and there at those prominent events which must for ever stand out in hold relief upon the chequered pages of our lives!

It is to the writing-desk that we consign our first small earnings, until necessity, or a more profitable investment calls them forth. In that desk, too, will be found our last wishes, when we have no longer breath to give them utter-

ance. At her writing-desk the careful housewife sits, pondering how to make "hoh ends meet;" and often by the midnight lamp may be found the speculative man, leaning over his, and reckoning profits which are, perhaps, at that very moment wrecked at sea. Who will, after such considerations, look with indifference on writing-desks? Those we have noted, and many other examples of feeling, varied as individuals' minds, find a resting-place in those lone receptacles of the heart. Whenever we are called away, survivors! respect their contents, for they represent the spiritual part of our nature, which too frequently passes through this life misjudged and misunderstood. Touch the long-treasured relics they contain with reverence, and on committing them to the flames, which must, sooner or later, be done, let it be with solemn thoughts and careful hands, for perhaps the spirit of the departed hovers over them! Mas. C. H. S.

ANCIENT FURNITURE IN THE RATHHAUS, OCHSENFURTH.

SOME short time ago we gave a view and details of an interesting earthenware stove in the Rathhaus at Ochsenfurth, near Wurzburg.* Our present illustrations represent two very

curious old tables in the council chamber of the same building. No. 1 is made to open, and the upper portion forms a receptacle for documents. This table has been barbarously "grained" in imitation of oak; the wood of which it is constructed is a very fine pine.

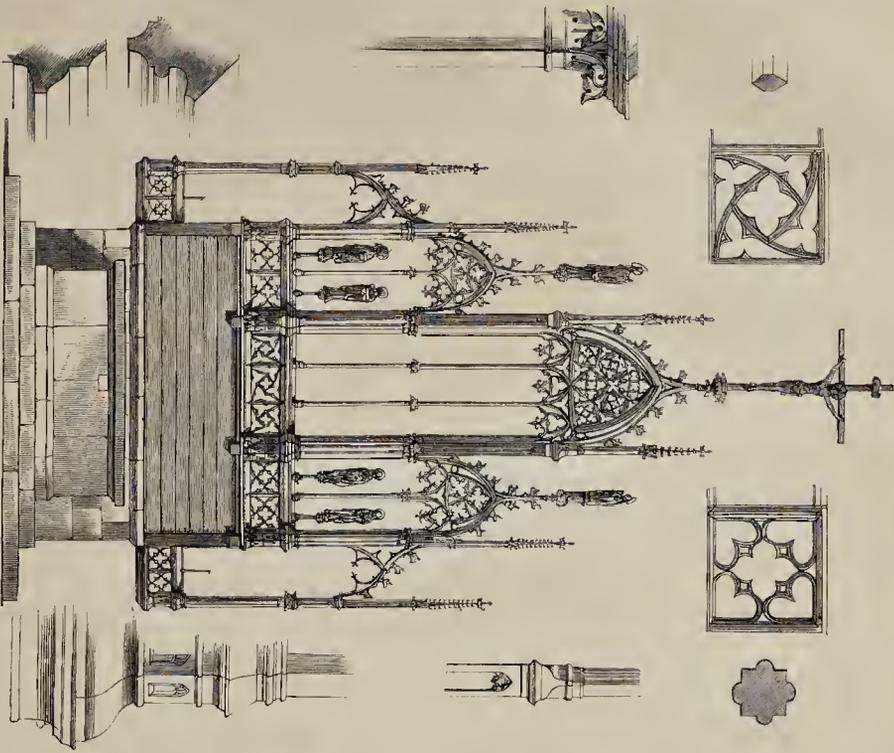
No. 2 is a still more remarkable example: like the former, it is of pine, but retains its old colour and decoration. The hollows are painted crimson with black spots. The chamfers are gilded. The slab of this table is ornamented with a "zigzag" pattern forming a border of inlaid wood. There are no less than eight other ancient tables in the same building, but the two we have illustrated are the most noticeable. The date of these interesting examples of ancient furniture is unknown, but from the style of the carving and mouldings there can be little doubt that they are works of the latter part of the fifteenth century.

REFERENCES.

- Fig. 1.
A. Termination of cusp of trestle.
B. Screw-head.
C. Side view of ditto.
D. Hinge.
E. Moulding under the slab.

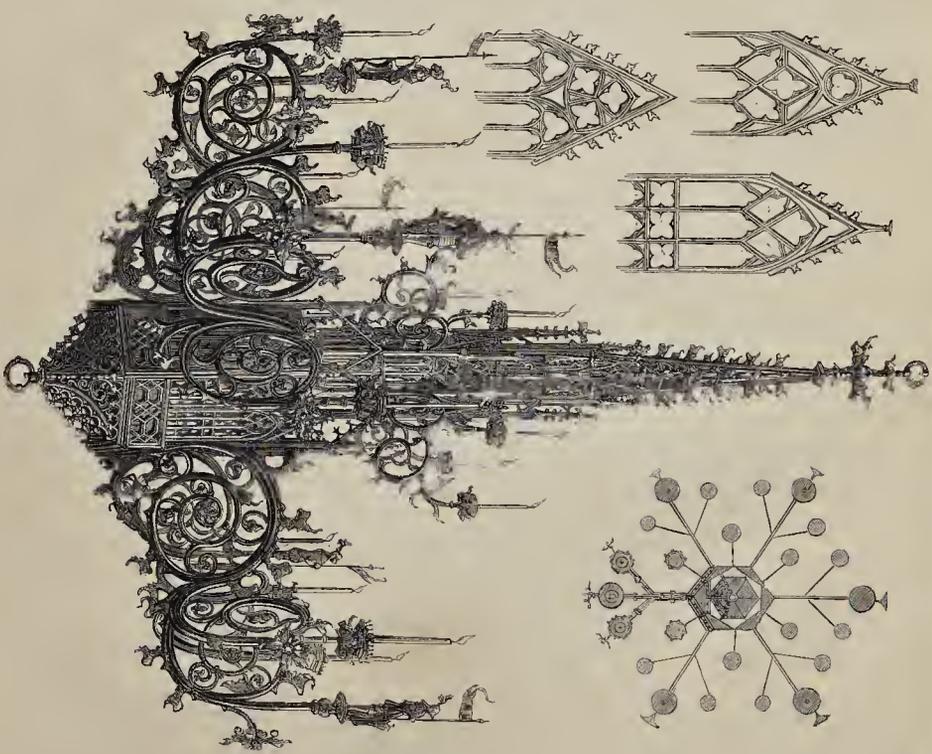
- Fig. 2.
F. Termination of cusp of trestle (half full size).
G. Moulding of leg of trestle (under side).
H. " " " (upper side).

* See pp. 450, 451, ante.

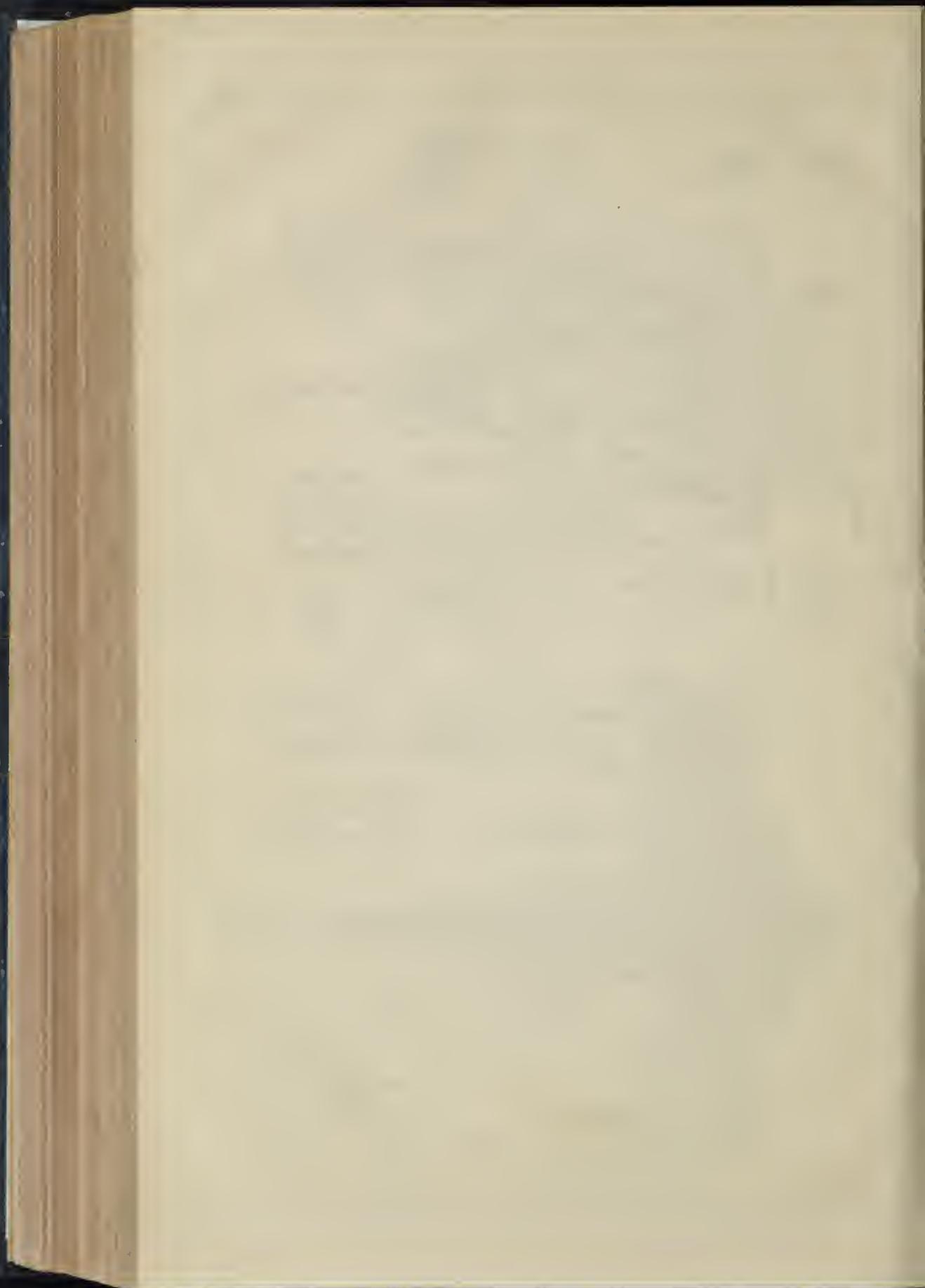


After and Decks, A.D. 1346.

MEDIEVAL BRONZE ALTAR AND CHANDELER IN AUGSBURG CATHEDRAL.



Chandlery, A.D. 1321.



**BRONZE ALTAR AND CHANDELIER
IN AUGSBURG CATHEDRAL.**

AUGSBURG CATHEDRAL, although by no means a magnificent or grand building, is exceedingly interesting on account of the singularity of its plan, the great antiquity of portions of the structure, and the very beautiful ancient furniture which it contains.

The cathedral consists of a large, lofty eastern choir, with apse, chancel, and surrounding chapels, all fourteenth-century work. The aisles of this choir are entered at the sides by two splendid doorways of the same date. Were the other portions of the church built upon a similar scale, with their choir and aisles, it would be one of the finest cathedrals in Germany; and it is highly probable that those who designed this choir contemplated the rebuilding of the whole church upon a scale of equal magnificence. The architect may regret that this scheme was never carried out, but the antiquary will be most thankful for its failure. West of the choir are two square Romanesque towers of moderate height, crowned with tall lead spires. These towers are placed so wide apart that the nave and aisles intervene between them. The effect of this arrangement is singularly ugly, and is not improved by the roof of the choir being higher than the towers themselves. The nave is very early Romanesque work, with double aisles of the fourteenth century. It is so low that the chancel arch is only as high as the aisles of the choir. The vaulting is fifteenth-century work, but very bold and good. Westward of the nave and aisles are two transepts, the same height as the nave, and these are crowned by a western choir, terminating in an apse. Internally this choir is raised about 12 ft. or 15 ft. higher than the floor of the nave, and beneath it is a very early Romanesque crypt. On the south side of the nave is a Romanesque chapel, dedicated to St. Blaise. The cloisters on the south side are late fourteenth-century work.

The bronze altar, of which we give an illustration, stands in the western choir in such a way that the priest, when celebrating mass, stands with his face to the people. The reposes is entirely in bronze; the constructive portions appear to be cast, and the ornamental ones beaten. The height to the top of the crucifix is about 35 ft. It is probable that the space now boarded up immediately above the altar was occupied by a retablo of costly metal work. The three centre spaces do not appear ever to have been occupied by statues, but the two outer ones were certainly filled up with some kind of ornament, as the rivets into which it was fastened are still visible. The four lower statues are of wood, gilt, and are probably not the original ones. The date of this most interesting work of art is 1346. This altar is about to be restored, and the portions which are wanting will be replaced.

In the apse, immediately to the west of this altar, is the ancient episcopal throne. It is a stone seat supported, upon the backs of two rudely-carved lions. It is evidently a work of very early date, and the little ornament used is quite classical in character. It is far older than any portion of the existing cathedral, and may have belonged to some earlier church. Against the wall, to the north of this altar, is another bishop's throne. It is of Early Romanesque work, and has a curious canopy over it supported upon pillars with ornamented shafts. Its date is 994. Westward of this altar and throne are a fine double set of stalls, richly carved, in deal. They are the work of the fifteenth century, and their good state of preservation is a strong proof of the durability of this wood for internal work. At the east end of this choir is a low metal screen. It is the work of the sixteenth century. Against the pillars of the nave are eight altars, the reposes of which are new, but contain most remarkable ancient pictures; four of these are by Zeitbloom, and the other four by the elder Holbein.

Hanging from the vaulting in the centre of the nave is the superb bronze chandelier, of which we give an illustration. The date of this fine work is 1321; and it is in a perfect state of preservation. The bronze doors to the porch on the north side of the nave date from the year 994, and are very remarkable (we have given a description of them in another number). Six of the windows of the nave contain stained glass, which is probably coeval with the building A.D. 990. They represent very rude figures, which, in drawing, strongly remind one of the Bayeux tapestry. They are probably the very earliest stained glass in existence.

The eastern choir contains a double set of stalls and stone sedilia, of the fifteenth century, the backs of which are hung with stamped leather, which has a very agreeable effect; and a modern Gothic high altar, of poor design. The chapels round the apse contain ancient altars, with beautiful sixteenth-century pictures, by Zeitbloom and Hans Burknaier, and some interesting monuments of bishops of the cathedral. Two of these are large tablets, carved in red marble, and show how this description of monument can be made ornamental, instead of disfiguring a building. The screens to these chapels are good specimens of late sixteenth-century metal-work. In the Lady Chapel is a good Early fourteenth-century stained-glass window. The whole church has been well restored. There is a little modern stained glass, but it is far from meritorious.

EXPLORATION OF PALESTINE.

WILSON'S ARCH is on the west side of the "Haram" area, near the Jews' Walling-place. Hero Lieutenant Warron sank a shaft last November, "to see what the wall was like" at that place. He found the rock, and the base course of the Haram wall let into the rock at a depth of 50 ft.; he discovered, also, a stream of water running "through the land," down this Tyropsean valley. Later, on January 22nd of this year, he wrote,—"We have made a great discovery this week, viz., a system of tanks, vaults, and aqueducts, in connexion with, and to the west of, Wilson's Arch: they are, apparently, of similar age and construction, and are likely to throw considerable light on Jerusalem topography. In fact, it appears to me that this system of vaults is the key to underground Jerusalem; and we may reasonably hope to have a good knowledge of the great embankment which runs across the Tyropsean valley." We have before us, just now received, a plan of these vaults, as far as they have been explored. In one row, the vaults are each 12 ft. square, and about 18 ft. high. It is evident, from the passages broken off and unexplored, that a great deal yet remains to be investigated here before the question can be answered,—What was the use of these vaults? The passage, which is 12 ft. wide and 14 ft. high, was probably used as a secret passage connecting the Jaffa Gate with the Haram area. By this, in case of a tumult, troops could be brought quickly and unperceivedly. It has been followed to a distance of 250 ft. from the wall.

We would remind our readers that the fund is wholly supported by subscriptions; that money is wanted; and that the society's office is at 9, Pall-mall East.

THE NEW BANKRUPTCY ACT.

THE Act passed last session to amend the Bankruptcy Act of 1861, came into force on the 11th instant, and as it is an Act of considerable importance to all men of business, the following abstract in popular language will no doubt be acceptable to our readers.

The Act provides that no deed between a debtor and his creditors, or any of them, relating to his debts and his release therefrom, or to the distribution, inspection, management, and winding up of his estate, shall be as binding on all the creditors as if they were parties thereto, unless, in addition to conditions hitherto observed, the following be also complied with—1. Together with the deed there is to be delivered to the registrar a list of the debts and liabilities of such debtor, stating the times when incurred, the consideration for same; the names, residences, and occupations of creditors, the respective amounts due to them, the securities held by them, and the estimated value of such securities. 2. There is also to be handed in a statement, setting forth the amount of the debtor's property and credits, and the estimated value thereof. This statement may be, from time to time, by leave of the court, amended, the amendment, as well as the original statement, to be on oath; and in the case of an amendment, the affidavit is to state the reason of the amendment being made, and why it was not in the original statement. Notice of the handing in of such lists is to be given in the *Gazette*, or in a daily paper, circulating where the debtor resides or carries on business, within such time as the general orders made by the Lord Chancellor and

two commissioners shall direct. Any person stating himself in writing to be a creditor, may personally or by agent, inspect the statement and amendments, and (on application in such manner as general orders shall direct) obtain a copy or extracts. Creditors assenting to the composition deed must prove their debt in the manner prescribed by the General Orders. In the computation of the requisite value, the amount due to each creditor, after deducting the value of the securities held by him on the debtor's property, shall alone be reckoned. The time for the production and leaving such deed at the office of the registrar, is to be twenty-eight days from the day of execution by the debtor, or such further time as the court may allow. Proofs by creditors are to be filed, and any person stating himself in writing to be a creditor, may inspect all the office documents in the case, personally or by attorney, and have copies, in manner directed by General Orders. The Act contains provisions respecting the examination of the debtor, and of any creditor, or alleged creditor, and others possessed of information; and also respecting the payment of the costs of such examination. The application for the examination must be by a creditor whose debt exceeds 10*l.* In case of a "deed of arrangement," creditors, in order to be reckoned in computation of majority, must prove their debts in the manner set forth in General Orders. The other portions of the Act are of a technical nature, referring to the jurisdiction of the respective Bankruptcy Courts, and to other strictly legal matters. The Act does not extend to Scotland or Ireland.

THE TRADES MOVEMENT.

A REPRESENTATIVE meeting of the trade societies of the metropolis has been held at the Bell Inn, Old Bailey, for the purpose of adopting such measures and taking such action as may secure the passing of a Bill which will place trade societies on a footing of social equality with other associated bodies. The circular calling the meeting stated that this had become necessary "by reason of the insecure position in which the recent conflicting decisions of judges have placed trade societies." A large number of trades were represented at the meeting. The chair was taken by Mr. Spelling, of the Velum Binders' Society. Among those present were Professor Besley, Mr. Lloyd Jones, Mr. Crompton (barrister), &c. Mr. Guile (Ironfounders' Society), moved the first resolution,—

"That this meeting, composed of representatives of various societies in the metropolis, having fully considered the Bill which has been prepared for the purpose of obtaining legal protection for the funds of trade societies, and which was brought before Parliament by Sir Edward Burton, is of opinion that it is sufficient for every legitimate purpose, and should receive the support of every well-meaning member of the House of Commons."

Mr. W. Allen (Engineers' Society), seconded the resolution, which was spoken to by Mr. Applegarth (Carpenters' Society), and Mr. George Potter (Joiners' Society). Mr. Lloyd Jones and Professor Besley also took part in the long discussion which followed. Mr. Odger suggested that the meeting should be adjourned, that the Bill should be improved if possible, but not abandoned. The consideration of the question was then adjourned.

A court of arbitration and conciliation has been formed in Manchester. The first step was taken by the local Chamber of Commerce, which invited a conference on the subject with the trades' council. Deputations from the two bodies accordingly met, and formally agreed that a court of arbitration should be established. One of the rules provides that the objects of the court shall be to arbitrate on any question relating to wages or other matters that may, by mutual agreement, be referred to it from time to time by the employers and operatives, and, by conciliatory means, to interpose its influence to put an end to any disputes that may arise. The court is to be appealed to only when the employers and employed have failed to effect an amicable settlement of any dispute by other means. The court is to consist of a chairman and sixteen members, eight of whom shall be selected by the Chamber of Commerce, and eight by the trades' council.

An adjourned annual meeting of the General Builders' Association has been held, at the offices of the Liverpool Master Builders' Association, South Crescent-chambers, Lord-street, Liverpool, Mr. Baker, of Bristol, presiding. There

was a large attendance of members from Birmingham, Manchester, Stockport, Chester, Bath, Coventry, Leeds, Bradford, and about twenty other of the principal towns in the Kingdom. Some routine business having been transacted, a long discussion took place on a resolution, that notice be given to the operatives that the following rules will come into operation on the 1st of May next:—"That wages in all branches of the building trade be paid by the hour;" "That all rules restricting machine or quarry worked stone be rescinded in all towns where they are now in force;" "That all disputes respecting wages or working rules be settled by arbitration." An amendment, that the debate be postponed for twelve months was proposed, but it was subsequently withdrawn, and the resolution was carried unanimously.

A very full meeting of the Bristol operative carpenters and joiners has been held, to consider their hours of work and wages. The first resolution adopted declared that the trade had long felt the necessity of having a legitimate half-holiday on Saturday, by leaving at twelve instead of two o'clock, and pledged the meeting to do all they could to secure so desirable an end. A second resolution contained a respectful request to the employers to make an advance of a halfpenny per hour on the present rate of wages (6d.), in order to bring the week's wages as near as possible to the present amount. It was decided to give the masters notice that the men would expect the increase to come into operation the first Saturday in May next. The chief reasons urged for the demand thus resolved on, according to the local *Times*, are that the members of the same trades in other towns, where the rent is cheaper and provisions are not dearer, get more money and work fewer hours than those in Bristol.

BUILDING OPERATIONS AND SANITARY IMPROVEMENTS IN BARNSELY AND THE DISTRICT.

The improved appearance of the town of Barnsley within the last few years, where perhaps building operations have been carried on as extensively as in almost any West Riding town, is very marked indeed. The numerous new collieries and iron works in the district have caused the building trade to be brisk, whilst the new Midland Extension from Cudworth to Barnsley has found ready work for a large number of hands. Barnsley possesses few good public buildings; but this will, no doubt, be altered, should a charter of incorporation, for which it is seeking, be granted. The want of builders has chiefly been in the erection of cottage property, for which there is yet great demand. The number of houses in the town in 1860 was 2,889; whilst in 1861 it was 3,368, being an increase of 679. Since that time new streets almost without number have been erected both at the west and south ends of the town. The operations are being further extended. At the last monthly meeting of the Board of Health, which is the governing body, upwards of thirty building plans were presented to the Board for approval, whilst at the previous meeting of the same body not fewer than fifty plans were approved. With regard to the sanitary improvement of the town, something has been done. A new sewerage scheme has been provided and carried out to a great extent. The Board of Health are, however, still wishful to provide for the wants of the public, and at their last monthly meeting they signed and sealed a contract for a new sewer on the Cockerham-road, which is about to be constructed by Mr. Henry Carter, of Barnsley. It may also be mentioned that something approaching 70,000l. has been spent in providing a supply of water from a scheme propounded by Mr. Hawksley, from the Yorkshire moors. At Ingbirchworth, a place about seven miles from the town, the works are scarcely yet completed; but the water has been supplied to the inhabitants for a few months, and, during the past trying season, has not been found to be wanting. In addition to these improvements, which have provided much labour for those connected with the building trade, there are several rather important enlargements about to be made. Plans have been prepared by Mr. Wade, and are now before the Poor-law Board in London, for the erection of two additional wings to the workhouse, which was erected in 1851 from designs prepared by Messrs. Lockwood & Mawson, of Bradford, at a

cost of 5,000l. A new wing is also about to be added to the present Beckett Dispensary, which has been built and presented for the benefit of the town by Mr. F. J. Beckett, of Torquay. The new addition is to provide an infirmary or accident ward for the reception of the numerous accidents which are constantly occurring in the district collieries and works. The changes brought about by the extension of the new line into the town will necessitate the erection of a new county court, the present one being required in the extension, so that there is every prospect that builders will find plenty of employment in the town and district for some time to come.

THE HOUSES OF THE POOR AT THE WEST END.

THE thirty-fifth section of the Sanitary Act of 1866 having, with the sanction of the Secretary of State for the Home Department, been adopted in the parish of St. James, Westminster, for the purpose of regulating houses let in lodgings, Dr. Lankester, medical officer of health, proceeded to ascertain the number of notices to be served on persons for lightening the pressure of the population on the existing lodging space. He commenced with twenty-five houses in Heddon-street (Regent-street), Rupert-atreet, and Tyler's-court. In these twenty-five houses he found 549 persons living; whereas under the regulations of the Act the houses would only accommodate 198 persons, showing that 350 persons would be turned into the streets. Carrying his investigations further, he estimates that there are 500 other houses in the parish equally overcrowded, and that at least 7,000 persons must be removed from their homes to carry out the regulations. If these 7,000 persons had been for the sake of their health compelled to get rooms somewhere else they would have been obliged to leave the parish and go to the surrounding parishes, or to the suburban districts, where it would have been impossible for them to carry on their occupations. Dr. Lankester states that he sees no remedy for this state of things but the erection of dwelling-places, adapted for the working-classes to live in, in the districts where labour is required. There are many spots in the parish where such lodging-houses might be slightly built. Nearly every court in the parish is overcrowded, and a gigantic nuisance, injurious to health. In the construction of such lodging-houses, the wretched domiciles which now minister to the poor, the indolent, the vicious, and the criminal classes, would be abolished.

OPENING OF TURKISH BATHS IN BRIGHTON.

The directors of the Brighton Turkish Bath Company (Limited) have opened their new building in West-street. The foundation-stone of the building was laid on the 2nd of last March. The contractors were Messrs. Cheeman & Freeman, of Brighton. The architects were Messrs. Goult & Gibbins. The style is of an Oriental or Moresque character, even on the exterior. The height of the building is 56 ft., and it has 50 ft. of frontage. Its depth from front to back is 120 ft. The gentlemen's bath is entered from the upper, or north, side of the frontage, through a waiting-room, 13 ft. by 21 ft., and an ante-chamber. The "cool-room is a large, nearly square, Alhambraic hall, 47 ft. long and 45 ft. high. There is a miniature fountain close to the entrance. A polished and deeply-attained flooring skirting the apartment and enclosing shining and rich coloured tiles for the inner part. A marble bath, 35 ft. long, 5 ft. wide, and 5 ft. deep, bordered with exotic plants, leads up to a Moresque triple arch, one section of which is closed by lace curtains and the side arches by heavy red curtains. There are "divans" round the room, curtained and cushioned and pillowed in damask and silk of varied hues. In a gallery above, similar drapery and curtains show "divans" there also. The high and steep-pitched roof overhead has beams, rafters, and pillars of Moorish design.

The triple arch leads into the "hot room." This chamber, about 30 ft. in diameter, is floored entirely with white veined marble. There are four recesses of the room; two of which are used as hot rooms in aid of the central chamber;

the other two being used respectively as a lavatory and a douche room. The large hot room is kept at a temperature of from 115 to 120 degrees; one of the recesses is at about 150 degrees; the other can be heated to 180 degrees. The recesses are fitted with marble slabs, by way of couches, covered with felt and having pillows and cushions. The hot air comes in from the furnaces under the building through perforated zinc.

In the gallery (13 ft. in height to the roof) are three private baths with divans and hot rooms. The Ladies' Baths are on the first floor, and are approached by a separate entrance on the south side of the frontage. There are four hot-rooms, each 9 ft. by 10 ft. 6 in.; two cool-rooms, about the same size, and one large cool-room, 27 ft. 6 in., by 14 ft. 5 in. The waiting-room for the ladies' bath is on the ground-floor. In the back part of the upper story of the building is a laundry, with drying-rooms, &c., attached. There are also rooms for the shampooers and attendants. The cool-rooms were decorated by Mr. T. Dury, who has furnished the stained glass and will complete the decorations. The heating was executed by Messrs. Joakes & Co., of London. Mr. Parker has acted as clerk of the works during the construction of the building.

CHURCH OF ALL SAINTS, LITTLE MUNDEN, HERTS.

On Thursday, the 8th inst., the parish church of All Saints, Little Munden, was re-opened for public worship after being repaired and renovated. The manor, of which this is the parish church, is very ancient. Domesday Book mentions the name of a vassal of Earl Harold, to whom it belonged in Saxon times; and how William the Conqueror afterwards disposed of it. The church belongs chiefly to the beginning of the fifteenth century. It contains some remarkable canopied monuments with sculptured effigies. In July of last year a circular was issued by the rector, the Rev. F. A. L. Foster, in which the state of the church was described in the following words:—"The whole of the fabric has fallen into a bad state; the walls require re-facing; the stonework generally needs repair or restoration; the woodwork of the roofs has been disfigured by alterations, and is much decayed; drainage and paving must be attended to; there should be new seating throughout, and means must be provided to warm the church, at present so damp and cold as to be scarcely endurable in winter." Through the strenuous exertions of the rector and parishioners, the programme of restoration, as traced in the circular quoted, has been carried out. The church consists of a west tower, nave, north aisle, a north chapel, and chancel; but there was doubtless a much earlier church on the same spot. Some vestiges of this are observably at the north-west corner of the building, and have been carefully preserved. The walls, which are of flint, with freestone dressings, have been refaced; and the windows restored.

The coarse modern porches have been removed, and two new ones erected at the north and south entrances, constructed of the same materials as the main body of the building, and in accordance with its style of architecture. A stone groined vault, of which only indications remained, has been put in at the western entrance through the tower. This ought really to be the chief entrance to the church; but it is at present obstructed by a large raised pavement, resembling an organ-loft, just over the door. This is private property, but it is to be hoped that its owner will be persuaded to consent to the removal of so unsightly an obstruction. The interior of the church and the porches has been paved with tiles. New open seats, of stained deal, have been substituted for the old pews, except in the north chapel and the chancel, where such of the old seats as could be used have been worked in. The pulpit and reading-desk are carved in oak. There is to be a new reredos. The roof of the nave (one of the Hertfordshire king-post kind) is open, showing the rafters. The drainage has been attended to, and the interior is warmed by hot-water pipes. At the south-east angle of the church a vestry has been erected, the want of which has caused some inconvenience hitherto. The path through the churchyard leading to the north entrance, which was five steps above the floor of the church, has been lowered and levelled. The architects of the works were Messrs. G. & H. Godwin, of Brompton. Mr.

Ginn, of Puckeridge, was the builder; and Mr. Leigh clerk of the works.

The tower had been left undone for want of funds; but on the occasion of the opening, the lay-patron, Lieut. Colonel Loyd, who had already subscribed handsomely to the works, undertook the cost of bringing the tower into the same sound condition as the church.

REEREDOS, HEMPTON, DIOCESE OF NORWICH.

A new reeredos has just been completed in Trinity Church, in this parish, and dedicated to the glory of God, in memory of deceased communicants. It occupies the entire east end of the chancel, from north to south, and is divided into three compartments, the central part higher than the two sides, and rising up to a point. The central space is occupied by a cross, in green and red marbles, on alabaster, executed by Messrs. Field & Co., of Westminster, and it is flanked by two panels in Minton's majolica tiles, embodying the passion-flower and the Agnus Dei. The whole of this part rests on a retablo of stone, inscribed, "By Thy cross and passion, good Lord, deliver us," whilst the monumental inscription is placed behind the altar. The whole has been executed from the designs of Mr. C. J. Moxon, architect, London.

BIRMINGHAM NOTES.

The London builders are sending fair orders into this district for tools and material. Mr. Milward, successor to Allarton & Powell, the well-known awl-blade makers of Birmingham, is cautioning the public against an improper use which is being made of the name of the firm by a late manager in their employ. The inquiries for stove-grates and register-grates are steadily maintained, and door-knockers command a considerable request. The difficulty among builders and ironmongers often experienced in regard to the "band" of locks required for doors, is being effectually remedied by Messrs. Carpenter & Co., of Wilkenhall, who have recently introduced a number of new patterns of their double-banded rim and mortise locks, adapted for doors opening either to the right or left. The wrought-iron makers in East Worcestershire have a better demand in the leading branches, and the men are getting better wages for their work. The awl-blade makers at Bloxwich are better employed both for home and export. In the bolt trade, the manufacturers in South Staffordshire are introducing machinery on a more extensive scale, and thereby reducing the cost of production. The price both of "towel" and "barrel" bolts is proportionately lower. The Brassmasters' Association, at the recent quarterly meeting, decided that the price of brass should remain unaltered during the next three months. English tin is higher. Ornamental fences, gates, and balustrades, both in wrought and cast iron, are in more request for home and Continental trade.

THE ATLANTIC CABLES.

The manufacture of a new Atlantic telegraph, which is to be submerged between Brest, on the French coast, and a suitable terminus on the shores of the State of New York, is progressing satisfactorily. The new cable is almost identical in construction with those which were completed in 1856, the only difference being that the diameter of the conducting copper core is slightly greater, and the outside wires are of homogeneous Bessemer steel, galvanized, having a breaking strain of about 1,000 lb., while the wires outside the existing Atlantic lines have a breaking strain of only about 800 lb. The new cable will be laid in two lengths,—one from Brest to St. Pierre, off the south coast of Newfoundland, of 2,225 miles in length, not including slack; and the other from St. Pierre to the terminus, of 22 miles in length, not including slack. The water section will be similar to the Persin Gulf cable, as it will have to be laid in comparatively shallow water, and its exterior wires will be protected with Bright & Clark's patent silicious compound, which consists principally of powdered flint and pitch. The construction of the shore ends will be similar to that of the existing Atlantic lines, and will gradually become thinner

until they assume the deep-sea dimensions. During the summer Her Majesty's ship *Gannet* took soundings along the proposed route. In order to avoid the dangers of injury from rocks and icebergs, the new line will be laid to the south of the present cables, below the southern edge of the Great Bank, so that it be in deep water. Sir James Anderson will command the *Great Eastern* during the expedition organized for the submergence of the line. The breaking strain of the new steel cable will be 7½ tons, and the strain required for submergence need not be more than 14 cwt. Even if at any time it be necessary to haul up any portion of it already laid, the strain need not exceed a ton and a half in the deepest water. The weight of copper forming the conductor of the existing Atlantic cables is 300 lb. per knot; in the new cable it will be about 400 lb. The *Great Eastern* has arrived at Sheerness, whence she will proceed with the cable probably in the end of next June.

We are glad to state that the Atlantic cable of 1866, which sustained some damage two or three months ago, has been repaired, and is again in working order.

THE DUBLIN WATER SUPPLY.

FOUL RESERVOIR BOTTOMS.

The water supplied at great outlay to Dublin from the Roundwood reservoir is pronounced undrinkable by the consumers. The Roundwood reservoir lies in a valley, one end of which is closed by an embankment, while the Vartry—a sufficiently pellucid stream—enters at the other. The bottom of the reservoir is composed in part of peat-hog, and hence, it is said, the impurity of the water. In process of time, no doubt, the peat in the Roundwood reservoir will either be washed thoroughly or rotted away, and then the water will become pure, but the process must be tedious, and for years the water supply of Dublin may be defective. Unfortunately, in the case of the Dublin Waterworks, washing cannot be effected. The Roundwood reservoir takes two years in filling, and to empty it now would be tantamount to postponing the supply of water to Dublin from the Vartry for at least a year. It is not easy to suggest any remedy other than the emptying and refilling of the reservoir. Water stained by percolation through peat cannot be purified by any filtering power which a great water company can be expected to employ. It is somewhat remarkable that engineers seldom pay the smallest attention to the character of the soil on which they propose to store up water, except in so far as its peculiarities are likely to affect the permanence of the storage embankment.

A physician, writing to one of the Dublin papers, suggests a reason for the impurity of the new supply which deserves attention here. He asserts that the valley of the Vartry was for many years thickly populated, and that the soil has been greatly contaminated by excreta and sewage matters which, now being dissolved out, render the water bad.

GENERALISATION IN ARCHITECTURAL EDUCATION.

The article under this heading, in a recent number of our Journal, has called forth a rather melancholy and desponding letter from a correspondent who signs himself "Adelphi," a letter which, however, we have no doubt expresses very much the feeling of many who have been decoyed into the profession by premium-hunting architects, and find, after the best years of their youth have been spent, that they have learned nothing satisfactorily, or that they do not possess the special talents which they discover, when too late, to be absolutely necessary for success in the profession. Many can sympathise with "Adelphi." Even those who were fortunate enough to be placed under a member of the profession who conscientiously endeavoured to do his best in instructing his pupils, must remember their own feelings of helplessness when, at the expiration of the articles, they began to consider what they really knew, and what capability they possessed for carrying out works on their own account. The answer to "Adelphi's" question, "Where are we to get the education we require?" we believe can only be, for the present, that a man must teach himself, as well

as he can. Details of construction may be learned during studentship, but all that appertains to the history and the principles of architecture, as an art, must be obtained for themselves from the study of published works, attendance at societies, and from thinking out the subject themselves.

There is one means, however, whereby the present apprenticeship system might be made to bring forth much better fruits than it does, or has hitherto done, viz., the more conscientious recognition by architects of their responsibility for the proper training of a pupil for whose education they have received a premium, and a greater degree of care and caution on the part of those who advise or induce a young man to commit himself to the study of so arduous and exacting a profession. What becomes of all the young men who go through their term of apprenticeship in architects' offices, and are then never heard of again? In nine cases out of ten, they have very likely been carelessly bound over by friends to a master who receives them as carelessly, without the slightest effort being made to explain to them the real bearings of the profession they are to undertake, or to ascertain whether they possess in any degree the natural ability for it, without which genuine success is out of the question. On this latter point, the architect who takes the pupil is the man most able, generally, to form a judgment; and it is not too much to say that any architect who, knowing what the profession requires, accepts as a pupil one who he is aware has no capability for it, without giving him or his parents a word of advice or caution on the subject, but quietly pocketing a premium and letting a lad's youth run to waste in copying drawings, such a man is guilty of a moral delinquency; he is carelessly permitting a fellow-creature to take a false step in life, which perhaps can never be wholly retrieved. This is surely an evil case; yet how common it is it would perhaps be well not to inquire too closely. If the remarks on architectural education, which occasioned the letter of "Adelphi," should have had the slightest influence in awakening to a more serious view of the subject either any who are entering the profession, or any of those who are undertaking the responsibility of acting as their professed and premediated teachers, they will have done good.

MASBRO' CEMETERY COMPETITION.

There were twelve competitors, and some of them sent in two or three designs each. The number was, according to pre-arrangement, first reduced to five, and then to three. The final choice fell upon the plans of Messrs. Blackmoor & Mitchell-Withers, of Rotherham and Sheffield. Next came those of Messrs. Swann & Hill, of Sheffield and Leeds, and those of Mr. Thomas Dobb, of Rotherham. It was accordingly unanimously resolved that the plans of Messrs. Blackmoor & Mitchell-Withers be adopted, and the work no doubt will be proceeded with. The two chapels,—the one for the use of the members of the Established Church, and the other for the use of Dissenters,—will be Early English in style. They will form separate buildings, as it is understood that the Archbishop of York objects to consecrate buildings of this character that are erected together with and, as it were, under the same roof as chapels for the use of other denominations.

THEATRES.

The Haymarket.—During the recess, Mr. Buckstone's popular theatre has been very agreeably decorated. Fresh painting and gilding to the public box-fronts, and hangings of green and gold to the private boxes, produce a bright and elegant effect. Above the proscenium is an allegorical group by Mr. E. C. Barnes. We happened to be ill-placed to judge of its merits, and may find another opportunity to do so more fairly. A new drop-scene, representing Tasso reciting his poems in Venice, has been painted by Messrs. Tebbin. It displays their usual skill, but is over-red in colour, and might be improved by a little additional work in the right place. The re-appearance of Miss Bateman, in "Leah," seems likely to prove a great success, notwithstanding the length of time during which the piece was played in London some four years ago, an evidence of the number of audiences to be

found in the metropolis for any perfect work of its kind. The actress each night, in the special points of her performance, excites the spectators to the loudest demonstrations of satisfaction. A sister of Miss Bateman, under the name of Francis, made a pleasant impression, as she had previously done in Birmingham.

Royal Alfred Theatre.—Evidence was afforded on the opening night of this theatre in support of what we have before now said, that no quiet enjoyment can be expected in a house where any number of the audience are unable to see. This was the case in the gallery of the newly arranged theatre in Marylebone (we suppose it is by this time altered), and the result was a constant hubbub and the imminent risk of a serious accident. We do not hear of any architect having been consulted. The whole of the interior is new. Mr. S. Simpson was the builder employed. The ceiling, proscenium, and balcony front have been executed by Messrs. White & Co. in *carton pierre* and *papier mâché*. The coloured decorations have been carried out, discreetly, by Messrs. Green & King, and the general effect is light and elegant. The drop-scene, which represents the *Galatée* as she anchored in Port Jackson Harbour, is hard and heavy. On the other hand, some of the scenery in the Indian piece, with which the house opened, is creditable to Mr. Arthur Henderson. Miss Amy Sedgwick has the direction.

India.—It is stated that the Punjabees are going in with spirit for the erection of a theatre and concert-house at Anarkullee by a limited liability company with 100rs. shares. Eighteen shares have been already subscribed, and operations are to be commenced directly other eighteen shares are taken up.

THE GLASGOW INSTITUTE OF ARCHITECTS (INCORPORATED).

The first general meeting of the Glasgow Institute of Architects, which was incorporated on the 18th ult., under "The Companies Act, 1862," and "The Companies Act, 1867," was held in the Religious Institution Rooms, St. George's place. Mr. James Salmon occupied the chair. After some preliminary business was transacted, the Council of Management for this year was chosen, consisting of Messrs. James Salmon, Alexander Thomson, John Burnet, George Bell, John Baird, James Boucher, John Carrick, Campbell Douglas, John Honeyman, junr., William Spence. It was unanimously agreed to recommend that the members of the Institute should use the initials I.A. after their signatures to documents connected with their profession, meaning thereby Incorporated Architect or Incorporation of Architects, to indicate membership.

A meeting of the Council of Management took place immediately after the general meeting of the Institute, at which Mr. James Salmon was elected president; Mr. John Burnet, vice-president; Mr. Wm. MacLean, writer, secretary; and Mr. Alexander Thomson, treasurer. A committee was appointed to frame a table of fees to regulate the charges for professional work done by the members, and by-laws and rules for the purpose of regulating and conducting the examination into the professional attainments and qualifications of entrants.

GAS.

At the usual meeting of the Metropolitan Board of Works Mr. Newton moved the following resolution:—

"That in the opinion of the Board it is expedient that the manufacture of gas should, as far as practicable, be removed from the populous districts of the metropolis; that the Board should promote a bill empowering them to supply gas to the metropolis; that if it be desirable to take the existing gas companies they should be compensated, the terms of such compensation to be, if possible, agreed on between the Board and the companies; and that the matter be referred to the special gas committee, with instructions to obtain the needful advice and take the necessary steps for the preparation of Parliamentary notices and of a bill to be introduced into Parliament during the next session; these powers, however, not to be sought if the companies will agree on such a price and such regulations as to the supply of gas as shall be satisfactory to Parliament."

Mr. Evans moved an amendment,—

"That in the opinion of the Board it is not advisable to take measures to promote a bill in Parliament in relation to gas supply during the ensuing session of Parliament."

After a long discussion the amendment of Mr. Evans was carried upon a division.

The Sheffield Gas Company have declared a dividend at the rate of ten per cent. for the last year at their annual meeting.

Bombay Cathedral is now lighted with gas. The sparrows that frequent the place found the burners very convenient to build their nests in, and when on the first two Sundays the gas was fully turned on, the materials composing these nests ignited, and there were, for a few minutes, three or four small conflagrations, that for a time looked dangerous, more especially as several sparks fell into the pews immediately under the burners.

At the half-yearly meeting of the shareholders of the Geelong Gas Company a dividend of 10 per cent. per annum was declared. The consulting engineer's report enumerated considerable improvements in plant and erection of masonry, and stated that the works were in a complete state of repair.

UTILIZATION OF WASTE STEAM IN WARMING BUILDINGS.

The steam from high-pressure engines is led into a self-acting apparatus, patented by Messrs. Herring & Co., of Chertsey, and is there condensed and utilised in warming the buildings, after which it is returned to the boiler still hot, and so pure, from its previous distillation into steam, that it can produce no incrustation in the boiler. Not only are the buildings connected with the steam power thus warmed, but 95 per cent. of the water is thus economised in its re-use, and fuel saved by the re-entrance of the water while still hot into the boiler. By this apparatus 20,000 cubic feet of mill or manufactory per horse-power, it is said, can be warmed, and six gallons of water per horse-power per hour saved, the water, as we have indicated, giving a hot feed, and without deposit; and all this continues to be done absolutely without any cost, the only outlay being the first cost of the apparatus, which seems to be safe as well as economical. The using up of waste heat has for many years received our attention, and we do not recollect of a finer example of such utilisation than this at least, in theory; and as for the practice, it seems that this invention has been tested, with great success, by the experience of the last two winter seasons.

UNDERGROUND ROOMS.

SIR,—Will you allow a plain country parson to enter his solemn protest against the cruelty of builders? Wherever I go I see great deep holes being dug, in which many of our poor unfortunate countrywomen are to be buried alive. Now, sir, it will be quite time enough to put us underground when we are dead; until then, pray let us do what we can to keep above ground. It may be difficult to do so in every case, but surely in the suburbs of London, and many other parts, there is no imperative necessity for sinking kitchens in the earth instead of placing them on the earth. Sunken kitchens are so prejudicial to health that few of us would think of placing a valuable horse in one of them. Ought we, then, to deem them antiseptic for our own species? But further, they entail a serious additional expense. The extra work occasioned by kitchen stairs is almost equal to half a servant. Without these stairs a servant could well-nigh do double the work. Then, again, the inconvenience and discomfort to the mistress of the house are great, and it is a terrible tax to her if she has to run up and down stairs every time she may wish to superintend some little matter in her kitchen. Health, economy, and comfort are all in favour of houses with kitchens at the back, on the same floor with the sitting-rooms. How houses constructed upon this plan are valued, appears from the fact that they are no sooner built than they are immediately taken; while those built upon the old-fashioned plan remain vacant for months, and in many instances for years. I have myself for some time been looking out for a small villa in the suburbs of London, with the kitchen at the back; but house-agents tell me that this style of house is rarely ever vacant,—that they could let any number of them if builders understood their own interests and would erect them. Yet the great majority of builders seem to persist in multiplying houses with the terrible drawback of a sunken kitchen; but I am persuaded that as the question of comfort and health is

considered, so will sunken kitchens be avoided. I for one will never take a house so constructed, and I think that underground servants should strike and go in for double wages. Builders will do well to turn their attention to this important matter. There is another point which I should like to bring under the notice of architects and builders, and that is the erection of handsome blocks, capable of division and subdivision, combining economy and security;—each suite of rooms to comprise all offices and appliances necessary to constitute a complete and distinct residence; in fact, something after the Scotch fashion, and that which obtains in some parts of Italy. Many families would prefer such an arrangement to the expense and responsibility of a separate house; and many who now take lodgings would be glad to take a block suite. If well planned and on eligible sites near London, the speculation would be a great success, and supply a great desideratum of the present day.

WILLIAM WRIGHT, late Vicar of Harbury.

CONCRETE HOUSES.

SIR,—In common with most members of the architectural profession, I take great interest in the question of cement concrete for walls; and noticing that a failure had occurred in the construction of a house at Twickenham, I visited the spot. On inquiry, I found that the work had been superintended by Mr. Tall, and that his apparatus was used for the formation of the walls. It appears the walls were carried up in his usual way of 18 inches at a time, between 30 ft. and 40 ft. high, the ordinary door and window openings being left where required. Nothing unusual occurred to cause apprehension of a failure, when suddenly one evening, fortunately after all the men had left off work, a large portion of the walls fell in. The exact cause of the accident I could not gather from the men upon the work. The concrete had been carefully mixed in the proportion of eight to one in measured quantities of Thames ballast and Portland cement. I noticed that the work had broken up in straight courses, evidently at the level at which the machine had been shifted, showing imperfect adhesion at this point. This is undoubtedly a grave defect, and is caused by the wall being formed in layers, or courses, 18 in. in height, and the concrete of one layer setting before the next is added. How far the bolt-holes which are left in the walls for the purpose of fixing the machine may have contributed to this failure, is difficult to say; but, from appearances, it seemed to me that they would considerably help to increase or extend a fracture already begun in the work. Being somewhat puzzled to account for the original defect, I was led to examine the boundary-walls, which are constructed in precisely the same manner; and upon a close inspection I noticed minute cracks occurring at certain intervals, and extending from the top to the bottom of the wall. Now, it appears to me that these cracks must be due to the contraction of the material in the process of drying; and it is just possible that one of these cracks, occurring between a series of openings in the wall, caused its destruction.*

ARTIFEX.

THE FAIRFORD WINDOWS.

SIR,—Your correspondent, Mr. J. G. Waller, has written a very long letter to prove that he is not of Mr. Holt's opinion respecting the Fairford windows,—for that is all he does prove,—and I have no doubt that Mr. Holt will cheerfully allow him to enjoy the conviction he entertains as long as he pleases. Who Mr. J. G. Waller may be does not appear from his letter, but from his initials he is probably the engraver of a creditable work on Sepulchral Brasses, which was published some years ago. His authority, however, as an art-critic has yet to be recognised, and his lucubrations may be safely left to the tender mercies of Mr. Tom Taylor, whose authority in such matters is recognised, and who has more than once publicly expressed his opinion that the hand of Albert Dürer is visible throughout the work. I am not going to follow Mr. Waller's example, and inflict my opinion upon you, though it might not weigh less with the public; but he has indulged in

* We have received some other letters on this subject, too late for consideration.

expressions which, while they do not advance his argument, deprive him of the right to complain should he be accused of "impertinence" in return. He is exceedingly facetious and satirical respecting the discovery of the letter A upon the sword of an executioner, in one of the windows—a discovery which was not made by Mr. Holt, or considered by him of great importance, though it certainly does not militate against his theory. The last paragraph of Mr. Holt's "exhaustive paper" (I use the words of an antagonist), at Cirencester, are, "To me that monogram needs not to be inscribed anywhere on that noble range of windows in Fairford Church; the painter has left on them the more conclusive mark of his great mind and master hand." If Mr. Waller has read that paper, "the savor of impertinence" attaches to his own remarks. Let me, however, do him justice. He has himself made "a great discovery." He has discovered that Herod not only commanded the execution of St. John the Baptist, but actually presided at it, on his throne, in his royal robes! "How can we withstand such learning and research?" If Mr. Waller has studied the works of Albert Dürer as deeply as he appears to have studied the Scriptures, there is an end to the controversy. It is consolatory, however, to know, that although Mr. Waller has not been able to "detect a single trace of the special style of Albert Dürer" in the windows, he thinks "they are fine works of art, and their completeness is such as should make it a matter of importance to insure their due preservation." I trust, therefore, that he will forward his subscription to the fund opened for that purpose: it will, I have no doubt, be received by the treasurer or either of the secretaries of the British Archaeological Association, to which Mr. Waller, if he be the engraver, formerly belonged, without any reference being made to his secession from that society, a calamity which it has providentially survived. B. A. A.

—the old Failers' Earth pits, mentioned by Pennant, but of late (I think) perhaps scarcely much less used. A retired Quaker Meeting-house is said to be as old as their founder, George Fox. The "purchase" of a "common right" of the poor by a nobleman some seventy years ago, which certainly cannot be considered ungenerous, may interest now, when we read of encroachments with no wish for compensation. Francis, Duke of Bedford (the friend of Fox, &c.), having covenanted, for himself and heirs, to give to the poor of Wavendon, in lieu of their right to "dig turf," &c., a head of land, worth, a hundred tons of coal yearly, at a time when the price, with carriage, and before even "Grand Junction Canal" was, was doubtless much higher than at the present day. Whether the quantity has been (liberally) increased with that of population, &c., is not known to the writer.*

STROUD NEW RESERVOIR.

Sir,—Can you inform me to whom the Local Board have awarded their premium for the above competition, as there is evidently a great want of courtesy on the part of their officers, who (upon application) do not care to afford the necessary information upon the subject? The Board seem to have been determined not to afford any assistance to competitors, for they did not provide even a plan of the site, and those wanting information had to obtain it the best way they could. A COMPETITOR.

DAMAGES FOR BESPATTERING CLOTHES WITH LIME.

Mr. J. PITT TAYLOR, the judge at the Greenwich County Court, gave judgment the other day in a singular case. A young lady residing at Greenwich was passing some buildings in the course of erection at New-cross, when a liquid containing lime fell upon her bonnet and velvet mantle, doing damage to the extent of £4. The land upon which the houses are being erected had been taken on a lease by a Mr. Turner, a builder, and against this person an action had been brought to recover the amount of damage stated. The defendant contended he was not liable, on the ground that another person had agreed with him to do the brickwork of the buildings at so much per rod, and that, in law, such person was a contractor, and would alone be liable. The Judge ruled that this person was, in the eye of the law, the servant of the defendant, and an order was made for the full amount claimed, with costs.

AN ARCHITECT'S BILL.

Jones v. Knight.—This was an adjourned case (Hyde County Court), in which defendant, an inhabitant of Hyde, disputed the balance of a bill of 132. 3s., for drawings, surveyings, &c., as an overcharge, 10% having been put into contract. Mr. Bull appeared for plaintiff, and Mr. Hooper for defendant. It was agreed that the issues of the case should depend upon an item of 52. 6s.

Plaintiff examined, said the item in dispute included two sets of drawings of the premises in the Arcade, which he had been ordered by Mr. Urry, defendant's solicitor, to prepare for him. He followed his instructions implicitly, and on sending him the drawings he said they were useless, and he prepared others, which answered the purpose desired. He had, of course, charged him for the first set, which was included in the item of 52. 6s.

Defendant examined, said he had not given orders for the plans to be prepared; the first he heard of it was when he received them from his solicitor, Mr. Urry, saying they were useless.

His Honour said, if he employed a solicitor, it was at his discretion to act and order were necessary.

Mr. Urry examined, said he never gave orders for particular plans. He gave Mr. Jones instructions to prepare three plans of the three changes the premises had undergone. The plans were for the purpose of illustrating a case to the counsel in a cause now pending between Mr. Knight and Mr. Hughes. The plans first sent to him were not what he wanted, and he told plaintiff they were not, saying at the same time that they were rubbish. The plans he afterwards received were what he wanted.

Mr. Hooper submitted that if plaintiff did not properly prepare the drawings he was not entitled to charge for them; but his Honour thought it would depend upon from what cause they were useless whether he ought to charge or not; and a Mr. Bink, surveyor, of London, having given evidence as to the charge being moderate for the work done, he gave judgment for plaintiff.

HAMPSTEAD FEVER-HOSPITAL COMPETITION.

WE understand that the recommendation of the committee of the Metropolitan Asylum Board is favourable to the design of Messrs. Pennington & Bridgen for the first, and that of Mr. F. Fowler for the second premium. The Board at their meeting on the 10th instant decided not to adopt this recommendation of the committee until they had all had an opportunity of examining the designs, and the matter is therefore adjourned until, this, Saturday. In the meantime permission has been given to the various competitors to send any further printed particulars of their designs for the information of the Board.

* At the neighbouring Woburn (town) Consecration something it seems was done for the poor. A recommendation of "Benefactions" to the poor on consecration or re-opening of churches, "a kind if not useful mode of making them remember it," appeared in the Gentleman's Magazine about six years ago.

Acting upon this permission, one of the competitors, Mr. Snell, has sent in a protest which deserves the consideration of the Board. In the course of it he says:—

"The 'Instructions' issued by you to the six competing architects, stipulated that the designs should surmount the following difficulties, viz. —

1. That the buildings now to be erected for the accommodation of 104 patients, should be so arranged as to admit of their future extension, and the ultimate addition of other pavilions.
2. That the area of the pavilions should be (if practicable) north and south.
3. That an adequate site should be left for the erection of a small-pox hospital."

The design submitted by Messrs. Pennington & Bridgen, which I am informed you recommend for the first prize, will not admit of extension or the addition of other pavilions. There is no room without encroaching on the small-pox site for the required additional pavilions, and the ventilation of the one-story buildings being through the roofs, it is not possible to extend the accommodation by building another floor over; and further, provided this objection did not exist, there are no provisional spaces for staircases to the upper stories.

The axes of the pavilions, instead of being north and south (as desired by you) are nearly due north-west and south-east, and consequently the windows of the wards face north-east and south-west, the coldest and dampest points of the compass. If by this design be made capable of extension, the piece of ground left will, as I have pointed out, be too small for the erection of a small-pox hospital. Consequently none of the above 'instructions' have been complied with by Messrs. Pennington & Bridgen. . . .

FROM SCOTLAND.

Thurso.—The foundation-stone of the new town-hall of Thurso has been laid with Masonic honours. The whole cost is to be about 2,500! Of this sum nearly the whole has been subscribed, a legacy of 1,000!, left by the late Mr. Alexander Henderson, being the "nest-egg" around which the sum accumulated. The building is to contain, besides the town-hall and public rooms, a library and museum. The following are the contractors for the work:—Mason work, Mr. George Manson, Murkle; joiner work, Mr. J. Gauvie, Aberdeen; plaster work, Mr. A. Smith, Thurso; slater work, Mr. Donald Ross, Thurso; plumber work, Messrs. Johnston & Son, Wick; painting and glazing, Messrs. J. & S. Fife, Aberdeen. The architect is Mr. Mackenzie, Aberdeen.

CHURCH-BUILDING NEWS.

Leaden-Road.—The church of this village has been re-opened. The whole structure has been renovated and restored, commencing with the porch, which has been rebuilt in oak in the old Norman style. The plaster walls have been replaced by rubble, with south stone dressings; while the chancel has also been rebuilt throughout in the same material. The floor has been repaved with Staffordshire tiles, a new open oak roof built, the font restored, and the church re-seated throughout with oak benches. The spire, which was formerly in a dilapidated and unseemly condition, has been restored, and a new bell added, the church possessing three bells. New buttresses have also been added throughout to the exterior of the building, and it is proposed hereafter to complete the restorations by adding a new vestry and introducing other minor improvements. The old pulpit has been restored under the direction of Mr. Dowsett.

Wadworth.—St. Mary's Church, Wadworth, after having been internally renovated and restored, has been re-opened for divine worship by the Archbishop of York. The chancel was restored about three years ago, and this year it was resolved to complete the work, which had indeed become a very necessary one. The interior of the church, like the one recently restored at Tickhill, had become thickly coated with dirt and whitewash, and the carved stonework had fallen into a dilapidated state, which was not improved in appearance by the contrast with the renovated chancel. Something like 400l. is the cost of the restoration. The work was entrusted to Mr. Athorn, of Doncaster, who also carried out the restoring of the chancel. The whole of the stonework in the nave and aisles has been scraped, cleaned, and stuccoed, and the carving where demolished or disfigured restored, and the floor also levelled and relaid. Open stalls throughout the church have been put in by Messrs. Green & Snowden, of Wadworth. The organ has also, under Mr. Meacock, of Doncaster, partaken of the general overhauling.

Bridelick.—The foundation-stone of a new church has been laid here. The plans were prepared by Messrs. Cory & Ferguson, of Carlisle.

ROAD-MAKING.

Sir,—The practice now of repairing highways is by laying on a thick bed of stones, say 4 in. or 5 in. in thickness, covered with road scrapings in a semi-fluid state; then rolled with an iron roller some tons in weight till a surface is obtained resembling the one on roads which have been repaired and used weeks subsequently. The old system recommended by Telford and others has been to lay on a thin bed of clean, equal-broken material, and when rats began to appear, the material was raked into them, so the surface being kept even, and the traffic as equally distributed over the surface, by means of road-guards, as possible. If from the quantity of traffic one bed was insufficient, others followed as soon as the other material had got wound together, till the strength of the road was made equal to its traffic.

Now, if any of your scientific readers or practical road surveyors can give any evidence as to which system makes the best roads at the least expense, I am sure it will give great satisfaction to members of corporations and local boards, and to none more than your humble servant, X. Y. Z.

"WOBURN SANDS."

Sir.—The origin of the church here is due to the late Rev. J. V. Moore, rector of Aspley, and a gentleman of some family property. Feeling, as all must long have done, the great church deficiency there (beyond, I believe, any school-room service instituted by the present rector of Wavendon), he offered to "meet" the late Duke of Bedford by completely "endowing" a church on condition that the Duke, &c., being erected. This seems to have been carried out with schools, &c., by the present Duke. Mr. Moore having bequeathed (I am locally informed) 5,000l. upwards, for the other object. The gift of a "clock" by a surviving state was a grateful though minor tribute; but the very "rare" tri-centenary organ may, doubtless, cause distant musical visits.

A chapel-of-ease to Wavendon, to which the greater population—then much smaller—belonged at that time, was recommended in accordance with the aspirations of the incumbent, Mr. Fisher, as early as Parry's "History of Woburn," 1831. Woburn "Sands" though not in that parish, the "Station" being over two miles from the town, were once well known on that line of road. There exists a very rare semi-humorous engraving by Bunbury, representing the "Passing of the Coach,"—a small antique one with the "basket," and a sturdy, blunderbussed "guard" trudging along, nearly knee-deep in sand by the side. This, however, has long been remedied by a deepening hill-cutting (70 ft.), with some raising of good road below the tall cliffs on the cliffs having an extremely interesting effect. To this locality also belong—though attributed to Aspley

The estimated cost is about 3,100l. It is to be built of yellow freestone, and cruciform in structure, consisting of a chancel and nave, with a square tower rising upon pillars, and about 61 ft. in height, resting between the chancel and the nave. The interior of the nave is to be 39 ft. 8 in. by 22 ft.; the exterior, 46 ft. 7 in. by 27 ft. The interior of the chancel will be 29 ft. by 18 ft., and the east end of the church circular, while outside the building there are to be two transepts, each 19 ft. 9 in. by 19 ft. The contractors are, for the masonry, Mr. Henry Graves, of Aspatria; the joiners' work, Mr. Henry Dent, Cockermouth; and the plumbers' work, Mr. Thompson, of Carlisle. The site of the new church is on a portion of the glebe land of the parish close to the present edifice, which is now being pulled down. Towards the cost of the new edifice the sum of 2,400l. has already been contributed.

Stimping Thorne.—The parish church of St. George, which has been under restoration for more than twelve months, has been completed, and the services are now performed in the church. In the late restoration cathedral glass has been used for the chancel windows, except the east, and the old stained glass canopies have been replaced by Messrs. Bailie & Mayer, of London. The floor has been paved with Minton and Hollins' tiles. There are new altar-rails and stalls for the choir, of oak. The chancel restorations were carried out by Mr. J. Maxey, of Louth, from designs by Mr. Fowler, architect, of the same place. The repairs of the rest of the edifice have been much more extensive; new roofs have been added to the nave and aisle, all the chancel arch and much of the adjacent wall of the nave, and all one side of the tower, have been rebuilt, and the whole of the exterior pointed out. The tower arch has been opened out, and a new window of stained glass inserted by the rector, the subjects represented being our Saviour's Transfiguration and Ascension. In the place of the north door a new window has been made, which has thus restored some of the light excluded by the abolition of the modern clear-story windows. The furniture of the nave and aisle is of oak, and the sittings have ends of carved panel-work. The panels of the pulpit, together with the cornice, are the work of a lady, Mrs. Tyrwhitt Drake, of the Thorne.

Windsor.—We learn from an appeal which the vicar and churchwardens have laid before the parishioners that steps have been taken with a view to the re-seating and restoration of the parish church. The estimate is as follows:—1. Reseating of area, alteration of gallery-seats, reconstruction and decoration of other parts of interior, 1,540l.; 2. Erecting a chancel, vestry, organ-chamber, and new Royal pew, with the necessary decorations, 2,150l.; 3. Entire reconstruction of windows; addition of a large western porch, with circular cloisters right and left, to communicate with the street; new parapets, alteration of tower, &c. (according to plans), 3,650l.; giving a total of 7,340l. It is not proposed, however, at present, to take any step beyond the exhibition of the plans, which will remain on view at Mr. Griffin's, in the High-street. Three sums of 250l., 150l., and 100l., besides a thank-offering of 25l. and a donation of 20l., have been promised, whenever the work shall be commenced. Should these be followed by others of sufficient magnitude to justify an expectation that, with the help of the Church Building Societies, the sum of 3,690l. might be speedily raised, steps would be taken to bring the plans in proper form before the parishioners at large, for their approval or rejection.

Fylkingates.—The corner-stone of the new church for this parish has been laid. The object is to provide the parishioners with a place of worship in closer proximity with the largest part of the population than the old one is; the latter being in such an exposed and inconvenient place, that in winter only a small portion of the congregation can attend the services regularly. The church will be built from the designs of Mr. Street, architect.

Buckland Monachorum, Devon.—The parish church is now undergoing restoration and repair, under the direction of Mr. H. Elliott, of Plymouth. The works are being executed by local tradesmen, Mr. P. Blowey being the principal contractor. The building is an interesting specimen of ecclesiastical architecture, and was erected during the reign of Henry VII. by the members of the neighbouring Cistercian abbey, from whom the parish derives its name. The church is interesting from the fact of having formerly numbered amongst its worshippers the

great Admiral Sir Francis Drake. An elaborate monument by the elder Bacon, erected in the church to the memory of General Elliott, afterwards Lord Heathfield, the defender of Gibraltar during the siege in 1782, bears silent witness to the fame of another illustrious parishioner. The works now undertaken will comprise the cleaning and repair of the existing oak roofs (now partially covered by plastering), new slating to roofs, removal of the high deal pews and huge western gallery, repair of the ancient carved oak bench ends and renewal of the seating throughout in oak, carved so as to harmonize with the ancient work; new tiled flooring in passages, plastering to walls, glazing to windows, and various other works that may be required to restore the ancient features of the church, as far as possible, to their original appearance. About 1,200l. are proposed to be spent on the works, part of which sum is raised by a parish rate, and the remainder by voluntary subscription.

Sopley (near Ringwood, Hants).—St. Michael's Church, after having undergone restoration, was reopened for divine service on Michaelmas-day. It is a cruciform building of Early English date, to which alterations were made in the Perpendicular period. The chancel has been repaired. The original lancets and the lopers' window, which had been blocked up, have been opened out. The modern segmental plaster ceiling to the nave has been removed, and has disclosed to view a fine Tudor tie-beam roof, with tracery in the upper part, and elbow-pieces supported by figures of angels holding various kinds of musical instruments. The walls, pillars, and arches have been cleansed from many years' accumulation of whitewash. Open deal benches, stained and varnished, supply the place of the high old square pews throughout. It is much to be regretted that the funds in hand did not permit of the restoration of the tower (at the west end), and of the noble arches opening into it from the nave and aisles, which are at present blocked up by temporary wood and brick-work. Were this removed, and the deeply-recessed and moulded arches properly repaired, the effect would be remarkably good. The works have been superintended by Mr. Ferrey, and carried out by Mr. J. Tanner, of Sopley, builder.

Houghton-Conquest (Bedfordshire).—The fine old church in this parish is about to undergo restoration. Mr. G. G. Scott, R.A., is the architect, under whose instructions the work will be carried out, by Mr. John East, of Melton-Mowbray.

DISSENTING CHURCH-BUILDING NEWS.

Devesbury.—The foundation-stone of a Congregational church has been laid here. The site of the building is at the junction of the Bradford and Halifax roads. When erected, the edifice will be used in place of the building now known as the Public Hall. The basement floor will contain the school-room, 50 ft. by 44½ ft.; lecture-room, 30 ft. by 22 ft.; infants' class-room, 24 ft. by 14 ft.; and four smaller class-rooms and kitchen. There will be separate yards on each side of the building for boys and girls. These will be approached from the Halifax-road by a flight of stone steps, and from Wellington-road by a side street inclined to the required level of the yard. There will be four separate outer entrances to this floor, two being provided through side lobbies to the school-room. The remaining two will be for the class and lecture rooms. There will also be two separate communications by staircases to the ground floor and gallery, and a minister's staircase to the vestries. The ground floor will consist of large vestry, 29 ft. by 14½ ft. and a minister's vestry, 14½ ft. by 11 ft., with lavatories, &c.; also the main body of church, which will be 87 ft. by 50 ft., with the two side wings containing the entrance vestibules and staircases to galleries and schools. The approaches to this floor will be three in number, the two principal entrances being from the Wellington-road by flights of stone steps to the vestibules. The remaining entrance will be from Halifax-road by level landing to the vestries. A gallery will be continued round the entire chapel, supported on ornamental cast-iron columns. The gallery front will be moulded, divided into compartments by pilasters, and filled in with perforated ironwork on a scarlet ground. The body of the church and the gallery will seat 500 persons each, making the entire seating accommodation

of the church at least 1,000 persons. The whole of the seating will have shaped stall ends, low doors, and leaning backs, and the whole of this and other woodwork in the church will be of red deal, stained and varnished. The ceiling of the church will form an ellipse, and will be 37 ft. from the floor in the centre. The style of the architecture will be Italian. The principal front will be towards the Wellington-road, the central portion of which will project from the main wall and will be surrounded by a pedimental cornice. The main feature in this portion will be a triple-light window, divided by Corinthian columns, supporting the arched and canopied head of the centre light, which will be 25 ft. high and 8 ft. in width. The two side lights will be square-headed, and the space below the eills will be filled in with ornamental balustrading. On each side of this central portion, and recessed from it, will be two other windows of similar proportions. The whole of this front and the wings will be constructed of toolled ashlar, from the neighbourhood of Huddersfield; and the remaining external portions of the building will be faced with pitched Elland Edge wallstones, with dressings of Huddersfield stone. The cost of the entire building will be about 7,500l. Messrs. John Kirk & Sons, of Huddersfield and Dewsbury, are the architects. The contractors for the various works are as follow:—Mr. G. W. Fox, of Ossett, mason; Messrs. Monson & Hollings, of Bradford, joiners; Mr. George Shaw, of Mirfield, plasterer; Mr. Thomas Yeoman, of Dewsbury, plumber and glazier; Mr. John Brook, of Huddersfield, painter; and Messrs. T. A. Heaps & Co., of Huddersfield, ironfounders and smiths.

STAINED GLASS.

St. Michael's, Alnwick.—Three stained glass windows, in memory of the late Algernon, Duke of Northumberland, are about to be placed in this church.

Ashtford Church.—A memorial window has been placed in the south chancel of this church, to the memory of Richard Greenhill. The window is by Mr. Wailes, of Newcastle.

Tallard Royal Church.—A painted window has been placed in the east end of the north aisle of this church, to the memory of the Hon. Alice Arbutnot, who was killed by lightning on her wedding tour while ascending the Schelhorn, in Switzerland. The window has three compartments. In the centre one at the top is a half-length representation of the Saviour blessing little children. Below these is a full-length female figure, with upturned face, the arms extended and raised, as if in the act of ascension. The north compartment contains two figures, representing the wise and foolish virgins. In the south light are two figures, representing orphan children, one holding an infant in its arms, while a third figure represents Charity. The stained glass is protected by plate glass outside, the size of each compartment, as well as by a wire guard. The window was painted by Bertini, of Milan.

Town Church, Guernsey.—A memorial window, lately set up in this church, and completing the stained glass of the whole east end, has been placed by Mr. Emamy Dobrée, of London, to the memory of his father and his son. The design is founded upon the subject of the nativity of our Lord and His manifestation to the Gentiles. The window consists of three main openings, of considerable dimensions, and a flowing tracery of Flamboyant character, having nine openings. In the lower portion of the centre the infant Jesus is shown lying in a crib in the manger, the Virgin Mary being immediately behind him kneeling and in the attitude of prayer. Joseph stands by, bearing his staff, as having been journeying. In the background are the ox and the ass, and ruined buildings which formed the stable. The compartment on the dexter side of this contains figures of the three wise men or Magi. On the sinister side is a group of worshipping shepherds. Above all these groups, and extending through the three main lights, and also through the eight opea of the tracery, the entire is filled with the Heavenly Host, the angels in the centres bearing a scroll with the sentence, "Glory to God in the Highest," the other angels bearing and playing upon musical instruments, the topmost opening in the tracery having the Star of Bethlehem. The three main lights are enclosed within a border, which forms a framework to the whole picture, composed of the vine

foliage and fruit. This is upon a ruby ground. The artists were Messrs. O'Connor, of London, who had previously placed three other large memorial windows in this church.

St. Nicholas's Church, Newcastle.—A memorial window, of large dimensions, has been erected in this church, at the cost of Major Spoor. The window is one of a series at the north side of the church, and consists of four lights with Decorated tracery. The first compartment contains "The Agony in the Garden," the next is filled with "Our Lord hearing the Cross," in the third opening is "The Entombment of Our Lord by Joseph of Arimathea." Next follows a scene after the resurrection, "The Marys at the Tomb." The tracery is filled with an angel, and the monograms of the family are surrounded by foliage. The window is the work of Mr. Baguley, of Newcastle-upon-Tyne.

SCHOOL-BUILDING NEWS.

Kerry (Montgomery).—The Kerry new schools have been erected from the designs of Mr. David Walker, of Liverpool, and are built upon a site presented by the Rev. W. Morgan, B.D., vicar of Kerry. The front view of the schools is towards the road leading from the Sarn, the building being placed upon the same frontage as the Reading-rooms, erected some years ago by Mr. Naylor, which form a group. The new building is designed for National Schools. The plan consists of two separate rooms, each 40 ft. long by 18 ft. wide, with class-rooms attached to each about 14 ft. to 17 ft. The height of the wall-plate is 13 ft., and about 28 ft. to the ridge. The roofs internally are open, timbered with curved braces of pitch-pine varnished, the open spaces between the spars being plastered. The floors are laid with selected pitch-pine, the walls being coloured with a warm salmon tint upon the brickwork, a skirting of about 4 ft. high being carried round the walls in oil paint of a dark chocolate colour, and capped with an ornamental stencilled border. The boys' school is entered from the east, or principal front, the girls' entrance being on the west front, and leads from their enclosed playground. Both of these entrances are laid with tiles from a design of the architect. The building has a tower, with slated spire and ornamental iron finial, rising to a height of 45 ft. over the boys' entrance, and fitted up with a cast-steel bell by Vicars & Co., of Sheffield. The tower is broken up by openings, filled in with ornamental projecting louver boards. The chimney-shafts spring from the square into the circle. The walls externally are constructed of Bower's light yellow Raabon bricks, and are laid in Flemish bond with a wide mortar-joint, which is ruled in a headed form. The roofs are slated with Bangor slates, the ridge crests of red clay being manufactured from the architect's design by Mr. Peake, of Tinstall. The glass used in the windows is of Harley's ribbed manufacture. Accommodation is provided for 130 boys or girls. The ironwork was supplied by Messrs. Smith, of Birmingham. The works, from the plans of Mr. Walker, were carried out under the superintendence of Mr. James Martin, by the staff of workmen on Mr. Naylor's Kerry estate, the dressed stonework being supplied by Mr. James Porteous, of Welshpool.

PATENTS CONNECTED WITH BUILDING.

APPARATUS FOR WARMING BUILDINGS, &c.—*W. A. Herriny.* Dated 4th December, 1867.—Here the patentee causes the exhaust steam from the engine to pass a coil of pipe of such diameter that the back pressure on the engine may be insignificant. This coil he encloses in a cistern or close tank with which pipes for warming the building are connected. The outlet pipe passes away from the top of the cistern or tank, then circulates through the rooms or holdings to be warmed, in the ordinary way of a hot-water apparatus, and afterwards the pipe returns the same water in a comparatively cold state to the bottom of the cistern or tank. This water remains in the cistern or tank until it again becomes hot, and then it again circulates through the pipes of the hot-water apparatus. In this way the rooms or holdings are warmed without other fuel than that necessary to keep the high pressure steam-engine at work, and at the same time an economy of water is effected, which sometimes is of importance, the exhaust steam

from the engine being condensed into a pure water, which is returned into the boiler.

BRICKS, &c.—*T. W. Walker.* Dated February 5th, 1868.—The patentee claims, first, the general construction, arrangement, and combination of machinery or apparatus for the manufacture of bricks, tiles, slabs, and other like articles, as described and illustrated by the drawings; secondly, the combination with the pistons or plungers of machines for compressing bricks, tiles, slabs, and other like articles of a self-acting expanding packing, arranged and operating substantially as described; thirdly, the moulding and compressing of bricks, tiles, slabs, and other like articles on a bed-plate or table, by the aid of a mould-box or frame and piston or plunger, substantially as described; fourthly, the peculiar composition or compound for the manufacture of plain or ornamental tiles and slabs, as described; fifthly, the production or manufacture of ornamental tiles by punching or perforating holes or openings through such tiles according to any desired pattern, and filling in such perforations at the time of laying the said tiles with mosaic work, or with other tiles of a more or less ornamental character, as described.

HEATING BUILDINGS, &c.—*W. Gram.* Dated January 23, 1868.—These improvements consist in taking or receiving the steam from the boiler or steam generator into the first length of pipe, and continuing such piping to any required length throughout the building, and returning the steam to the boiler by introducing the last length or other extremity into the boiler below the water-line. A tap or valve is applied at the entrance-pipe to control the admission of steam, and another is provided at the termination or exit, near where the pipe enters the boiler, by which tap water is withdrawn from the heating-pipes, and by such combined means the constant circulation of the steam is effected, and an increased heat obtained from the pipes.

DOORS, SHUTTERS, AND BELL-KNOBS.—*J. C. Sanders.* Dated 23rd January, 1868.—A mould of metal or other suitable material is prepared of the shape or form which it is desired the exterior of the knob or other articles shall possess, and glass, either coloured or colourless, is poured therein in a molten state. Any desired pattern is then impressed upon the upper surface of the molten glass whilst the latter is in the mould by means of suitable stamps or dies. When cold and hard the glass is removed from the mould, the edges trimmed, and such portions of the impressed pattern as it is desired shall be of a different colour or colour from the rest of the glass are painted. The glass is then placed in a metallic mounting in the manner well understood by persons connected with the manufacture of such articles, the effect of brilliancy being given to the pattern by placing metallic foil or other suitable varnished or polished material of any desired colour or colours between the glass and the metallic hack or mounting.

Books Received.

Geological Table of the British Fossiliferous Strata. Compiled by Sapper WILLIAM PARSONS, R.E.

THIS seems to be a well-arranged and useful table, compiled from the works of Lyell, Murchison, Tennant, and others. It gives a compendious list of fossils characteristic of the various strata, which are arranged in the order of superposition. In the column for "Remarks" there is one which might have been usefully extended to other instances besides the one in point. The remark is in reference to Portland stone. A table of great use to architects and builders might be compiled in a similar form to this one, but containing many such remarks. In reference to the lowest "Typical Group of Rock," the Laurentian, which is stated to be "devoid of fossils," it must be remembered that this is a table of British fossiliferous strata, and hence does not include the Transatlantic Laurentian rocks.

VARIORUM.

THE *Quarterly Review* for October is a specially good number. Amongst the more interesting papers are the leader on the Great Railway Monopoly, and one on Lake Dwellings. The leading paper advocates the transfer of the railways to one consolidated management, under Government auspices, and we are of opinion

that this is really desirable. As an example of what may be anticipated under such an arrangement we may quote what is said on the Belgian system:—

"Let us now glance at the results of the bold policy adopted by King Leopold in providing for his kingdom,—then the youngest member of the family of European nations,—a system of railways at the public cost, at a time when other nations were indifferent, if not actually hostile to their formation. At the beginning of the enterprise the prophets of evil were in the ascendant. They were able to point to the constantly increasing annual deficit on the working of the lines. Excepting in the year 1836, when there was a gain of 37,000 francs, the loss went on increasing until it amounted to 39,000,000 of francs yearly. This loss was, however, more apparent than real, being principally occasioned by the payment of interest on unproductive capital while the lines were still under construction. But by the end of 1852 the State railways were nearly all made and at work, and then the tide began to turn. Year by year the apparent loss was reduced, until at length not only was the interest on the borrowed money all paid, but a substantial profit was shown on each year's working. In 1858 the net profits, after providing for all interest and outgoings, was 5½ per cent. on the capital expended; in 1860 it was 6½ per cent.; and now it is 7 per cent. The principal of the debt incurred in constructing the lines is in course of annual reduction, and if the revenue continues to increase as heretofore, not only will all the Belgian railways become the unburdened property of the State, but they will contribute in no small degree to the reduction of the ordinary taxation of the country."

Some interesting statistics in reference to our own railway system are given. One of the most startling facts brought to light by the railway traffic returns annually published by the Board of Trade is the comparatively small average number of passengers carried per train. Every one must have been struck with the frequent long and empty trains travelling on railways, but few, we dare say, would be prepared even from these for such a result, in illustration, as this, that to accommodate 4,482 passengers 13,512 seats should be given, or 1,274 to accommodate 179! This, of course, is done under the mistaken idea that it is for the public accommodation all this absurd waste is incurred; but how can the public be accommodated in such a way as this? It goes towards accounting for low dividends and high fares, but there is something radically wrong in the management which renders it possible. In respect to Irish railways the whole system, it appears, might be purchased at present, for 22,000,000*l.*, or less than one year's expenditure on our army and navy. There are 333 Irish railway directors, 70 auditors, 35 secretaries, and 13 general managers, all of whose functions would be much more satisfactorily performed by one efficient executive sitting in Dublin. Let us hope that "Her Majesty's highways," which have for long been superseded, will soon be replaced by "Her Majesty's railways."—*"A Treatise on Optics; or Light and Sight theoretically and practically treated; with the Application to Fine Art and Industrial Pursuits.* By E. NGENT, C.E., of New York. London: Virtue & Co." This is an American offering to those interested in technical instruction amongst the industrial classes. The author has steered pretty clear of abstruse mathematical investigation and formulae, and yet his book is capable of giving an accurate enough knowledge of one of the most interesting and useful branches of science. The treatise seems to be one capable of being made useful not only to artists, but to mechanics and artisans generally, and as a text-book for schools and colleges for both sexes. The style is clear, and the instruction plain and intelligible. The author has had specially in view its utility to the house decorator and painter, the builder, architect, draughtsman, engineer, and others connected with the building trades, as well as those engaged in various other branches of industry.

Miscellaneous.

FALL OF THREE HOUSES AT HOLLOWAY.—On Sunday morning, about eight o'clock, three houses that had lately been erected in the Holloway-road, adjoining the Tottenham and Hampstead Junction Railway, fell with a great crash. Fortunately no one was in the houses, or passing at the time. The cause of the houses falling ought to be ascertained.

THE PARKIN JEFFCOCK MEMORIAL FUND.—A meeting of the friends of the late Mr. Parkin Jeffcock was held in Sheffield last week, when it was decided to proceed at once in the erection of a memorial church, in sympathy with the Oaks Colliery calamity of 1866, at Mortomley, to accommodate about 260 persons. A design by Mr. Butterfield was approved by the committee.

TECHNICAL EDUCATION.—On Saturday, October 10th, classes in connexion with the Science and Art Department were opened at the Slough Mechanics' Institution for the study of practical plane and descriptive geometry, mechanical and machine drawing, building construction, and architectural drawing. About twenty-five students have already joined, and the classes (which are under the direction of the Messrs. Dorrell) promise to be successful.

SOUTH STAFFORDSHIRE INDUSTRIAL AND FINE ARTS EXHIBITION, 1869.—The Guarantee Fund, which the committee determined should be fixed at a minimum of 2,000*l.*, to be limited to 10*l.* each guarantor, is now complete, and the list of 200 names includes very many of the wealthiest and most respected names of the whole district, names which guarantee not only a much larger sum than 2,000*l.*, if it should be necessary, but also the thoroughness of the scheme, and, as far as they possibly can, the prospect of its entire practical success. Mollinex House and grounds are also now taken for the purpose of the exhibition.

GAS REGULATION.—An account is given in the *American Gaslight Journal* for the 2nd of October of an invention patented by Mr. E. Beggs, of San Francisco, for the regulation of gas burners. By means of a small apparatus containing levers, valve, &c., applied to the gas-pipe supplying the burners from the meter, or to the burners themselves, the amount of pressure is equalized, so that whether a smaller or a larger number of burners are used, or whether the gas be at high pressure or low, no gas shall be wasted by undue pressure. The invention is said to be in operation at the office of the journal in Fine-street, New York.

ENCOURAGEMENT FOR OTHERS.—On Thursday evening, the 15th instant, the vestrymen and members of the Board of Guardians for the district of Chelsea, which Mr. Tite, M.P., has long represented in the Metropolitan Board of Works, entertained him at dinner, in testimony of the services he had rendered in Parliament in the passing of the Act authorizing the construction of the Thames Embankment at Chelsea. The entertainment was given in the Vestry-hall, King's-road, Chelsea, and about 200 of the principal inhabitants took part in it. Sir Charles Wentworth Dilke, M.P., presided; and Sir John Thwaites, chairman of the Metropolitan Board of Works, with several of the members of that body, and the Rev. Mr. Burgess, incumbent of Trinity Church, Sloane-street, occupied seats on his right and left.

RAILWAY GARDENS.—A company has been formed to rent, for sixty years, from the various railway companies having lines through the east, middle, and south of France, the right to plant and cultivate fruit-trees on whatever portion of the sides of the line is found suitable. The trees will be trained on metal espaliers, and those kinds planted according to the situation. Gooseberry and currant bushes are to be made to flourish in the least favourable spots, but pears will form the staple crops. The first five years no rent is to be demanded. The idea is not new, as those who have travelled on the German lines can recall the thrift displayed in cultivating these waste spots, in Luxembourg particularly. It is to be hoped, however, that the company will be restricted from obstructing the views of the country with their trees.

SUSSEX ARCHÆOLOGICAL SOCIETY.—The annual meeting of this society has taken place at Lewes, where Mr. M. A. Lower, as usual, became Coryphæus, the Rev. Edward Turner, V.P., being at his post. The Hon. Secretary, Mr. Francis Barchard, the Rev. William Powell, and several of the leading clergy and gentry of the district, were present. In the course of the day the objects visited were Kingston Church and Manor House, Iford Church, Rodmell Church, and the site of a British cemetery on the Rodmell Downs, where excavators were employed to dig into some of the twenty-six barrows which indicate the site of the cemetery, and where human remains were found. Mr. Lower explained the churches of Kingston and Iford. The Rev. P. de Patron did the same for Rodmell, and also read a paper on *barrows*, by Mr. Joseph Cooper, F.S.A.; Mrs. Rosseter, Iford Manor House; and the Rev. P. de Patron. A luncheon took place at Rodmell, and the party, numbering upwards of fifty, enjoyed one of the most pleasant "outings" that the society has ever had.

MARPLE CHURCH.—NARROW ESCAPE.—On Sunday before last, before the congregation had all left the church in the morning, a large portion of the cornice which encircles the chancel-arch and gaslights fell from the ceiling into the middle aisle of the church. Fortunately no person sustained any injury.

ANCIENT REMAINS IN FRANCE.—The *Journal des Landes* mentions discoveries that have been made at St. Cricq, near Ville-Neuve-de-Marsan. These remains consist of antique walls of great thickness, of rooms adorned with mosaics, and in good preservation. In the River Sèvre, also, sunk beneath the bottom, have been found the remains of a boat, which probably belonged to the Normans.

LOUGHBOROUGH PARK VILLAGE.—The works on this estate, which have become the property of the Sutherland Village and General Dwellings Company, have been commenced. It is proposed to erect on this estate about 650 houses, each to have a garden. Plans have been prepared. The houses are to be in price from 200*l.* upwards, payment to be made in the shape of rents, extending over fourteen years.

LIVERPOOL.—Although the Liverpool corporation has long been considered one of the wealthiest in the kingdom, the inhabitants are now complaining bitterly of the pressure of local taxation. At a recent meeting of the town council, Alderman Dover pointed out that the local taxation has risen since 1858 from 5*s.* 1*d.* in the pound to 7*s.* 4*d.* In addition to this, the corporate debt is now 5,000,000*l.*; and recently no less than 21,000*l.* had been spent in obtaining thirty-four bills, which involved an expenditure of 1,000,000*l.* Another speaker complained that the original estimate for the Sefton Park had risen from 85,000*l.* to about 250,000*l.*

A NEW STEAM-ENGINE.—An extremely simple steam-engine, in which piston, crank, steam-chest, &c., are dispensed with, has, it is said, been invented by Mr. Benjamin Franklin, of Westmoreland, Penn., U.S. It depends entirely upon centrifugal force; friction is almost entirely overcome; and it will produce 1,500 revolutions per minute with one-fourth the steam usually required, although the same amount of horse-power is developed. This centrifugal steam-engine condenses almost all its steam (which in itself is a great saving), whilst from its simplicity it can be constructed at one-fourth the ordinary cost, and is not liable to get out of order.

OBTAINING WATER AT ANY DEPTH.—Experiments have been made, on the grounds of Richmond Villa, with Messrs. Watson & Baker's newly-patented invention for obtaining water. The Hon. Edward Erskine, accompanied by several scientific gentlemen connected with her Majesty's Government, were conducted by the patentees to the spot, and two gentlemen representing the Russian Government, and others from the East-India service, attended, all of whom expressed themselves gratified at the result, water being obtained in less than an hour. The water so obtained, it is said, can be pumped up from any depth, and conveyed into the top rooms of the highest house.

A HINT TO LECTURERS.—Many lecturers have felt how unsatisfactory it is to write or draw, or in any manner attempt to illustrate their ideas in a large room. Professor Albert R. Leeds, of Haverford College, Pa., suggests that this difficulty may be overcome thus:—A plate of glass is placed in the lime-light or magnesium lantern, and an inverting prism is put in the forward part of the draw-tube of the objective. If, now, while lecturing, writing is done with an ordinary pen and Indian-ink upon the glass plate, proceeding from left to right upon the plate, it will advance correspondingly upon the screen, and will be read in greatly enlarged characters by those present. The square prism inverts with respect to bottom, and the writing being actually reversed by the writer in reference to the other direction in which the lantern is pointing, the crossing of the rays produced by the lens becomes in this case an advantage, and corrects the letters upon the screen. A collodion film, blackened by exposure to the sun's rays, may be substituted for a naked glass plate with great advantage. On such a film chemical and mathematical formulae, drawings of apparatus, machinery, and so on, may be cut with delicacy, and appear as intensely bright white lines on a black ground, and with something of the appearance of an immense copper-plate engraving.

"ASSOCIATED ARTS INSTITUTE."—The opening *conversazione* will be held on next Sturday evening, the 31st inst., when the president, Professor Westmacott, R.A., will make an address. A remarkable collection of drawings (never before exhibited) by the late Sir J. Westmacott, R.A., will be on view. For ensuing meetings a number of papers are promised by Mr. Soda Smith, Mr. R. Radgrave, R.A., Mr. Ellis Woolbridge, Mr. Bateman, Mr. Cave Thomas, Mr. A. Hart, R.A., and others.

THE ARUNDEL SOCIETY'S PUBLICATIONS.—The Council announces "An illustrated description of the Arundel Society's publications during a period of twenty years." The whole of the publications, including the ivory carvings, will be photographed one-fifth the size of the originals, and arranged chronologically according to the years in which they were issued, whether as annual or occasional publications. The letter-press will give a full description of the works, arranged in a similar manner.

MANCHESTER JEWS' SCHOOL.—The foundation-stone has been laid of a building about to be erected from designs of Mr. E. Salomons, in Derby-street, Chetham-hill-road, as a school-house for Jewish children. Mr. Edward Nathan, the president of the institution, laid the stone in the presence of a considerable number of the members of the Jewish congregation. A dinner in celebration of the event was given by Mr. Nathan, at the Queen's Hotel, and amongst the company were Mr. Thomas Bazley, M.P., and Mr. Jacob Bright, M.P.

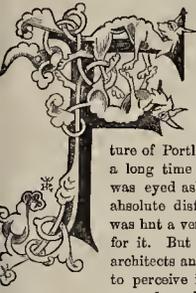
MEANS OF MAKING PAINT ADHERE TO ZINC.—It is a difficult matter to get a coat of paint to adhere well to zinc, which rapidly oxidises when exposed to air and moisture; and, as most engineers know, galvanised iron goes very quickly when once the covering of zinc has decayed. Many means have been tried to obtain the firm and close adherence of paint to zinc. The last we have met with is due to Dr. Botiger, who professes to have completely succeeded. He makes a solution of one part of chloride of copper, one part of nitrate of copper, and one part of chloride of ammonium in sixty-four parts of water and one part of commercial hydrochloric acid. This solution acts as a sort of mordant. It is paid with a wide brush over the zinc, which immediately becomes a deep black colour, forming, according to the Doctor, a basic chloride of zinc, and what he calls an emorphous brass. The black colour changes in the course of twelve or twenty-four hours to a gray, and upon this gray surface any oil paint will dry, and give a firmly-adhering coat. Summer heat and winter rain will have no effect in disturbing this covering, which affords complete protection to the zinc.

FINSBURY PARK.—On Monday night a public meeting was held in Myddelton Hall, Islington, for the purpose of protesting against the proposed building on Finsbury Park by the Metropolitan Board of Works. Mr. W. T. M. Torrens, M.P., presided. Mr. Alderman Lusk, the other member for Finsbury, was also present. The following resolutions were passed:—"That this meeting views with great surprise and regret the course contemplated by the Metropolitan Board of Works to dispose of a large portion of the ground already purchased, and positively required, for the purposes of the Finsbury Park; and feels certain that, if the intention of the Board be carried out, the object of the Legislature will be frustrated, a great injustice will be inflicted upon the inhabitants of the borough, and the usefulness and beauty of the park as a place of public resort will be materially and permanently injured." "That a memorial be signed by the chairman on behalf of the meeting, and presented to the Metropolitan Board of Works by a deputation to be headed by the chairman." "That, failing to obtain a satisfactory reply from the Metropolitan Board of Works, a Bill be prepared to amend the Finsbury Park Act of 1857, having for its object the preservation for the use of the public of the whole of the 131 acres purchased; that the borough members be requested to carry such into the House of Commons; and that they, together with the county members, give the said Bill their utmost support. Further, that the assistance of the Government and the Open Spaces Association be respectfully solicited." Among the speakers were Alderman Lusk, M.P., the Rev. R. Maokenzie, Dr. Harvey, Messrs. C. H. Eli, A. Walker, E. W. Phillips, E. S. Conlin, and J. Vincent.

The Builder.

VOL. XXVI.—No. 1343.

Portland Cement.



PORTLAND CEMENT. For a long time the new material was eyed askance, if not with absolute disfavour, and there was but a very limited demand for it. But gradually foreign architects and engineers began to perceive its merits, and become large customers for it,

using it in vast quantities in the construction of harbours, docks, and fortifications; and within the last fifteen years English engineers have dismissed their prejudices against its capabilities; and its manufacture is now conducted on a gigantic scale on the banks of the Thames, as well as on those of the Humber, Tyne, and Medway. Meanwhile Germany has commenced to make Portland cement. Hitherto Germany and France have been our chief customers: consequently, had it not been for the general acceptance of the cement in our own country, this innovation would have seriously affected the trade. As it is, the increased demand at home is more than compensated for the loss of this outlet. Nevertheless, it will, doubtless, be useful to examine into the mode of cement manufacture in Germany, the more especially as a claim for superiority has been set up for the Continental method. Such a scrutiny has been made by Mr. Reid, who, in a work setting forth the history, properties, and purposes of cement, has given a translation of a German pamphlet by M. Lipowitz, who is the inventor of a mode of manufacture stated to be an improvement upon our own, in which his particular process is fully detailed.* The production of Portland cement in Germany commenced sixteen years ago: there are now twenty-five manufactories established; and we read of a German prince giving the subject his especial attention; contributing, indeed, a paper entitled "The Theory of Portland Cement" to a periodical devoted to mines and manufactures, in which there is evidence that he has made a great number of experiments to ascertain which are the best clays for cements. Being the importance that is attached to the subject abroad, we feel Mr. Reid has been well advised when he resolved to place the information in his possession before the public. Before opening the German branch of the question our author describes the English mode of manufacture; states the combination of advantages that should rule the selection of a site for a manufactory; gives the nature of the raw materials; describes the various kinds of kilns and machines in use; indicates the methods of grinding the burnt cement, and testing it before using it; and, finally, shows the manner of its application in marine architecture, in the building of houses, and formation of roads. This part of his work is of considerable interest. It

seems cement manufacturers are under great obligations to French engineers and architects, whose rigid tests of their material and peremptory rejection of all not coming up to a certain standard led to the strict attention being paid to the various processes, which resulted in the ultimate excellence of the article. Subsequently, the equally severe tests instituted by the engineers of the Metropolitan Board of Works, previously to its use in the formation of the Thames Embankment, have had a similarly beneficial effect in raising and maintaining the quality of the cement. Formerly, the simplicity of the materials, and the comparative ease with which they were manufactured, led to the impression that all care in their manipulation could be dispensed with, which carelessness allowed the article to deteriorate to an often worthless quality, and permitted its export in sacks, instead of casks, whereby it became damaged. One of the charges brought by the Germans against English cement is its inferiority from this last cause. They say it used to arrive in sacks which had lain in the holds of ships exposed to damp and even water; and when landed, instead of the spoil being separated from that which was unruined, both were pounded together, and sometimes adulterated with powdered ashes, metal dross, and sand. Under these circumstances it is scarcely to be wondered at that rivals possessed of facilities equal to our own entered the field.

Portland cement being a mixture of chalk and alluvial clay, the first condition in the selection of a site for its manufacture is that it should possess an abundant supply of these materials. It would be unwise, our author warns, to commence operations on a site where there is not material enough to last for at least twenty years. The next point is accessibility and cheapness of transit. Much of the success of the principal London manufacturers is due, he affirms, to their excellent situation in commanding water-carriage to their principal points of consumption or shipment, at a cost of about 1s. 6d. per ton, combined with their contiguity to the port of London, which facilitates their shipping to foreign ports at low rates. Another item to be considered is the price of fuel. London is provided with a cheap fuel, in the shape of coals, from the gasworks. Owing to this advantage which cheap fuel confers, Newcastle-upon-Tyne is able to compete with London in the production of cement for foreign markets, although it possesses no chalk, and relies for its supply of that essential upon the coal-vessels, which bring it back from the Thames as ballast. The theory of Prince Schönau-Carolath, mentioned above, is that the clays best suited for cements are those which contain iron up to 10 or 15 per cent. in the form of iron oxydide, and that this qualification is possessed in the most eminent degree by the clay of the Medway, a superiority only shared by the clays of Wildau and Kieferstädtel, near Gliewitz. After the choice of a site with the necessary materials at hand comes the selection of the means by which their due and accurate manipulation is accomplished. The first process of washing or mixing is performed either with edge-runners, harrows, or knives; but beyond these, in point of efficacy, Mr. Reid places a wash-mill of a certain construction, which he describes, furnished with two sets of revolving knives. This mill requires a power of eight horses to work it, and costs, with boiler, engine, and machinery, from 300l. to 400l. The proportions of the chalk and clay are, of course, a matter of judgment. Mr. Reid furnishes two tables of analyses of various limestones to assist the manufacturer in forming a conclusion. If the materials be the simple chalks and clays of the rivers Thames and Medway he recommends four parts of chalk from the Medway (which is of a grey colour), or three parts of that from the Thames (which is white), with one

of clay, subject to modification according to the state of both. The next process should always be sampling, that is, a sample of the mixtures overflowing from the wash-mill should be taken and dried on hot plates, and then burnt, with a view to ascertain the correctness of the proportions. Our author directs that the sample should be moderately well burnt, and when quite cool pounded in a mortar, from which it should be sifted in a fine-meshed sieve of about 2,000 meshes to the square inch. He says:—

"Make a sample from the powder with the least possible quantity of water, which divide into two circular pats three or four inches in diameter, and half an inch thick. Place one of these, when sufficiently set, into a basin of water, leaving the other in a dry place; the first with the object of proving the hydraulicity of the mixture, and the other the colour. After an interval of twenty-four hours the samples should be carefully examined in a good light, and if the water-sample is free from cracks or fissures it may be passed as sound, or at least may be considered safely mixed with the proper proportion of carbonate of lime. If on examination the air or dry pat appears of a blue-grey colour, without any stains or brown specks, you may safely continue the proportions of chalk and clay represented by the duplicate samples. But if, on the contrary, the water-sample gives way, cracking and flying, as it is technically called, no time must be lost in reducing your measure of chalk or increasing the quantity of clay. Again, should the water-sample continue sound in appearance after twenty-four hours' immersion, having set quickly when being worked up into the pat, and the air-sample of a brown colour, you may consider the mixture over-clayed, and instant steps must be taken to alter the proportions."

This system is called the wet method. The German system is called the dry method. Instead of mixing his materials in a mill, M. Lipowitz dries his chalks and marks by heating them to 100° centigrade in a square building constructed of fire-bricks for the purpose. The dry chalk is then mixed with this other materials in a dried form, in certain ascertained proportions, and then ground. Mr. Reid compares the two systems very fairly. As far as the cost is concerned in the preparation of the cement to this stage the balance is in favour of the English method, but, taking other considerations into account, he candidly states that the German plan has the advantage. He estimates that the expense of mixing and reducing the raw materials according to M. Lipowitz's method could not be less than 3s. per ton, or three times the cost of the washing operation. On the other hand, the English mode requires more space and more time, consequently the use of a larger capital. To illustrate the comparative merits of the two systems, he states the conditions with which 100 casks per day, or 20 tons, are manufactured by both. By calcination, or the dry method, 240 tons of raw materials would be required to furnish 100 casks per day for a week, allowing for the waste or loss of moisture by heat between the raw materials put into the kiln and the result in manufactured cement obtained at the spots of the horizontal millstones; while by the wet method at least 400 tons of washed material would be required to furnish the same amount of finished cement. To deal with the amount of material, a space of at least an acre must be provided; and two months must elapse before it has settled and dried sufficiently to be turned to proper account. Mr. Reid sums up the respective merits thus:—

"The space, therefore, under the conditions named in the above description, for the reception of one week's washing is an acre, with the weight to be dealt with 400 tons; whereas by the dry method an insignificant amount of room only is required, and the weight but 240 tons, in obtaining equivalent results. The necessity of delay in allowing the raw materials to settle and dry entails the great cost of space, and in like manner adds to the weight. . . . While, therefore, by one method, the material washed is not available for further operation until an interval of two months has elapsed, by the other method, when ground dry, the further process may be continued and even perfected on the same day, obviously great and important advantages, preventing thereby the necessity of locking up an amount of capital represented by the value of two months' washed materials; so that, notwithstanding the extra cost of grinding over that of washing, there are other considerations on the question which, when duly estimated, may leave the balance in favour of the German system."

From the wash-mill, English Portland cement proceeds, by gravitation, by descending drains or channels, to a series of reservoirs, called hacks, provided with sluices to assist in the passage of superfluous water from the mixture

* A Practical Treatise on the Manufacture of Portland Cement, by Henry Reid, C.E., to which is added a translation of M. A. Lipowitz's work, describing a new method adopted in Germany of manufacturing that cement, by F. Reid. London: E. & F. N. Spon, 48, Chancery-lane, 1868.

where it lies till it is sufficiently consolidated to be wheeled in barrows to drying-plates, placed conveniently between the hacks and the kilns, so as to economize the waste heat from the ovens used for coking the coals required for the kilns. After this desiccating process has continued for about twenty-four hours, the material is burnt in the kiln. When cool it is drawn from the kiln, and sent on barrows or trucks to the grinding-mill, where it is either stored or hoisted into the hoppers of the millstones, to be pulverized at once. In considering all these processes, and the appliances required for them, Mr. Reid sees preferable advantages in the German plan. This we will proceed to notice more fully.

A leading feature in the method invented by M. Lepowitz is the use of a kiln he describes as "endless." He has applied the principle of this endless kiln to a sample kiln, in order that his samples may be burnt under the same circumstances as the great hulk of the cement. It is oblong in form, and may be described, so as to give some idea of it, as divided into three parts, two gratings to hold the fuel, an oven to hold the bricks and cement, and a ventilator; and it is so contrived that the whole heat from the fire must pass through the oven to get to the ventilator. A sheet of mica is introduced in one side of the oven, through which the condition of the contents of it may be observed. These are the advantages claimed for the sample kiln of this construction:—

1. The value of different fuels may be accurately determined. It is only necessary to introduce between the kiln and the ventilator a serpentine tube or pipe, immersed in water. The heat engendered in the kiln and the temperature of the water represent the worth of the fuel.
2. The adaptability of all kinds of fuel for the purposes of burning cement, chalks, bricks, &c., can be ascertained.
3. The amount of heat may be regulated to any degree, by the quicker or slower rotation of the ventilator (from 600 to 2,600 revolutions per minute).
4. The proper degree of heat can be accurately determined by the colour of the material while burning, and the time required to burn it.
5. The space required to burn certain quantities of cement or chalk can be with accuracy determined.

Another structure required is the fire-brick building, in which the chalk is dried. This is composed of four walls, enclosing a quadrangular space, which may be either arched over or left open at the top, though if the latter alternative be adopted a slate roof at some height above it is recommended as necessary. In the centre of one side of the square is a small door, through which the chalk is introduced, and another side is occupied with low arched holes for the fires. The chalk is piled up within so lightly that there are plenty of interstices through which, when the fires are lighted, the hot air can rise and dry it. While the drying process is going on the door is kept closed, and is plastered up with clay; and when it is complete the door is opened and the chalk taken out. Besides these kilns, factory buildings, sheds, &c., there are several machines used for special purposes, such as a stone-breaking machine, vertical mills, and horizontal mills. Each mill is provided with covered shoots to endless worms, which carry the material on to pits, whence elevators raise it to cylindrical sieves, through which it again descends through inclined shoots. M. Lipowitz gives a detailed estimate of the cost of machinery and iron for a manufactory capable of producing 30,000 casks per annum, which amounts to 4,682*l.*, exclusive of the cost of buildings. This is subject to the degree of accessibility and neighbourhood of iron-works of the proposed manufactory, the author giving the maximum price of each article. This he supplements with a statement of the yearly cost of raw materials and working expenses in producing 30,000 casks per annum. Including, what appears to be every possible charge besides the raw materials, such as labour, coal, casks, repairs, oil and lighting, carriage, travellers' expenses, 5 per cent. on the outlay for the works estimated in round figures at 9,000*l.*, and 10 per cent. as a redemption fund for the outlay, the cost comes to 9,780*l.* Setting the sale of the 30,000 casks at 9*s.* each against this, there is an income of 13,500*l.*, or a net profit of more than 40 per cent. on the outlay. With these figures before us the interest taken in the subject in the Fatherland is not extraordinary.

Besides describing the process very minutely and systematically, M. Lipowitz gives a plan of a model cement manufactory. Here we may see the shed in which the raw materials are placed, the fire-brick building close by where

the chalk is dried, the positions of the stone-breaker, the edge-runners, and the horizontal mills, by means of which the raw materials are successively ground to powder, the place into which the sifted powder falls, close to the machine which forms it into bricks or briquettes, the drying channels along which it is propelled on wagons by woman, on tramways, to the endless kiln; the return roads that bring it all back again to another series of grinding-machines; and the room where, finally pulverized, it is stored till the casks are ready for it to be packed in. All are arranged with a view to saving of space and labour. There is no passing and repassing. The raw materials are received at one end of the works, and thence in a well-considered circuit, all the necessary processes are effected till it returns to the same extremity of the works, which is probably in proximity to the wharf or other means of transit, perfected and packed ready for export. The employment of women in the transport of the bricks is a feature not common to us. The wagons are, however, small and light. They are composed of six stages, on each of which are laid three drying-plates, holding twenty-seven bricks. Each wagon therefore carries 162 bricks. Our author, speaking of his system of drying, says:—

"When the bricks are dried they shrink to about one-half of their original size, and then weigh about 4 lb. each, so that the channel, when full, contains more than 2,000 bricks, weighing 4 tons. From the mouth of the channel a tramway leads to the endless kiln. Another return-channel declines from the kiln to the forming machine, down which descends the empty wagons, to be used again. This method of drying is one great advantage of my method of manufacture. Other works have extensive drying-houses, built at great cost, requiring a large outlay of labour and time to do an equal amount of work, besides the loss sustained by breakage of the bricks. Other works, again, have extensive covered drying-plates, return-channels leading from the kiln to the forming machine, and other a chimney-shaft, from 100 ft. to 125 ft. high, in order to cause a draught through the numerous flues. My system utilizes the heat, which in other manufactories escapes through the chimneys, I can dry equally fast in winter as in summer, and am therefore independent of the seasons and temperature, as well as the dry or wet state of the atmosphere."

The endless kiln is by no means in general use in Germany. The old-fashioned high cylindrical kilns, 50 ft. high and 10 ft. in diameter, are in vogue there still. It was the knowledge of the time and labour wasted in filling these high kilns and the loss of fuel in heating them every time they were used, that led M. Lepowitz to consider whether the ring-kiln could not be adapted to the same purpose; and the result of his experiments and deliberations is the endless kiln, built, however, not ring-formed, but oblong. Exact particulars of its construction, as well as a plan and section, are given by the author, to which we must refer our readers. Its inventor caudally allows that English cement is better than French cement; but he contends that cement made by his method is better than either. Moreover, his endless kiln is equally advantageous to the brick and lime manufacturer.

Mr. Reid's details of the tests applied to cement afford valuable information. Some people are of opinion that cement requires an addition of sand to give it strength; but this is not so. In proportion as sand is added its strength is taken away. Thus, neat cement gauged by Mr. Grant at different periods in twelve months, to ascertain its strength, yielded the following results:—

	lb.
1 week	445
1 month	449.9
3 months	877.9
6 "	878.7
9 "	935.9
12 "	1,075.7

That is to say, it more than doubled in strength in the twelve months; while, mixed with equal proportions of clean, sharp Thames sand, a considerably lower strength resulted, although a progressive rate, developed by time, was also shown:—

	lb.	Per cent. of the Strength of neat Cement.
1 week	379.9	= 21.8
1 month	399.3	= 44.3
3 months	367.0	= 41.8
6 "	549.8	= 55.9
9 "	607.8	= 61.3
12 "	700.3	= 65.1

The nature of the tests, too, are curious. French architects have given the most attention to this subject, and it is their tests that are the most rigid. In one case Mr. Reid relates that the form of test prescribed by the French authorities for a quantity of cement, ordered for a French Government contract, involved an expense that was out of proportion to the terms;

and that to curtail the cost, he invented a machine for pressing the sample briquettes, instead of cutting them, now in general use. One test consists of the penetration of a needle into the cement. This was invented to measure the relative hardness of several mixtures of pure mortar and cement without sand. A steel conical needle, protruding from a socket on the lower extremity of a vertical rod or spindle, is impelled into the cement by a hollow metal cylinder, weighing about a pound. Another test is a breaking weight of 480 lb., applied after fourteen days' immersion in the sea. Then there are the comparative, hydraulic, and frigorific tests; and the age test, which later Mr. Reid somewhat scornfully couples with fortune-telling. Mr. Grant instituted a triple test. He first required that the cement should weigh 110 lb. to the struck bushel; next that it should remain under water for six days before being submitted to the tensile and third test, which should yield a value equal to 400 lb. on an area of 24 square inches. After reviewing the results of a large number of tests, Mr. Reid draws attention to the fact that Portland cement bricks, even at nine months old, exceed in value or resistance to compression some of the best natural and artificial building materials in the country.

The purposes to which cement may be applied occupy a large share in the thoughts of both the English and German writers. They both speak highly of its applicability to domestic architecture. The use of Portland cement, instead of lime-mortar, would be a cure for at least half the dust in our houses from which we now suffer, according to Mr. Reid. He would have the cement and sand accurately mixed in the required proportions supplied to the builders, so as to only require the addition of water to render it ready for use. For cottages and farm buildings, and barracks and cottages for soldiers, Portland cement is recommended as possessing many advantages. The whole roofs, walls, ceilings, and floors of cottages, with the addition of a small quantity of iron, could be built with this material, and great stability and comfort ensured. M. Lipowitz specially advocates its adaptation to roofing. He says a firm in Silesia has produced a black pitchy substance, called Häsler's wood-cement, which has been used with much success for covering roofs. It is as cheap as felt, much more durable, and is not cracked by the sun's rays. Roofs covered with it are cool in summer, warm in winter, cannot catch fire from the outside, and may be covered with earth, and used as gardens. It has been tested for upwards of twenty years, and no repairs needed. The enterprising German advises all cement-makers to make it, and tells how it is made. From 160 lb. to 190 lb. of cement are mixed with 100 lb. of coal tar in a large iron boiler with a flat bottom. The tar is put in first, then the cement is gradually stirred in, and to every hundred-weight of cement a pound of powdered sulphur is added. When the mixture becomes too thick to flow, it is drawn off through a pipe fixed in the side of the boiler and packed in casks. Before covering a roof with this material, a coating of sand is spread over it, then a covering of strong brown paper. Upon this the molten mixture is spread with a tar-brush, another layer of paper is then added, and the process repeated till the coating is four layers strong. A dressing of sifted ashes is strewn over it; and when all is finished, including the zinc borders recommended to secure chimneys, a depth of an inch or inch and a half of gravel is laid on, properly levelled with rakes and scrapers. The necessary framework should consist of rafters or joists placed not more than 2 ft. 3 in. apart, with boards an inch or an inch and a half thick nailed on to them and dovetailed; and it should have an inclination of half to three-quarters of an inch per foot. The cost of a square foot of this roofing, guaranteed not to require repair, is about 1*l.* 4*s.* in Germany. Mr. Reid would extend the use of Portland cement to roads, the walks in our public parks, and places of amusement. He gives full particulars of the trials that have been made in this direction already, including the failure in St. James's Park. Mr. Mitchell's Scottish successes are also quoted. Diminished wear and tear, superior cleanliness, and diminished cost and annoyance from repairs are urged in the favour of cement concrete roads. Where a square yard of concrete road has cost 6*s.* 8*d.*, a similar measure of a paved road has cost 17*s.* On the other hand, when the concrete road is required to be taken up, for the purpose

of attending to gas or water pipes, the strength of it is a disadvantage. To obviate this Mr. Reid recommends the use of blocks of convenient sizes, that have acquired the requisite degree of hardness. In the certainty of the feasibility of this mode of using concrete for roads, he says he would not reckon the engineer a visionary who would undertake to relay the whole extent of London Bridge with blocks of concrete in this manner in fourteen days; and he seems disposed to back the road so made as likely to be superior to the present one in every way.

Mr. Reid also gives a short account of the experiment made for the Metropolitan Board of Works to ascertain the virtues of the "Béton Aggloméré Système Coignet," under the superintendence of M. Coignet, by a staff of French workmen, in the construction of several arches under the stair approach from Westminster Bridge to the Southern Embankment of the Thames; he fully endorses the excellence of the French article, the more unreservedly, perhaps, because its high price puts it out of competition with ordinary Portland cement concrete. The latter cost, on these works, from eleven to thirteen shillings per cubic yard, while the Bêton Aggloméré's came to more than double that sum. About twenty miles of the Parisian sewers were laid down by M. Coignet of this material, when it was considered, and certified, that a saving of 20 per cent. upon the cost of masonry was effected by its use. Without its large proportion of Portland cement, however, our author doubts whether it would retain its applicability to building purposes.

The conclusions to which our authors would conduct us are that Portland cement is on the eve of a greatly-extended use; that it fully merits the good opinion engineers now form of its qualities; that the opinion can only be maintained by due attention to its manufacture; and that the best and most remunerative mode of manufacturing it is by the process invented and perfected by M. Lipowitz. Some of our own manufacturers had better take heed. Sad stuff is occasionally sold and used.

THE BISHOPRIC OF RAMSBURY.

ENGLAND without railways has become a scene altogether unfamiliar to the literature of the day. Steam locomotion has entered the minds of the present generation as an established means of travel. A novelist who sends his hero on the stage by the only conveyances known to the first quarter of the present century is now looked upon as an antiquarian writer,—a feeble imitator of the Great Wizard of the North. The change effected on the face of the country, on the manners, habits, and appearance of the country folk, is in accordance with this great revolution of thought. Facility of locomotion, and that facility on a very liberally used, has given an impulse to the national life that is everywhere apparent in the great sign of vitality,—steady and continued transformation.

While the England of 1868 is so different in all, except its most marked physical features from the England of 1828, we must remember that the country is not yet absolutely reduced to the dead level of homogeneity. Strong as is the influence of modern travel in destroying local and provincial peculiarities, the effect is, like that of the force of gravitation itself, eminently modified by the distance at which it acts. Find a nook of the country that is deprived of ready communication with the great railway network, and you meet with lingering features of pre-railway England, and the quiet of these little country nooks, the tranquil content with which the village shopkeeper will confess herself "out" of the article you require, but expectant of a stock of it next month, or the indifference with which the postmaster will tell you that between 6 p.m. on Friday night and the same hour on the following Monday the only mail-bag made up is despatched at eleven a.m. on Sunday, is no doubt the very height of an enviable philosophy, although the jaded inhabitant of a great city, surprised at the unthought disregard of quarters of an hour, unwarily denounces it as "stupid." It takes some time to realise the felicity of being safe from the post-man for twenty-four hours,—safe from a telegram, unless it is brought by a steadily-trotting horseman whom you may recognise a mile off at the very entrance of the long and shady avenue.

At a moment when the attention is called to

questions of ecclesiastical history, to the habits of the early Anglican clergy, and to the "Use of Sarum," it cannot fail to be of interest to detect in one of these quiet and forgotten nooks of an agricultural county the remains of a cathedral and See of greater antiquity than Old Sarum itself. In the year 635, we are told by the Sarum Almanack, when Severinus was Bishop of Rome, twenty-eight years after the mission of Augustine to Britain, Cynegils, King of Wessex, abjured heathenism, and was baptised at Dorchester by Birinus, on which occasion the seat of the hishoprie of Wessex was established in that city, Dorchester, in Oxfordshire. In 683, Bishop Hæddæ removed the see to Winchester. In 705 the diocese was subdivided, the country to the east of the Forest of Selwood remaining as the diocese of Winchester, and all to the west of Selwood being formed into a new diocese, the see of which was fixed at Sherborne, and first filled by Althelm, a kinsman of King Ina.

In the year 906, a fresh division was effected, and a see was created at Ramsbury, comprising Berks and Wilts. The names of the hishops of Sherborne and of Ramsbury are still preserved, and the latter are often termed Episcopi Wiltunnenses, or Bishops of Wiltshire; and also Episcopi Sunnungenses, from their residence at Sunning, in Berks. In 1045, Herman, one of the chaplains to King Edward the Confessor, was made Bishop of Ramsbury. He attempted to remove the see to Malmshury, but the abbot of that famous monastery, supported by Earl Godwin, successfully opposed the effort. Herman retired in disappointment to the monastery of St. Bertin, in France; but on the death of Alfræod, 1058, he was made Bishop of Sherborne, and administered the two dioceses of Sherborne and Ramsbury from the former see.

In 1075, in consequence of the decision of a council, held under Archbishop Lanfranc, in 1072, to the effect that the episcopal sees which were established in obscure villages should be removed to considerable towns, Herman changed his residence to Old Sarum. Osmond, the successor of Herman, commenced the erection of the Cathedral of Sarum in 1092. Four of the successors of Osmond sat in this church, the founder and endower of which established the famous "Use of Sarum," which regulated, for many centuries, the form of the Anglican worship, and to which attention has so recently been called by the proceedings of the Ritual Commission. The exposed situation of the cathedral, and the turbulence of the garrison of the castle, caused the removal of the see, and in 1220 Bishop Richard Poor laid the foundation of the new church in the "Fair Mead," two miles distant from the former site. The present Bishop of Salisbury is the sixty-second in succession from Bishop Richard Pauper, or Poor.

The Bath road of the great coaching era, which crosses a branch of the Great Western Railway at Hungerford, leaves at that town the valley of the Kennet, and runs through pleasant chalk hills, and under the shade of trees of a yet surviving actual forest, to Marlborough. But the river Kennet, running along the arc of a bow of which the coach-road forms the chord, flows through a country unweaved by traffic, and dotted with fine old mansions seated in those green and well-timbered parks so dear to the lovers of the picturesque, and of the old country life of England, and so grievous in the eyes of a certain school of improvers. About four miles west of Hungerford, half way between the two stately parks of Littlecote and of Ramsbury, is the site of the episcopal see which, in A.D. 909, comprised the counties of Berks and Wilts. Little remains in the quiet and tidy village to tell of its former ecclesiastical importance. The unusually large buttresses which form part of the low along tower of the church seem to tell of a former and forgotten spire. The roof of the nave is an ancient piece of oak-work, recalling, at an humble distance, the ceiling of St. David's Cathedral. The most curious and unaccountable architectural feature that distinguishes the building is the eccentricity of the chancel. The handsome five-light Gothic window at the east end of the building is some 3 ft. or 4 ft. nearer to the southern than to the northern wall. Within, this peculiarity fails to strike the eye at once; but on the exterior it has the disagreeable consequence, that the ridge of the roof is not perpendicular to the point of the window. The hand of the restorer may, indeed, be detected; and on the tower are to be seen marks of a roof of much higher pitch than that which now covers the nave. At the east gable the abomination of rough cast disguises some

repairs or alterations in the wall above the window; but a piece of ancient work, which looks as if it were *in situ*, and which encloses in a trefoil light two scutcheons, of which the bearings are now entirely obliterated by weather, is in the vertical line of the ridge, and thus unsymmetric with the eastern window below it. The whole of the southern wall of the church has moved decidedly outward, and is held from further mischief by iron rods.

A very fine, though very neglected, canopied tomb of the twelfth or thirteenth century, and an episcopal grave-stone in the floor before the altar, from which the brass has been stripped, are all within the church to tell of its former rank, excepting the appropriate offerings of some feminine hand which adorn the backs of the communion-table chairs, on one of which is embrodered the arms of the present see of Salisbury, and on the other, on an azure scutcheon, a silver archiepiscopal pall, charged with five sable crozettes, under a silver cross pattée, which, from the antique shape of the mitre above, seems to denote the ancient see.

The Church of Ramsbury is not, however, without memorials of much interest in an historical, if not in an ecclesiastical sense. On the wall of the chancel hangs a hatchment which, by its fine old bearing of two bars or, on an azure field (the same charge which is borne on a gules field, by the House of Harcourt, which traces an unbroken descent to the times of the Carolingian dynasty), recalls the name of one who was in his time, not only the most famous haronet, but also the most popular man in England, the Sir Francis Burdett, who stood siege in his house in London, against the military power of the House of Commons, represented by the Sergeant-at-Arms. No sculptured memorial to this distinguished lord of Ramsbury Manor appeals to the eye in this church. There are tombs to his predecessors in the property, the Jones family, from whom Ramsbury, falling to the spindle, came to the Burdetts,—one, the last male of his line, in the tight two-eared wig, of the time of George III., a young man of whom two portraits of singular beauty exist in the manor-house; the other that of the first proprietor of the name, "*ayres curatus*" and "*atomatus generosus*," in the time of Charles II., who acquired Ramsbury by marriage, and who looks in a half-remicent attitude from his monument, adorned by a full and flowing perwig, with a physiognomy that is so characteristic that it can hardly fail to be a truthful portrait. One hatchment of the Jones family, whose arms are party per pale azure and gules, three lions rampant argent, blazons what the French heralds would call a pennon, being enriched with fourteen quarterings, with a scutcheon of pretence of five more. Those silver lions have ramped out of the country, and are now only to be seen on the shield over the entrance to the manor-house, and sculptured as large as life, and with particularly malignant and human visages, on the piers of the great gateway of the park.

The most interesting feature, however, of this ancient church is one which will escape the notice of the casual visitor unless he take the trouble to walk round the exterior of the edifice. North of the chancel, and in continuation of the north aisle of the nave, from which, however, it is now entirely separated, is a mortuary chapel bearing signs of very costly and tasteful labour, which is known by the name of Darrell's aisle. It is a building distinct in date and design from the church, into which it formerly opened, and contains an altar of its own. In the centre stands a fine tomb, somewhat recalling that of King Henry III. in Westminster, the sides of which were once of polished granite, while the brass which has been ruthlessly torn from the slab seems to have presented the effigies of a knight and of two ladies—the last Darrell and his two sisters. The chapel is in the most discreditable state of neglect, a fact which does small honour to the family which, under circumstances long recorded in ballad, succeeded to the Littlecote property—a family commemorated in the distich,—

"Popham, Horner, Trute, and Thynne,
When the monks went out, they went in."

The story of the extinction of the proud line of the Darealls is so frequently met with, under one legendary form or another, that it is interesting to trace it to its very scene. Littlecote Hall, a fine old Elizabethan mansion, which, though girt with a semicircle of noble timber, and looking on a well-wooded and undulating deer park, containing a crested hill, from the summit

of which radiate nine noble avenues, lies low by the swampy course of the Kennet. The story goes—we cannot make room for the seventy-five verses of the ballad—that a midwife was summoned by night by a masked visitor, was placed in a carriage, and closely blindfolded. The direction and duration of her rapid journey she had no means of ascertaining, but she was led at its close up six stone steps, across a hall measuring twenty paces, and then up thirty-one polished stairs. She was freed from her bandage in a noble chamber, lighted by a single taper, held by an old woman, where lay her patient in a stately bed. Her function was safely and successfully performed; but the fine boy whom she introduced into the world was seized by her masked conductor, dashed against the mantel-piece of the antechamber, and consumed in a large fire piled on the hearth. The nurse, in terror and perplexity, secretly cut a piece off the hangings of the bed, and with this in her pocket was reconducted, with the same precaution which attended her arrival, to her own home, and dismissed with a purse of gold, a recommendation to silence, and a threat of death if she broke the injunction. She kept her bed for three days; on the fourth she heard the sound of a passing bell from Littlecote, and repaired to a neighbouring magistrate, to whom she stated what had taken place. The sister of Darrel had just died, it was said, of a sudden attack of fever, and the details of the information so exactly pointed to Littlecote Hall as the scene of the infanticide, that Darrel was at once arrested. As the trial was proceeding, it is said that Popham, the presiding judge, received a letter, to the effect, that if the prisoner was acquitted, the judge should be his heir. By an interference with the course of justice by no means incredible under the Stuart kings, the judge twice made the jury reconsider the verdict of guilty, and thus saved the murderer. Darrel returned to celebrate his triumph by a great banquet at Littlecote, but his slumbers on the following night were driven away by the appearance of the ghost of his sister, bearing a child of fire in her arms. He started in the morning on a great stag-hunt, and by a stile, which is now reduced to a single aged oak stump, beheld the same apparition, at which his horse shrank in terror. In fury he spurred the animal at the stile to clear it, shutting his own eyes to avoid the reproachful glance of the spectre; the horse again refused to leap, and Darrel was thrown headlong and broke his neck in the fall. Popham, in virtue of the iniquitous bargain which failed to lengthen the murderer's life, succeeded to Littlecote, but a curse, such as is said in several cases to linger in the blood of some old families (like the curse of Jeanne D'Arc on the house of Talbot, and the curse of the Grand Master of the Templars on the house of Capet), attended the heritage. This portion of the legend is not given in the ballad; but the whole history of the descent of the property is said to be in accordance with the tradition, and the gloomy and neglected condition of the noble park,—and the yet more melancholy condition of its present owner,—go far to excuse the superstition, if such it be.

The manor-house of Ramsbury, on the west of the village, though now for many years untenanted, presents a strong contrast to its more ancient and gloomy neighbours. Not devoid of a certain sort of tastefulness, the impression which this mansion produces on the mind is that the *attornatus generalis* and his heirs contrived to make themselves eminently comfortable on the estate of the Bernards. Unstudied, provident, elegant comfort, is the character of the house, now some two centuries old. You enter a noble hall, containing a billiard-table and some fine family portraits, directly leading to a wainscoted drawing-room, 27 ft. by 36 ft., or thereabouts, with moulded ceiling, very fine marble mantelpiece, adorned by wood carving, that suggests the chisel of Gibbons, and full of Indian and Chinese furniture and of old china,—a room, in fact, which once entered you regret to leave. The remainder of the house is *en suite*, the dining-room, which corresponds to a library on the opposite side of the hall, being, however, hardly large enough for the remainder of the building. The fine oak panelling of this room, moreover, has been barbarously painted over. Some of the family pictures are very noticeable. There is a very good full-length of his most sacred Majesty King Charles II., which seems to fix the date of the building as the work of the *æques auratus*.

Here is a portrait of the heiress, through

whose alliance Ramsbury came to the Jones family, a lady every inch a great heiress; handsome, portly, jolly, and authoritative. There are two portraits of the last Jones, a singularly handsome young man, in the gay and picturesque costume of a time when the great schism in dress had not arisen, and when we did not see the men attired like grooms or poachers, and the women like draggled-tailed and disreputable persons. You leave Ramsbury Manor-house with a feeling of great regret, that the sixteen fires which are kept alight during the winter, should not cast a glow on merry faces, and that the noble hall should be silent to the echoes of children's feet and voices.

There is one point in the arrangement of the park which is worthy the attention of those who lay out ornamental grounds. A branch is led off from the Kennet to form and freshen an artificial lake, which, although sadly requiring cleaning out, abounds in fine trout. Near the house, one of the occupation roads crosses this lake, or rather river. A bridge would have been a considerable expense, if at all in keeping with the character of the place. The difficulty is met in this ingenious manner. An artificial ford has been made, and well metalled, like a turnpike road. Three culverts, running in the direction of the stream, are adequate to convey the water under this ford. When, therefore, the flood-gates that draw up the lower portion of the lake are open, the road is dry. When these are closed, and the lake is full of water, the river ripples over the ford, which is then perfectly safe and practicable in either case. The sly-looking, well-fed trout, that haunt the spot, let you come close to their lurking-places, or hunt the smaller fry out of the water, under your very nose, as if they, too, were fully aware that Sir Robert had not been near the park since the funeral of his father, Sir Francis, and that no one can get leave to fish.

THE DOGE'S PALACE.

The imposing effect of the Doge's Palace in Venice is approved by admiration so general and so unaffectedly genuine as to place it above all question, all cavil. We may criticise it at extended leisure; but the first impression must be that we are in the presence of a majestic architectural enunciation. We may criticise ourselves into disquiet, but it will be apt to be less with what appear to be its faults, than with our own inability to justify the leniency with which we cannot help regarding them. The more serious the objections that gain hearing after the first enthusiasm has had time to cool, the more perplexing is it to render an account to ourselves of the principles on which enthusiasm inevitably revives,—re-establishes itself. While cavils, then, must have fair play, to strangle them in their birth were to do injustice to the artistic value of the expression that can countervail them: it is of more importance to save first the accurate recognition of this better expression, and to analyze—if so we may—its causes.

The position of the palace is most happy, yet only happy in the last degree, because the erection is worthy of it. Two equal fronts at a right angle, face—who needs to be told it?—one towards the broad quay of the lagoon, the other to the piazzetta. The chief of the republic's government—seems housed at the very margin of the element where its power was most conspicuous, so placed for the reception of earliest tidings from remote possessions, for most immediate despatch of commands, for readiest communication with dock and arsenal, for promptest action. Where more fitly could be placed the chamber for those councils of which Shakspeare has epitomised the characteristics in a single scene of *Othello*;—the midnight summons,—the progress from conflicting to consenting opinion in sober respect for reason and for ever-accruing evidence, the justification of sagacity by confirming news, and the energetic policy at last enforced with "Haste, post haste, despatch!" So the palace of the Doges faces towards the line of the Adriatic, and then towards the opening by which the Grand Canal broadens out into the lagoon. The city is close behind and at either side of it, accessible in every direction by canals and bridges; and opening immediately out of its piazzetta is the largest open space upon its groups of islands, the piazzetta, that bears the name, and is fronted by the cathedral, the original ducal chapel, of St. Mark.

Significant as the site and aspect of the palace may be, it is not inconceivable that their advantages might have been seriously damaged, not to say forfeited, if original design or later modifications had been subject to inferior architectural inspiration. The grandeur of the building depends on simplicity of distribution of parts in elevation and outline, on a certain nobleness of proportion and harmony with the form and dimensions of the piazzetta, and on magnificence of general mass, combined with an effect of magnitude even in details.

The building consists,—who does not know, and yet it needs must be repeated,—of an open arcade on a level with the piazzetta, with broad pointed arches and bold cylindrical pillars: each name seems most appropriate to supports that, sooth to say, have no title to the more finished style of "column." A string course conducing with the extrados moulding of the arches, carries a frieze of small rosettes, and above these is a loggia, a second open gallery, with smaller and closer shafts and intermediate balustrade. The pointed arches, with imperforate cusps, rise with returned curve between the heavily moulded circles that fill the spandrels,—quatrefoil circles with a red marble ball at each blunt cusp. These two orders of arcades are of stone, and above the horizontal string-course that crowns the upper, is superposed the grand story of the palace; it rises with flush surface, built of reddish and yellowish marble, diapered on a large design, with lozenges of hreath just so far exceeding height as to harmonize in an expression of recumbency with the broad proportion of the facade. There is no projection above the upper line of the wall that can be dignified as a cornice; but it is surmounted by a series of alternate small obelisks and somewhat fantastic pointed and pierced turrets that at least recall to a certain extent the open forms of the arcades, and are of sufficient magnitude to assert themselves as constituting a concluding member. The marble ashlar of the upper story is divided into lateral halves by the stone dressings and accompaniments of a stately central window; the balcony of this rests on the cornice of the loggia, and represents, in fact, the *vinghiera* of the proper Italian loggia or townhall, the feature whence etymologists derive our English word *harangue*. The pointed opening is flanked and surmounted by architectural and sculptural enrichments; niched statues are on either side in double tiers; above is the large tablet for the gospel-guarding lion of St. Mark, and higher still, and raised above the pierced parapet, is the statue of personified Venice, between the loftier obelisks that terminate the enclosing pilasters on either side. On the front, towards the lagoon, there is a corresponding central balcony and window, and surmounting and flanking sculpture,—corresponding in position and effect but not in detail. Details and treatment in both cases declare these central features to be works of the period of the Renaissance—documentary proofs were not wanting,—yet they are far more in harmony than could be with the more original details of this most prominent civic example of Venetian Gothic, and are, indeed, to a great extent the saving of it. The more advantage to unity that is gained by the principle of organic as distinct from simple perforate arcuation being thus carried up unbroken from the truly masculine arcades, through the weaker ashlar, and to the very summit of the building, is invaluable; and invaluable also is the expression of centre which is thus obtained on either face for a structure which otherwise must have looked rather like a fragment than a composition.

There are nineteen of the large stumpy pillars of the lower arcade towards the piazzetta, and consequently eighteen pointed arches; over the apex of each of these comes a smaller pillar of the upper arcade, and one intermediate ranging with a pillar below,—thirty-seven pillars, therefore, and thirty-six arches. There are thirty-five circles between the extrados mouldings of these upper arches, and at the conclusion of the series at each angle a half circle, or, if we please, a complete one bent upon the angle.

The lower range of the sea front has one pillar less, with consequent differences above. These lower arcades exhibit no accentuating mark of centre, and their terminations present quite as much a simple breach of continuity as an emphasized architectural pause. The lower pillars at the angles are no doubt visibly more stout and solid, and they have larger and deeper capitals, and a projecting super-capital with a subject elaborately sculptured, but in such a

manner as in no degree to reinforce—indeed to weaken—the expression of solidity intended by the substantial support below. It were a serial to ingenuity,—to say nothing of ingenuousness and candour,—to have to hold ourselves bound to dissent enthusiastically on the excellence and dignity of these sculptures, either as sculpture or in their architectural application; there is considerable beauty of parts, of feature sometimes, of foliage more generally, but, as Horace knew,—

"The meanest sculptor of the Æmilian square
Can imitate in brass the nails and hair."

but still remain in no high sense a sculptor. At each of the three exposed angles of the building the figures of the group are on adjacent fronts, and their action is distributed on either side of an intermediate tree: a vine separates Noah from his sons; a fig-tree marks the temptation of Adam and Eve with an arrangement of amusing, were it not of grotesquely absurd, quaintness; and, again, a tree interposes in the apparently later scene of the Judgment of Solomon, where, sooth to say, there seems little indeed to choose between the dead child and that which the point of the anecdote obliges us to consider as alive. The deeply-cut sculpture, then, weakens the angle; and when again the angle pillar of the upper arcade is seen also to have extra thickness, the advantage is again forfeited by the ill-closed diameter of the open semicircle above it. The necessary interruption of a series at such a point is precisely one of the emergencies to which the inventiveness of Gothic architects usually responded with promptest alacrity, but there was none forthcoming here. The angular solidities below are still farther disowned and falsified by the slightness of the spiral mouldings that run up the angles of the aërial to support small canopied shrines rising at the top, above the level of the turrets. The great plain campanile of the piazza has its angles strengthened with simpler, but still the best appropriate ones. In the library of Sansovino, opposite the palace, and much smaller, a lapse in constructive feeling at the same point has been carefully—it may be even through reaction somewhat too emphatically—avoided.

It is in spite and not in consequence of such derelictions that the Doge's Palace remains, nevertheless, so impressive. We might ascribe them to a later architect than he who built the arcades, if we could accept the suggestion of Fergusson, that these were originally intended to be in advance of the upper story; but this seems scarcely clear,—the presumptions, indeed, seem clearly the other way. The seventh column from the sea in the piazzetta is an unusually stout one, and the pillar in the loggia above it is compound, having attached shafts, and bears a stronger unperforated circle with sculpture in relief, differences all admitting—announcing—a responsibility to the hearing of the party-wall of the northern division of the palace. By a difference having no relation to construction, and as little to any obvious principle of selection, the ninth and tenth pillars from north in the upper gallery are not white like the rest, but of red marble,—the position, it is said, from which sentences of death were proclaimed.

Of the large lower pillars one alone,—the northernmost,—has a base, and this is so fitted, not beneath, but round it, as to be manifestly new; the others pierce the pavement, and it is just possible that a base moulding may be hidden below, although no argument is to be derived from comparison of the present level of St. Mark's, and levels do not alter easily in the dustless city of Venice. Nothing would be more easy, of course, than to indulge in all manner of lazy imaginations and all kinds of subtle reasons to more than vindicate the omission; the eloquent have filled pages of declamation, delightful to read, from many a more barren brief. The pillars emergent directly from the earth may be interpreted, if we please, as symbolical annunciations of the very principle of existence of the pile-built city, and so forth; it is, however, probable enough that the wharf on the sea-front was originally much less broad, and the steps down to the water much closer, or probably quite close to the palace. So would an expression have been given originally of that indispensable ground-line,—the basis of support, that can never be slurred with impunity,—that resposion of horizontal solidity to vertical pressure that is wanting so unfortunately to the front towards the piazzetta, but is supplied in some degree to the eastern aspect by the quay as seen from seawards.

What may have been the original treatment of the central places of the two façades seems now beyond discovery; to the uniting effect of the feature supplied in their present form by architects of the Renaissance, is due the realization of the sentiment of a dignified composition. By no less decisive interference could the long-drawn regularity of the arcades be reconciled with the gross disregard of symmetry in the division of the structure above them. The stone construction and ornaments of the central window carry up, in a certain sense, the stone construction of the lower stories to the top of the building, and make them, above all, dependent on its centre; and, even yet more important, the aërial of the upper story is thus fairly cut in two, and so is reduced on the one hand to due subordination to the arcades; on the other hand, has on either façade a more symmetrically-disposed half, divided from a more unsymmetrical, to the manifest reduction of disturbance from the irregularity.

On each façade there are three large windows on either side of the central window and balcony; but in each case the three large windows to the left of the balcony have smaller windows and perforations above them irregularly interspersed, and are even themselves of varying proportions and at various levels. On the sea-front this difference is connected with an interior distribution, to which is further due the original closing of the five lower arches next to the Bridge della Paglia. The disturbing effect of such vagaries is contravened perhaps, but we are not therefore authorized to construct a theory to prove them beautiful; nor, fortunately indeed, bound to trouble ourselves to controvert those who care for such theories. There is a difference in the pillar of the loggia that bounds the division answering to the blind arches below; it may be remarked also that the balcony and its window centre accurately with arches of the loggia, but not so with any of the larger below,—spanning them indeed from a spandrel to an apex.

The modified asymmetry, moderate or excessive, of one side of an otherwise symmetrical composition touches a question of theory of great interest and speculative curiosity. It is here that the genius of an architect may rise to assert its freedom at the very point where it seems under compulsion to admit its limitations. Absolute symmetry is liable to degenerate into absolute hardness; it seems to be naturally a type of subjection to inflexible legality rather than the exponent of conscientious law-abiding principle,—of solitary self-sufficiency and jealous independence rather than of that nobler self-dependence that can venture to recognise and respond to an exterior circle of influences, and is not above allowing some stem of attachment to a grander whole,—displaying some sensitiveness to an unusually forcible proximity. Architecture triumphs no doubt in the reduction to well-balanced order of varied and competing claims to accommodation, and the symmetry of a public building becomes then the best expression of the concentration of purpose that governs the association of the functions it is provided for,—enhancing their efficiency by discipline; of what can utter irregularity without being typical bit of disorder within, of disastrous conflict, or at least of incapacity for measured co-operation? But, on the other hand, it would seem that absolutely scrupulous adherence to minute symmetry in an extensive design declares by as necessary an implication an undue tightening of mechanical discipline that derogates from the honour of vitality,—a negation of sympathetic movement so complete as to involve an apprehension of anaesthesia,—of paralysis.

An argument of this kind, however, requires to be carefully watched lest it degenerate into that fanatical habit of justifying an admired work at all risks and against all conscience,—the sycophantic assentation that will slavishly,

Exalt each whimsy, every vice adore;

so should we be drawn into citing carelessness, caprices, and even vilest tastes as illustrative of truly refined,—subtle it would be styled,—and deliberate art. Hence we give up, as vindications of permissible licence, the cases of grossly ill-matched western towers that are due to the disregard one Gothic architect was ever wont to display for the design of his predecessors. In every large design it is certain that, however absolutely it must be left to inspiration of the architect to adopt place and degree of licence, the licence must ever be manifestly well under subjection; regularity, of which grand symmetry

is the highest expression, must ever be manifestly predominant. Among the greatest classical works we observe,—as in the case of the Parthenon,—that the strictness of symmetry in the building was tempered by a managed approach from the angle,—by oblique presentation. This resource was not available for the Propylæa arrived at by a broad direct ascent of steps; but so far as the best critical examination of the ruin yet applied can be relied on, it seems impossible that the two wings of this imposing structure can have been completed in exact correspondence, while it is no less certain that whatever difference were admitted could have told for nothing as against the general agreement in respect of mass and the predominance of the central portico.

The value of the expression of centre by the high-canopied window of the Doge's palace, supereminence with pinnacles and high central statue, is well seen by comparison of the building opposite, the celebrated Libreria Vecchia, of Sansovino. The effect of this, as compared with the palace, and even relatively to what should have been expected from its sameness of art and execution, is wanting in point, vigour, and concentration. There was, it may be, no obligation to treat the long elevation towards the piazzetta as a proper front rather than as a flank dependent on the shorter return towards the lagoon and quay; but when the alternative was adopted, it seems weak to have relied for expression of centre not on an enhancing addition, but on an omission—on breaking the line of statues above the balustraded attic, and leaving the two midmost pedestals vacant. This is much like leaving out the front teeth, in order to mark decisively the centre of the range. Of the intention there can be no doubt, for in the division of the arcade immediately below, the chief entrance is made elaborate, and was at least intended to be ennobled, by a pair of colossal Atlantes. In the range of buildings that close the piazza opposite to St. Mark's, there is much the same reliance on much the same expedient: here the surrounding range of statues is hacked by a wall, and their ranks are interrupted in the centre, to display a section of it in more exposed exposure; this is enriched, no doubt, by bas-reliefs; yet even these are without a conspicuous central subject, and, in any case, of a dignity inadequate to compete with the distinction of statues in the round.

A line of gratitude, however, is ever due to Sansovino,—of admiration if he acted of deliberate purpose,—that he did not raise the Libreria Vecchia by still another order. He thus left the superior height and western exposure of the palace free in all its dignity, and spared to reduce the supereminence of the glorious campanile, or the freedom of distribution of uncrowded space, where cathedral, palace, campanile, and library all approach most nearly, and all lend, each to each, enhancement of effect.

To architecture proper, as imposing the gradations of the upper and lower portions of the palace, and its symmetrical division,—to architecture, as lord of proportion in general magnitude, outline, and relation to heights and open space adjacent, must be assigned the main glory of the magnificent whole that reconciles us to overlooking such considerable anomalies. Pictoresqueness, however,—another,—an alien, and sometimes an interfering influence, contributes something, indeed no little, to our readiness to be so satisfied; the associations of history, of poetry, the prestige of antiquity, and the apologetic allowance conceded among the generous to some obviousness, some ungainliness, some lapses of accuracy in pronunciation, and even syntax, on the part of the aged, must account for the rest. But quaintness and incongruity are not art in themselves, and live only parasitic lives,—are tolerated impatiently as encumbrances and rent-charges upon it.

Some vague notes may be worth recording vaguely. The transverse arch of the lower arcade at the north angle meets a stout attached pillar, but all the others descend on poor pilasters with weak angle mouldings. This arcade is groin vaulted. The loggia above has a ceiling of horizontal beams, and shows no trace that any other more legitimate Gothic construction was intended,—an anomaly again.

All the great arches from the north-west angle as far as the eleventh have but three vousoirs on either side, and an undivided key-stone; the spandrels are also built of large stones, but the seven spandrels south are built up of more numerous courses, and we miss the masonic marks

that—sometimes complicated enough—occur regularly on almost all the first thirteen.

Only one of the southern spandrels on this side now retains remainder of an inland circle and incrustation of coloured marble, but there is every appearance in grooves upon extrados moulding of the others, that the embellishment was once, or was intended to be, general.

Quaintness abounds, again, and is too often so rampant as to predominate, in the elaborate subjects introduced in the capitals of these lower pillars. The sculptor must answer for his vagaries to the architect, who will be better satisfied with the natural, with the truly artistic, grace of his foliage,—the extreme, yet, as their preservation shows, not rash thinness to which he wrought the several leaves, and the ingenuity of his stratagems for strengthening and attaching them.

More distinctly architectural still is the consideration of the propriety in ordination of the leafage as compared with the original Classical type, and its numerous and noble Gothic variations. In the Corinthian capital the stem of the leaf rises erect, and takes its greatest curve forward and at the top. In these examples the middle of the leaf quits the root of the capital with an outward bulge, as the thickened calyx of a flower starts from the corolla—in fact, with the proper cymatium curve.

The subjects intermingled with foliage above the lower range and just below the shacrus are quaint and amusing enough, and so varied that no doubt a poet or a philosopher may surfeit in admiration and wisdom from them, like *Amiens* or *Jaques* from *Tonchstone*, and yet will he not be justified in asserting for them a claim to any particular enthusiasm. Latin inscriptions help the interpretation of more of the subjects than require them. In the capital below the subject of the Judgment of Solomon, Moses is receiving the law on one side, and Aristotle is expounding philosophical jurisprudence to his pupils on the other. Between them the anecdote that justifies Dante in placing the heathen *Trajan* in Paradise,—his justice to a widow,—is represented. The suppliant kneels on the ground before the war-horse, but, even so, her head is well on a level with that of the mounted emperor, whom she is conjuring with hands lifted between its ears. One capital has simply a series of baskets of fruits, well imitated, but still with names inscribed.

On another the various industries are represented that are connected with building. Masons, sculptors, and polishers are at work, the marble under their hands being sometimes inserted pieces of coloured material,—serpentine or verde antique. Here we find the stages and epochs of domestic happiness embodied in detail, and consecutive and enlivening scenes from the commencement of courtship forwards; and there, below the edges of an octagonal shacrus, are the seven ages of the living man; and, finally, the outstretched, aged corpse. As a last note, he it added, that Bellini's picture in the *Accademia* shows *trascry* in the now plain west windows of the *Palace*.

THE COURTS, ALLEYS, AND COUNCIL OF BIRMINGHAM.

At a recent meeting of the Birmingham Town Council, after hearing a report from the Borough Inspection Committee, Mr. Alderman Brinsley said he was amazed at the nonsense which was spoken at the Social Science meeting in reference to the condition of cottage property in Birmingham. He begged to say that in no town in the kingdom was small property in better sanitary condition, better drained, or better arranged than in Birmingham, and in no town was it to be let so cheap. The fact was this, that those gentlemen who had abused them at the Social Science meeting, went to a policeman, and said to him, "Show us the worst part of Birmingham!" Then, having seen the worst part of the town, they went and retailed what they had seen, and held up Birmingham as the most unhealthy borough in the country. But was that fair? He maintained that it was not.

Alderman Sadler, commencing with a rudeness for which he was called to order by Alderman Ryland (who has a proper regard for the dignity of the council of which he is an eminent member), said he must express his opinion that the frightful picture of the sanitary condition of Birmingham drawn by Mr. Godwin, at the Social Science Congress, was greatly exaggerated; and he feared that the remarks of that gentleman

were made solely with the view of creating a sensation which should lead, whether wisely or unwisely, to the appointment of an officer of health. Again, Mr. Godwin, instead of making inquiries of the Public Works Committee as to the number of holes emptied, had thought fit to accept the statement of some old lady, who told him that they were never cleared out except on application. The whole aim of the speakers at the Social Science Congress was, he argued, to enforce the appointment of an officer of health—to do that which was already done efficiently by inspectors.

Mr. Guest said—Was it not too bad that a parcel of scientific gentlemen should meet in conclave in Birmingham, and abuse the council, and use hard names—too hard to repeat?

One thing, at any rate, is very much too bad, and that is, that these complaining gentlemen did not keep a little close to the truth. Who abused them and called names? Mr. Godwin, in making his statement, expressly said he desired particularly to avoid uttering a single word against the authorities of Birmingham, and the utmost that he asked in the course of his remarks was, if the authorities had exercised all the powers they possessed to remedy the evils complained of. Again, it was never said, as asserted by Mr. Brinsley, that Birmingham was the most unhealthy borough in the country. So far from it, constant reference was made to the fact that the average death-rate was not a high one comparatively; but it was properly asserted that that should not be accepted as an excuse for allowing parts of the town to remain in a frightfully unhealthy condition. The hardihood exhibited by Alderman Sadler in asserting that Mr. Godwin's statements were greatly exaggerated, and were made solely with the view of creating a sensation which should lead to the appointment of an officer of health, might have done him credit in a better cause, but it cannot be said to do so now. The statement was true to a letter, understated rather than over, and was confirmed in every respect by others. At a meeting which followed that at which the first remarks were made, Dr. A. P. Stewart said, that coming down from London, he read the observations of the mayor in the papers, and the same afternoon he made a tour of inspection with an old friend. They visited a number of courts, and he must say, though he had seen many very bad cases, he had seldom seen any courts so filthy and abominable a state. Leeds was formerly considered one of the very worst in the kingdom; but there had been a great improvement there, especially in regard to the state of the ash-pits and privies; but here, going from court to court, every one was worse than another. Some of these receptacles of filth had been emptied that morning, immediately after the discussion which had taken place in that section. They had been expressly informed of that fact. But the mischief was, they were only half emptied. They were emptied only three times a year; and in the immediate vicinity of these horrible accumulations of refuse were the public wells, from which the population derived a large portion of their water supply.—Mr. Clayton entirely corroborated the statement of Dr. Stewart as to the disgraceful state of the courts, and from his own practice in Birmingham he could say that one-half of the diseases there were preventible.

At the very same meeting of the Town Council at which Alderman Sadler's remarks were made, Alderman J. H. Cutler demonstrated, by a fact which he could within his own knowledge, the absolute necessity for a more vigilant inspection and supervision of lodging-houses; and Mr. Brooke Smith directed the attention of the Inspection Committee to the nuisances to health arising from uncovered ashpits and from cesspools in the courts of Birmingham, and said he believed a great portion of the sickness which had taken place during the summer months had been occasioned by the exhalations from the pits.

The Rev. Dr. Hart Burges, vicar of his parish containing many of the miserable holes pointed to, took exception to the particulars given of the unwholesome dens in which masses of his people were living. On the contrary, he fully admitted "the incalculable injury to health and physical well-being" that is thus done; and said he was satisfied "that the generally wretched character of the dwellings of the poor, the absence of refining influences, and the miserable associations of poverty-stricken homes, courts, and streets, tends much to the inhumanizing influence which, destroying the finer susceptibility,

ties, and blunting the better feelings of the heart, generally results in brutality and crime, a family plague, and a social curse." "In the greater portion of Mr. Godwin's statements," added Dr. Burges, "I most thoroughly agree."

The *Birmingham Journal*, commenting on this discussion, says, sensibly, after referring to statistics of sanitary work done in the town that were brought forward,—

"There is no question about the accuracy of the fact thus stated, nor, we imagine, is there as to those adduced by Mr. Godwin. Birmingham, therefore, presents two sets of sanitary statistics. On the one hand it possesses a naturally healthy soil and site, a vigilant Inspection Committee, under whose auspices ash-pits are emptied by increasing thousands per annum; healthy embarks, the death-rate of which is exceedingly low; and an exceptionally large area per head of its inhabitants, which tends to render deleterious influences less active than they would be elsewhere. On the other hand, it contains courts and alleys unfit for the habitation of human beings, and districts of so pestilential a character that disease is one of their permanent occupants. The balance of the two phases is, that the annual death-rate of the whole borough is lower than that in other large populations, and it is much higher than that which prevails in really wholesome places, but the average of the borough is made up of a very low rate in certain parts, counteracting the high rates which exist in others. The sanitary question consequently offers a compound puzzle, and one which can only be dealt with by taking the several localities separately. Mr. Godwin, in his observations, pointed out the parts which he had seen, and the Town Councilors are equally accurate in their representation of the whole. The difference between the two may be best shown by a comparison. Mr. Godwin treats the town as a phylax, and looks at the community. He gives his attention only to the parts which are diseased. The Council argue as if medicine were unknown, and the sick and the healthy were to be bundled together in one general average, and left alike to the powers of nature. If Messrs. Brinsley, Sadler, and Orest will regard the question in this light, we have no doubt that they will see the necessity of more diligent watching and perishing for the want of assistance such as they have the power to render, though there are others where the death-rate would not be affected if such a thing as an Inspection Committee were unknown."

We will add an incident of the examination made by Mr. Godwin not before narrated. In No. 5 Court, Old Cross-street, there are a dozen houses, containing, shall we say, eighty or ninety people; and for these there is but one privy, and at the time of the visit it had no seat. Twelve or fourteen women, the majority with children in arms, came round the visitors when they had been in the court a few minutes, and spoke, unasked, of the miserable condition in which they were. One of the most respectable in appearance and manners pointed to the shonimhole pit in the centre of the court, and merely said, "Sir, there is no possibility for a decent female to remain decent." What an amount of teaching there is in that one sentence! Will Mr. Alderman Sadler have the audacity to say that such a state of things as this should be allowed to prevail? Or, again, let him look at what is called the Back of the Gullet,—where he will also see ten or twelve houses with one most filthy "convenience" indescribable, and at the time of the visit mendicant; yet there are rooms over it, and people living in them!—and answer the same question.

The whole local press has supported the views we take in the frankest and most comprehensive spirit. "We have much to answer for," says the *Daily Gazette* (in addition to those journals we have already quoted),—

"Contented with, and even proud of, the fact shown by statistics, that our town is one of the healthiest in the kingdom, we have never seriously inquired into its condition in detail; nor have we been roused to greater curiosity by the significant circumstances that, while other towns have improved in salubrity, Birmingham has stood still, and even in some degree deteriorated. An alarm of cholera sometimes galvanizes us into a brief and factitious fit of sanitary zeal; but the great danger passes by, and the silent, steady mischief continues as before. It is not till an inquisitive stranger makes it his business to inspect for himself some of the poorest quarters of the town, that we learn,—what we ought to have found out long ago,—that if we leave Edgbaston and some other of our suburbs out of the calculation, the official death returns prove that, instead of comparing favourably with other large centres of population, Birmingham shows a greater mortality than those of the naturally less favoured towns in the surrounding 'Black Country,' and is entitled to a much lower place in the national list than has hitherto been claimed by and assigned to her. We are indebted to the recent visit of the Social Science Association for having this matter brought before us in a way that precludes on any longer pleading ignorance of the miserable condition under which some thousands of our poorer brethren live, move, and have their being."

And again:—

"Till the whole question be taken up in earnest, and treated solely with reference to the public welfare, irrespective of private interest, we shall not only live in almost constant danger of an outbreak of epidemic, but we must expect, even if that do not happen, our death-rate to increase rather than diminish; and with the example of Bristol and other places before our eyes, our 'sanitary' arrangements will continue to be a disgrace to a civilized community, as we have been frankly told they are. How the necessary change in the views of our local rulers is to be brought about, we do not at present clearly see, but we apprehend that failing the undesirable visitation of a scourge which would produce conviction by decimating

Edgaston, Small Heath, Moseley, and the rest of our aristocratic suburbs, we shall have to wait for the pressure which will in a few years inevitably be brought to bear on the authorities by that great body of the burghers whose health and whose lives are now being needlessly sacrificed to ignorance and prejudice. Thirty thousand and upwards of these had no voice in the election of representatives to the Town Council until the abolition of compounding. Let us hope that they will now at least look after their own dearest interest in this "Bio-health."

We earnestly entreat the Town Council to put aside the notion that anything like dictation is being attempted. Let them consider the matter calmly, like men of business, men of intelligence, men of humanity, as they mostly are, and they will see it is not consistent with their credit or the credit of their town, to allow things to remain as they are; they will see that steps should be taken immediately to remedy evils that cry aloud.

SUBTERRANEAN APARTMENTS IN BRISTOL.

THE daily papers have mentioned briefly the discovery of an extensive system of subterranean passages and caverns in the neighbourhood of Redcliff Hill, Bristol, and some of our readers may be glad to have fuller particulars. It is not altogether a discovery: the existence of passages of the kind has been known for some time, and four or five years ago circumstances and impressions, to which we will not now further allude, induced gentlemen connected with the works at Redcliff Church to enter them with the view of discovering in what direction they led. After a time, however, they were brought to a stop by an immense pile of stones reaching to the ceiling of a cave, and did not prosecute the inquiry further.

The present examination was brought about by the excavations which are now going on behind Redcliff Hill, for the branch line of railway from the terminus to the floating-harbour. In the deep cutting at the back of Guinea-street, one of these passages was accidentally cut through. The aperture on the left-hand side is blocked up with *debris*, but the other, which is immediately underneath Jubilee-place, is open, and is opening to a considerable extent with huge rocks of sandstone. On Monday evening in last week a party, consisting of Mr. J. H. F. Roberts, C.E., Mr. W. Rice, and several gentlemen residing in the parish, explored a portion of the passages. Each member of the party carried a lighted candle or a torch, and before entering, care was taken to secure the end of a line to one of the supports, so that the explorers would be in no danger of losing their way in the subterranean labyrinth. Getting through a small opening, 20 ft. to 30 ft. below the level of the roadway, one by one, the party proceeded cautiously along a sort of low corridor, cut in the solid rock. After about twenty yards the road widened, and the party halted opposite a row of three arches, each leading in a different direction. The one to the right, however, was impassable on account of a large quantity of *debris* having been piled up there. Selecting the central roadway, the pioneer of the party, Mr. Roberts, moved on, the rest following on hands and knees under the arch, which was of an immense thickness, and supported by roughly-hewn columns, every thing being hewn out of the rock. On the other side of the arch a short, narrow passage opened into a commodious cavern, and here a brief pause was made. Leaving this apartment behind, the explorers were again brought on their hands and knees, and toiled up the cold, heavy sandstone. The shadow of the torchlight fell on what at first appeared to be a great fissure in the right-hand side of the rock, and beyond a large sheet of water, some 20 ft. or 30 ft. from where they were resting. The extent of it could not be ascertained, but several pieces of loose rock were thrown into it, and from the sound it was judged to be of a considerable depth. Further examination showed that the material on which they were resting was not the original bottom of the passage, inasmuch as there were traces of archways and columns to be seen on each side. Other circumstances tended to show that this branch had been partially filled up at some period or other. Still bearing to the left, a little more toiled brought the explorers into a cavern of larger dimensions than any yet entered. It was lofty, and the roof preserved a pretty good shape, although several falls of rock had taken place from it. Two or three wider branches were explored a short distance, but the whole of the line

having been paid out it was found necessary to act with increased caution, for the passages were of such a circuitous character that the correct path, once lost, could only be recovered with the greatest difficulty. After the pioneer had gone some distance farther on, he led his followers into another large apartment, in front of which were two or three openings in different directions. Selecting that which appeared to be the best, the party again went on "all fours" to get underneath the ponderous arch. On the other side, a short but disagreeable walk in a stooping position, brought them into the largest and by far the most singular apartment, or rather cavern, they had yet visited. In form it is octagonal, being some 60 ft. or 80 ft. in diameter, and from 6 ft. to 8 ft. high. The vaulted roof, hewn out of the solid rock, is supported on eight very large columns, and one fixed under the centre. At some period or other a well has been sunk from the property above, and the boring passes right through the centre column, taking away a portion of one side of it. In the aperture thus caused a lighted torch was placed, and by its aid the water at the bottom of the well could be distinctly seen. From the bottom of the cavern to the bottom of the well the distance appeared to be about 40 ft., but all attempts to learn the height failed. The well is walled round pretty neatly, and the pillars of sandstone are dressed up to a form with a small pick, and have a tolerably fair face. The spaces between the columns were walled in, with only two exceptions, viz., the passage through which the explorers had entered, and a similar one immediately in front of it. This was the first masonry that had been seen, everything up to this point having been cut out of the rock. Returning, the corridor on the other side was the most regularly formed that had yet been entered. As with the apartment just left, the roof was arched, the whole superstructure resting on columns, the spaces between them being built up. The corridor itself was also walled up at a distance of about 20 yards, and further progress in this direction was thus put an end to.

In all directions, in fact, passages were found walled up, so as to prevent further progress. The path by which they entered was kept to as much as possible, and the party emerged from the cave in a little more than two hours after they entered it. In a map of Bristol, dated 1250, published by Barratt, this spot is marked as the hermitage of St. John, and it appeared then to be a place well known. Whether the subterranean passages have or had any connexion with this hermitage it is difficult to say. It is well known that some extensive caves are used by Messrs. King as store-rooms, and there is little doubt that the passages above indicated communicate with them in some manner. One thing is quite certain, that some of the passages have been formed by the removal of sand for the purposes of the neighbouring lead-works, but this would not serve to account for the whole of the excavations. It is intended, if possible, to explore the passages on the other side of the railway cutting, and which appear to lead towards Bedminster Bridge.

THE LIVERPOOL SEWAGE WORKS.

THE Liverpool Sewage Utilization Company, which obtained an Act of Incorporation during the last session of Parliament, and in which the town-council are largely interested as shareholders, are now actively proceeding with the works. Parliamentary powers have been obtained for carrying the sewage of the town, by means of pipes, as far as the neighbourhood of Southport, extending to about twenty miles in length; but the works now in progress are limited to the laying of the pipe-line from Commercial-road, near the Sandhills Railway-station, to Ince Blundell, a distance of about nine miles, and when this portion of the works is completed, the distribution of the sewage around the land in the neighbourhood of Ince Blundell will, in the first instance, be commenced, after which the works will be continued to Southport. Already the pipes have been laid down to the extent of between three and four miles, and are carried beyond the township of Linacre. They are 9 in. in diameter, and are laid, on an average, about 3 ft. below the surface of the road. Mr. W. Barrows is the contractor for this department of the undertaking. The deposit-well at Sand-

hills, which is ten yards deep, has already been sunk, and the pumping-station immediately above it is in progress. The engine, which is capable of being worked up to sixty-horse power, is being manufactured by Messrs. R. Dalglish & Co., of the St. Helens Foundry, and is nearly ready. The deposit-well will be connected with the main sewer near Sandhills, from which the sewage will be received into the well, and from thence pumped out and forced along the pipes to the point of distribution. This portion of the works is being executed under the direct superintendence of Mr. Duncan and Mr. Newlands, the water and borough engineers. The engineering details at the pumping-station will be so carried out that the sewage can be thrown back into the main sewer by means of valves, when pumping from the well into the pipes is not going forward.

The company have purchased fifty acres of land at Ince Blundell, for the application of the sewage, and beyond this a considerable number of the tenants of the Earl of Sifton and Mr. Blundell have already arranged for the laying down of branch pipes to their respective farms, in order to enable them to put the sewage upon the land. The company expect that the whole of the works to Ince Blundell, including the pumping-station and connecting sewer at Sandhills, will be completed, so as to enable them to commence the distribution about Christmas next.

THE BLOMFIELD MEMORIAL IN ST. PAUL'S CATHEDRAL.

BISHOP BLOMFIELD'S monument has been set up in one of the window-recesses in the south aisle of the choir, and the whole recess has been made to form part of the memorial, the panels on each side being filled in with coloured marbles, and the window containing the arms of the deceased prelate in stained glass, with inscription referring to the monument below, and being formed into patterns with pieces of blue and green glass. This conjunction, however agreeable in masses such as blue skies and green fields afford, is not so heroic. The window, moreover, being chiefly of white glass, with ugly bars, the effect is poor and cold. It would be better even to paint the surface of the glass some warm, harmonious, and harmonizing tint. The monument proper is a low altar tomb of Caen stone, relieved with insertions of coloured marbles and mosaics. Thereon is placed a bed of polished marble, and a raised pillow diapered; and on it rests the full-length figure of the bishop in full episcopal habit, the right hand lying across the breast, and the other at his side on a book, and by its side a crozier. The effigy is the work of Mr. G. Richmond, R.A., better known as a painter than a sculptor. It must be pronounced a meritorious production, and a good likeness.

HOUSELESS POOR, OVERCROWDING, AND CRIME.

AN elaborate report in reference to the houseless poor in the City of London has been issued by the out-relief committee of the Board of Guardians of the City Union, in anticipation of the coming winter. It appears that the adoption of the plan by that Board of supplying warm broth, coffee, and soup in the daytime to wanderers had the effect of vastly increasing the number of that class applying for relief in the union. In a corresponding month in the present and past year there had been 8,101 and 6,101 cases respectively; whilst in 1866, before that plan was put in operation, there were but 1,513 cases. The Board have just erected premises for the distribution of relief to casuals, in Northumberland-alley, Fenchurch-street, at a cost of 3,000*l.*, exclusive of the land. The accommodation is, however, very limited; and it will be necessary, as before, to send all except sick cases and very urgent ones to the work-house at Bow every night, a distance of about three miles, to sleep. The City Union, though occupying a space of about a square mile only, has a yearly expenditure of from 48,000*l.* to 50,000*l.*, for its ninety-eight parishes. One parish that contributes for its quota about 1,100*l.* yearly has but one solitary pauper chargeable to it.

The demolition of dwellings without any compensatory erections will have to bear a heavy share of the blame if the overcrowding lead to

some terrible pestilence, as it is but too likely to do. And to blame such a cause is to blame the legislature which has not provided against it while authorizing such demolitions.

The directors of convict prisons in England report a great increase in recent years in the proportion of convicts who are of a weakly and diseased constitution. Of 6,552 male convicts in confinement on the 7th of April, 1868, no less than 1,981 were either confirmed invalids or fit only for light labour. Of 1,237 convicts disposed of from Millbank prison in the year 1867, only 688, or 55 per cent., were removed to the public works prisons as fit for hard labour, and 136 to public works for light labour; the remainder being sent to the invalid prisons. The great majority of these prisoners are either men of originally feeble constitutions or the subjects of diseases or infirmities which they have contracted through circumstances over which they have had no control.

The number of depredators, offenders, and suspected persons at large in England and Wales last year was 112,403, against 113,566 in the preceding year. All persons who have been living honestly for one year at least subsequently to their discharge after any conviction, are not included in the above numbers. The returns for 1866-7, lately issued, show that, of 22,889 known thieves and depredators, 3,944 were under 16 years of age; of 2,959 receivers of stolen goods, 31 were under 16 years of age; of 23,378 suspected persons, 4,086 had not reached their 16th year of age; and of 32,558 vagrants and tramps, 5,709 were under 16 years of age. The total number of these classes at large in 1866-7 shows a decrease of 3,243, or 2·8 per cent., compared with the average number in the three years 1864-6. In the number of known thieves and depredators there is an increase, as compared with the preceding year, of 83, but a decrease of 70 as compared with the average. The following are the proportional numbers of the criminal classes in the different groups of towns which have been classed together for comparison in former years:—In the metropolis the proportional number in 1866-7 was 1 in 220 of the population, against 1 in 222 in the preceding year, showing an increase of 1 per cent.; in the pleasure towns, such as Bath, Brighton, Dover, Ramsgate, &c., the proportion was 1 in 89 against 1 in 79 in 1865-6, or a decrease of 11·2 per cent.

ACCIDENTS.

A FEARFUL accident has happened at the immense building which was being raised to the ground to make an entrance to the new street from Blackfriars Bridge to the Mansion House. Great blocks of stone had to be removed from the coping, and whilst a man was in the act of rolling one of these blocks over a couple of rafters, one, having a knot in it, suddenly snapped asunder, and caused the unfortunate man and the stone to fall into the basement. The stone struck another block, which canted over, and drove the poor fellow with great force against the wall, breaking his arms and legs, fracturing his ribs, and otherwise fearfully injuring him. He was extricated as soon as possible, and removed to St. Bartholomew's Hospital.

The district of Halifax has been visited by a strong storm of wind and rain, and at Bolton Brow, Sowerby Bridge, a horse fell, killing a woman and her infant. The house, we understand, has been in a dilapidated state for some time, but there were no immediate signs of its fall.

A fatal accident is reported from Bolton. Two men were engaged building a lofty chimney-shaft attached to the works of Messrs. Little & Smith, cotton spinners, when the scaffolding gave way, and one of the men was precipitated a distance of 36 yards. He was, of course, instantaneously killed.

The inquest on the bodies of the eight men who were killed by the fall of the building at Hull, on the 26th ult., is being held. The evidence went in a great measure to show that the floors had been overlaid with seed. The chief foreman, however, who had had several years' experience in seed warehouses, considered the building to be perfectly safe, and so constructed as to be capable of bearing almost any weight. The accident was, in the opinion of the warehouseman, due to the filling of the stores, which drove the walls outwards. The deceased were warned of their danger fully fifteen minutes before the catastrophe occurred; but thinking

there was nothing wrong, they did not heed the warning.

On Wednesday night the deputy-coroner for Westminster investigated the circumstances attending the death of Henry Ellis Hill, aged fifty-four, who lost his life by falling from the roof of Her Majesty's Theatre, now in course of construction. Mr. Henry Ellis Hill said that he was a draughtsman, and the deceased was his father. He saw him after the occurrence, but he was unable to tell him how it happened. Charles Clott stated that the deceased was a carpenter, and employed in rebuilding her Majesty's Theatre. On Wednesday last week he was at work on the roof of the theatre, and witness was about 8 ft. from him. They were talking, and he was collecting the joints for some loop cords. All of a sudden the deceased stepped on a piece of deal hoard in order to come to him, when one end sprang up and shot the deceased below. He fell upon a heavy iron shoe, put there to receive an iron girder. The distance he fell was about 13 ft. The jury returned a verdict of accidental death, but added that greater care ought in future to be taken in not leaving pieces of timber about, as they were calculated to mislead persons employed on the works.

PHOTOGRAPHS IN PRINTERS' INK.

THE permanency of printers' ink has now been fairly and fully realized in photography. The carbon photographs of Mr. Pouncy, of Dorchester, in which we early saw the realization of this great desideratum, have been submitted to tests of the most trying nature, by Mr. George Dawson, of King's College, M.A., and lecturer on photography. They have been tortured by oven heat, and by boiling water, and have withstood the ordeal in the most triumphant manner. Mr. Dawson, in one of his experiments, soaked a Pouncy photograph, which was snn-printed on canvas and printers' ink, for six days in cold water, and then boiled it for six hours in water, without any change whatever being apparent except a little in the colour of the canvas! He kept paper Pouncy photographs in water till the paper rotted, but there was no fading, no failure of the photographs! He hung up slices of Pouncy pictures in a gas oven, and roasted them for six days in a heat of 300 deg. to 400 deg. Fahrenheit, and "on matching the cuttings with prints from which they were severed, no change whatever could be discovered!" There need be no more lamentation over fading photographs.

JUNIOR UNITED SERVICE CLUB.

ALTERATIONS have been carried out during the recess for the improvement of the ventilation of the Junior United Service Club, by Mr. Wilson W. Phipson, C.E. A fan worked by a small gas-engine now supplies the fresh air to the building; a new fresh-air supply erected near Waterloo-place; and an entire rearrangement of the old air-pipes and main channels to the different rooms, constitute the most important features of the new arrangement; besides which a more direct use of the existing extracting-shaft has been effected, so that it is hoped the coffee-room will especially derive great advantage from the adoption of this plan. We shall be glad to hear of the result.

THE TRADES MOVEMENT.

AN adjourned delegate meeting of trade societies of the metropolis has been held at the Bell, Old Bailey, for the purpose of adopting such measures and taking such action as may secure the passing of a Bill which will place trade societies on a footing of social equality with other associated bodies. The following societies, among others, were represented:—Engineers, ironfounders, carpenters, joiners, plasterers, bookbinders, tailors, deal cabinet makers, ropemakers, bricklayers, painters, zinc-workers, gliders, stonemasons, glassworkers, coopers, and shoemakers. The chair was again taken by Mr. J. Spelling, vellum binder, who was supported by Professor Beesly, Mr. Lloyd Jones, Mr. Crompton (harrister), &c.

Mr. Burgess (joiner) resumed the discussion upon a resolution proposed at the last meeting,

to the effect that the delegates approved the Trades' Unions Bill brought into the House of Commons last session by Sir Fowell Buxton. He defended the 3rd clause of the Bill, which provided that any workman using a threat of violence should be subject to three months' imprisonment, because trades unionists did not want their societies to exist on a basis of violence or intimidation. He also defended the Bill generally, because it legalised trades' unions, and simplified and defined the law of conspiracy.

Mr. Nisbett (mason) said his society, consisting of 20,000 men, were opposed to certain words in the said clause referring to threats of violence, because a wink or a shake of the head might be construed into a threat of violence. He objected to exceptional legislation for trades' unionists. He moved that the words relating to threats be omitted.

Mr. Broadhurst (not Broadhead) seconded the amendment.

Mr. Crompton (harrister) said the amendment would virtually strike out the third clause. Under the law of assault a man may get twelve months' imprisonment, but by the third clause of this Act the punishment was limited to three months' imprisonment. The general law of conspiracy was what unionists had to dread.

Mr. Lloyd Jones advised the delegates to retain the clause, and thus challenge the law, and say, "Punish us if we deserve it."

Mr. G. Potter suggested the appointment of a committee to reconstruct the third clause—having first conferred with Professor Beesly and Mr. Crompton.

The discussion was carried on by various others, and ultimately the Bill was sent to a committee to reconstruct the third clause, and the proceedings closed.

CHURCH BUILDING IN WALES.

THE churches of Llanfihangel Bryn Pabuan and Llanfhechan have been re-opened after restoration. The church of Llanfihangel, dedicated to St. Michael, is situated on a hill on the roadside leading from Llanfawr to the picturesque village of Newbridge-on-Wye. It has been supposed that it is called "St. Michael Pope John," because it was built in the time of a pope of that name, but the proper derivation of the name is Llanfihangel Bryn Ty Ienan, St. Michael-on-the-hill in St. Avau or Ienan. Ienan is another name for Afan. It seems that some of the early Welsh churches were called Tai, "houses;" St. David's is called to this day "Ty Ddewi," St. David's House. The old church of Llanfihangel has witnessed many changes. In the time of Cromwell it was converted into a stable, and the font removed from the church to a farm-house, where it was used as a pig-trough. The ordained minister was expelled from his living; and a mason of the name of Evan Bowen, an ignorant fanatic, was appointed in his place. The vicar was, however, ultimately restored to his living. Tradition says that when he was expelled all the jackdaws left the church steeple!

Llanfhechan Church, which, like Llanfihangel, is annexed to the vicarage of Llanfawr, is situated on the banks of the river Iro, about four miles from Bulth. It is dedicated to St. Afan, to whom, also, the mother church of Llanfawr is dedicated. The present vicar, from the dilapidated state of the edifices, which were not equal to the meanest hovels in his parish, appealed for help far and wide; issued no less than 10,000 circulars; and, besides being able to renovate the two churches, he has collected 550l. to erect a school and master's house, which are now nearly finished. The churches are in the Early English style, and were designed by Mr. Backridge, of Oxford. The builders were Mr. Pryce, of Bulth, and Mr. Evans, of Talgarth.

IMPROVEMENTS AT ASCOT RACE-COURSE.—A new building for the transactions of all official business during the Ascot race-meetings is in course of erection in the adjoining enclosure. The new building, which is designed by Messrs. Clark & Holland, of Newmarket, will contain weighing-offices for the jockeys, rooms for Messrs. Weatherly (stakeholders and secretaries), Mr. Manning (clerk of the course), Mr. Oxley (printer), and for the representatives of the press. Outside there will be an erection from which the officials may see the running.

THE AFFIX "MASTER OF ARTS."

"FELIX SUMMERLY" did good service the other day by directing attention through the medium of the columns of the *Builder* to the greater consideration given and larger share of time devoted to the study of art in the Continental colleges and schools, than in England. This opens a question of great moment, and a subject which must be actively agitated and well ventilated. Is not the affix "Master of Arts" a delusive sign of a complete education, being earned as it may be, and commonly is, by men entirely ignorant of the principles of the two great arts of painting and music? The classics, it is true, were for many centuries the only studies having the spirit of art in them, and this long prescriptive right has doubtless fostered a prejudice, and a jealous antipathy against permitting new-fangled studies in the *curricula* of our ancient seats of learning. There are signs, however, of a better temper, and of a yielding to a more advanced idea even there; but our more modern collegiate institutions offer every facility for the complete study, not only of the classics and the mathematics, but of the natural sciences, and even medicine. For the thorough study, however, of the two great civilizing arts of painting and music, there is still small if any provision, and notwithstanding it has been admitted on all hands that Art is a national necessity, that it promises a greater mercantile prosperity, a plethora in the British pocket, British prejudice remains proof even against the proffered bribe of wealth. This insensibility and immobility to common sense I believe could exist nowhere but in England.

While the School Commission was pursuing its useful course in 1865, I took advantage of a professional position to call one of its members' attention to the disadvantages under which the study of art commonly labours in colleges and schools, and when urging the importance of the study, and the necessity for some reform in this direction, I stated that—"The study of art was not merely important as the means of educating men to appreciate the beautiful, but in its direct utilitarian bearings; for that when drawing is properly taught it is a most potent agent in perfecting the faculty of observation, as people are then taught to see, to observe correctly. How inaccurately people do commonly observe what is before or going on around them is only fully known to art-teachers and Queen's counsel. And this must continue to be so till the importance of training the senses be thoroughly recognised. It is not, therefore, an indifferent matter," I urged, "how drawing is taught in public and private schools, whether it be condemned to *make-shifts* for times and places of study, whether it be pinched between hours devoted to Greek or Latin, and driven to the worst lighted and most inconvenient classrooms; then and there to be limited, as it too often is, to crude water-colour blotching. For to fulfil its proper educational function, the study of art should beget a habit of exact comparison, and this can only be effected by experienced teachers, conversant with the thorough means of training used in art schools, the student commencing his studies from the simple lines of fruit and flowers, and gradually rising to grapple with the greater subtlety of the human form."

One hindrance to the introduction of a better system of drawing in schools is, doubtless, the ignorant satisfaction at flimsy "accomplishments" in their children, which too many parents exhibit. Thus landscape drawings, composed of impossible rustic figures and dwellings, surrounded with a brilliant and almost tropical array of foliage, are preferred from pupils, to the dry, imperfect, less showy but more useful attempts under a good teacher.

But in retarding to the subject of "the footing" which art ought to hold in our great seminaries of learning, I would ask why it should not be the same as that of the most favoured subjects? I think I have shown there is every good reason why art should be so placed. A student of painting, sculpture, or architecture, ought to have it in his power to carry on other studies simultaneously, and to take the general degrees of B.A. and M.A. The question, then, arises, as to the re-organization of our educational system must soon become a leading question, whether it would not be preferable to found colleges with a leading speciality, though embracing also the general branches of study, — thus, the Royal Academy, or Royal College of Arts, the College of Medicine, the College of Engineering, &c., in which the general

degree of M.A. could be matriculated for, as well as the special one of R.A., M.D., or C.E. The plan would have this advantage, that the greatest talent in each speciality could be then concentrated, while rising talent would be enlisted in other colleges where art, medicine, and engineering would only take their positions as branches of general education. This would appear to me, too, to be the best mode of combining special with general education; and one which would not disturb existing elements, or rend our present educational framework to any great extent. Oxford could keep to its classics, Cambridge its mathematics, raising at the same time other subjects of general study to their fair proportions. The Royal Academy could easily be converted into a College of Arts; the College of Physicians or Surgeons into a great School of Medicine, and so on. Having thus briefly set forth my notions on the affix M.A., I leave a siller pen to extend and support them if they be of any value. W. CAVE THOMAS.

WEST INDIA PACKET SERVICE.

In a former number of our journal, we called attention to the "R. M. Steam-ship" service connected with the Island of St. Thomas and the West Indies, and pointed out the serious consequences of persisting in using that island and the neighbouring islands as the central depot for that important service, in consequence of the dangers arising from hurricanes, yellow fever, &c. We observe by the last report of that company that they are unable to pay any dividend for the last half-year in consequence of the serious falling-off in the traffic; and that falling off has not only affected that once powerful company, but it has also extended its ill-luck to another company, the "Panama and Australian R. M. Co.," who are now in financial difficulties; and so impressed is the latter company with the importance of abandoning the present route, that they suggest an alliance with another company who will run their steamers direct to Colon, abandoning the pestiferous districts of the Virgin Islands, and thereby saving, it is said, a distance of 1,800 miles in the sea voyage; and what is most important, shortening most materially the time of transit between Great Britain and the Australian colonies. It is much to be regretted that the former company did not attend to our warning remarks or appreciate our observations, particularly as they were induced by the most humane considerations and friendly spirit towards that particular company, as these excellent auxiliaries of our civilization,—the sea-going steam-ship companies,—are worthy of all aid from the press of the country, and deservedly merit a substantial reward in the shape of good dividends.

Who are to blame for this state of things we do not know. It is evident a serious loss in a pecuniary point of view has resulted from the arrangement, and we fear both the Government and the companies have lost confidence and prestige by it.

THE WEDGWOOD MEMORIAL INSTITUTE AT BURSELEM.

At a meeting on the 23rd instant, in connexion with this structure, Mr. Hope described the new building,—the first in England in the construction of which ceramic enter largely,—as a remarkably successful experiment in ceramic architecture. Mr. Melly presided over the evening meeting, and much of his opening address was devoted to technical education, which he said was now a vital necessity to England if she was to retain any of her superiority in trade. Technical education had become one of the cries of the day. Suddenly it was found that hundreds of thousands of window-frames, door-frames, and doors had arrived from Sweden and Norway, followed a few days after by twelve locomotive steam-engines from Belgium; and forthwith everybody rushed to the conclusion that our carpenters and joiners, and our workers in iron and brass, had had their education neglected, and that we were being rivalled and outdone by foreign nations. This, of course, led to questions in the House of Commons, and equally, of course, to the issue of a commission of inquiry; and he found from the ponderous Blue-book which resulted from that commission that we were behind one or two nations in Europe in the matter of schools of science and

art. Comparing England with countries he had named, they were bound to admit that, though in the matter of art England lagged not far behind, in respect of technical education we were a long way behind other nations. Still, he was not going to say that because some hundred thousand door and window frames, and a dozen steam-engines had been imported into England, the sun of England's commercial and manufacturing prosperity was setting. On the contrary, he hailed with satisfaction everything that tended to the commercial intercourse of nations, believing that to be one of the surest means of securing peace, increasing the comforts of mankind, and bringing about the brotherhood of nations. The memorial building is to be formally opened next Easter with an art exhibition. Its erection will cost upwards of 9,000*l.*

SIR DAVID WILKIE'S LETTERS.

It did not seem to us necessary to make any observation on Mr. Raimbach's letter which we printed recently (p. 768), nor does it now. But more than one esteemed correspondent thinking otherwise, we give a line or two of information. Mr. Raimbach says he has no doubt the letters came into our possession in a legitimate manner; but that some one through whose hands they had passed had obtained them surreptitiously. He adds, that one of them in particular had been looked for on a special occasion, but could not be found, and that he "thought it had undergone the fate of many valued papers, and had been used by the cook to light her fires. It seems it had a different fate." A strange probability surely,—that of the cook, in a well-ordered household; but still not at all interfered with by our recent publication; for the letters we made public were not printed from the originals, but from copies kept by the great painter's brother, Thomas Wilkie, since dead. There is no surreptitious dealing in the case at all therefore, and the cook must still rest under Mr. Raimbach's suspicion.

ST. CHAD'S SCHOOL, DENSTONE.

On Thursday, the 22nd inst., the first stone of these buildings was laid by the son of the late Bishop of Lichfield, the Rev. Canon Lonsdale, in the unexpected absence of the Marquis of Salisbury, who was detained through illness.

This school is a branch of the parent college of St. Nicolas Lancing, and is the first of three which are to be established in the Midland Counties, after the models of Lancing, Hurstpierpoint, and Ardingly schools in Sussex. St. Chad's School is for the middle class, as is the Hurstpierpoint School, and will be built for 400 boys, who will be educated and boarded at a cost of little more than 30*l.* a year.

The site is on a low range of hills between the town of Uttoxeter and Alton Towers, and the North Stafford Railway has a station at Rooster on their Manchester line which is about a mile from the college. The school will thus be in the centre of the great towns of Derby, Nottingham, Manchester, and Leicester. The ground on which the school stands is given by Sir Percival Heywood, bart., and is in the parish of Denstone, on the borders of Staffordshire.

The buildings are being erected from the designs of the college architects, Mr. W. Slater and Mr. R. Herbert Carpenter, by Mr. Bromwich, of Rugby. The plan follows in its general outline the letter H; that is to say, there are two quadrangles, the one opening to the east, and the other to the west, divided by a central block. The western quadrangle is 200 ft. long and 160 ft. wide; the eastern is about 160 ft. square. In the central building is the great school-room, 100 ft. by 35 ft., with a lofty open timber roof, 62 ft. to the floor from the ridge, and lighted by two-light tracery windows, running up into the roof with gables over them. Under this room are day-rooms for boys, porter's, and visitors' rooms. The great staircase to the school-room is at its northern end.

The chief entrance to the buildings is in the centre under the school-room. Over the doorway opening into the east or "Chapel Quadrangle" will be a figure of St. Chad, and over the doorway into the western quadrangle a figure of Bishop Lonsdale, whose memory will be preserved by this quadrangle being called the "Lonsdale Quadrangle." The two wings of this quadrangle are 210 ft. long and 40 ft. wide, in three stories. The two



ANCIENT BRONZE MEASURE AT OCHSENFURTH.

upper stories in both will have each two dormitories for fifty boys, with lavatories and junior master's rooms attached. In the ground-floor of the northern wing are class-rooms, and in the southern wing a gymnasium, 125 ft. by 17 ft., a series of rooms for the master's training-school, a boys' library and a master's library, and the chaplain's rooms. The second master's house is at the west end of this wing, and the head master's house occupies a corresponding position in the north wing. At each of the inner angles of the quadrangle, where the wings join the central building, is a lofty and massive tower for the water-tanks, and supply for the whole building, so placed as to preclude the possibility of any fire spreading. The chapel will be of lofty proportions, apsidal with a campanile on the north side of the apse, and an ante-chapel communicating with the cloister, which runs through the entire ground-floor of the building. The dining-hall will be 100 ft. by 35 ft., opposite the chapel. These two are not yet begun, but the foundations will be put in during the next spring. The kitchen and offices form a small separate quadrangle north of the buildings, and will include engine-house, gas-works, and workshops.

The present contract (with the foundations) for the Lonsdale quad. is about 20,000*l.* The ultimate cost will be about 50,000*l.* The style is Early English, treated with a certain amount of severity. The material for the external thickness of the walls is grey Alton stone in coursed work, with hands of red Alton stone.

ANCIENT METAL FURNITURE.

BRONZE MEASURE AT OCHSENFURTH, BAVARIA.

The accompanying engraving represents the "Eimer" Measure still used in the town-hall at Ochsenfurth. It is cast in bronze. On the rim is the date "Anno domini M^o CCCC und III^o" 1403. The mixture of German and Latin in the inscription is singular. The subjects represented in low relief are the "Crucifixion," in the first and third compartment, and "St. Michael and St. Lawrence" in the second and

fourth. The handles are curious, but very convenient. The following are the dimensions of this peculiar relic of antiquity:—

Height	29 in.
Diameter	22 in. at rim.
Figures	6 in. high.
Thickness at rim ..	2 in.

This measure is preserved in the council chamber of the town-hall.* In our last we gave drawings of some remarkable specimens of ancient furniture in the same room.

The details of the Measure show section of the lip, section of rib on face of the Measure, one of the handles, and the rosette at end of handle.

THE CHÂTEAU CARADOC, BAYONNE, FRANCE.

BAYONNE, it may be remembered, is near the south-western extremity of France, in the department of the Basses-Pyrénées; it has a cathedral, docks, and a vast military hospital, capable of containing 1,700 patients; and gave its name to a weapon first produced there, which the English took to using with some effect. It is one of the prettiest of French fortified towns, and its suburbs are delightful. Few who visit it fail to ascend the high ground of St. Etienne, where the view, extending to the summit of the Pyrenees, and brightened by the river Adour, is superb. Here, during some years past, a chateau of large size and costly appointments has been in course of erection, from the designs of Mr. B. Albano, for an English nobleman, Lord Howden, whose father, the first baron, was Lieut.-general Caradoc. The chateau is now completed, or nearly so, and we publish in our present number a general view of it from the south. Mr. Albano, who is best known as the architect of the interior of the Royal Italian Opera House, Covent Garden, built in 1847, and which was burnt

* These particulars were erroneously attached to a view of a bronze font in Würzburg Cathedral, in our last volume (xxv), p. 829, as was explained at the time; see p. 834 of same volume, where also some particulars of metal fonts will be found. View of a bronze font at Ochsenfurth is given in our present volume, p. 28, ante.

down in 1856, has devoted himself entirely to the work in question, which includes not merely the chateau as seen in our view, but a graceful water-tower, terraces, winter gardens, enclosures, and garden buildings.

The residence forms three sides of a quadrangle, open to the south, and from which side long flights of steps overcome the declivity of the grounds. On the north front is a carriage-porch, the servants' entrance, and staircase being in the lofty tower seen to the right, the conical roof of which (as of the others), is covered with cut slates. The walls, we need scarcely say, are of stone. The pavilion seen on the left, is covered with a domo, groined within and without, and surmounted with a lantern formed of eight Ionic columns, wholly of Crazeanne stone. The cornices and mouldings in this, as they are indeed throughout, are very carefully worked. The same stone in the dome forms the two faces, internal and external. The diameter of this pavilion is about 19 ft., and its height about 40 ft. The prevailing effect of the exterior of this building is one of great dignity. Within, every part is fitted up with care and skill: the chapel is Gothic in style, and includes marhle mosaics and carvings; the library and other rooms display excellent woodwork. In the *salle à manger* the panels of the doors are painted in oil with views of the principal Spanish cities, and the parquetry-floor is especially noticeable.

A Frsnoh visitor, warmed into enthusiasm by an examination of the chateau, writes,—"In this well-ordered dwelling the domestic duties will be accomplished with ease. The daily duty of each, from the master in his cabinet to the *cordon-bleu* in his kitchen, is facilitated in the most complete manner; consequently and evidently good-humour will be preserved, the discretion of the interior life will be respected, each will be free in his own domain, and the exterior relations of friendship and society exercised with dignity and order. This picture of material and moral comfort is but the expression of what is due to the architect of the *Casa Caradoc*."

We may take an opportunity to illustrate this work more fully.



CASA-CARADOC, ST. ETIENNE DE BAYONNE, FRANCE: THE SEAT OF LORD HOWDEN. — MR. B. ALVARO, ARCHITECT.

SALARIES OF BOROUGH SURVEYORS.

In a report made by a committee appointed by the Huddersfield Town Council, to inquire as to the appointment of a borough surveyor, they give particulars with reference to the following twenty towns where the salaries were as follows, viz. :—

	£.	Area.	Mileage of Roads.
Birmingham	600	8,420	136½
Sheffield	400	22,370	160
Leeds	300	21,672	149
Newcastle-on-Tyne	600	5,325	74
Bradford	700	6,500	50
Leicester	600	3,760	60
Bolton	250	1,550	no return
Birkenhead	500	1,700	60
Salford	350	1,320	45
Preston	400	2,900	57
Oldham	300	4,685	45
Norwich	400	6,630	43
Halifax	400	3,788	42
Wolverhampton	550	3,410	37
York	300	2,720	24
Gateshead	400	5,134	13
Derby	350	1,829	30
Blackburn	250	3,681	30
Oxford	320	5,000	no return
Ashton	200	1,591	31
Average	400	6,582	64
Huddersfield	.....	10,438	50

In eighteen of these places no private practice is allowed: the two exceptions are Sheffield and Derby. The average allowed for clerks' salaries, &c., in addition to the salaries named in the whole of the twenty towns, is about 212l. In the cases of Bradford, Preston, and Halifax, the duties of waterworks manager are combined with those of surveyor, and in the case of Oxford the borough surveyor is also the nuisance inspector.

THE PHYSICAL COMMOTIONS THROUGHOUT THE GLOBE.

THESE commotions unfortunately are not yet at an end. The rendings of the earth's crust south of the equator have only partially relieved the internal pressure, and now they have extended into the northern hemisphere, and California has been seriously shaken, so that San Francisco has had many buildings thrown down and several villages have been reduced to heaps of ruins. The island of Hawaii in the Pacific ocean, opposite these coasts, is slowly sinking into the ocean, on the western and southern shores, which are now several feet lower than they were in April last when the terrible volcanic eruption took place there. Since the first attack, a second earthquake, but much less violent, has occurred at San Francisco. The disturbance of the Pacific ocean has been of an extraordinary nature in connexion with these commotions,—at least, with those of August; and considering that the bed of the Pacific is like a sunken continent whose mountain tops alone appear in the form of its innumerable islands, there seems to be little doubt that the crust of the earth is thinner there than on the continents above water. This fact seems to corroborate the idea that the cause of all these commotions is really chemical, or underlies the whole crust of the sphere, and hence operates chiefly where the crust is thinnest; and that it is such as Hopkins, of Cambridge, represented the cause of old crust fractures to be—an expansive force, or force operating outwards from within the earth's crust. Moreover, if it be such a force, it will tend to relieve itself chiefly by *rendings north and south*, if it be connected, as we have suggested, with the earth's rotary and centrifugal force, and especially in regions more or less extending from the equatorial. Thus, too, the idea prevalent amongst geologists that the earth is still essentially a fluid or molten though encrusted sphere,—and indeed, *a fortiori*, it must be admitted that a spherical form indicates a fluid substance,—is one which is much more capable of explaining the geological phenomena than that of a solid sphere, particularly if, as we have suggested, the admitted or recognised tendency to expansion is derived from the rotation of the sphere.

The problem of the influence of a varying rotation on a molten and encrusted sphere (though there is no actual evidence of the earth's rotation being at present either on the increase or the decrease) is one of peculiar interest and importance, and is capable of affording curious explanations of the present states of other planets as well as our own. For example, the greater the rapidity of rotation, the lighter in specific gravity *ought* the fluid and encrusted

sphere to be, as well as the more expanded in dimensions; and the less the rapidity of the rotation, the denser and the less expanded ought they to be. Now, it is evident that on a general view this is the fact,—namely, that it is precisely those planets which rotate with the greatest rapidity that are the lightest in specific gravity, as well as the most enormous in circumference; and it is not difficult to explain what may not at first sight seem so evident. Jupiter rotates once every nine hours; and hence it is, probably, that his great molten mass is so levitated, expanded, and centrifugalized by this tremendous rapidity of rotation that the specific gravity of his vast sphere is reduced to something like that of water, although, for all that, he may thus be an encrusted sphere. Saturn, with his centrifugal rings, his magnificent dimensions, and his specific gravity like that of cork, also rotates with immense velocity. On the contrary, Mars, Venus, the Earth, and Mercury,—all small in dimensions,—are comparatively dense in substance: hence, as the earth is least dense, they probably all rotate comparatively slowly. There is no great planet of anything like the density of the smaller ones.

SANITARY STATE OF THE NAVY.

THE sanitary report of the Royal Navy shows that the total force employed for the year 1866-67 was, in round numbers, 50,000, and that of these about 500, or one in every hundred, died in the twelve months. But at least one-fifth of these deaths were accidental, leaving 400 due to the effects of disease. The year 1866 was marked by a visitation of epidemics. At home, in the Mediterranean, and on the south-east coast of America, cholera was prevalent; in China and Japan small-pox raged with great severity; and on the East Indian and Pacific stations the ships were visited with serious outbreaks of remittent fever. Thus, though the period was exceptionally unhealthy, the mortality in the navy, and not the mortality alone, but the sickness and invaliding, were less than had been known for years.

It is also satisfactory to note, as we may here do, that the General Sanitary Convention at Berne have agreed to specific articles as regards the neutrality of those engaged in the management of the sick and wounded in war and all that relates to such management, whether in maritime warfare or warfare on land.

THE PROPOSED NEW ROUTE BETWEEN ISLINGTON AND THE CITY.

PROGRESS is being made, although slowly, towards the opening of a direct route from the Branch Post-office, Essex-road, Islington, through Packington-street, Shepherdess-walk, Bath-street, Bunhill-row, Type-street, Moor-lane, Cripplegate, and the centre of the grand termini of the Metropolitan, Great Northern, Midland, Great Western, London, Chatham, and Dover, Western and South Metropolitan districts, and St. John's Wood Railways, to the centre of the City. At a recent meeting of the Board of Guardians of the parish of St. Luke, the clerk reported that Mr. Vulliamy, the arbitrator appointed by the Metropolitan Board of Works, and Mr. Clutton, on behalf of the parish of St. Luke, to whom reference was made in order to ascertain and determine the value of the land belonging to St. Luke's Workhouse required to be given up for the widening of Shepherdess-walk, had selected Mr. John Shaw, of Christ's Hospital, as umpire between them, and that the question was in a fair way of being speedily and equitably settled. The Board of Works have agreed to widen Shepherdess-walk at its own cost, and the Asylum wall in Bath-street has been already set back to a line, ranging with Alleyn's Almshouses. Two portions, and these the most difficult, of the direct route from Islington to the City, have thus been won, and the whole length of thoroughfare will soon be opened for public use and vehicular traffic.

It has been determined that the forecourts of Lady Lumley's Almshouses shall be thrown into the thoroughfare as soon as the arrangements for opening Shepherdess-walk, widening the canal-bridge, and removing the workhouse wall have been completed. It is likewise in contemplation, according to the *Clerkenwell News*, to remove the almshouses altogether from their present site to one more suburban.

WORKS DONE IN THE METROPOLITAN DISTRICTS.

THE Superintending Architect of the Metropolitan Board of Works (Mr. G. Vulliamy) has just now published his annual report on the monthly returns of district surveyors. It shows that the total of the gross fees received for the year is 36,674. 6s., in respect of 21,303 works, of which more than two-thirds were done within the year.

The gross fees received in thirty-two districts vary from 24l. to 450l., five being under 200l., twelve under 300l., six under 400l., and nine under 500l. In the others the incomes vary from 500l. to 1,644l.

The expenses of district offices are 65,691. 17s. 3d. The fees remaining due for all arrears are 27,592l., but probably mostly of little value. The sums abated or lost are 1,509l. Compared with the results of former years the present abstract shows still a considerable increase.

	Works.	Fees received.
In 1856	14,654	210,904 11 11
" 1857	15,330	20,989 11 4
" 1858	15,590	21,732 11 2
" 1859	15,668	22,355 9 2
" 1860	15,080	22,791 2 3
" 1861	14,008	21,586 2 8
" 1862	15,707	25,315 2 3
" 1863	17,954	29,440 5 9
" 1864	18,984	31,803 5 2
" 1865	19,251	32,072 7 9
" 1866	20,190	31,689 11 4
" 1867	21,303	36,674 6 0

The returns above 1,000l. are from,—

How and Poplar	£1,083 19 6
South Kensington	1,244 18 3
Hammersmith	1,307 8 0
Newington, &c.	1,338 8 6
St. Pancras	1,569 12 6
East Islington	1,532 9 9
St. Giles, Camberwell	1,580 10 0
Southern division of Lambeth and part Camberwell	1,643 17 2

ROTHERHITHE SICK ASYLUM COMPETITION.

THE Board of Managers invited eight architects to furnish plans for the Pauper Hospital for the parishes of Bermondsey, Rotherhithe, and St. Olave, to be erected on a limited site adjoining the Rotherhithe Workhouse and the new Southwark Park.

The principal conditions were,—

Each architect to receive 40l., except the successful competitor. The successful competitor, if required, is to carry out the works for a payment of 500l.; but he will not be entitled to any payment unless a substantial contractor will undertake the work at a price not being more than 10 per cent. above the estimate. An estimate is to be sent with each design. The payment of the sum of 500l. is to include all travelling expenses and attendances, and the supply of all plans, working drawings, &c. &c., that may be required. All drawings are to be to a scale of one-twentieth of an inch to the foot. Accommodation is to be provided for 600 patients—about 200 males and 300 females; and the buildings are to be so arranged as to be easily capable of extension if required, so that easy access may be had to all parts. Buildings to be constructed on the pavilion principle.

The competitors were—

	Estimate.
Mr. George Legg	£35,000 0 0
Mr. Elkington	32,000 0 0
Mr. Ernest Turner	29,000 0 0
Mr. C. H. Cooke	29,000 0 0
Messrs. Giles & Biven	27,500 0 0

Dr. Markham and Mr. Corbett, inspectors of the Poor-law Board, attended the meeting of the managers, to give their opinions on the designs; and recommended those by Messrs. Giles & Biven, and Mr. Ernest Turner. Ultimately that by Mr. Turner was selected.

ROADS.

THE present practice of repairing roads is certainly open to improvement, and we have now no eminent living authority to advise and direct us as formerly in the execution of such works.

Your correspondent "X. Y. Z." seeks information on the subject; and I shall be glad, as an old practitioner, to offer my mite of knowledge derived from the late Telford's practice. In one of his specifications he speaks of 6 in. of broken stone being applied—4 in. to be first laid on and worked in by carriages and horses, care being taken to rake in the ruts until the surface becomes firm and consolidated, after which the remaining 2 in. are to be put on.

The whole of the stone is to be broken as nearly cubical as possible, so as to pass through a 24-in. ring inside diameter, and the whole of

the material to be covered with a "binding" of 1½ in. of good gravel, free from earth or clay.

In another of his late works at Coventry, what he generally considered one of his most perfect works, the pitching is to be covered with a layer of Nuneaton stones, to be laid on 6 in. thick, the stone to be broken as heforesaid, cubically, and to pass through the gauge. The Nuneaton stone is to be covered with 1½ in. in depth of good binding, evenly and regularly laid on, and well raked, so as to prevent it getting into ruts.

In my own practice on suburban roads, I should lay on the 6-in. coat at two different times, 3 in. each time, and let the first coat become nearly consolidated before I applied the second, at the same time paying strict attention to the shape of the cross section, and to secure a smooth surface when set and consolidated.

On town roads, if 6 in. in thickness be required in one coat, I should lay it on at one time; then clean gravel, or screenings of metalline; and if this be properly put on, and the stone well and regularly broken, and afterwards rolled with a steam roller, the metal cannot fail to become soon consolidated. Of course, in towns, if macadamized roads are indispensable—of which I have grave doubts—the mode of repairing should be such a one as to effect the object in the shortest space of time, so that the inhabitants and the traffic may suffer the least possible inconvenience, while the street is undergoing repair; but the system of rolling to consolidate macadamized roads adds very materially to the cost of them, and makes the difference in the first cost and repair very much more in favour of a well-executed pavement.

The metropolitan roads need the application of those excellent axioms laid down by the late eminent Telford, derived from his extensive practice and experience; and until these are followed out and adopted more generally, I shall expect to hear at the approach of winter ominous sounds of grumbling, not only loud, but deep, in the pages of the metropolitan press.

B. BAYLIS.

THE NUMBERING OF HOUSES.

A CORRESPONDENT, "C. B. H.," writes,—“An improvement in the numbering of streets is called for. I would suggest that the number of each house be painted on a piece of ground-glass, and inserted in a small aperture in the street-door, where, by the aid of the hall lamp it would be easily seen outside. On an evening there is a difficulty to find in any strange neighborhood the particular house for which we may be searching, especially if it be situated in a badly-lighted thoroughfare, or if it stand back a little distance from the road.”

The suggestion has been made before in our pages, but will bear repeating.

GENERALISATION IN ARCHITECTURAL EDUCATION.

The observations and advice in the *Builder* of last week in answer to poor "Adelphi" are both kind and good, but I cannot but think if farther advice were given in regard to a useful and plain course of study, and reading, it would be a considerable aid to "Adelphi" in enabling him to fetch up some of the leeway in his neglected course of architectural education. I am fully aware that a course of reading has already been recommended in the *Builder*, but I think some of your correspondents might advise a simple and useful course of works for his study on the following heads, viz:—

- On the general rules and principles of Architecture from Palladio, &c.
- On General Construction, Geometry, &c., &c.
- On the Principles of Design.
- On the Principles of Taste.
- On Estimating, Specifications, &c.
- On Colour, Light and Shade.

No doubt much might be gained from the programmes of King's College and the London University, supposing that a young man when out of his time could not afford to attend the classes. Many of your correspondents are both competent and capable of giving sound advice to "Adelphi," as well as others who have fallen in their time into the same dilemma, after expend-

ing five or six years in an architect's office, leave it without one single word of advice or teaching during that period, and who ought really to have the interest of the premium presented to them on leaving as some atonement for neglect.

A SUBSCRIBER.

PAINTING HOT-WATER PIPES.

A CORRESPONDENT from Sussex writes:—In answer to "A Subscriber" in your impression under date October 17th (p. 769) allow me to say the paragraph to which he refers occurred in the *Illustrated London News* of June 20th, 1868. He will there read, "In Germany . . .

a suggestion has been made to do away with the black lead, and paint the stoves and ovens. Oil paint, of course, cannot be employed, but water glass (silicate of potash), coloured with pigment to match the paint of the apartment, is the material recommended. Before this is applied, the iron must be thoroughly cleansed from grease, and all rust spots must be rubbed off with a scratch brush. Two or three coats of the paint may then be put on and allowed to dry, after which the fire may be lighted without any fear to the colour, which may, indeed, be heated to redness. It may be kept clean by washing with soap and water; spots of milk and grease have no effect upon it. Dutch ovens and like utensils may also be coated with the same materials, and the labour spent in polishing be saved. A good coating of the paint, the author says, will last a year or two."

GLAZING IN IRON.

In reply to "R. P." respecting glazing Iron skylights, I have to inform him I have used putty made with lamp oil instead of linseed. This putty remains soft, and prevents the breakage complained of. I have used it on several occasions with great success.

CHARLES CLARE.

HERTFORD COTTAGE COMPETITION.

SIR,—Can any of your readers oblige me by affording information concerning the award of the premium in the above competition? I had my drawings set back, with a letter accompanying them, thanking me for the kind assistance I had afforded, but not containing any information concerning the "successful competitor," or whether the premium was awarded or not.

COMPETITOR.

POPULAR AND STEPNEY ASYLUM COMPETITION.

SIR,—If you saw the drawings you could have had little difficulty in judging whose estimate was really to be depended upon as founded on actual knowledge and experience in the value of such works; but to show you how little value can be placed on such estimates, I beg to forward you the estimated value of the works required to carry out the three selected designs, as ascertained by surveyors appointed by the Board of Managers of the asylum. They are as follow:—

	Original Estimate.
Mr. A. Wilson	£54,700
.....	£35,000
Messrs. Hammett & Lambere ..	34,000
.....	65,500
Messrs. Harston	62,900
.....	58,000

In one case, Mr. A. Wilson's, the difference is only 20,700!! Still, I fear you will hardly credit it, the real contest has been between him and Messrs. Harston; and I believe Messrs. Harston are No. 1 by 6 votes to 5. This is hearsey.

I have no hesitation in asserting that, if all the designs had been cubed up and valued at one and the same price per foot cube, it would have been found that my estimate was not too high. I mean for good sound and lasting work. I believe that the estimates, even as obtained by the Board, would be found 15 or 20 per cent. too low for first-class work, such as there ought to be in public buildings.

My estimate was based on 6½d. per foot cube average. Can you get work well done for less?

The absurd estimates sent in by some of the competitors need no comment. I was always taught in early days that estimates ought to be founded on a certain basis. Is that the case now?

E. L. BRACEBRIDGE.

SIR,—We observe that in your notice of the designs submitted in competition for the proposed "Popular and Stepney Sick Asylum," you have not placed any estimate in connexion with our names. As this may give rise to erroneous impressions as to our assumed unwillingness to do so, we beg to state that an estimate of 55,000l. was given by us; but being embodied in the specification, and not in our general description, it may probably have thereby escaped recognition.

HILLS & FLETCHER.

THE FAIRFOLD WINDOWS.

SIR,—Your correspondent "B. A. A." has written to you apparently with little other purpose than to assure you that I am to be handed over to the tender mercies of Mr. Tom Taylor, whose authority "is recognised, and who has more than once publicly expressed his opinion that the hand of Albert Dürer is visible throughout the work." Very well, this shall be the test of Mr. Tom Taylor's claim as an art-critic and of mine. I have no fear for the issue. If these words are by Albert Dürer, those known to us by his signature are not. This is the issue I put, and it is a matter easily decided. I remind "B. A. A." that I mentioned no names in my letter; and he had been wise, as he conceals his own, to have followed my example.

I thank him for showing me my error in appropriating the so-called signature to the wrong subject. My argument is not touched thereby, and as this was the only instance of my omitting to make a note on the spot, it was an error of memory. But I do not excuse it; let my opponent make the most of it.

As regards every other point in which "B. A. A." makes free with my name, I do not think it necessary to trouble your columns. He is probably but a young member of the Archaeological Association; for an old one would have known my claims to enter into this dispute. He would also have known that on my retirement from active participation in their proceedings, I received a very cordial vote of thanks for my services.

I must apologise for troubling you, even to this extent, in reply to a writer who can only refer me to others. I write only in the interest of truth; and it is to elicit truth that I have applied to this question the result of a study occupying upwards of thirty years of my life.

J. G. WALLER.

WANTS IN JERSEY.

SIR,—Will you allow me to mention two things that struck me during a fortnight's stay in the island of Jersey? Thousands of pounds are being spent in making the vast quarries available for road purposes; but although the island is overrun with visitors and tourists, the authorities grudge a few shillings for half a dozen finger-posts. In the remoter parts of the Isle they are specially wanted.

During a few visits to the police-court at St. Helier's, I was much struck with the fact that nearly all the cases that were brought before the magistrate had their origin in intemperance; nevertheless, all the pumps I saw in the island were deficient of their laces or drinking-cups.

VERBON SAR.

UNDERGROUND ROOMS.

SIR,—Your correspondent, "A Plain Country Parson," is labouring under a very great mistake, when he says that houses built all above-ground are rarely vacant. I have recently completed the erection of about sixty houses, on an estate considered one of the most healthy parts of London, very open, with gravel soil, adjacent to a park. Twelve out of the above number are built all above-ground, with every convenience: it is true six of them are let or sold; the rest I seldom have an application for.

Now, sir, all the rest are what is termed half-story, or by some under-ground, and not one of them is vacant, but were bought up immediately.

I can, therefore, at once accommodate your correspondent with the sort of house he requires; rent, 45l. Not a villa, true, but one of a block.

M.

BUILDINGS IN MANCHESTER.

SIR,—We beg to inform you that we were the architects of the Commercial Chambers and Stock Exchange, mentioned in your Art Notes in Manchester; also of the warehouse in Peter-street.

WALLERS, BAKER, & ELLIS.

PROVINCIAL NEWS.

Cheshunt.—The building known as St. Mary's Hall has been pulled down, and the foundations of a new hall to be erected on the same site have been dug out. The contractor is Mr. F. Sanders, of Cheshunt, and the cost of the erection will be between 1,000l. and 1,100l. The building is expected to be finished in about six months.

Bodala.—The foundation-stone of a new Drill-hall has been laid here for the local Volunteers. The hall is to be 70 ft. long and 30 ft. wide.

Lincoln.—In obedience to the instructions of the committee appointed at a recent meeting of the Town Council, Mr. Wheeler, C.E., has prepared a plan and scheme for converting the land adjacent to the Bath-gardens into a public park or recreation ground. The land in question is already the property of the Corporation, and is 33½ acres in extent. It is proposed to enclose with a light fence about seven acres, lying between Mr. Joyce's garden and the Mill Hill, and by filling in the ditches and levelling the ground make it available as a play-ground and for fives and parades. The entrance, provided the scheme be carried out, will be through a pair of iron gates fixed in the line of the fence of Mr. Joyce's garden, where an ornamental cottage for the park-keeper's residence is to be erected.

FROM IRELAND.

Ballycastle.—The foundation-stone of five houses and a tower has been laid at Ballycastle, for the Coast-guard buildings, where the Government has obtained a site and two statute acres of land on the Boyd estate, adjoining the Coast-guard-station. The site is on an eminence, commanding an extensive view of Rathlin Island, the hills of Scotland, Fairhead, Glenshenke, and Knocklady Hill. The contractor is Mr. Mathew McClelland, of Derry.

POPULAR BOARD OF WORKS NEW BOARD ROOM AND OFFICES.

The Popular Board of Works at a recent meeting entrusted the erection of their proposed new offices to the joint firms Messrs. Hills & Fletcher and Messrs. A. & C. Harston, who, it will be remembered, gained the first and second prize respectively in the competition decided in June, 1867.

PUBLIC WORKS IN INDIA.

The following gentlemen have recently been selected from among 250 candidates for temporary service in the Public Works Department in India in the unmentioned grades:—

Executive Engineers, Fourth Grade.—Mr. C. C. Adley, Mr. W. J. B. Clerke, Mr. T. P. S. Crosthwait, Mr. W. J. W. Heath, Mr. W. Henderson, Mr. G. F. J. Hood, Mr. G. H. Jones, Mr. H. M. Mathews, Mr. R. Reynolds, and Mr. T. T. Ryan.

Assistant-Engineers, First Grade.—Mr. J. P. Bell, Mr. J. A. Coghlan, Mr. H. W. Cliff, Mr. C. H. Oudnes, Mr. R. Foley, Mr. A. D. Fox, Mr. C. E. Guel, Mr. H. S. Hallett, Mr. R. M. Henderson, Mr. E. J. Jones, Mr. G. N. R. Lambert, Mr. J. C. Ledger, Mr. G. W. Macdonald, Mr. T. P. Morris, Mr. J. Ramsay, Mr. S. A. Reade, Mr. H. S. Ridings, Mr. H. T. Tanner, Mr. W. B. Taylor, Mr. R. H. Winder.

Assistant-Engineers, Second Grade.—Mr. G. C. E. Barnard, Mr. J. W. Brasington, Mr. F. Bullock, Mr. F. B. Cunningham, Mr. R. H. Denny, Mr. R. Fogarty, Mr. A. B. George, Mr. W. C. Hoaking, Mr. J. E. Hilton, Mr. R. B. Joyner, Mr. T. W. Miles, Mr. R. D. Morgan, Mr. E. B. Oliver, Mr. W. G. Owen, Mr. P. Reynolds, Mr. W. P. Richardson, Mr. H. Riggie, Mr. F. Robertson, Mr. C. B. Target, Mr. A. Valentine.

CHURCH-BUILDING NEWS.

East Barwick.—The parish church, which is dedicated to St. Mary Virgin, has been re-opened after restoration and addition of a north aisle. The nave and south aisle also have been restored, and the chancel, which was built about twenty years ago, refitted. The seats, which are all free, and subject only to the allotment of the churchwardens, are of pitch pine, the pulpit of the same material. The floor tiles are by Messrs. Minton. The stained-glass memorial east window, in three compartments, is the work of Messrs. Lavers, Barrand, & Westlake. The subjects are the bearing of the cross, the crucifixion, and the interment. The reredos was done by Messrs. Bell & Co., of London, and contains a statutory marble cross, enriched with gold, with angels painted in the side panels, and with moldings decorated with mosaics. The chancel works were done by Mr. Withers, of London. The architect of the nave was Mr. Atkinson, of York. The carving of the stone corbels which support the principals of the roof represent the Christian course (the infant children blessed by the Saviour, guided by the guardian angel, the cross held out by the angel as the race goes on followed by the crown as the reward, ending in prayer and praise in heaven) was the work, as was that of the chancel, of Mr. Earp, of London. The builders employed were Messrs. Pattinson, of Ruskington, near Sleaford. Considerable portions of the ancient structure still remain. The old tower, the porch, with St. Mary holding the infant Jesus in her arms, the arcade of the south aisle, and the ancient font, with the emblems of the Passion on the panels, are almost untouched. There is also a narrow lancet window at the west end of the south aisle, showing that some parts of the church date from the beginning of the thirteenth century. It had been closed up with bricks, and on these being cleared away it was observed by the workmen that there were marks of there having once been a shutter with a bolt, &c. In the restoration this window had to be in great measure pulled down, but it was rebuilt, under the rector's orders, with its large internal splay, &c., precisely as before. The day after the re-opening

of the parishioners, men, women, and children, and their friends, to the number of about 400, were feasted by the rector and chief parishioners.

Helmsey.—The ancient church of Helmsey, in the North Riding of Yorkshire, has been restored at the cost of the late and the present Lord Feversham, and re-opened by the Archbishop of York. The restoration (almost the rebuilding) has occupied nearly two years. The work was commenced in 1866, by the late lord, under the advice of Messrs. Banks & Barry, of London, architects. At his death during last year the work was far advanced, and it has now been completed by his eldest son and successor. In the course of the works of restoration, it has been found impossible to retain much more than the south wall of the nave, the arcade between the nave and north aisle, the old arch into the chancel, and the lower part of the tower. It was found that alterations and repairs had been going on in the chancel and transepts, which had so shaken and loosened their walls that rebuilding was imperative, but the examination of them revealed the positions and sizes of the old windows which had been walled up, and enabled the architects to reproduce, in all essential features, Helmsey church as it existed in the eleventh century. The old pitch of the gables and of the roofs has been restored, and the late windows have been replaced by the original deeply-recessed round and lancet openings. The west gallery has been removed, and the tower, with its arch, thrown open to the church. The old chancel arch and that to the south door have been preserved and their mutilations repaired. The whole of the internal seating is renewed in oak, while externally a new south porch has been built, the incongruous upper part of the tower renewed and replaced by a belfry stage and pinnacles of early character, and a lych-gate of the old familiar type has been inserted in the south wall of the burial-ground, immediately opposite the south entrance. The whole of these works have been carried out by Messrs. Barton & Smith, of Helmsey. The chancel windows and some in the transepts have been filled with stained glass by Messrs. Hardman, of Birmingham. The treatment of the eastern triplet being illustrative of the dedication of the church to All Saints; the centre light contains the Saviour in a sitting attitude, of heroic size, in the act of receiving and blessing the bands of saints, prophets, martyrs, and confessors, groups of whom fill the lights on each side, while four single-light windows in the sides of the chancel contain figures of the Evangelists. Messrs. Brown & Downing, of Birmingham, have supplied the metal work in the gas standards, gates, &c., and the pavement of the chancel is designed in encaustic tiles manufactured by Messrs. Maw & Co., the nave and transept floors having tiles of plain character made by Messrs. Watkin, of Burslem. An organ has been given by the Earl of Feversham. It is from Messrs. Walker & Son, London. The instrument is erected on the north side of the nave, and its front pipes are gilded and illuminated. A new clock by Messrs. Moor, of Clerkenwell, with musical chimes at every quarter of the hours, has been provided, and the old peal of bells has been examined and rebung by Messrs. Mears, of Whitechapel, the largest of them (found cracked) having been recast. The entire expense has been upwards of 10,000l.

Rickingham Superior.—The parish church has been restored and re-opened. The restorations recently effected have brought to a completion a work inaugurated a year or two ago by the restoration of the chancel. The floor of the nave (formerly on a level with the chancel) has been lowered 30 in., and paved with red and buff tiles; those with which the chancel is paved are red and black. The decayed roof of the nave, which was of oak, has been replaced by one of stained Memel deal, of the same pattern as the old one, with traceried spandrels, circular ribs, and moulded principals, supported on stone corbels. The inside walls have been stripped of the old plaster and fresh stuccoed, and the whole of the stone-work has been freed from accumulated coatings of whitewash, and repaired. A gallery at the tower end of the church has been taken down, and the tower-arch thrown open to the church; a two-light window in the tower has been restored and filled with cathedral glass. All the windows in the nave have also been repaired and glazed with cathedral glass, with a white margin, and a few fragments of stained glass have been collected and placed in the windows on the north side of the nave. A chief feature of the recent altera-

tions is the removal of the high old-fashioned pews, which have given place to oaken benches, rather too close together. Over the south porch there is a chamber, or parvise, reached by a stone staircase. This, until recently, was used as a lumber-room, but it has been thoroughly cleaned, and is now fitted up as a vestry. The staircase to what was formerly the roof-loft was until the recent alterations filled with brick-work, done by a churchwarden of past time, who was a maker of bricks, of which some 2,000 were thus disposed of. On removing the pews on the south side of the nave a piscina was brought to light. The north door of the church has been re-opened, after being closed for thirty years. The church doors have been newly constructed of oak, with ornamental hinges, &c., of wrought iron. The roof of the nave has been covered with slate. The exterior walls of the church (which are mainly of flint) are in good repair, but Macfarlane's gutter has been affixed to the eaves. In the chancel is an organ of seven stops, by Mr. Conacher, of Huddersfield, which was opened at Easter last, and has been purchased by subscription. The whole of the recent work (which has occupied about five months) was undertaken by Mr. Chas. Bishop, of Diss, and has been executed by him under the supervision of the architect, Mr. Fawcett, of Cambridge. The glazing was done, under Mr. Bishop's directions, by Mr. Herbert Osbourne, of Stowmarket. The total outlay will amount to between 800l. and 1,000l.

Paddington.—A new church has been opened at Paddington, near the north end of Westbourne-road. At the ceremony a large number of clergymen vested in their cassocks and stoles attended, and the lady from St. Alban's, All Saints', Margaret-street, and other churches were present at the services. The new church is dedicated to St. Mary Magdalene. At present the chancel and nave alone are completed, there being but a temporary roof. Mr. Street is the architect.

Millwall.—The foundation-stone has been laid of the new church of St. Luke at Millwall, in place of the temporary iron building erected in a great measure by the liberality of the Bishop of London's Fund some few years since. The church will be built of Kentish ragstone, with Bath facings, and the ground on which it will stand has been granted by Lady Margaret Charteris. The site is at the end of Stratford-street. The architect is Mr. E. L. Blackburne; and the builder Mr. Howard.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

Gloucester.—A new church on the old site in Northgate-street was opened in March, 1860. That church was designed by Mr. Gilbert Blom, of London, architect, and was in the Gothic style of the second period of the pointed arch. The parts of the building completed at the opening were the chancel, the lady chapel, the sacristy, and about two-thirds of the nave and the aisles, and the cost was 2,500l. In 1864, new schools were built, at a cost of about 600l. In August, 1867, the works needed to complete the original design were begun, and now they have been well-nigh finished, at a cost of about 5,000l. The original design was that the total internal length should be 101 ft., the width 39 ft. 6 in., and the height 41 ft. The chief part of the new work is the addition of a tower and spire. The total height is about 180 ft. The style is the Decorated of the fourteenth century. Above the tower is an open lantern with double windows on either side, having marble shafts: rising from that is the broached spire, crocketed to the first hand, canopied, ornamented, sculptured near the finial, containing four two-light windows, and surmounted by a metal weather-vane cross. Gargoyles spring from the tower, and in it has been placed a clock, which was purchased at a cost of about 100l. by Mr. W. Ellis, solicitor. There is a ringing-loft, and provision is made for bells. The lady-chapel has been rebuilt; the chancel roof has been altered; and the walls have been rebuilt, hollow, so as to prevent dampness, and hereafter to admit of fresco painting. As now completed, therefore, the building consists of nave, north and south aisle, baptistery, chancel, lady-chapel, cloister leading to robing-room, and organ-gallery at the west end. The columns of the gallery front are of Devonshire marble. The arcades of the nave consist of six columns on each side,—those of the chancel of four columns on each side; the latter are of Devonshire

marble. The floor of the chancel has been re-laid with Minton's encaustic tiles, and the Forest stone steps have been altered. The moulded ceiling is new, and has groined arches with carved terminations. All the windows are now filled with tinted cathedral glass; but it is hoped that this will be replaced throughout with painted glass. The work has been carried out by Messrs. Wingate, builders, of Gloucester; the clerk of the works was Mr. Reynolds. Messrs. Hardman & Co., of Birmingham, supplied all the metal work—the vase, six or seven crosses, the chancel gates, and so on. The new organ, supplied by Mr. Williams, of Cheltenham, is the largest instrument in Gloucester, next to those at the Cathedral and the Shirehall: the cost was between 400l. and 500l.

Windsor.—On the octave of the Feast of St. Edward the Confessor, once King of England, the new church, dedicated to his name, and erected in the Alma-road at Windsor, was opened with a grand Pontifical High Mass. The portion of the church already completed comprises the nave, 80 ft. in length and 51 ft. in width, with north and south aisles: to the latter of these is appended the Lady Chapel, or Riley Chantry, and a south porch. The style is English, of the latter part of the thirteenth century. The edifice is built of Kentish rag, with quoins and dressings of freestone. The church is fully open to view on all sides. A niche in the gable over the west window contains a seated figure of Edward the Confessor. The chancel and the proposed north-west tower and spire are still wanting to complete the outline of the architectural group and the symmetry of the interior. There are five arches on each side of the nave, with clustered columns and moulded capitals. The clearstory windows are arched and cusped, surmounted by a roof of open timber-work supported on slender shafts. The temporary high altar at the east end of the nave is raised beneath a moulded arch, with clustered and banded columns, and destined to open into the future sanctuary. The east end of the south aisle communicates with the Riley Chantry, a transeptal chapel, with arched and panelled roof. The rose window over the lady altar is embellished with stained glass by Messrs. Hardman & Co. The principal light is admitted by two traceried windows towards the south, prepared for figures of patron saints. The floor and steps are laid with Minton's encaustic tiles of ornamental patterns, colours, and borders. The blank arches towards the north are intended to open from the chantry to the chancel, and to correspond with other two, on the opposite side, for the tribune. The works have been carried out by the contractor, Mr. E. W. Kelly, of Windsor, from the designs and under the supervision of Mr. C. A. Buckler, of London, architect. The cost of the church is upwards of 4,000l., raised by voluntary contributions. The stone pulpit is the gift of Mr. Kelly, the builder; and the font is given by Mr. T. Kelly. The organ was built by the Messrs. Bevington & Sons.

STAINED GLASS.

Kington Church (Grantham).—Memorial windows of the late Duke and Duchess of Rutland have been erected in this church. That to the memory of the duke is fixed in the east end of the north transept. It consists of three lights, the middle one containing the Raising of Lazarus, the dexter the Good Samaritan, and the sinister Abraham offering his son Isaac, illustrative of the Christian graces of hope, charity, and faith. Below the central light are the arms of the Duke and Duchess of Rutland. The memorial window to the duchess, which is fixed in the south side of the nave, contains two lights, representing the Raising of Barabas. An inscription at the bottom of each window records that they were erected in memory of the duke and duchess by the villagers of Kington.

Books Received.

Letters on Natural Magic, addressed to Sir Walter Scott, by Sir David Brewster, F.R.S. New edition. London: William Tegg. 1868.

This edition of Sir David Brewster's charming and well-known letters on natural magic is prefaced with a somewhat elaborate paper "On the Being and Faculties of Man," by Mr. J. A. Smith, and has at the end an account of additional

phenomena of natural magic, including particulars of some of the Polytechnic inventions.

Transactions of the London and Middlesex Archaeological Society. Vol. III., Part IX. J. PARKER, Strand.

The new Part of the "London Archaeological Society's Transactions" is very interesting and readable. It includes the paper by Mr. W. P. Griffith, F.S.A., on St. John's Priory, Clerkenwell; notes of various Roman remains recently discovered in London and Middlesex; and an account of the church of St. Mary Somerset, Upper Thames-street (about to be pulled down with the exception of the tower), written by Mr. Milbourn, architect. "Grub-street," by Mr. Campkin, F.S.A., should also be mentioned.

Miscellaneous.

THE MANCHESTER TOWN HALL.—On Monday last the foundation-stone of the Manchester town-hall was laid by the mayor of Manchester, Mr. Robert Neill. A procession, consisting of most of the city dignitaries, military and civil authorities, left the town-hall at 12.30, and proceeded to the site in Albert-square, where the stone was laid with the ordinary formalities. Mr. Bazley, M.P.; Mr. Jacob Bright, M.P.; Mr. Cheetham, M.P.; Mr. R. N. Phillips, M.P.; and Mr. Fildes, M.P., were present. A public banquet took place afterwards in the town-hall. We have given a view of the proposed building.

FETE IN HONOUR OF A VILLAGE PUMP.—There was a well dressing at Pilsley, not long since, according to the *Derbyshire Advertiser*. During the summer the whole of the inhabitants had been supplied with water from the village pump, and people from Tibshelf, Morton, North Wingfield, and other places, had been largely dependent upon it for supplies. Notwithstanding it has been such a remarkable season the well has never been exhausted. The grateful inhabitants consequently determined to do honour to the pump, and it was gaily decorated with flags, evergreens, &c. About 400 people sat down to tea in the large room at the Horse Shoes Inn. Towards the expenses 14l. had been subscribed, and the women and children were allowed tea free. A musical band was in attendance.

ROMAN REMAINS AT COWES.—Having obtained permission to excavate the garden at the extreme point of Gurnard Bay, the Rev. E. Kell has, during the last few weeks, uncovered two rooms and the wall of a third room of the Roman building discovered on this spot in 1864. The garden formed the site of Gurnard fort, which, so late as 1635, was in a state of defence, though now no trace of it remains. The Roman building, the entire of which has now been uncovered, was about 70 ft. in length by 13 ft. 6 in. in breadth, and consisted of five rooms in a line. The two rooms at the west end had tessellated pavements of a common kind, made from tiles. The building had been consumed by fire. Among articles found were a large quantity of hexagonal stone roofing-tiles, fragments of a mortarium, a Roman fibula, and a lady's bracelet. This Roman building stood at the termination of Rue-street, which is considered the point at which the Isle of Wight was united to the main-land of Hants.

THE NEW STREET FROM BLACKFRIARS TO THE MANSION HOUSE.—The Metropolitan Board of Works, deeming it desirable that their works along the new street from Blackfriars to the Mansion House should be carried on under the same management as that of the railway as far as possible, with a view to expedition and economy, have made arrangements with the Metropolitan District Railway Company whereby the company have undertaken the formation of the sewer and subway at the same time as their railway, up to the point where the railway and street will diverge, for the sum of 22,000l. The portion to be constructed by the railway company is that east of St. Andrew's-hill, while that portion west of Chatham-place is included in the Thames Embankment contract, No. 3; but there remained an intermediate space of about 700 ft., and a short length of vaults, the execution of which has been given to Mr. Webster at the rates of payment specified in the schedule of prices attached to his contract for the portion of the embankment from the Temple to Blackfriars Bridge, the estimated cost being 10,000l.

SOCIETY OF ENGINEERS.—At the next meeting, Monday evening, 2nd November, a paper will be read on "Modern Gas Works at Home and Abroad," by Mr. Henry Gore.

ARCHITECTURE AT THE ROYAL ACADEMY.—A course of lectures on architecture will be delivered by Mr. G. G. Scott, R.A., professor of architecture, at the Royal Academy, on the 4th, 11th, 18th, and 25th of March.

ENGLISH CHURCH IN CONSTANTINOPLE.—The English memorial church at Constantinople has been consecrated. On the occasion, the Greek Patriarch paid the unprecedented compliment of sending his vicar and a bishop to be present.

STABLE FITTINGS.—The well-known proprietors of the Ann-street Iron Works, Belfast, Messrs. Musgrave, Brothers, have issued a new and varied illustrated catalogue of stable, cowhouse, piggyery, and kennel fittings, stoves, and drainage and flooring materials, park-gates and fencing, cast-iron bridges, &c. Much practical information is conveyed in this catalogue, which seems to have been carefully prepared, and at considerable cost. Messrs. Musgrave's fittings have an excellent character.

THE BALANCE-CONE CHIMNEY GUARD.—This invention consists in the construction of a hollow cone, in three parts, held together by three outside partitions or fans, attached edgewise at equal distances. The fans hold the pieces of the cone sufficiently apart to allow a current of air to pass through in an upward direction, which ventilates the cone, with the view of causing an increase of the up-draught in the chimney. The cone is balanced with nicety on a universal joint, and at such a height with relation to its centre of gravity that it can be easily moved by the wind, which causes it to shield the windward side of the chimney or shaft, while the smoke escapes to leeward beneath and between the divisions of the cone. The idea is very ingenious; and the invention, we should think, is one that will work well, if the joint do not get corroded and stiff. It seems well worth a trial.

THE SINGAPORE GAS COMPANY, LIMITED.—From the directors' report for the half-year ending 30th of June, 1868, presented to the shareholders at the extraordinary general meeting, on the 27th of October, it appears that the profits on this undertaking for the half-year are 1,000l. 4s., which, together with 45l. 16s. 4d., the unappropriated profit of the preceding half-year, makes the available balance 1,067l. 0s. 4d. Out of this sum the directors recommend the declaration of a dividend at the rate of 7½ per cent. per annum, less income-tax, on the preference capital; and a dividend at the rate of 4 per cent. per annum on the amounts paid up on the original capital, free from income-tax. The coal question is still causing some anxiety, rates of freight ruling high from Australia. A cargo of coals which arrived from Australia in May last, fully answered expectation; they produced 9,200 cubic feet of gas per ton, of 13½ candles illuminating power, and 40 bushels of good hard coke.

DOCK ACCOMMODATION AT CARDIFF.—The new dock works on the estate of the Marquis of Bute at Cardiff are being executed with great rapidity. The powers conferred by Parliament on the trustees of a low-water pier and a basin of construction so large that it will present the appearance of a dock rather than a basin. What looked like a few piles at the commencement of early summer is now a pier extending out to the mouth of the river Taff, with a tramway laid upon it the entire distance; whilst at the head the arrangements, by means of a pontoon and a lift worked by hydraulic arrangements for the landing of passengers, and the loading and unloading of goods, are of the most complete description. The pier forms a breakwater for the approaches to the docks. The basin that is to be rapidly assuming shape, so far as the work of excavating goes, and the masonry has been formally commenced. The weekly estimate of money paid in wages and materials is from 10,000l. to 12,000l. Even the Bridgewater canal sinks into insignificance when compared with the outlay on the Bute Dock works, the rapidity of their execution, and their influence upon the development of the trade of a district. A scheme is said to be under consideration for having rapid saloon steamers between the Bute pier and that of Portishead, by which the distance from Cardiff to Bristol will be accomplished in an hour and a half.

THE NEWARK HOSPITAL.—It is in contemplation to make extensive alterations in the Newark Town and District Hospital, with a view of rendering it more efficient than its present limited space enables the governors to make it. The building was not erected for the purposes of an hospital; and the space and accommodation do not amount to half of what is necessary. It is intended to make application to the Town Council to appropriate the whole of the site of the present buildings.

LARGE RIDING SCHOOL IN AMERICA.—A fine riding school has just been erected at Poughkeepsie, a place already well known for its educational institutions, and especially for those of the more practical sort, such as Eastman's Business College, and the Vassar Female College. The new institution is for the especial benefit of the latter. In point of size, it is second only to the Riding Gallery of the Military Academy at West Point. The building is 156 ft. long by 130 ft. wide. It was designed by Mr. J. A. Wood, of that place, architect, and is built of brick, ornamented. It contains a gymnasium, 81 ft. long, with a width of 30 ft., and a height of 23 ft., a billiard-room, 30 ft. by 52 ft., a bowling-alley, 30 ft. by 82 ft., a number of dressing-rooms, and stalls for twenty-three horses. The cost may be put at 56,000 dollars.

IMPORTANT DISCOVERY IN THE MANUFACTURE OF STEEL.—The *Times's* City article says:—Great interest is stated to attach to the successful operation of a process patented by Mr. Heaton, of the Langley Mill, in the Erowash Valley, by which inferior iron is made into first-class steel, thus utilising for the higher purposes of manufacture vast deposits of ore hitherto condemned to the lowest rank. The process is chemical and not mechanical, and a great economy of time and labour appears thus to be secured. Nitrate of soda is the agent employed, and the personal investigations of Professor Miller, of King's College, vice-president of the Royal Society, and Mr. Robert Mallet, F.R.S., together with the results of experiments by Mr. D. Kirkaldy as to the tensile and resisting strength of the steel manufactured by this method, appear to be conclusive as to its efficiency, placing the steel upon an equality with Low Moor and Bowling. The saving in cost of production is said to be several pounds a ton.

PROPOSED ASSEMBLY-ROOMS, RAMSGATE.—A scheme is now on hand for the erection of Assembly-rooms in this town. It is proposed to erect a building for this purpose in High-street and George-street. Plans and specifications of the proposed building have already been drawn up by Mr. Bridge, architect, and the ground has been purchased. The idea at present is that the capital should be 10,000*l.*, a large portion of which has been subscribed. The entrance will be from the High-street, and the grand hall will be in dimensions about 120 ft. long by 55 ft. wide. Entrance to the hall will be obtained by a grand staircase. The decorations of the room itself will be in the Italian style. In case of fire there will be four ways of escape. The roof immediately above the orchestra will be devised as a shell, and the ceiling will be elliptical. Ventilation will be obtained from the roof, and an apparatus will be constructed for the admission of cool air, but without forming a draught. It is contemplated to build a colonnade of shops on the ground-floor.

PROPOSED INFIRMARY FOR OLDHAM.—At a meeting recently held for the purpose of considering the propriety of erecting an infirmary at Oldham, with the 1,000*l.* granted from the Lancashire Relief Fund, a committee was appointed to make the necessary inquiries and report. A meeting has just been held at the Town-hall for the purpose of considering the report and taking proceedings thereon. The report recommended—first, a dispensary with the necessary apartments and offices for the resident staff and servants, and, if possible, two or three rooms for special cases where quiet and isolation were necessary; second, an infirmary containing separate rooms for male and female patients, arranged so as to afford about 1,500 cubic ft. of air to each bed, of which it was proposed to begin with twenty. The committee were of opinion that the proposed buildings would cost at least 6,000*l.*; and, in addition to this, 4,000*l.* should be added for purchase of site, furniture, &c.; and they therefore recommended that a sum of 10,000*l.* be raised. The entire amount subscribed by the meeting was 2,655*l.*

AN ART-FUND MEMORIAL.—An art fund for the benefit of Irish artists is to be established as a memorial of the late Judge Berwick, of the Dublin Bankruptcy Court, who was killed by the Abergelle accident.

AN ORCHARD-HOUSE.—Under the title of "Orchard-houses in the Midland Counties," a correspondent of the *Notts Guardian* thus describes an orchard-house, in which peaches, apricots, nectarines, plums, cherries, mulberries, pears, and apples, are grown, as well as grapes, interspersed with flowers, such as camellias, and with herbs. The house is 80 ft. long, 30 ft. wide, and 7 ft. high at the sides; the walks are paved with black and red tiles, in a diamond pattern, and beneath the flooring at the south end is a large cistern, which collects the whole of the rain-water which falls from the roof. Its aspect is north and south, thus enabling the sun's rays to travel over the house, and avoiding the excessive heat at mid-day, when they fall direct upon a slanting roof: the position in which an orchard-house is placed contributes materially to its success. The house was erected about four years ago, somewhat after the model of the houses belonging to Mr. Pearson, of Chilwell: it is glazed at the ends and sides with 16-oz. glass, and the roof with 20-oz. glass: the roof is also made in separate lights, and, if occasion require, the whole structure can be removed without breaking a pane of glass. The building, complete, was erected for less than 200*l.* There are about seven peaches and nectarines, fifty plums, forty pears, ten apples, thirty cherries, twenty apricots, and twenty vines: the whole stock cost about 40*l.* The orchard-house is pleasant at all times of the year, in winter as well as summer. On each side are the trees, packed together as closely as possible, the pots imbedded in litter: thus is frost prevented from attacking the roots, and the little of it which gets into the house does good rather than harm. About Christmas last year the house presented the appearance of a winter garden.

LIABILITY OF EMPLOYERS.—The case, as between master and servant, is another in which actions for negligence are very commonly brought. A careful perusal of the Lord Chancellor's judgment in the late case of *Wilson v. Merry*, in the House of Lords (see 12 Sol. Jour., 858), will perhaps throw more light than anything else on the true principles which govern this case. The question is, whether there has been negligence on the part of the master in anything which he undertakes, as between himself and his servant, to do. He does not undertake personally to superintend the work; but, if he does not do so, he undertakes to employ reasonably competent persons for the purpose. He does not, however, warrant the competency of these or of any other of his servants, but is only bound to select such as, so far as his means of knowledge go, he has reason to believe competent. If he does personally superintend the work, he undertakes, doubtless, to bring to bear upon it a reasonable and ordinary amount of skill and of care. He also undertakes to provide proper and efficient materials and plant for the work; but here, again, he does not warrant the efficiency, but need only do his best to furnish what is required. And this duty of seeing to the materials, &c., is not one which he is bound to attend to personally, but he may employ another presumably competent person to do that, as well as the rest of the work, and he will not be liable for that person's default: see *Feltham v. England*, 15 W. R. 151, L. R. 2 Q. B. 33. We believe that the above is substantially a correct summary of the effect of the very numerous cases which have recently been decided on this branch of our subject, and it will furnish a solution of all master and servant cases. Possibly, however, we ought to add that the master does undertake, as regards his servants, that he will perform any statutory duty imposed on him with respect to the manner in which his business should be carried on; for instance, with respect to the fencing of machinery, the ventilation of a mine, and so on. We have, however, already remarked on this subject in our last article. It remains only to add that of course even where there is a breach of the duty above defined on the part of the master, the doctrine of contributory negligence of the plaintiff applies as in other cases. So that a servant who works with materials or implements which he knows to be unsafe, cannot recover against his master, nor can he if he has equal means of knowledge of their condition with his master.—*Solicitor's Journal*.

NEW BLACKFRIARS BRIDGE.—The capitals for the columns have been modelled by Mr. J. Birnie Philip, and will be executed in Portland stone.

HIDDERSFIELD BOROUGH SURVEYOR.—The town council have appointed Mr. Abbey, borough surveyor, at a salary of 350*l.*, Mr. Abbey providing the necessary clerks, and not giving up his private practice. Offices are to be provided by the town.

BAD WORK IN ISLINGTON.—At a meeting of the Islington Board of Guardians last week, Mr. Fairbank, in the course of the business, said, two stone buildings which had been raised in the parish had lately been found to be sinking. Mr. Higgins, the surveyor, had visited them, and had found that instead of concrete being laid as a foundation, ballast only had been used, and the consequence was that there would be an expense of 200*l.* to make them good. Clerks of the works were employed when these places were built, and yet these things had been overlooked.

OPENING OF THE NEW MARKET, SMITHFIELD.—At the last Court of Common Council, Mr. H. L. Taylor announced that the formal opening of the new market would, in all probability, take place on the 14th of November, and that an application had been made to the Prince of Wales to be present and perform the ceremony. His Royal Highness, in reply, however, had expressed his regret that he was unable to do so, having made all his arrangements for leaving England previous to that date. The mayor, Mr. Taylor added, would therefore be left in the hands of the Lord Mayor for the time being and the corporation.

LECTURE ON VENTILATION OF SCHOOLS, &c.—The last lecture of a course has been given in the Bedford Rooms, by Mr. K. T. Craig, of Oxford. The subject of ventilation of dwellings, school-rooms, and public buildings was shown to have an important relation to health. Mr. Craig directed attention to the utter neglect of proper means of ventilation in dwelling-houses, and the great mortality from consumption and preventable causes of disease. He also made some practical suggestions on the ventilation of bed-rooms and school-rooms. Resolutions in accordance with the lecturer's ideas were proposed by the chairman and carried unanimously.

THE CUMBERLAND NEW GAOL.—At the last Quarter Sessions for the county of Cumberland, the county surveyor stated that if he had gone down to a solid foundation for the new prison it would have put the county to 5,000*l.* additional expense, and as they were about to commence another part of the building he wished to know whether the county would rather have that portion erected in the same manner as the other portion, with a liability to crack, or they would go down to a solid foundation, with a certain cost of 1,700*l.* additional. Mr. Spedding said he had understood from Mr. Reddin that one reason why the building had cracked was that the concrete had not had time to harden. The county surveyor said that was so; they had been obliged to build within a few days of the concrete being laid. Mr. Spedding suggested that arrangements should be made to give the concrete time to harden. The chairman said the gaol committee would see to it.

THE BIRMINGHAM SCHOOL OF ART.—The *Birmingham Journal*, reprinting and commenting on our recent mention of the School of Art in that important town, says:—"We quite agree with the writer of these remarks, and we may add that other considerations make the suggested improvement still more desirable. The School of Art occupies part of the Midland Institute building, and the Institute is so much in want of room that it is becoming absolutely necessary to take into its own use the space now occupied by the School of Art. But this cannot be done until other accommodation is provided for the school. The subject has been very often pressed upon the attention of the Institute Council, and it is to be hoped that something practical may soon be attempted. Both institutions would benefit by the change. The School of Art would get more suitable accommodation, and the Institute would obtain the room now so urgently wanted for its increasing classes. At present both the School of Art and the Institute are prevented from expanding, the space at their disposal being so comparatively limited and so fully occupied that not another student can be crammed into it."

LIBRARY FOR STAFFORDSHIRE.—The widow of the late Mr. William Salt, a Staffordshire gentleman, has given to that county a library valued at 8,000l.

THE FRENCH GALLERY.—The usual Winter Exhibition of Cabinet Pictures by British and foreign artists in the French Gallery will be open to the public next Monday.

ECCLESHELL CHURCH SERIOUSLY INJURED BY FIRE.—Eccleshell parish church has been on fire. The north aisle, the lower end, and the vestry were gutted, and the wood-work of the roof was destroyed. The north wall, supporting the clearstory, was so greatly weakened as to endanger the safety of the building, and men were set to work to prop it up. The fire began in a beam built into a chimney of the new warming apparatus. The damage, it is said, cannot be less than 1,000l. or 2,000l. There was unfortunately no insurance on the building.

THE YORKSHIRE WOLD TUMULI.—The researches of the Rev. Canon Greenwell, of Durham, among the graves of the Britons on the Potter Brompton Wolds, near Scarborough, are being continued. Several archaeologists have accompanied the reverend explorer, and results of an interesting nature have been brought out, particularly in a narrow 54 ft. diameter and 1 ft. high. This had a trench cut round it being 23 ft. in the inner diameter, and varying from 14 ft. to 24 ft. in width, and being cut 24 ft. deep into the chalk. The circle was incomplete, having at the south-east and south side a space of 8 ft. not excavated. In this trench, on the east and south side in a slight oval hollow in the bottom, was the body of a man doubled up. At the centre of the barrow, on the natural surface, was the body of a young person, of about sixteen years, doubled up. In the grave below were the remains of at least two persons, one old, one young, disturbed. About 6 in. from the south side of the grave, and 14 in. below the natural surface, was a burnt body, and near it a red deer's antler. The grave was oval, 8½ ft. by 6½ ft. and 3½ ft. deep. In it was the body of a young man. There were also several portions of a "drinking-cup," and a flint knife, 3 in. long, beautifully chipped on both sides. The knife and cup probably belonged to the disturbed bodies. The incomplete circular trench accords with the circle of stones which, whether with or without a tumulus is always incomplete, as witness the so-called burial-places called "Druid's circles." Other barrows have been opened. The whole of the unburnt burials were of the round-headed (*brachycephalic*) people. About five more openings will complete the investigations on the north range of the wolds.

KITCHEN BOILERS.—Mr. Hiller, chief engineer of the National Boiler Insurance Company, Manchester, writes as follows:—The recent explosion of a kitchen boiler at the United Hotel suggests to me several points which are frequently overlooked in the original construction of such boilers. They are generally made and set up by men who know nothing of steam pressure, and are unable to calculate the strength of such vessels. The feed is generally by a column of water from a cistern placed in a convenient position at or near the upper part of the building. Where the top of this inlet pipe is at a high level above the boiler, the pressure will be proportionately great, and, I believe, in many cases reaches from 15 lb. to 20 lb. per square inch in boilers not suitable for half that pressure. The open escape-pipe is supposed to be an outlet for any steam pressure which may be generated, and thus a safety-valve is believed—erroneously—to be unnecessary. Such boilers ought always to be made very strong, and to be provided with safety-valves and suitable test-taps, which could be tested without inconvenience. The height of the outlet-pipe should also be limited according to the strength of the boiler. I would suggest the following to the attention of all who use or may require such boilers:—Their construction should be intrusted to none but those who possess the requisite engineering knowledge to insure the boilers being suitable for the purpose required. They should be provided with a safety-valve and with taps so fixed that the flow of the feed-water, &c., may be tested. The boiler and all its connections should be regularly tested and examined by a competent person. Were these precautions taken, the risk of working such boilers would be very much reduced.

CHRISTIAN MORTAR.—In New York, a maiden lady has left all her property for the purpose of building a church, on condition that her body and bones shall be made into mortar in which to lay the corner stone. What could have been the leading motive for such a stipulation? Was it that she was determined to guard against the possibility of being buried alive, or that she desired, with her own body and bones, to help to consolidate the church?

THE SUEZ CANAL.—The directors of the Maritime Canal of Suez have published a table, showing the general situation of the works on September 30. In the narrow channel and basin of Port-Said, and along the canal to Suez, the total to be extracted was 74,112,130 mètres cube; between August 15 and September 15, 2,081,367 were taken out; the total up to the present time being 49,309,522. There remain to be removed 24,802,608. Fifty-eight dredging-machines are at work, and two more are in preparation. The number of labourers is 14,853.

LICHFIELD CATHEDRAL.—Improvements have recently been made in the lighting of the nave. Mr. Atterton has accomplished the desired end by fixing round the heads of the columns of the nave sixteen jets. The result is a uniform body of light, which, from its elevated position, is singularly pleasant. This same workman is now fitting four rays in the choir, with grilles of ornamental ironwork. They are of a geometrical pattern, from designs by Mr. G. G. Scott. Mr. Atterton has also been engaged in lighting the new church of St. Augustine, Edgbaston.

CANYONE SOCIETY, BRISTOL.—The anniversary of the Canyone Society was held on Thursday, the 22nd, commencing with divine service in Redcliff Church. A very eloquent sermon was preached by the Dean of Chichester (Dr. Hook), at the conclusion of which a collection was made in aid of the restoration fund. This annual dinner took place at the College-green Hotel, when upwards of one hundred ladies and gentlemen sat down to a repast, the mayor presiding. The annual report showed the steady progress of the restoration, though it also stated that the funds were very low; and that, unless a vigorous effort were made, the work would have to be suspended. Several admirable speeches were delivered, among others by Archdeacon Denison, Mr. R. P. King, and the Rev. H. G. Randall, after which the chairman announced that the collection for the day amounted to about one hundred guineas.

MISERABLE LEADENHALL-STREET.—At the meeting of the City Court of Sewers on Tuesday, the 20th instant, Mr. Deputy de Jersey in the chair, the principal clerk, Mr. Davy, read a report from the Finance and Improvement Committee, in reference to the plan for improving Leadenhall-street and Fenchurch-street, at the eastern angle. The committee recommended that no further proceedings should be taken on account of the many pressing financial obligations of the commission to the improvements at present in hand. The plan originally framed for making the improvement was now recommended to be entirely given up. The Chairman observed that the subject was one of considerable importance, and perhaps the better course would be, that the consideration of the report should be adjourned until the next meeting of the commission. Mr. Whiteside agreed that that was the best course that could be pursued, and the suggestion was adopted.

SCIENCE TEACHING IN SOUTHAMPTON.—Dr. Bond, the principal of the Hartley Institution, has been delivering a course of lectures on "Experimental Physics" adapted for young persons, the greater part of the audience on the occasion consisting of about 200 boys, who had been selected from the national and other similar schools in the neighbourhood, and who, with their teachers, were admitted gratuitously to the course. The object which Dr. Bond has had in view in making this experiment, which has grown out of a conference with the teachers held a short time ago in the institution, was twofold: firstly, to prepare a certain number of the boys for the examinations of the Department of Science and Art, and for competition for the Local Science Exhibition, which has lately been founded by the council of the institution, in conjunction with the Lords of the Privy Council, for artisans in Southampton; and, secondly, to lay the foundation of a regular system of science teaching in the national schools of this neighbourhood.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—The opening meeting will be held on Monday next, the 2nd of November; when Mr. Tite, M.P., President, will deliver an Opening Address. Several papers of architectural and archaeological interest have been promised for the evening meetings, which will take place once a fortnight, as usual.

CANAL ACROSS THE PANAMA Isthmus.—The company which has been for some time endeavouring to arrange for the construction of a canal across the Isthmus of Darien, or Panama, to unite the Atlantic and Pacific Oceans, has at length, it is stated, been definitely formed. President Johnson and Mr. Seward are both favourable to the plan.

BATH HEATING.—This discussion on this subject in the *Builder* has led Mr. C. R. Havell to invent and patent a stove for submergence in the bath water to be heated by it. This new stove can either be used with gas or with spirit. The stove has holes for circulating the water through it, and an air-shaft as well as a chimney; and the gas can be supplied to it by an india-rubber pipe descending the air-shaft, or spirit can be used by simply pouring it down the air-shaft. The stove is lighted by putting a lighted taper down through an opened cap in the chimney. It will heat sufficient water for a full-sized bath, it is said, in from twenty-five to thirty minutes, by gas, at a cost of 1½d.; or in thirty to forty-five minutes by spirits, though, doubtless, not at so small a cost. Stopping added to the chimney leads the products of combustion either into the fire-place or through a window.

THE DELUGES IN SWITZERLAND.—A letter from Berne gives some details concerning the late torrents. The waters have now subsided, and the roads and defiles across the Alps are again open to commerce, so that the authorities are able to ascertain the extent of the damage done. There had already been two great deluges in Switzerland since the commencement of the present century—once in 1817 and the other in 1834; but that of 1868 has been of wider extent and more destructive than either. In the Ticino, the river of that name swelled by the mountain torrents, submerged all the valley above Locarno for an extent of more than twenty-five miles. At that town the water reached the windows of the first story of the houses and destroyed a large quantity of merchandise: the apartments on the ground-floor are still filled with mud. Lake Maggiore rose more than 7 ft. At Palmengo a mass of stones 500 ft. broad rises before the village, which is totally destroyed. Near Faido, Chioggiogna, Crovareggio, Lavorgno, and Chironico, various bridges were destroyed, the road washed away, the houses filled with water, and the fields devastated. At Giornico four dwellings were thrown down, fourteen inundated and devastated to the first floor, and two mills and twenty-five cow-houses were carried away. At Badio seventeen persons perished. Aquila, Torre, Lottigna, Grumo, Agnarossa, Maralta, Dangio, Malvoglia, and Semaine were all inundated, the houses and fields filled with sand and stones several feet deep, and the cattle drowned. At Chiniasca, a hamlet of the commune of Corzonese, not a stone remained standing; eighteen persons were drowned; also five at Semaine, and as many at Malvoglia. At Blegno alone the loss is estimated at 1,200,000 fr. In the Valais, the Visp inundated Truttman, Echolz, Leuchern, Batscheld, Raron, Oberwald, Lauche, Martigny, &c. for a distance of twenty kilometres. The dykes are destroyed, and all the villages more or less devastated. The loss in 1834 was estimated at 10,000,000 francs, a sum which the late loss will probably far exceed. The country will do what it can in the circumstances, but other countries should extend a helping hand to the Swiss, whom all respect. We are glad to hear that, in addition to the subscriptions which have been organised in France and Switzerland for the relief of those who have suffered from the floods, a subscription for the same end has been started in London. The distress which has been occasioned by this fearful disaster is widespread, and we feel sure that Swiss residents and our countrymen generally will sympathise deeply with the unfortunate sufferers, and subscribe generously towards their relief. Information will be gladly afforded by Mr. Carlo Gatti, of Villiers-street, Strand, who is a member of the Swiss Parliament, and was in Switzerland during the rains.

TENDERS.

For erecting Victoria Hotel, Peckham Rye. Drawings supplied by Mr. Pierce Arthur:—
Loveloy £1,540 0 0

For alterations and additions to the Manor House, Osterham, Surrey, for Mr. G. Parbury, Mr. Richard Martin, architect. Quantities not supplied.—
Gross, Old Materials, Not Amount.
Blyth £2,375 £95 £2,280
Ward 2,368 150 2,218
Regis (accepted) 2,220 130 2,090

For erection of shop and alterations to premises, Walworth-road, for Mr. Edward Belcher. Mr. P. Arthur, architect:—
Langdale £500 0 0
Day 750 0 0
Tabel 712 0 0
Henson 680 0 0
Brett 630 0 0
Davis (accepted) 610 0 0
Lanc 605 0 0

For building nine mechanics' cottages in Newbury, for Mr. W. H. Care, including old materials, Mr. J. H. Money, architect:—
Sargent £1,393 10 0
Elliot 895 0 0
Whiter 115 0 0

For repairs to the Tiger Inn, Newbury, for the Trustees of St. Bartholomew's Charity. Mr. J. H. Money, architect:—
Elliot £1,128 10 0
Whiter 115 0 0

For building a dwelling-house at Marine-terrace, Horne Bay, for Mr. S. Dorrige, Mr. B. Adkins, architect:—
Shrubsole £1,245 0 0
Welly 1,636 0 0
Brown (accepted) 1,488 10 0
Lawson 1,230 0 0
Harnett 1,320 0 0

For the erection of two shops and dwelling-houses in Gloucester-street, Strand, for Mr. Sebastian S. Dickinson. Mr. Wm. Clissold, architect:—
Harper (accepted) £275 0 0

For painting, decorating, &c., Castleton House, Wimbledon Common. Mr. J. Cox, architect:—
Blott £247 0 0
R. & Sons 749 0 0
Stapley 280 0 0
Gordon 680 0 0
M'Kac 32 0 0

For new offices, Cogan's Charity, Kingston-upon-Hull. Mr. R. G. Smith, architect. Quantities not given:—
Simmons & Frow £1,570 0 0
Hutchinson 1,543 0 0
Clarkson 1,508 0 0
Holmes 1,431 0 0
Barnard 1,430 0 0
Renard 1,429 0 0

LOWEST SEPARATE TENDERS (ACCEPTED).
Bricklayer's Work, &c.
Barrill 694 0 0
Mason's Work.
Walker 66 2 0
Carpenter's Work, &c.
Holmes 360 0 0
Plumber's and Glazier's Work.
Harrison 145 0 0
Painter's Work.
Charlton 18 12 0
Slater's Work.
Smith & Co. 11 0 0

For new Congregational Church, Gao-street, Great Yarmouth. Mr. J. P. Bortle, architect:—
Wright £2,984 0 0
Cooper 2,962 0 0
Leggett 2,889 0 0
Brown & Bailey 2,834 0 0
Hood (accepted) 2,626 0 0

For building new infirmary, rain-water tank, &c., at the workhouse, Hitchingley, for the Guardians of the Godstone Union. Mr. Alex. S. Stenning, architect:—
Knight £3,909 0 0
Morris 3,899 0 0
Worsell 3,881 0 0
Cooper 3,600 0 0
Shayer & Moore 3,550 0 0
Sherwood 3,549 0 0
Cocker 3,515 0 0
Grover 3,465 0 0
Barnes 3,400 0 0
Kesterton & Head 3,293 0 0
Smart 3,250 0 0
Wells & Sons 3,263 0 0
Daniel 3,200 0 0
Reynold 3,164 0 0
Till 3,140 0 0
Macey 3,109 0 0
Colls & Sons 3,080 0 0
Bates 3,072 0 0
Nightingale 3,063 0 0
Knight 3,058 0 0
Regis 3,050 0 0
Johnston (two lots) 3,048 0 0
Woodward (ditto) 2,900 0 0
Constable & Baker (ditto) 2,891 0 0
Gege (ditto) 2,510 17 6

For altering, repairing, and painting the buildings of the Borough Market, Southwark, for the Trustees of the Borough Market. Messrs. Henry Jarvis & Son, architects:—
Bageley £2,557 0 0
Thompson 2,149 0 0
Hart 1,915 0 0
Henshaw 1,175 0 0

For fire-brigade station, Amherst-road, [Hackney, for the Metropolitan Board of Works:—
Shurman (accepted) £2,144 0 0

For rebuilding house and shop, Newington Causeway, for Mr. A. Bennett. Messrs. Henry Jarvis & Son, architects:—
Hart £925 0 0
Thompson 830 0 0
Henshaw 830 0 0
Carter & Son 797 0 0
Richardson 785 0 0
Taylor 793 0 0
Colls & Son 740 0 0
Hagley 721 0 0

For the erection of synagogue, vestry offices, and two ministers' residences in Great Portland-street and Charlotte-street. Mr. N. S. Joseph, architect. Quantities by Mr. S. B. Wilson:—
Jackson & Shaw £27,250 0 0
Coleman 27,055 0 0
Hill, Reddell, & Co. 25,370 0 0
Paper & Co. 25,095 0 0
Holland & Hannen 25,598 0 0
Mansfield 25,112 0 0
Hill & Son 24,590 0 0
Avery & Son 24,900 0 0
Myers & Son 24,582 0 0
Browne & Robinson 24,500 0 0
Newman & Mansfield 24,207 0 0
Henshaw 23,980 0 0
Perry & Co. (accepted) 23,973 0 0

For new warehouse and offices, Queen's-road, Brighton, for Messrs. Lulham & Sons. Benj. H. Nunn, architect:—
Reynolds £3,257 £468
Kirk 3,189 817
Nash & Co. 3,182 769
Parsons 3,141 747
Chaesman & Co. 3,140 800
Matthews 2,974 750
Nightingale 2,973 823
Lockyer 2,906 710
Sawyer 2,897 670
Anson & Newman 2,883 744
Dean & Dickenson 2,720 637
Kemp 2,710 749

TO CORRESPONDENTS.
Fall of Concrete House, Tulse-hillham.—We have received a letter from the owner of the house, and a long statement from Mr. Tall, but he is late for consideration this week.
J. R. C. R. G. B. H. W. Mr. M. T. A. H. M. J. R. R. W. C. G. F. N. E. T. J. M. J. G. A. & C. H. J. T. R. N. R. J. W. C. T. W. R. E. C. R. H. W. H. E. R. T. R. W. C. T. R. E. R. H. C. W. R. Messrs. H. F. S. J. W. H. C. B. M. R. A. A. J. H. M. H. & Son. J. O. W. P. M. H. R. M. W. F. S. T. O. M. J. A. W. W. W. P. R. S. M. W. M. W. (must have consent of Board of Works for such a building)—J. G. last usual to charge 5 per cent. on works not carried out but there may be special circumstances. Place the matter in proper hands.—W. E. N. (cancelled, having appeared elsewhere).—J. F. (will receive proof).—B. B. (thanks).—No. 1—A Reader (not cheaper, but more convenient under some circumstances).—C. H. G. (next week).—J. R. (already mentioned).—E. B. F. (in type).

Country newspapers should be marked.
We are compelled to decline pointing out books and giving addresses.
All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.
Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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The Builder.

VOL. XXVI.—No. 1344.

Foreign Improvements carried on by English Enterprise.



PART of the question of individual rectitude of character, there is much matter of importance involved in the subject of the recent trial at Brussels with reference to the

execution of a certain foreign enterprise by English capital. Every professional man, engineer or architect, who has or who seeks for foreign practice; every builder or contractor who is disposed to turn his attention to Continental work; every investor of money who thinks 6 per cent. abroad better than 3 per cent. at home, has a direct personal interest in questions that involve the relations of English speculators or capitalists to foreign officials and to Continental Governments and tribunals.

Our own practice and habits as Englishmen differ so widely from those of the countries regulated by the *Code Napoléon*, that statements often come from the foreign journals that may produce an altogether erroneous impression on the English mind; and while we may find that, in the real principles of business, which are, in fact, the principles of human nature, there is little actual difference in different localities, we shall yet be made aware that, in the formal or conventional mode of the application of those principles, differences of the widest nature occur. It is important to look a little into this part of the subject.

We must not, for instance, assume the identity of a court of law and a tribunal of justice. We intend no backhanded blow at the morality of our neighbours; but we refer to what is palpable fact. The celerity and rigour, for example, with which judgment by default is sometimes rendered and executed under the *Code*, has no reference to the true equity of the case. Advantage can be taken of the absent, and at times is cruelly and most unjustly taken. Thus the personal character, enmity or friendship, political colour, or temper, of the judge, has a far more direct influence on the sentence of many foreign tribunals than an Englishman can well conceive to be possible. Above all, it must be borne in mind that the grand principle at once of English law and of English liberty, viz., that a man must be presumed to be innocent until he is proved to be guilty, appears to be incomprehensible to the foreign judge. Everywhere it is a misfortune to be accused, but on the Continent generally, accusation means not only inquiry into fact, but presumption of guilt. The accused is put on his defence, in a manner entirely contrary to our ideas of fair play. It is not the accuser who is called on to make out a definite case, on the failure or breaking down of which the trial is at an end: it is the defendant who is called on for explanations, and out of his very explanations the matter most damaging to himself is frequently extracted. The public prosecutor seeks, one is almost bound to believe, conviction rather than justice; and the judge but too often seems to think it his duty in every way to aid the public prosecutor. Such, indeed,

was the habit of the English Bench under the Stuart kings.

Another point important to bear in mind is, the opposite manner in which an Englishman is viewed, and, for the most part, is treated, abroad, under different phases of his engagements. No one who has experience in this matter will hesitate to endorse this statement. An English capitalist, engineer, or architect, is, in the first instance, only applied to in cases of magnitude, of risk, or of difficulty. His aid is sought, in fact, for something a little beyond the power of the man who invites him. For anything within their means foreigners, of course, seek no English aid. Great inducements are therefore held out, and courtesy of every kind is extended to the insular stranger. Doors fly open at his approach, difficulties disappear at his suggestion, and even the law of the place assumes, or is made to appear to assume, a strange pliability to his will. If this occurs to a man but imperfectly acquainted with the language in which his new business is conducted, and if, moreover (as is pretty sure in that case to be the fact), he is somewhat dazzled by his sudden accession to an apparent influence and power which he could have never hoped to attain at home, it is not in human nature that all error should be avoided.

Let the enterprise, however, be set afloat; let the skill or the money of the Englishman supply the missing link; that which was admirable, even when only on paper, then assumes a more tangible form. The promised benefits appear, by onward and visible signs, to be at hand. Then comes the second phase. The patriotism, or the self-love, or the greediness of the inviters wakes up. What! is all the fruit of their enterprise to be reaped by the stranger? Against such a consummation the Continental habit of thought revolts. The case must be reconsidered, and hard will be the fight and long the odds but that some act or some omission of the Englishman, committed in sheer ignorance, or under assurance that it is unimportant or advantageous to his interest, will be unearthed, and he will find his own importance far less, and his friends' powers of taking care of themselves far greater, than he imagined in the first instance.

In the case of the Belgian Public Works Company it is clear that, whatever the amount of blame that may attach to any individual, a course of proceeding from which the English capitalist has too often had to suffer, has been resorted to in Brussels. It is admitted on all hands that a concession was made to two Englishmen, for certain works for the improvement of that capital. The Belgian Public Works Company (limited) was formed by the *cessionnaires* to carry out this concession. A sub-contract was made by the *cessionnaires* to carry out a portion of their concession with Belgian contractors for an amount of 598,000*l.*, and this sum was made to cover the payment to the *cessionnaires* of 100,000*l.* It further appears, that this contract was accepted by the Belgian Public Works Company as an element of its constitution. A resolution of the directors is also published, which implicitly covers the arrangement between the *cessionnaires* and the sub-contractors; but, although this is the case, it does not appear that any one except the parties to that agreement was at that time aware of the nature, or, at all events, of the amount, of the payment thus stipulated to be made.

Now, as to such an arrangement, we conceive that the English shareholders of the Belgian Public Works Company,—a company constituted in London,—have the right to expect full information. It is a matter affecting the character of the directors, and one quite proper to be cleared up as between these gentlemen, in their quality as trustees, and their constituents. But what the *Bourgmestre* and *Échevins* of Brussels

have to do with the arrangement (fair or unfair, honest or dishonest, as it may be) we altogether fail to perceive; and it will take something of a very different character from the attempt to rip up the private character and habits of the English *cessionnaires*, to which the President of the Tribunal Correctionnel of Brussels so freely lent himself, to convince the English public that the inquiry originates in any other source than the wish to get a possibly excellent contract out of the hands of the foreigners, who have given it a tangible value.

Let us hope that we are wrong. Let us trust that long and consistent experience has made us, for once, uncharitable. None the less do we advise our English friends to remember to what that experience points, and to be very sure of their exact *status* before investing labour, or time, or money in the numerous list of grand Continental improvements.

A point arises in this case which is of far more importance than the case itself. It is the question of the remuneration of the *cessionnaire*, or promoter, or founder, of a foreign enterprise. On this subject it is highly important that there should be no mistake. It is one on which our habits are so different from those of our French, and Belgian, and Italian neighbours, that misapprehensions are very likely to occur. We manage these things in a different way at home. It may be, perhaps, a wiser or an honest way; it is certainly a more cumbersome and expensive one. In a matter like the improvement of Brussels, one or two individuals obtain a concession or grant of an exclusive right under certain conditions. It is, in fact, a regularly articulated contract. The one in point was entered into by the Corporation of Brussels, and approved by the King. The men who have given the time, and undergone the expense necessary for procuring this concession, naturally seek to be reimbursed, and generally to be somewhat more than reimbursed, for their trouble. They constitute or deal with a company, and in their arrangements with this company, to which they make over their concession, they provide for their own compensation.

So far so good. But the gist of the matter lies here. Does the incoming company know what it is paying for the purchase? This is a question of which the morality concerns both parties. Those who buy should settle it with their consciences no less than those who sell. Frequently, we fear, there is that hinking of the question on both sides which plain-dealing honesty must condemn. The subscriber is eager to gain a share in a lucrative enterprise, and does not stop to inquire whether the men who enable him to do so are properly remunerated for their labour. It is a short-sighted greediness. The seller is not only apt to take care of himself, but is, for the most part, too ready to do so in that silent and subterranean way which covers a more ample payment than he could venture distinctly to ask. In any case in which a concession is made over to a public company, the distinct arrangement of an adequate and defined remuneration to the *cessionnaires* should be brought prominently and intelligibly forward. If this is not the case, it is because there is something to conceal.

Two principles should be borne in mind, in the regulation of such compensation. Payments actually made should be fairly refunded. Further compensation to the promoters should be contingent on the prosperity of the undertaking. The mode in which this should be secured is matter of detail, but the general idea is clear. It is nothing but what justice demands. The allotment of a certain number of shares in the enterprise to the founders, is a usual mode of attempting this object; but it is one liable to abuse. What is required is, to ensure identity of interest between promoters and shareholders; or to make the remuneration of the former

depend on the prosperity of the latter. This is not ensured by delivery to the former of a set of obligations or securities which they can carry into the market, and which they may be induced or driven to dispose of on terms that are injurious to the *bona fide* shareholder. The reservation of a *tantième* on the dividend would appear to be a more rational and satisfactory arrangement.

Let the English subscriber to a company formed for foreign objects, then, first be sure that he has to deal with no vague indefinite claims, and that he is not, apparently, about to receive some unthought benefit. Let him remember that projectors are but human, and that any apparent disinterestedness on their part is dangerous in proportion to its magnanimity. Then let him look to the faith of the guaranteeing Government. Let him remember that he has no help from the English law, or English justice, or English diplomacy. He must be dealt with by the *lex loci* administered by the local judge. In no case of wrong can he hope for any ministerial or diplomatic support from his own Government, unless the foreign Government, or municipality, *break their own laws*,—a proceeding which involves a degree of clumsiness which he must not anticipate. He may rely on finding quite difficultly enough, when divergence of interest arises, without the other parties to the contract getting outside their legal rights. In this respect the conduct of every foreign Government to their English employes or creditors deserves attentive notice. The black book has a good many pages. Repudiation, in one form or another, is the law in a good many ministerial palaces. The Englishman who lets his money go to aid the schemes of those who have robbed his countrymen, deserves, in our opinion, to lose it. At all events, deserve it or not, he is pretty certain to do so.

Let us remember, too, when we are tempted to express a virtuous horror of a *pot de vin*, how we manage matters at home. What is the amount of secret service money, with the payment of which the capital account of most of our own public works has been hounded? Bribery! How shocking it is, especially when found out! But compensation to landowners, consideration for opposing companies, regard for vested interests, Parliamentary charges, legal charges, financial charges—for how many millions do they figure?

Parliament has just linked this question. In the Act passed in July, 1868, for the future regulation of railways, it only needed one or two intelligible words to secure an answer to it. We can conceive that it was not altogether without purpose that these words were omitted. Could such a body as Parliament be conceived of as having a conscience, or were the consciences of the individual members liable to any qualms of remorse as to the action of each in their collective capacity, we can well understand why the Act of 1868 should have omitted to ask for a return of Parliamentary and legal expenses incurred in legislating our ill-considered and ill-distributed net of railways.

It is tolerably clear, however, that our Belgian neighbors are now disposed to strain hard at a gnat, very diminutive in its size as compared to the camels which we so easily gulp down at Westminster. The gnat must, we fear, have been a mosquito, and the venom of its sting must have been derived from its English origin. Take matters at the very worst, a sum of 100,000L. has been spent, or has been demanded, to cover the design, the legalisation, and the efficient organisation, of an enterprise involving a capital of 2,000,000L. We do not say that all has been quite fairly managed; we reserve our opinion on this score. But we intend no innuendo when we say that it would have been a fortunate thing for great Britain if our railway schemes had been legalised at so small a proportionate cost. The nominal value of the B shares, however, which has also to be taken into account, has not come out in the course of the proceedings. But the morality which st once reprobates the *pot de vin* to a foreign promoter, and winks at bribes on all sides to men at home to make the way smooth, does not very strongly commend itself to our respect.

KENSINGTON GARDENS.—The well-known fosse separating Kensington Gardens from Hyde Park, near the bridge over the Serpentine, has been filled up at the southern end, and the site added to the roadway, an iron railing marking the line of division.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS: OPENING NIGHT.

The opening meeting of the session of this Institute was held on Monday evening last at the House, in Conduit-street, when Mr. W. Tite, M.P., the President for the ensuing year, delivered an opening address. There was a large attendance of members and associates.

The President said the growing success of the Institute was manifest from the large increase in the number of its members, and the consequent increase in its finances. All the topics in connexion with it were those of congratulation. The total number of associates, fellows, &c., in May of this year, was 623. In the year 1858 (ten years ago) the number of fellows was only 146: at the present time they amounted to 262. He apprehended there were very few architects in London who had not joined the Institute and endeavoured to further its objects. Having spoken of the large additions made to the Library, he remarked that the papers read during the past session had not been very many, but they had been of very great interest. Prominent amongst these was a paper by Professor Ansted, "On the Relations of Geology with Architecture," and the discussions which followed the reading of that paper showed how important the one science is in relation to the other. A paper of great importance followed, by Mr. Digby Wyatt, who had gone to Paris on a mission of the Government connected with art. That paper was a very important one, and led to frequent discussions. It also improved their acquaintance with much that might be said to be novel in architecture. The last communication to which he would allude was that by Mr. Charles Barry, which treated of the improvement of structural architecture; and he showed how he had in the case of a large building with which he (the President) was connected as a governor,—Dulwich College,—introduced very successfully the use of terra-cotta instead of the more costly material of stone. He showed its cost, the nature of the material, and the incidents which led him to use it. Having, however, some experience himself in that material, he would caution those who might view these results in too sanguine a light as to its use. He had been told that the ante-fixe of St. Pancras Church, which were composed of terra-cotta, had failed; and they knew that the statue of the Prince of Wales at Brighton, composed of the same material, dropped to pieces,—first an arm, and then a leg, and then became a complete wreck. To young architects, he would say they should be careful that the material was well and homogeneously burnt, and that they ought not to be too ready to adopt that with which they had not an entire acquaintance. He then referred, in passing, to a promise made by Mr. Beresford Hope to bring before the House of Commons the question of the conservation of ancient buildings and archaeological remains. He trusted that his excellent friend would have an opportunity afforded him of redeeming that pledge in the next Parliament.

Up to this point, the President continued, he had adverted to subjects of unmixed satisfaction, but he now thought it his duty to refer to one which, with every possible respect for the persons most concerned in it, he felt to be one of considerable difficulty; nevertheless, he was called upon to notice it. The incidents to which he would refer were of great importance in their general bearing on the position of architects. It seemed to be the universal fashion that architects were to be ever exposed to competition in all directions. He had no reason to quarrel personally with competition, for he had been as unsuccessful as most men, and as successful. He, however, thought that all matters relative to the late great competitions should be thoroughly understood by those whom he addressed, because they had an important reference to, and bearing upon, their position as architects in general. The matter to which he specially referred was that in connection with the competitions for the New National Gallery and the Law Courts. By the assistance of a kind friend he had obtained the details of every step taken in both these matters. First, then, with regard to the National Gallery. The invitation to compete was issued on the 15th of February, 1866, to E. M. Barry, Banks & Barry, D. Wyatt, Street, and Scott, afterwards increased to eleven by the addition of G. S. Clarke, O. Jones, Penrose, Cookerell, and J. Murray. Mr. Scott ultimately withdrew, leaving ten competitors. Designs were sent in by ten competitors on January 1st,

1867. Judges of designs were appointed in January, 1867; viz., Viscount Hardinge, Lord Elcho, Mr. A. J. Beresford-Hope, Mr. W. Bosall, Mr. D. Brandon, Mr. R. Redgrave, Mr. W. Russell, Mr. T. Gambier Parr, and Mr. W. Tite. Letter by competing architects to Lord J. Manners, First Commissioner of Works, pointing out that it would be a breach of faith with them if one of them were not selected for employment: 16th February, 1867. Judges reported, 28th February, 1867, that they were "not prepared to recommend any one individual design for adoption," but that the design of Mr. E. M. Barry "for a new gallery," and that of Mr. Murray for the adaptation of the present building, exhibited the greatest amount of architectural merit. Appointment of Mr. E. M. Barry as architect of a new National Gallery, 16th June, 1868. There the matter rested, and for a considerable period of time nothing more was done in it. It might be that it was sufficiently embarrassing to the Government. The next communication to which he would advert was that with reference to the new Law Courts. In that case the arrangements were very different, and the complications which ensued were very great. Those arrangements were as follows:—February, 1866.—Five judges were appointed by the Treasury.—Mr. Cowper (chairman), Mr. Gladstone, Sir W. Stirling Maxwell; by the commission.—Sir A. Cockburn and Sir E. Palmer. December 23rd, 1865.—Treasury minute, that the committee of judges shall issue the invitations to compete, and their award shall be final. Determination to limit the number of competitors to six, and letter of invitation (enclosing printed instructions, which contained no promise to employ the successful architect) to Mr. Barry, to be one of the six. Negotiations, in the course of which the Treasury undertakes to employ the successful architect, but introduce a condition forbidding him to undertake new work for three years after his appointment. March 21st, 1866.—Withdrawal of Mr. Scott and Mr. Barry from the competition, in consequence of this condition. April 20th, 1866.—Condition withdrawn, the number of competitors increased to twelve; Mr. Scott and Mr. Barry re-invited by letter of invitation, containing printed conditions, finally revised and signed by Lord Chancellor Cranworth. January 15th, 1867.—Designs sent in by eleven competitors, one having resigned. June 8th, 1867.—Messrs. Shaw and Pownall appointed judges of designs, at the unanimous request of the competitors, increasing the number of judges to seven. July 30th, 1867.—First award of the seven judges, to the effect that they considered Mr. Barry's design the best for plan and distribution of interior, and Mr. Street's the best as an architectural composition; recommendation, therefore, that those two gentlemen should be jointly employed in the respective departments named. Return of award to the judges by the Treasury, with the request that the judges would select one architect. November 25th, 1867.—Reconsideration of award by the judges, and statement by them that, having come to the conclusion that the design of Mr. Barry is the best in regard to plan, and the design of Mr. Street in regard to elevation, and having recommended the joint employment of those two architects, they could do no more. Reference of case to Attorney-General. Opinion of the Attorney-General that the award was invalid, and the Government free to make any appointment they thought proper. May 30th, 1868.—Appointment of Mr. Street. June 8th, 1868.—Letter of protest to Treasury by Mr. Barry, followed by others, to none of which any answer has been returned. Now, in Mr. Hope's inaugural address, in the year preceding his (the President's) nomination, he made the following remarks:—

"I was just observing that there were certain complications attaching to the competition for the New Law Courts. These were of an administrative character, and owed their origin to the fact that the Government had handed over no considerable portion of the contract which, in the case of most public buildings, would have been shared between the Treasury and the Board of Works, to a special commission created by an Act of Parliament, and comprising a large infusion of the legal element. These gentlemen set to work with a very sound principle strongly before them; and as was not unnatural, rode that principle a little hard. They assumed that the successful architect (or architects) ought to have made himself practically acquainted with the working of the different courts of law; and the inference which they drew from this undeniable proposition was, that it was needful for them to be excessively restrictive in the number of competitors chosen, in order to prevent the business of the courts from being interrupted by the frequent visits of curious investigators; and so they drew the line at six. This was palpably, in the eyes of all men, except the commissioners themselves, an extravagant application for their principle. Not to allude to any other objection, this prin-

eriction manifested considerable confusion as to the architect's obligation, contracted with the national honor, to produce the best obtainable building. However, it required a vote of the House of Commons to overcome the reluctance of this most respectable Junta.*

What Mr. Hope then predicted followed; but the result was not, perhaps, on the whole, unsatisfactory. The calling in of two professional judges—men of great eminence and practical skill—was no doubt the proper course to take to remedy the difficulty; and he believed the appointment of Messrs. Pownall and Shaw was satisfactory to all parties concerned. The result was equally satisfactory. The plan of Mr. Barry and the elevation of Mr. Street were severally declared to be the best. These two gentlemen, putting their heads together to erect these buildings, would have been satisfactory to the nation and to the profession generally. There was, moreover, precedent for this course of proceeding. In his (the President's) early days, Mr. Wilkins and Mr. Gandy had built one of the great club-houses as joint architects; and in his own case, Mr. Cockerell and himself acted as joint architects in the building of the London and Westminster Bank in the City, and in each case everything went on agreeably and conveniently. But in the matter of the New Law Courts discussion was indulged in to a large extent, and it ended in Mr. Barry being awarded the building of the National Gallery, and Mr. Street the New Law Courts; a result, however, which did not appear very much to please anybody, and which was a difficult question to determine, because each gentleman had equal merits; and the solution which he ventured at the time to suggest in the House of Commons appeared to him a reasonable one. The suggestion he made was this—that inasmuch as it was perfectly well known that the Law Courts, as designed, would occupy much more space than had been accorded them, the Chancery and Common Law Courts should be divided—one to be placed on the Thames Embankment, and the other in Lincoln's-inn; and that one should be entrusted to Mr. Street and the other to Mr. Barry. This suggestion met with no favour in the House, and thus the matter ended in a somewhat unsatisfactory manner. He would not pursue this subject further than to say, that they must all feel in these competitions that if the strictest adherence was not kept to the conditions put forth, it could not be expected that men of honour and talent would join in such competitions. The result might, he said, be satisfactory in the present instance. No man respected more than he did, and than all of them did, both the gentlemen referred to, for either one or the other would be sure to erect a creditable building. At the same time, if there was no disappointment on the one hand, or inconvenience on the other, he should still regret that some more satisfactory result had not been obtained. He would only add on this subject, that if competition were to be indulged in, it could only be done successfully, usefully, and wisely by the strictest obedience to the original agreement under which gentlemen went into these competitions. The President concluded his remarks on this topic by quoting an article from the *Builder*, of June 13th, 1868, which he said he thought very fairly expressed the whole extent of the difficulty, and the position in which they were at present placed. He then proceeded to remark that the general consideration of the position of architecture induced him to believe that they were held in higher estimation as a body than was formerly the case. In his address to the Institute in 1862 he remarked,—

"I cannot but express my hope that the profession I am attached to, and that I have followed for more than forty years, may receive from me, in a kindly spirit, a few words of caution, that we ought not to forget that the great principles of art demand something more than a mere patient reproduction of forms eliminated in and appropriate to other times, without sufficient reference to the great power given to us by new materials, demanding different treatment, and a new exertion of the imaginative faculty."

He strongly recommended young architects not to confine themselves to one style of architecture alone. It was no use being merely a Gothic architect or merely a Classic architect; they must try, as far as they could, to understand both, and not be led away by the mere fashion of the day. At the present time everything must be Gothic. It was excellent when well applied, but far from agreeable when not well applied. This style was carried a little too far in the present day. His friend Mr. Beresford-Hope, he knew, would join issue with him on this point, and would give them a design for a Gothic theatre; but he (the President)

confessed he thought the Classic style better adapted for that class of buildings. He had done as much, perhaps, as most men in the Gothic way, and was one of the first to attempt a railway station in that style. Whether he had succeeded must be decidedly a visit to Carlisle station; but he had adopted other styles in France, particularly at Ronen, which perhaps on the whole were more satisfactory. Having congratulated Mr. Scott upon his success in connexion with the St. Pancras Station of the Midland Railway, the President passed on to notice the necrology of the Institute during the past recess, and referred more particularly to the death of Mr. Allason, whose father was an eminent and popular architect, and Mr. G. R. Burnell, the latter gentleman having been a most liberal contributor to the library of the Institute. In a passing allusion to the great public works in course of construction, he remarked that the Thames Embankment was worthy of the encomium that was passed upon it by his friend Mr. Beresford-Hope in his inaugural address. That work had been carried out so far in a comparatively small space of time. Whether they regarded the heany of the material employed, or the excellence of the workmanship, or the usefulness of the work itself, the Thames Embankment stood forth as one of the greatest features of our age, and when completed to the extent contemplated on both banks of the river, it would mark an epoch in the history of architectural skill, besides being a work of the greatest possible convenience; and the Thames, which had been so long the great disfigurement of the metropolis, would be one of its greatest ornaments. He expressed his gratification at the satisfactory progress which was being made with the new St. Thomas's Hospital facing the House of Commons. It was being carried out by Mr. Curry, and was founded on the principle of the Lariboisiere and other great French hospitals, and when completed would afford accommodation to 600 sick and wounded persons, and as a piece of architecture would be as creditable as it would be as a work of humanity. A great deal had been done during the last few years in respect of the architecture of the city of London. The great hotels especially were magnificent pieces of ornamentation, as well as being useful, and admirably adapted to the purposes for which they were built. They were based upon the best architectural principles, and were elegant and excellent in themselves. Evelyn had recorded in his works that, in passing through London he thought it "the ugliest city in all Europe for its bigness." He hoped they were now redeeming that great blot on their national taste and national means, and that London soon would be worthy of the great people and nation of which it is the capital. He could not say so much for the bridges, which now spanned the Thames in all directions. Old Blackfriars Bridge, which was a structure of surpassing beauty, and which was admired throughout Europe, had ceased to exist, and he thought, to the structure which was now taking its place, he might apply the words of Evelyn and say, "It would be the ugliest bridge in all Europe for its bigness." At the same time it would bring increased convenience and add to the comfort of the inhabitants, and no doubt it would carry them safely over the river for a very long time to come.

Mr. Beresford-Hope, in proposing a vote of thanks to the President for his address, said, while declining to follow his hon. friend in what he had remarked on the question of the two late great competitions, he would venture briefly to put the general question of competition in another shape. If it were not for competition, he asked, how could the young members of the profession make their merits and genius known? Architecture, after all, resolved itself into the simple question of *E. S. D.*, and those who decided competition should at least be able to bring some other plan forward by which the interests and the talents of all might be considered. As regarded the measure which he was to have brought before the House, he could only say that he had not done so for two reasons. The first was the extreme pressure of other business (having also been absolved of his pledge for that session by his friend Mr. Donaldson); and the second was, that he hoped to introduce the question as a branch of one more comprehensive; viz.—the necessity of having a great Minister of Art, Architecture, and Science. That minister should absorb the first Commissioner of Works, and some other offices, and should be an efficient public servant in that department, and upon whom,

when elected, the eyes of Parliament and the country should rest. He (Mr. Hope) would like very much to see a Gothic theatre, and did not agree with the President in all he had said in regard to that particular, but fully concurred in the opinion that it was the duty of architects to study all styles of the art.

Mr. G. G. Scott had great pleasure in seconding the resolution which had been proposed, and in doing so would say that he hardly knew of anything in which he differed from the President in the remarks he had made in his excellent opening address. He was well satisfied, so far as he was personally concerned, with the results of the competition referred to, though perhaps the logical part of the question would not be so easily followed out. He concluded by thanking the President especially for his valuable gifts to the library of the Institute.

Mr. George Godwin, in supporting the resolution, said that the energy of the President was equalled only by his liberality. He would let the results of hygone competitions be regarded as hygone. He could not, however, help remarking that there were a great number of new competitions which appeared to be managed in a peculiar manner. He alluded to those for erecting asylums for the sick and imbecile poor. He would like to know who it was that named the six or twelve gentlemen who were selected to compete in each of these cases. It was a fact well known that in one or two of the cases at least all that could be said of the young men brought into these competitions was that they were untrammelled by anything like former work or former connexions, and would make their first appearance as architects of those asylums. Doubtless many of them would gain distinction, but he did not think that the men who had won their spurs should be passed over.

Mr. Charles Barry said that doubtless the architects for the asylums referred to were selected by the local authorities from motives of economy. The terms of the competitions were such that he did not wonder Mr. Godwin failed to recognise the names of those who had acceded to them. The subject had already attracted the attention of the council, and would be further considered by them during the present session.

Mr. A. H. Layard, M.P., though only an honorary member of the Institute, wished to call the attention of those present to the fact that the Government was about to erect the largest series of buildings that had ever been undertaken at one time. These comprised the New Law Courts, the National Gallery, the larger part of the Public Offices; and, besides, there would soon be commenced a building somewhere in the vicinity of South Kensington, for a collection of Natural History, partly taken from the British Museum. He would offer no opinion upon these buildings as to whether the style adopted should be Gothic or Classic, but he did wish that those words were forgotten, and that attention was turned more to the cultivation of a true English style. It was a question of national honour. They had got a magnificent site on the Thames Embankment, and they had now the opportunity afforded them of erecting a series of buildings which might, perhaps, exceed in grandeur those of any other country. He trusted that they might not fall into errors in the erection of these buildings. He was desirous that the Institute should direct public attention to this matter, and to commence doing so at once, as little time was to be lost. He was afraid that the decision in some respects of the House of Commons in the matter of the National Gallery had not been satisfactory, but it would be useless to attempt to get them to alter it.

The vote of thanks to the President was carried by acclamation.

THE LAW AS TO APPRENTICES.—James Pond, aged twenty-one, who had been an apprentice at Messrs. Doulton's pottery works, was on Thursday brought up at the Lambeth police-court, charged with having left several months before his term had expired. As similar cases had previously been allowed to pass with impunity, the young man's employers determined to make an example, and having obtained a warrant, he was captured at Glasgow. He said he had gone away because he could not earn sufficient money to provide for himself properly. The magistrate inflicted a penalty of 6l. for the loss of service, and 10l. costs, or in default of payment a month's imprisonment.

A WORD OR TWO ON "FALSE ECONOMY."

THE contract for altering and enlarging the County Gaol at Carmarthen has just been accepted. The contractor is Mr. George Thomas, of Pembroke, and the amount of his tender 12,972*l.* Some of the tenders, we hear on good authority, were as high as 18,000*l.*, and Mr. Thomas's was the lowest. It is far from our intention on the present occasion to find fault with the Carmarthenshire magistrates, or indeed to say one word derogatory to the claims of Mr. George Thomas. On the other hand, we say most unhesitatingly that Mr. Thomas has performed some Government works which have given the greatest satisfaction, and he is at present making good progress with the fortifications at Tenby. But this reflection naturally thrusts itself upon us: that where a few men tendering for the same work,—by no means a large undertaking,—vary in their tenders from 12,972*l.* to 18,000*l.*, there must be a great blunder somewhere. In a discussion on this subject at the recent Carmarthenshire Quarter Sessions, the Earl of Cawdor alluded to the experience which the counties of Carmarthen, Cardigan, and Pembroke had so dearly purchased in the erection of the Joint Counties Asylum, a large building erected at Carmarthen some six or seven years since. Some of the readers of the *Builder* may recollect that, at the time the tender for the asylum was accepted, we called attention to the alarming difference in the amounts of the various tenders. We believe the lowest was about 24,500*l.*, and the highest about 42,000*l.* Well, the lowest tender but one was accepted, and the committee were justified in accepting it, inasmuch as the contractors were highly recommended. Now, what was the result of this? The sequel will show that the building is at present a monument to "False Economy." We are anxious to be as honest as possible in our statements, and we therefore only say what was publicly stated at the recent Pembrokeshire Quarter Sessions. It was there said that the work at the asylum was "very badly done." The committee "did all in their power to put matters right," but the work at last was so badly done that they "found it impossible to make them do it properly." The contractors used iron instead of copper nails to a large extent,—a number of the nails were smaller than the size agreed upon, and as a consequence, the committee has since been obliged to take a great portion of the roof off. The contractors placed a tank under the closets to receive the sewage. Of course this was a great nuisance, and it had to be removed. The cost of all this, including a new roofing to the building, was something considerable, and we are not surprised that some of the magistrates wished to know whether something could not be done in the matter, especially as the report of the Commissioners in Lunacy showed that a great deal of work was still undone. When a contract is accepted, and an architect is paid for certifying that the work is properly done, the public have a right to expect that the work is satisfactorily executed. The architect was well paid for his duties in the instance, if one of the magistrates was correct in stating that the remuneration amounted to nearly 2,000*l.* It was stated by the chairman that the committee were at present taking counsel's opinion as to whether they cannot recover from the architect the amount of any expense they may be put to in consequence of his neglect in not insisting upon proper work being done. Of course the committee are not to blame. Once they received the architect's certificate, it was simply their duty to order the payment of certain sums of money. At the same time some one must be to blame, and who that "some one" is, we suppose we shall shortly know, as it was stated that the committee were determined not to "let the fellows escape," but to take legal proceedings if the counsel's opinion warranted them in doing so. One of the speakers, who appeared a little anxious to smother the matter, could not but admit that some of the work had not been properly done, but added that it was done at a very low price and remarked that, as to Government inspectors, they did not want to quarrel with them, but they well knew that those gentlemen must complain: they were paid for doing so. Possibly there may be something in this, but it has little weight in the particular case under consideration.

However, our object is not to discuss the merits or demerits of this question: our object

is simply to draw attention to this case, as a warning to the public in general, and public bodies in particular, against always accepting low tenders. It is a policy which often becomes very costly in the end.

RESEARCHES IN ROME.

FUNDS are needed to enable the British Archaeological Society of Rome to continue their investigations. Some of our readers, when they see what has already been done, may feel induced to aid. Here is a list of the excavations and researches made to the end of July, 1868.

1. The line of the wall of the kings round the city of Rome, and the sites of the gates of Servius Tullius, fixed by the nature of the ground and the existing remains.
2. The principal chambers of the Mamertine prison discovered (the two small rooms usually shown are the *vestibule only*).
3. The sites of the Porta Capena and of the Piscina Publica fixed, by finding remains of the arcade of the Aqua Appia, where it crossed the Via Appia, passing over that gate from a reservoir at the foot of the Coelian to the Piscina Publica.
4. Another Castellum Aquæ, or reservoir, of the time of Trajan, found on the cliff of the Coelian, near the Porta Capena, with a series of five brick chambers of that period, and the *spectus* of an aqueduct passing through it.
5. Remains of another important building in the same valley, part of which is of the time of Sylla, and part of the time of Nero, supposed to be the *Ædes Camænarum*.
6. The month of the Aqua Appia, on the bank of the Tiber shown. The course of the *spectus* of this aqueduct traced through a subterranean stone quarry in the Aventine.
7. The source of the Aqua Appia found in another very ancient stone quarry of the time of the kings, 7 miles from Rome.
8. The site of some important *Thermae* found in the large vineyard to the north of the Porta Maggiore, and the building called the temple of *Minerva Medica*, shown to be a *Nymphæum*. Reservoirs and branches of several aqueducts found in the same vineyard.
9. Other reservoirs of the aqueducts found on the south side of the Porta Maggiore, near the Sessorium (now the monastery of S. Croce, in Gerasalemme); and the *Speens Vetus*, of Frontinus, found upon an old *agger* leading to the Coelian, and along the Coelian to the great antlerman reservoir at the arch of Dolabella.
10. The site of the Porta Trigemina, and of the Sublician (or wooden) bridge fixed, by finding remains of the gate and one of the piers of the bridge in the present *Salaria* or aal-wharf.

RAINFALL AND TEMPERATURE.

THESE two subjects are supposed to be very simple matters, and by many it is tacitly assumed that all is known that is worthy of examination. With the superficiality which is too frequently a characteristic of the present day, there are not a few men who say—"Oh! rain, yes: get a rain-gauge, put it in a tolerably clear space, and then you'll soon find out what the fall is."

During many years (see especially *Builder*, March 31, 1860), we have maintained and urged the paramount necessity of systematic regularity in, and increased attention to, the observation of rainfall. It is, therefore, with great pleasure that we draw attention to some most exhaustive experiments designed by Mr. G. Symons, carried on for some time by Col. Ward, at Calne, in Wiltshire, and now in an extended form continued by the Rev. C. H. Griffith, at Strathfield Targis, Reading.

Prior to 1863 there was no publication which gave any trustworthy information as to the relative amount indicated by large and small gauges respectively, and consequently gauges differed almost infinitely in size and pattern. In Scotland, owing to the influence of Professor Fleming and Mr. Stratton, the prevailing size was only 2½ in. in diameter, while English and Scottish engineers mostly employed gauges 1 ft. in diameter. Mr. Glaisher recommended 8 in., and Luke Howard, with many others, had used a 5-in. diameter. Hence it was imperatively necessary to ascertain if size influenced the returns.

Again. There having been no bond of union

nor standard authority in rainfall matters, the exact nature of the funnels above the ground was even more variable than their size, the heights varying from nothing up to 30 ft. or 40 ft. Some experiments had been made on Westminster Abbey, York Minster, and some other places, to test the law of decrease in relation to the elevation above the ground; but the data were neither sufficient nor in a serviceable form for practical men. Hence it was necessary to ascertain the ratio of decrease due to the elevation above the ground.

Passing over the preliminary stages, we propose to describe, as succinctly as possible, the exact nature of the experiments now in progress, before which we must preface one word as to their *locality*—a point of the first importance. Strathfield Targis Rectory is square-built, with a few trees near, and the whole of the grounds, 30 acres, perfectly level and clear of trees. It is therefore as eligible a site as can be conceived.

In one part of the ground there are a set of gauges of the following diameters:—1, 2, 3, 4, 5, 6, 8, 12, 24 in., and also two square ones of 25 in. and 100 in. area respectively. The whole of these are similar in material, construction, mounting, and height above ground; therefore any variation between their indications is due to size alone.

In other parts there are four other sets; one for the purpose of determining the influence of elevation above ground irrespective of buildings, the gauges being mounted on lofty poles. Another set are perched in all sorts of positions on the roof of the rectory and out-buildings, in order to obtain the effect of such positions, and therefrom approximate corrections to be applied to the many observations previously made in various parts of the country in analogous (unsuitable) positions.

The third series consists of different patterns, funnels with the rims sloping at different angles, and variations of that kind; and the fourth and last are identical in all respects except the material of the receiving surface, among which are pot, glass, copper, japan, paint, and shonite,—the last being apparently the best; but at present all are *sub judice*, and therefore we give no results.

We think the above will convince our readers that the questions we mentioned are now in a fair way to solution. Mr. Griffith is, however, by no means satisfied with doing what was never done before, and undertaking the arduous task of registering all these (42) rain gauges; and he has therapeutically work of the highest importance simultaneously in progress.

Almost every year, sometimes oftener, there crops up in the daily papers a discussion, more or less prolonged, as to "What is shade?" It generally arises in this way. A very hot day occurs. Forthwith sundry letters appear, giving temperatures varying, perhaps, 20°, and some of them hotter in the shade than others, possibly in the same town, are in the sun. Then some of those who have returned the lower numbers complain of the others, and it comes out that A had his thermometer on a post facing north, and forgot that the post got hot through and warmed the thermometer; that B was in a narrow space surrounded by houses,—in fact, might just as suitably have been in a well; that C's was outside a window, the glass of which reflected the heat on to the bulb; and so on. Now it is obvious that none of these positions is proper, and none comparable with any of the others; hence, many years ago thermometer stands were designed and they have since been adopted by all who have any claim to be considered observers of meteorological changes. Most unfortunately there have been several forms of stand adopted, differing as widely as a sentry-box and a meat-stand,—in fact, possessing no bond of similarity. Two years ago Mr. Symons drew attention to this anarchy in the *Times*, and expressed the hope that some person with leisure, and a clear open space, would take up the question, compare the various forms of stand, and determine their effect on the temperature and humidity recorded. Mr. Griffith having volunteered the space, and the time and trouble of observing, Mr. Symons has had stands made of the patterns suggested by Messrs. Lawson, Glaisher, Stow, Martin, Stevenson, Pastorelli, Morris, and Col. Sir H. James. Mr. Casella has provided the requisite number of thermometers (32). They have all been verified at the Kew Observatory of the British Association before commencing, and will be reverified at the close of the experiments.

We therefore conclude that meteorologists will

soon have the data for determining the relative influence of the various patterns of stand, and we hope they will agree to work uniformly in future; and in meteorology more than in any other science, uniformity of observation, of instruments, and of reduction, is all-important.

ON COLOUR IN CHURCHES.*

THE question, "What are we to do in the way of colour?" is very often asked in these days of church restoration, and it is with a view of doing something towards finding an answer to this question that I venture to bring these remarks under your notice. Almost every one admires colour, but most people dread using it, partly from a notion of its great expense, and still more from fear of failure. Of course, by the employment of celebrated artists, the cost of picture decoration may be swelled to any extent; and it is very desirable, where cheapness is not an object, that the best art should be employed in our churches; but, under ordinary circumstances, very good effects may be produced with a limited number of colours, and at a comparatively trifling cost. In most instances more money is expended, and more time lost, in experiments than in executing the actual decoration itself, when the style and arrangement have been determined on. The best way to prevent this needless waste of time is to make the necessary experiments with paper patterns, fixed up on the walls of the church, so that the effect of the proposed ornaments at a distance may be judged of. If this is done, the work will commence with a much better chance of success, and almost always a great deal of disappointment will be saved, for a painter is then able to set about his work with tolerable certainty as to the result. It is, of course, impossible to lay down any special canons for the guidance of any one wishing to decorate a building, as circumstances will determine many points better than the most elaborate rules. For instance, a dark interior will bear an amount of brilliant colour and high tones which would be intolerable in a more fully lighted building; and, on the other hand, the faint colours, and delicate whites, greys, and blues, which form such a beautiful harmony in an ordinary interior, would look poor and feeble in a gloomy little Norman church. Commonly, however (as far as we can judge from the specimens of colouring which keep turning up day after day in the progress of church restoration), there were but few colours employed in ordinary church-work in Mediaeval times, and the more elaborate decorations, and richer colours, were reserved for the most prominent situations in a church, as a retable on an altar, or the roof of a side chapel. As time went on, the church furniture itself seems to have been chiefly depended on for richness of effect; and the magnificent screen-work of later days was made to stand out by its brilliancy in an otherwise quietly-coloured interior. The choir sittings, also, sometimes came in for their share of the general splendour, as we see (if I remember rightly) at Walpole St. Peter's, Norfolk, where the fronts of the book-boards (if I remember rightly) are decorated with very good pictures of saints under canopies. Indeed, this plan was carried so far that the bench-ends themselves were sometimes coloured with stonil patterns, as at Brington Church, near here, though, as far as I know, this is a very unusual instance. The use of colour as a means of increasing the effect of the architecture never appears to have entirely died out. Up to the end of the fifteenth century it was, of course, common enough; and though the rise of the Renaissance style probably changed people's ideas a good deal, yet the old method of ornamentation was still adhered to, though the details were changed. To prove this I have only to refer to the exquisitely delicate colouring in Bishop West's chapel, in Ely Cathedral, finished early in the next century, and to the richly-decorated tombs at Brington and other churches. The church of St. Margaret, at Ipswich, has a very remarkable roof, apparently of the sixteenth century, though late in the style. The north transept roof in Empingham Church, Rutland, is another very good specimen, executed probably about the same date; and the restoration of South Kilworth Church now in progress, has brought to light considerable remains of wall decorations of this period. In

the seventeenth century we have the chapels of Lincoln and Jesus Colleges at Oxford; while the paintings of Thornhill, at St. Paul's Cathedral, and other places, and the pictured ceilings of St. Peter's at Arches, Lincoln, and St. Mary Le Wigford, in the same town, bring the art of permanent church decoration through the eighteenth century down almost to our own, when ornamentation of this kind certainly seems to have slumbered for a while, but only to be awakened with increased strength and power in the glorious Gothic revival of our own times. Perhaps I shall be doing the most service, and make myself best understood, if I describe the decorations of an imaginary church. Let us begin with the walls, and in doing so let us suppose that the common mistake of painting the interior has been avoided, and that the walls have been carefully plastered, so as to receive the decorations. The whole will then be coloured, with a general ground-work, in which pale bluff had, perhaps, hetero-predominate. Upon this ground bands of colour should be placed, the widths of which will be ruled by the architecture of the building. For instance, a kind of dado should be painted under the windows, reaching from the floor-line to the string-course, if there is one, and where no string exists, to give a finish a hand of colour might be used instead, to sever the pattern, below the line of the window sills, from the decorations above. This coloured string-course would look very well if designed with a fawn-coloured pattern, on a chocolate ground, or vice versa, as at Timworth Church. Above this, up to the height of the springing-line of the window-heads, some diaper or masonry pattern (as it is called) would fill up the space very well, upon the fawn-coloured ground, the divisions being marked out with red, black, or chocolate colour, and a small flower introduced into each square, in yellow or red, as at St. Alban's Abbey Church, and numberless other places; indeed, this masonry pattern is the commonest method of ornamentation which was used on the walls of churches. A second band of colour, repeating or counter-changing the tones mentioned before, might divide this pattern work from the upper part of the wall, where a less elaborate treatment might be used with effect (say a powdering of red roses or stars), till stopped by a third band of ornament immediately under the wall-plate. The eastern end of a church should be made to harmonise in point of tone of colour with the side-walls, of course, but would bear a richer and more ornate treatment.

The chancel of Ashley Church, in this county, has been coloured very carefully, lately, and the effect is in many respects highly satisfactory. Its arrangement will be found to agree pretty much with the plan of ornament which has been suggested, save that there is a band of canopies, running round the whole chancel, containing figures of prophets and apostles, painted with great care and very delicately coloured. The east end of Ashley Church is coloured in the same way as the side walls as far as the springing line of the east window, above which is a painting of our Lord in glory, surrounded by angels. This picture is rich in gold and colour, and adds very much to the effect of the interior.

The chancel of the church at Weston-by-Welland has also been entirely decorated very lately, and the general effect is harmonious and complete.

Holdenby Church has begun to put on its dress of many colours, but calls loudly for still further ornament.

The same may be said of Theddington Church, and Market Harborough Church was partially coloured some years ago; so you see we have not been altogether idle in this neighbourhood.

During the restoration of the little village church of Timworth, near Bury St. Edmund's, a most curious and valuable specimen of mural painting was laid bare, and it was especially interesting as showing the plan upon which the ornamentation of an entire chancel was arranged. It also followed in its general outlines the plan I have suggested. The lower part, or dado, was composed of a drapery pattern, in broad chocolate lines, at the top of which, just under the windows, ran a wide chocolate-coloured pattern, on a buff ground, of very bold and effective character. Above this was painted a series of wide architectural canopies, containing Scriptural subjects, among which "The Annunciation," "The Meetings of Saints Mary and Elizabeth," and "The Nativity," were tolerably perfect. The drawing was rough, but not bad,

and the whole, when fresh and sharp, must have looked very well.

I am sorry to be obliged to speak of these curious paintings as things of the past. They have been totally destroyed, and a rough sketch of my own is probably the only memorial that remains of what was certainly a very interesting discovery. The paintings at Timworth had been so much injured and hacked about, in the fifteenth century (to make room for another system of colouring), that it was impossible to preserve them as decorations for the restored church; but every one who saw them must regret that photographs were not taken before the walls were replastered. The painting was of the thirteenth century.

Another very remarkable specimen of wall-colouring has been discovered lately in the parish church of Easby, near Richmond, in Yorkshire. Situated under the shadow of Easby Abbey, no doubt unusual care was taken with the decoration of this church, and the painting seems to be very good. The subjects are arranged in square panels, and there are large figures painted within the arches of the sedilia. It is to be hoped that these very valuable models for church decoration will be found to be in a sufficiently good state of preservation to make it desirable to retain them.

St. Alban's Abbey Church, which is a perfect storehouse of beautiful architecture and quaint things, has many very good specimens of mural decorations, but they are so much like the general run of such ornament, that it is needless to describe them here. One of the best examples near at home is to be found in Lutterworth Church, which is being repaired under the able guidance of Mr. Scott, and this wall-painting is to be restored. The masonry pattern is of unusual excellence, and I am glad to have it in my power to show you a drawing of it, very carefully prepared by Mr. Lea, of Lutterworth. The painting appears to be of the end of the thirteenth century.

The pillars and arches of our ideal church must claim our attention next. They should be decorated much in the same style as the walls, and in old days were very frequently divided into a masonry pattern, running with the actual stories, though this was not always the case.

At Lutterworth, both the pillars and arches retain a good deal of their original decoration. In the arches the chief interest is given by graceful running patterns, in chocolate colour, following the lines of the arches. Specimens of this kind of ornament are to be found also at Ketton Church, Rutland, and in still greater quantity at Uppingham Church. A small portion of a more highly-coloured example of arch decoration is to be seen on one of the arches of the south side of the choir at Rothwell Church. It has a very good effect. The next specimen is later in style, and formed part of the second system of colouring employed at Timworth Church, Suffolk. It is taken from an archway which had long been blocked up, and the painting was very fresh in consequence. I am afraid I must admit that in this instance the general ground-work was whitewash, in addition to which there was another circumstance connected with it which rather jars against our notions of the truthfulness which is such a just boast of Gothic work. The spaces were covered with a rough red mottling, on a yellow ground, which must have been intended for sham marble. The idea is not pleasant, but it certainly looked very well. There is also some marbling of the same kind at Ketton. This need not be copied, however, as a plain surface of colour, not too evenly spread, would look equally effective, in all probability. With regard to the pillars, a chevron, or some other hold pattern, was often adopted, as at Lutterworth and Hunstanton, in Norfolk. But one cannot help thinking that a good strong stone column does not want much to recommend it, and that it might generally be left pretty much to itself; its fine natural colour would, in most cases, add to rather than detract from the effect of the interior by contrast.

The subject of roofs is one which deserves great attention, but there will only be time just to allude to a few existing specimens. The roofs of churches being almost inaccessible to the destroyer, and only get-at-able with considerable difficulty, by that still more fearful person, "the climber up" of later days, they have been suffered to retain their original colouring more than other parts of our churches; indeed, there is scarcely an old building where more or less of this roof decoration does not exist, and the style of all the periods of Gothic

* A paper by the Rev. F. Sutton, Rector of Theddington.

may be made out pretty clearly. The roof of Lincoln Cathedral, though at present covered with white and yellow wash, was once carefully painted, and bits of ornament peep out here and there, to tell us how to restore it, when the day of restoration arrives. The whole of the roof of that vast church, St. Alban's Abbey, is coloured! The nave and transepts have flat ceilings, which seem to have been coloured in imitation of older work; but the choir was a beautiful fourteenth century vault in wood, covered with very good painting, quite worthy of being visited by any one interested in such matters. It appears to be the second decoration which the ceiling has had. There is at Chichester Cathedral, on the roof of the vestibule, to the present library some very telling painting of later character, which might be imitated with great success on a vaulted roof.

Ely and Winchester cathedrals also give us examples of colour on stone-vaulted roofs of different periods. It was, however, with the open timber roofs of the fourteenth and fifteenth centuries that the full glory of coloured ceilings came in. In these, carving and colour vied with each other for the mastery, and the combination must have been sumptuous and stately in the extreme.

Norfolk and Suffolk give us the best examples, perhaps, but there are very good specimens scattered all over England. The church at Brant Broughton, in Lincolnshire, has a pine roof of the Perpendicular period, most effectively coloured. It is in very fair preservation. The plaster ceiling of the neighbouring church at Welbourn, in the same county, is said to conceal another of like character; and at Christ Church, in Hampshire, a fine wooden roof (still retaining its original painting), is hidden by a sham stone vaulting. Almost endless instances, indeed, might be referred to, but time would fail, and patience, no doubt, wear out too; so it will be best to conclude at once, with a hope that what we find in the way of painting we may preserve carefully, and that new work, founded on the excellent old models which we have, may rise up on every side round about us, so that one by one our churches may regain that quiet beauty and refined delicacy of coloring which so many of them once possessed.

THE FAIRFORD WINDOWS.

WILL you allow me, as one who has studied closely the early schools of Germany and Flanders, and for many years in companionship with my friend Mr. Alfred Bell (practised glass-painting as a profession, to express my entire agreement with your able correspondent on the subject of the Fairford glass, Mr. J. G. Waller, than whom none has fairer warrant for making his opinions public? I will further give the favour of a little more space in which briefly to note how Mr. Tom Taylor (to whose "tender mercies" Mr. Waller is consigned by "B. A. A.") practically expresses his concurrence too, by his direction of what I cannot help considering the heaviest blow that has been inflicted on the hypothesis he writes* to support,—viz., Dürer's authorship in the Fairford glass.

Beyond all doubt, the crucial test—the proof of proofs, one upon which Mr. Tom Taylor well insists, as bearing with most cogent force on the origin of the glass in question—lies, not in appeal to the confessedly dubious evidence of the "Biblia Pauperum," "Block Books," &c., whose own authorship is a matter of dispute, but in the striking identity between the west window at Fairford and the celebrated triptych of the same subject at Dantzig.

The complete coincidence, patent between the picture and the window could not possibly have been accidental; for a description of one is virtually a description of the other.

That the artists of these works were followers of one school,—that the author of the glass was familiar with the picture, and borrowed largely therefrom,—is beyond the limits of reasonable question.

Mr. Tom Taylor ventures, indeed, more than this. He says,—“It is difficult to believe that the designer of the Fairford window and the designer of the Dantzig picture were not one and the same.”

A claim of such personal identity of authorship as this must be received with reserve; but to all who have regarded the subject with an

artist's eye, the magnificent composition at Dantzig and the Fairford window reveal, in every characteristic, the unmistakable signature of their common school. In the Dantzig picture the general scheme of arrangement, the graceful delicacy of form, the long-drawn attenuated and peculiar modelling of the nude, and the characteristic type of the faces, proclaim a completely representative example of the art of Memling and Van Eyck.

Dr. Waagen, speaking of Flemish pictures, and especially of that at Dantzig, declares that "this is not only the most important by Memling that has descended to us, but one of the *chefs d'œuvre* of the school."

It is difficult to comprehend by what unusual oversight Mr. Tom Taylor confounds a work so distinctly Flemish with the name of Dürer, to whose more robust style it bears no real affinity. On the other hand, it is as easy to understand how he was struck by the obvious, though unnecessary, clue which the picture affords to the origin of the window.

But Mr. Taylor seems much more certain that the window is referable to the Dantzig picture, than that the picture is referable to Dürer; for he says, "It is quite possible that the picture may be Dürer's, if [I], as I believe, the Fairford windows are his."

With the same probability the converse might be stated, viz.,—It is possible the windows may be Dürer's, if the Dantzig picture is by him. Reasoning of this kind is really all that has been brought forward on behalf of Dürer's claim from first to last.

I would refer to one other point, which is significantly passed over in silence by the advocates of the Dürer theory, to which it is a fatal difficulty. I allude to the canopies of the Fairford aisle windows. These canopies are as Flemish beyond question as is the Dantzig picture; which, thus corroborated, carries, I submit, the whole question of the school whence the windows issued. That, in the absence of documentary or historical evidence, the actual artist of the glass can ever be known, I do not believe, though an enthusiast might easily make much of a theory favouring Memling. The gentle gradations of style resulting from the influence of schools in ancient works where an artist's characteristics are distinguishable, less by divergence of manner than degree of power, present difficulties in the ascription of individual authorship to apocryphal works, that in face of them artists are slow to pronounce. To establish the plausibility of a surmise that a work of ancient art of unknown authorship may, by possibility, be by a given artist, settles no doubts, and is but a tantalizing way of showing, what is never doubtful in such cases, that it is of a certain school and a particular date.

But, sir, next to an auctioneer there is no one like your non-professional enthusiast for vaulting over obstacles of this kind. In riding his hobby he has no faint-heartedness. He fears no stumble. His foregone conclusions absorb his heart and soul, and difficulties but intensify his purpose. Where the artist fears to tread he rushes in and cuts the knot in triumph. In this way all obstructions vanish; and many are the works of art that have been baptised thus with names that would make their owners' hair stand erect were they with us to claim their own again.

JOHN R. CLAYTON.

** The artist of the celebrated picture in the Church of Sainte Marie, Dantzig, mentioned above, is now understood to be Derrick Stuerhout, better known as Dirk Van Haerlem, from the place of his birth, and the earliest distinguished painter of Holland. Mr. Weale, long settled in Bruges, and whose name as an antiquary is well known by many of our readers, has recently met with a document, we are told, in which Stuerhout engages to paint the picture for a Milanese nobleman. Stuerhout was born in the year 1391, according to Mr. Crowe, and died at the age of eighty-seven, or in the year 1478; so that if this identification be certain, and we have no doubt about it ourselves, the Dantzig picture would seem to have been painted before Albert Dürer was born.—Ed.

MANCHESTER.—A site in Oxford-street has been chosen for the new buildings of Owen's College, plans for which are under consideration. The site will cost 29,000*l.* if the whole of a plot of building land containing 19,164 yards be secured; or 12,000*l.* if a plot of only 8,963 yards be taken.

THE WINTER EXHIBITION, FRENCH GALLERY.

THE collection here of cabinet pictures by British and (a few) foreign artists, 200 in number, is well selected and particularly interesting. Moreover, upstairs may be seen, without extra charge, Linnell's fine picture, "The Dusty Road." Foremost in the collection proper stands Mr. E. Long's "Christmas Charities in Seville" (165), hrimful of interest, both for the artist and the ordinary sight-seer. It shows us a well-dressed lady distributing alms to a group of beggars in one of the cathedrals. A sombre priest looks on approvingly, while the crowd is kept in order by a soldier who, under ordinary circumstances, would be the least interesting figure in the work, but who compels one to look twice at his bright uniform, and his whiskerless, mustached, amiable face, if only to see what the men are like who make the revolutions in Spain. The beggars are the most rugged, pictureque creatures in the world. The subject is well chosen, and admits of all that variety of character and beauty of colour in the rich-dyed and picturesque dresses, which have such charm for artists eyes, and in the fresh daylight effect of the lighting from the open door. As a composition, too, the picture is exceedingly well conceived. "The Twins" (69), by M. Bongueran, is distinguished by great excellence of painting; it represents an infant boy and girl lying asleep upon some downy cushions and rich quilt, the curtains parted letting in a ray of bright silvery light which just strikes upon the pretty form of the one twin, and leaves the group in shadow. The subtle modelling of the soft little limbs and velvety skin is wonderfully true, and the colouring of the flesh is perfection.

In No. (50), "The Favourite Padre," by J. B. Burgess, a lean padre is set off by the plump form of his unctuous brother. The favourite padre gives his hand to be kissed by one of a group of girls, while a boy oings on his arm, and looks up at him with a face bursting with fun. Mr. Dicksee is more than usually strong. "The Sick Chamber" (86), W. Q. Orchardson, although mannered, lays hold of the spectator, and keeps his place in the memory. (22) "The Morning Meal," by L. Perrault; (34) "A Highland Loch," B. W. Leader; (61) "Prayer," Eng. Fines; (173) "Fancy Free;" and Mr. Archer's touching picture, "Desolate" (186), all deserve special notice.

PARTIAL DESTRUCTION OF THE RESTORED CHURCH OF ECCLESHALL BY FIRE.

THE parish church of Eccleshall has narrowly escaped being burned entirely down. On the morning of Sunday in last week the north aisle was found to be in flames. Engines soon got to work, but at length the roof of that portion of the building fell in, and shortly afterwards the roof of the nave was discovered to be on fire. In a little time, however, the flames in that part of the building were subdued.

The damage done is very considerable, but not so great as might have been expected. 600*l.* it is said, will cover the whole, but there are 300*l.* or 400*l.* still unpaid for the restorations recently done. The whole of the north aisle is destroyed, and also a portion of the nave. Only the walls of the north aisle are left standing. The south aisle is uninjured. The chancel, with its rich oak carving, is safe, though the walls and roof are much discoloured by the smoke. The north aisle, in which the organ is placed, has received no material injury. The organ itself is a good deal damaged.

The conflagration, it is said, has been traced to one of the principal beams of the north aisle roof having been left into the side of the chimney of the warming apparatus. This apparatus, which supplies the building with hot air, had been lighted for the first time, as far as the services in the church were concerned. The beam appears to have taken fire, and the flames were communicated thence to the roof. The church was not insured.

The building had been re-opened for service on the 29th of April last, after a thorough restoration, which cost between 7,000*l.* and 8,000*l.* The general feeling among the people of Eccleshall is a determination to get the church restored, if possible, with the same beauty and proportions which it displayed before the fire. This is the result of a meeting convened by the

* In the *Gentleman's Magazine* for October.

Rev. C. P. Good, the vicar, and the churchwardens, in the Town Hall, to consider the steps to be taken respecting the damage done. More than half the 600l. required was at once subscribed. The Vicar presided, and, in a few opening remarks, explained the probable origin of the fire. He would not, he said, pretend to say who was to blame, or whether any one at all was to blame. Mr. Street, the architect, had written to express regret at not being able to attend, but Mr. George Wood, his chief clerk, was present at the meeting. Mr. Wood was asked as to the cause of the fire, and he said he had carefully examined the heating apparatus and the floors above it on the back of the arches, and also the flue leading to the chimney-stack, and he was of opinion that the fire originated in the stack on the level of the north aisle wall. One of the principal beams was set by the side of the flue at this point, and was protected by a fire-clay lump-lining 3 in. thick, supported at an inclination of about 40 degrees by an iron bar, so forming a bend in the flue. The actual face of the beam appeared to have had a clear space between it and the fire-clay lump of 3 in., which was, in his opinion, sufficient for the safety of the building. No doubt it would have been safer if the beam had been kept at a distance of 12 in. instead of 6 in., and this could have been done by the clerk of the works. In answer to a question, Mr. Wood said he, of course, considered the clerk of the works was the servant of the Restoration Committee, acting under the order of the architect, and he (Mr. Wood) had no doubt that had the clerk of the works reported the fact of the beam being so near the flue, and asked for special instructions, he would have been told to keep it at a greater distance. Mr. Wood, in conclusion, said that he had heard that the flue was used by the builder during the progress of the work to dry some timber. He believed the flue became filled with soot at the bend formed by the fire-clay lump, and when the fire was lighted it became red hot and communicated the heat through the fire-clay to the beam. Mr. Barker, who represented Messrs. Stuart & Smith, of Sheffield, who provided the heating apparatus, was present, and expressed an opinion that the fire must have arisen from the beam communicating with the chimney. Mr. E. Lyon, one of the churchwardens, said he felt very acutely that no insurance had been effected upon the church. He did not attempt to excuse himself for neglecting so important a matter, but any parishioner might have proposed to do so at the vestry meeting. The fire arose from a piece of carelessness. He considered that it was very important that the matter should be fully investigated.

ACCIDENTS.

A WAREHOUSE in Rigby-street, Liverpool, used for storing linseed and the like, seven stories high, has fallen in. On the fifth story about 50 tons of linseed were stored in a heap. Some men observed that the centre heap of linseed in bulk was subsiding; but they believed that this was caused by the "sliding" away of the outer ridge of the bulk. Both the upper and lower floors were deserted by the workmen because they "felt there was something coming;" but the machinery was working the press-room, and everything else was going on as usual, when a fearful crash was heard. The floor of the fifth story of the building had given way, the joists having apparently broken in the centre, and 50 or 60 tons of linseed in bulk falling on the fourth floor, on which there was a similar quantity of produce stored, broke that down, and, again descending on to the third and second stories, fell into the machine-room, where a number of pressmen, grinders, and others were employed. The falling of the floors was so sudden that not one of those engaged in the machine-room escaped, while several of the workmen employed in proximity to the scene of the disaster sustained severe injuries about the head and arms. All the centre timbers of the different floors appeared to have parted, leaving the flooring joists projecting from the opposite sides of the warehouse. Efforts were at once made to rescue the workmen inside the building; but after an immense quantity of *débris* had been removed, they found the bodies of four men amongst some broken rafters and ceiling-planks. None of the bodies were disfigured, and it appeared that the unfortunate men had been suffocated by the immense quantity of grain falling on them.

A new chapel has been blown down and four persons killed at Bill Quay, Shields. The chapel was in course of erection for the Wesleyans, in Swinburne-terrace, at the high part of the village, on a slight slope. During a strong gale of wind from the north-west the roof of the chapel came down, bringing with it nearly the whole of the south gable and a large portion of the north gable. The south gable fell bodily upon an adjoining house, a two-story one, crushing in the roof and the floors of the upper rooms, and completely burying the whole of the occupants in the ruins. Besides the four killed, others were more or less seriously injured.

Inflax has been also visited by a strong storm of wind and rain; and at Bolton Brow, Sowerby Bridge, a horse fell, killing a woman and her infant. Both were shockingly crushed. The house has been in a dilapidated state for some time, but there was no immediate sign of its fall.

THE EARTHQUAKES.

THESE commotions are still reported from one end of the world to the other; and now we have a slight indication of them in our own favoured land. On Friday in last week, between ten and eleven at night, the west of England was shaken by earthquake. There has also been an earthquake in Ireland. All these were comparatively very slight however; but it is said that the Baltic has been agitated to an extraordinary degree, subsiding 3 ft. and upwards below the usual average, and then rising a foot above that average. Nearly all the steamers plying between Cromstadt and St. Petersburg went aground, a circumstance unprecedented.

From north to south of New Zealand a curious tidal phenomenon was observed on the 15th August. The sea rushed out and in with extraordinary violence, and in some places in the South Island great damage was done from the sea going far over the usual high-water mark. On the 17th shocks of earthquake were felt over a larger portion of New Zealand than is usually subject to them. The Chatham Islands have been visited by three tidal waves, causing great loss of life and property. The settlement of Tupunga, on the north side of the island, felt the greatest force. It was entirely destroyed, no mark being left to tell where it stood. The ground was completely covered with sand and seaweed. The inhabitants barely escaped with their lives. The sea went inland about 4 miles. The settlement of Waitangi sustained great loss. Houses were shifted, and carried out to sea. There have been great floods in Chili, and many persons drowned. Doubtless these floods, as well as those of Switzerland, and also the previous drought, have all had something to do with the other phenomena.

OPENING OF YORK CORN EXCHANGE.

THIS building, which has just been completed, and is situated in King-street, has been formally opened. The erection has been carried into effect through the medium of a limited liability company.

The building is 7½ ft. long, 63 ft. wide, and from the floor to the apex of the lantern light about 54 ft. in height. The roof, which is an open timber one, is partially supported by two rows of iron columns, which are fixed about 11 ft. 6 in. from the side walls, from which spring semicircular laminated ribs spanning over about 38 ft., which forms the central portion of the Exchange. These ribs form part of the truss of the roof. Along the whole length of the building is a raised lantern roof, the whole of which is glazed, and gives an ample supply of light, and the side lights of lantern are made to open. It is also heated with two of Gurney's patent stoves.

In addition to the large room there is a settling-room about 38 ft. long and 21 ft. wide, and in the front there is a pile of warehouses, comprising several floors in height. The entrance to the Exchange is through a portion of the warehouses, and is 10 ft. wide. There is also an orchestra in the large room, and the interior is finished in an ornamental style.

The architect was Mr. G. A. Dean, of London and York; and the contractors were Messrs. Weatherly & Rymer, of this city. The clerk of the works was Mr. Vicars, who is also the archi-

tect's principal clerk. The total cost of the premises, including corn-stands and fittings, and alterations to the warehouse, will be about 3,000l.

The sub-contractors for the work were Messrs. Close, Ayre, & Nicholson, for the iron work; Mr. Rawlings, the plasterer; Mr. Pearson, for the painting and decorating; Messrs. Hodgson, the plumbers; and Mr. T. Wood, the slater.

THE ASYLUM AT LEAVESDEN.

WE learn from the daily papers that the foundation-stone of the first asylum for the imbecile poor of the metropolis, to be established under the provisions of the Metropolitan Poor Act of 1867, was laid at Leavesden, Woodside, about four miles from Watford, on Saturday last. The Metropolitan Poor Act of 1867, introduced by Mr. Gathorne Hardy, constituted what is termed the Board of Management of the Metropolitan Asylum District, consisting of sixty members, three-fourths elected from the thirty-nine parishes and unions comprised in the metropolitan area, and one-fourth nominated by the Poor-law Board. The Board are to provide asylums for imbecile poor, and hospitals for the reception of the poor who are afflicted with fever and small-pox. Two asylums, each to contain 1,600 patients, are now being erected, one at Leavesden for the north side of the river, and one at Caterham, near Croydon, for the south side. The Leavesden site contains 76 acres, and cost 100k. an acre—7,600k.; Caterham site contains 72 acres, and cost 80k. an acre—5,760k. There is to be accommodation in each of these asylums for 860 females, in six separate blocks, and for 700 males in five separate blocks. The estimated cost of the building, furniture, clothing, &c., for the Leavesden Asylum is 128,000k., and 129,000k. for the Caterham Asylum. The Board have obtained sites for fever and small-pox hospitals, as follows:—for north-west district, at Haverstock-hill, Hampstead, about 8 acres, cost 15,544k.; for north-west district at Homerton, about 8 acres, cost 11,812k. 10s.; for southern district, at Stockwell, about 7½ acres, cost 15,075k. The Board have approved the design for the fever hospital at Hampstead, for 10½ patients, submitted in competition from six architects, by Messrs. Pennington & Bridgen, of Manchester. The designs for hospitals at Homerton, to receive 184 fever and 102 small-pox patients, and at Stockwell for 150 fever and 102 small-pox patients, are to be ready soon. Up to the present time the Board have made a call of one-eighth of a penny in the pound on the rateable value of property in the unions and parishes of the districts (about 16,000,000k.) for defraying the expenses of the Board for the years 1867-8, and further call of a similar rate payable 31st December next. The funds required for the erection of the asylums and hospitals are raised by loans on the rates, repayable with interest by equal annual instalments in twenty or thirty years, as the provisions of the Act direct.

We have already given a general view and plan of the asylum at Leavesden.

THE MONMOUTH WORKMEN'S INSTITUTE.

THE opening of this Institute took place on the 15th ult. The site is in Monk-street. It has been founded by Mrs. Jones, of Ancre Hill. The plan of the building is a parallelogram, 52 ft. 6 in. by 32 ft. 6 in., with a transverse wing 28 ft. by 15 ft. on the south side, and it stands detached in its own ground, so that the front and two sides may be seen from the street. It has two stories. The ground floor, 12 ft. high, comprises a spacious entrance vestibule and hall with mosaic floor, from which an inner vestibule is entered through an ornamental glazed wooden screen, with self-acting folding doors. From the inner vestibule the following rooms are entered: the reading and news room, 32 ft. by 16 ft., lighted in front by a coupled window, and in the side by two windows of a similar character; the library, 20 ft. by 13 ft. 6 in., fitted with ranges of book-shelves, book-case and cupboard; between this room and the former is an arched opening, fitted with a counter and glazed sliding screen from which books, &c., may be issued by the librarian; a committee-room, 14 ft. by 12 ft., which can also be entered from the reading-room. From the outer vestibule a stone stair,

6 ft. wide, with an ornamental balustrade of hammered wrought-iron leads to the lecture-hall 48 ft. by 28 ft. and 20 ft. high. This hall is fitted throughout with movable seats, and has at the east end a raised semicircular platform; midway on the south side, and above the doorway is a pointed arcade of two openings to a gallery over the landing and staircase. This arcade is divided by a circular column, with an enriched and foliated capital, and the front of the gallery is of ornamental hammered iron works. The gallery is approached by a circular stair from a cloak-room, forming a mezzanine story on the first landing of stairs. Beneath this mezzanine, and approached downwards by a few steps from the outer vestibule, are a lavatory room and other conveniences, and in the basement, are a boiler-room for tea purposes, cellars for coals, stores, &c., a pump, and other appliances. All the interior is lighted with gas, the lecture-hall having a large gilt starlight pendant. The whole of the woodwork and fittings are stained light oak and varnished.

The general style of the edifice is of Italian Gothic character; the exterior is constructed with polished red sandstone walls, and Bath stone dressings and strings, interspersed with blue forest stone bands; the shafts of the columns of entrance doorway and windows also being of blue forest stone polished. The roof is of Carnarvon countess slate, in bands of purple and grey; the whole forming a contrast of colour. The noticeable features are the gable front. 54 ft. high, surmounted by a banneret of hammered iron, coloured and gilt, with crystal points. In the middle of the gable is the large pointed window of the lecture-hall. This window is subnarcated as a triplet on circular columns with foliated capitals, and the spandrel is filled in with the arms of the foundress surrounded by foliations on a diaper of conventional character. Between the lower windows is a circular tablet of polished royal marble, upon which in Lombardic letters is the following inscription:—

"This Free Institute
for Working Men
Was founded and endowed by
MRS. MATELA JONES,
of Ancre Hill,
A.D. 1868."

The entrance doorway, flanked with moulded jambs and disengaged columns, with foliated capitals and moulded bases, is finished above with a bold octagonal balcony carried on moulded brackets and corbels, with pierced spandrels. The site is enclosed with a low wall and coping, carrying ornamental baunmered-iron railings; and the entrance-gates are supported by circular pillars of red stone, with moulded bases and pyramidal, polygonal caps enriched with carving.

The contractors were Mr. C. Lawrence, jun., Mr. George Webb, and Mr. H. Elias. The cast-iron work was supplied by Macfarlane, of Glasgow; the wrought-iron work by Cormell, of Cheltenham; and the carving by Mr. J. Willis. Mr. Benjamin Lawrence was the architect.

WARMING AND VENTILATING BUILDINGS.

By the process of respiration a man absorbs 20-30 cubic inches of oxygen, and produces the same quantity of carbonic acid per minute. The absorption of oxygen represents the preservation, and the production of carbonic acid the waste, going on in his body from birth to death. Nitrogen is inactive, or rather serves by diluting the oxygen to moderate its energy, and diminish the violence with which burning would otherwise go on. Without oxygen a man could not exist, nor could a fire be kindled; and no more nor less than the normal amount of oxygen in the atmosphere is essential to existence and well-being. If a man breathes air diluted with carbonic acid for any length of time it produces headache, lassitude of mind and body, sickness and death. To do so, in fact, is a process of slow poisoning. The temperature of the air that he expires is always the same as that of his body,—namely, 98°; and, as it is warmer and lighter than the surrounding atmosphere, it ascends during the pauses between exhalation and inhalation above his head. In the open air, which is always in motion, it ascends at once and is dispersed and diffused never to return, and his lungs take in fresh air at each inhalation. In a room, however, it rises to the ceiling, where, if no aperture exist for its escape, it remains

until it becomes cool and loses its levity, or is displaced by other ascending currents, when it descends, diffuses uniformly throughout the air in the room, and the occupant breathes it over again.

The air in rooms is also further deteriorated by the aqueous vapour continually emanating from the lungs and skins of the occupants; and also by the products of combustion from gas, oil, and candles burnt therein. A man exhales from his lungs and skin 720 grains, or 13 ounces of aqueous vapour per hour. When the temperature of the air is high and the dew-point is low his lungs exhale an increased amount of vapour, while the quantity exhaled from the skin decreases. On the other hand, when the dew-point is high the air is less absorbent of moisture, and the amount of vapour increases from his skin and decreases from his lungs. Excessive heat, moisture, or dryness of the air render it insalubrious, and injurious to health. When air contains but little moisture its dryness rapidly absorbs vapour from the skin and lungs, contracts the blood-vessels at the surface, and surcharges others. Hence a due amount of water should always be present in the air to render it fit for respiration. Air is saturated with moisture when a cubic foot at 56° contains five grains, and at 66° seven grains of water. The quantity of moisture that should be present in air to enable it to absorb the vapour given off by the lungs and skin is when a cubic foot at 56° contains 3.4 grains, and at 66° 4.7 grains,—that is, when at 56° it is 1.6 grains, and at 66° 2.3 grains short of saturation. The 720 grains of aqueous vapour per hour exhaled by the body will then saturate 450 cubic feet of air per hour at 56°, and 330 cubic feet at 66°. An agreeable air exists in a room for respiration when the dry-bulb thermometer reads 50°, 63°, and 70°, and the wet-bulb reads at the same time about 45°, 54°, and 63°, giving dew-points of 40°, 49°, and 58°, successively; or when humidity is 66, complete saturation being represented by 100.

It is remarkable that, although the nature of the atmosphere, and the evil effects arising from breathing respired air have been known for nearly a century, houses are still built without any provision for bringing fresh air into the rooms and for taking vitiated air out of them, other than what comes in and goes out by doors, windows, and fireplaces. When the doors and windows are closed, air can only enter the rooms through the crevices around them; and the fire, together with the huge smoke-openings above them, devour the air, and cause strong cold draughts to rush through the crevices and across the rooms in the direction of the fireplaces, driving back the radiant heat and preventing it from warming the apartments. The object of the fire-grate should be, besides the cheerful glow of the fire, to warm the air and walls remote therefrom as much, and to use the fire-place for ventilation as little as possible. The combination of warming and ventilating by the fire-place alone has always ended in failure, and always will. A separate supply of air should be brought by a tube direct from the outer air under the floor to the sides of the fire-place, to feed the fire. The fire would then act almost independently of the air supplied to the room for ventilation. The area of the tube, and also of the chimney throughout, should be from 30 to 40 square inches, and the orifices of both should be provided with sliding regulators to contract and enlarge them at pleasure, and to close them in summer when fires are not required. This arrangement would check the cold draughts of air across the rooms from the doors and windows, and cause the floors to be warmer. Rooms, however, should not be dependent for the supply of air upon the chance ingress of it through the door and window crevices, but should be provided with sufficient tubes and apertures for its admission and distribution near the floors, either directly from the open air or indirectly from the staircase; and such tubes should be subservient to the admission of moderately warm air in winter and cool air in summer. Neither should rooms be dependent for the discharge of vitiated air wholly upon the fire-place, but should be provided with sufficient apertures in or near the ceilings, communicating with heated tubes, or with the smoke-flues, rising through the roof into the open air. Fresh air would then readily make its way into, through, and out of the rooms, partly by the fire-places, and chiefly by the openings above. This would render the rooms comfortable and salubrious. The currents should be gentle and under control, and sufficient to perform the office of purification.

Good ventilation is not less important than good drainage. In the eye of the law houses are not considered habitable unless they are properly drained. Neither should they be considered fit for occupation unless every room is properly ventilated also. In a sanitary point of view the one is as necessary as the other. Men and women who dwell in crowded towns, and work and sleep all their lives in close rooms without ventilation, and so continually breathe air contaminated with the waste of their bodies, go down to their graves seventeen years earlier than the men and women who dwell in the country, and work in the green fields, and breathe the fresh air. As the poor toilors for bread in pestiferous houses and workshops in towns are shut out from the balmy breeze and the glorious sunshine; from the sight of the prime rose, and the smell of the lawthorn; from the wild birds' songs in the hedgerows, and the lark's merry trill in the clear blue sky; the least those who live upon their toil can do for them is to make their homes and surroundings decent and habitable. There always have been, and always will be, poorer classes; that is inevitable; but there is no reason why, added to their poverty, the poor should be poisoned with foul air. It is sickening to enter some of the sties called houses in which thousands upon thousands of human beings eke out their miserable existence. The Hottentot and the Esquimaux are better housed in their mud-and-snow huts. It is marvellous that such barbarism and refined civilization should co-exist to the extent they do in our cities and towns.

When we enter unventilated rooms, especially bedrooms, that have been occupied for some hours, we immediately feel an unpleasant closeness and odour, and resort to the expedient of opening the doors and windows in order to pass currents of fresh air through the rooms. This in summer is not objectionable; but in winter, or in damp or chilly weather, it is not only inconvenient, but sometimes dangerous, to those who are exposed to such draughts. In crowded assembly and hall rooms, unprovided with adequate ventilation, the opening of doors and windows is particularly objectionable for the same reason. Now, in order to preserve the body from the pernicious gases which continually emanate from the lungs and skin, it is absolutely necessary that every room in which we live, and work, and sleep, should be provided with means for conveying away the vitiated air engendered therein as fast as it is produced, and for replacing it with pure air. The public generally have no voice in the construction of houses, but are obliged to take what is provided for them. The proper ventilation of houses does not receive that attention which its importance demands. If architects and builders would only think how much the health and comfort of those who are to inhabit the houses they design and build depend upon good ventilation, they would not hesitate to make special provision for it in every room. In future Building and Sanitary Acts clauses should be inserted compelling adequate provision for ventilating dwelling-houses, under proper supervision, other than by doors, windows, and fire-places. As the editor of the *Builder* truly observes, in reference to a kindred subject, "it is an imperial question of the greatest and gravest importance."

When air within and without a vertical tube, open at both ends, is of the same temperature, the weight of the internal and external columns is equal, and no motion ensues; but immediately heat is applied inside, the air therein expands, a portion overflows, and the remainder, being specifically lighter than the air outside, is forced upwards by the preponderating pressure. In this way an ascending current is produced through the tube; and as long as the internal air is warmer and lighter than the external air there will be an inflow at bottom and an outflow at top, and the velocity of the current will be in proportion to the difference between the temperature of the two columns.

Air expands, becomes light, and ascends by heat; and contracts, becomes heavy, and descends by cold. The ventilation of rooms and buildings, is dependent upon currents produced in the air by difference of temperature, whatever expedients may be adopted to cause it. Air expands $\frac{1}{100}$ of its bulk for every degree that its heat is raised; that is, 490 cubic inches at 32° become 491 cubic inches at 33°, and so on, increasing 1 cubic inch for every additional degree of heat. Hence, if the air inside a ventilating tube or a chimney be 127° and that

outside be 65°, the expansion inside will be $\frac{1}{80}$, equal to one-eighth nearly, or its weight will be one-eighth less than the external air. If the tube or the chimney be 50 ft. in height, the pressure causing the draught will be equal to $62 \times .002408 \times 50 = 6.92$ ft.; that is, 43.68 ft. in height of air at 65° will balance 50 ft. in height at 127°. Now, according to the law of gravitation, the velocity of the current through the tube or the chimney in feet per second will be equal to eight times the square root of the difference in height of the two columns; that is, equal to $\sqrt{632} = 8 \times 2.5 = 20$ ft. per second; and if the area of the tube or the chimney be 15 square inches, the discharge of air will be equal to $15 \times 20 = 300$ cubic inches per second, or equal to $300 \times 60 = 18,000$ cubic inches per minute. As, however, friction reduces the velocity about one-tenth, the actual discharge will be about 16,200 cubic inches per minute. From this example the flow of air into and out of rooms through ventilating pipes or chimneys may be easily calculated.

The system of warming rooms by hot water circulating through lengths and coils of iron pipes placed in the rooms has been successfully practised since 1816, when the Marquis de Chabannes first introduced it into this country. The principle upon which this system acts is that of convection, which consists in the particles of water at the bottom of a boiler, heated from below, gradually expanding and ascending through the colder particles above, which sink down by their gravity to be heated and expanded and to ascend in their turn, until the whole of the water in the boiler is raised to the boiling temperature, namely, 212°. If the boiler be closed at top, and a pipe filled with water be continued thence to any required height, then laterally to any reasonable distance, and finally down into the boiler near the bottom, the hot water in the boiler will rise through and displace the cold water in the ascending pipe until all the water therein also boils, or nearly so. Then, as the weight of the cold water in the descending-pipe will be greater than the weight of the hot water in the ascending pipe, motion will necessarily set in towards the boiler; and thus complete circulation will be established, which will continue so long as the descending-pipe parts with heat, which it does by radiation and conduction, and the water in the boiler receives additional heat from the fire.

This system has been aptly compared to the circulation of the blood. The heart is the boiler, from the left side of which oxygenized or bright scarlet blood is driven through every part of the body. In its course it loses its scarlet colour by parting with the oxygen, and becomes of a dark purple colour by taking up carbonic acid instead. It finally enters the right side of the heart, and is strained through the lungs, where exposed to the action of the air by respiration, it parts with the carbonic acid and takes up oxygen, which changes the colour again to bright scarlet. It then proceeds once more on its journey ended with life and nourishment to preserve and sustain the body.

Great heat is evolved from hot water circulating in iron pipes; and air heated from this source is much purer and healthier than air heated by any other artificial means. The hot-water pipes usually carried from the kitchen boiler to the roof and back again, for supplying a bath, or the upper part of a building, with hot water, are also capable of heating currents of air, which would not only warm the various rooms, but thoroughly ventilate them as well. These objects could be accomplished far more efficiently and economically than have hitherto been done, by carrying the hot-water pipes up and down in air tubes, communicating with the external air and with the rooms, and constructed within the thickness of the partitions which divide the rooms from one another, as shown by the following diagram.

From the top of the boiler, *a*, at the back of the kitchen fire, a pipe, *b c d e*, ascends in an air tube, *A*, fixed in the partitions dividing the rooms, to a closed cistern, *f*, placed in the roof. From the bottom of this cistern a pipe, *g h i k l m*, descends in another air-tube, *B*, built in the partitions, and returns to the boiler near its lower extremity at *n*. Two other pipes, *g d n l* and *h o k*, branching out of the last-mentioned pipe at *g* and *h* at top, also descend in air-tubes *C* and *D*, concealed within the partitions, and join the return-pipe at *k* and *l* at bottom. Now, as the water in the boiler becomes heated by the kitchen fire it expands and ascends in the pipe *b c d e* to the cistern *f*, and as the pressure

of the colder and heavier column in the pipes *g h i k l m*, *g d n l*, and *h o k*, is greater than that of the warmer and lighter columns in the pipe *b c d e*, movement takes place through the former pipes towards the boiler. Hence circulation is established from the boiler upwards through the pipe *b c d e* to the cistern *f*, and downwards through the ranges of pipes *g h i k l m*, *g d n l*, and *h o k* to the boiler, the velocity of which will depend upon the difference between the temperature and weight of the water in the ascending and descending pipes. The hot-water cistern *f*, the pipes, and the boiler, are supplied with water from a small cistern (not shown in the engraving) fed from the water-closets, and is placed a little above the other, and is of sufficient capacity to supply a bath, the water-closets, and the bed-rooms with cold water. The bath and bed-rooms would also be supplied with hot water from the hot-water cistern *f*, in the usual manner. A pipe, *t*, rises from the hot-water cistern out through the roof for discharging steam and air rising from the water in the pipes. The water will continue to circulate in the pipes and give out heat, after the fire is extinguished, so long as the temperature is higher than the surrounding air.

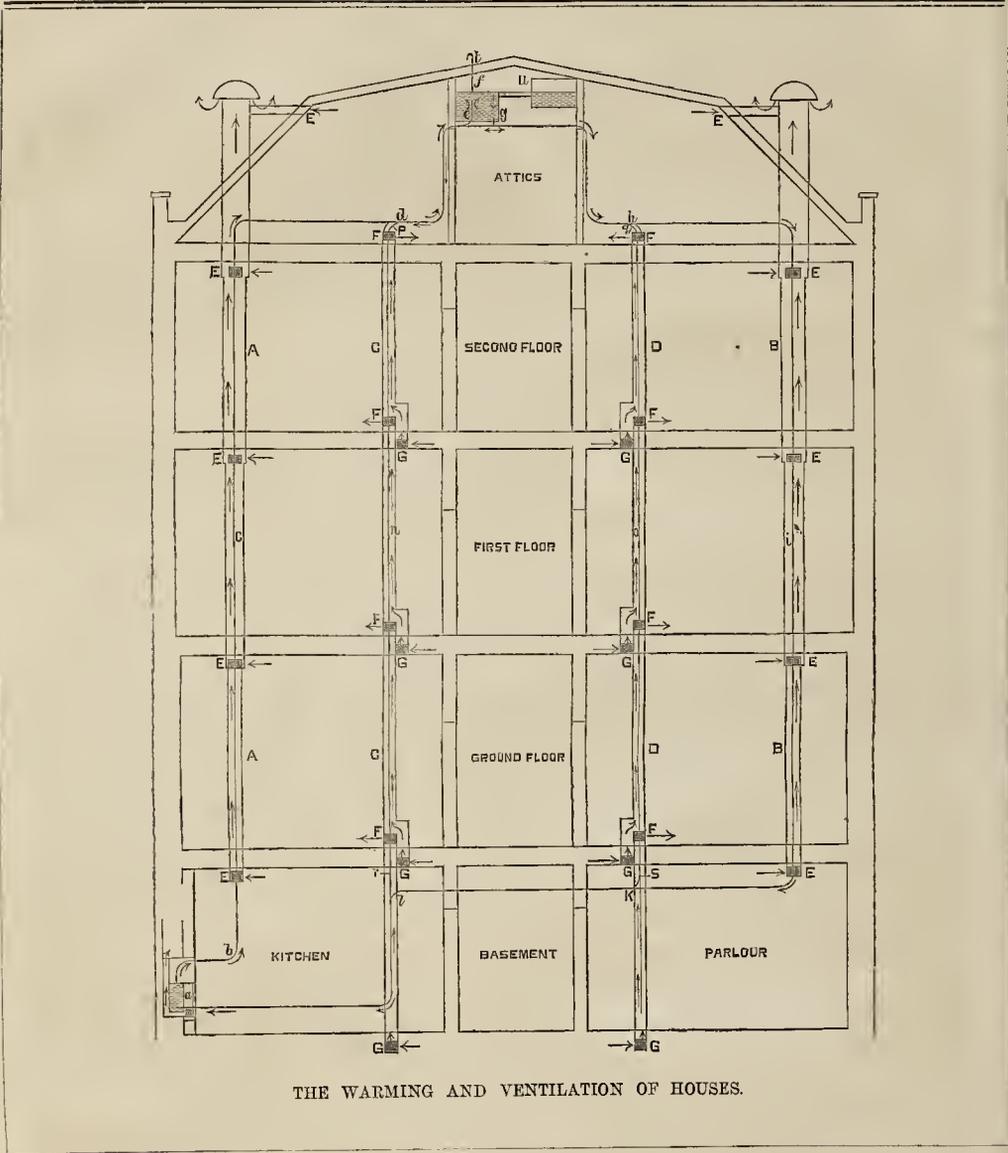
Now it is evident that by enclosing hot-water pipes in columns of tubing placed in the partitions or other walls of houses, in the manner shown by the diagram, considerable heat and velocity would be imparted to currents of air admitted into the tubes at any points. If, therefore, the tubes *A* and *B* be carried out through the roof into the open air, and openings are formed into them at *E* near the ceilings of the rooms on both sides of the partitions, the heat continually evolving from the hot-water pipes would expand the air within the tubes so as to produce strong upward currents therein, which would effectually ventilate all the rooms opening into and communicating with these heated tubes. Also if pipes are introduced between the joists of each story through the external walls to inlets at *G*, so as to conduct the external atmosphere into the air-tubes *C* and *D* surrounding the hot-water pipes *d n l* and *h o k*; and if openings are made in the tubes and skirtings at *F* near the floors, on both sides of the partitions, currents of fresh air, entering the several inlets at *G*, would, as they rise up the tubes *C* and *D* to the next floors above, be heated by the hot-water pipes therein, and the air so tempered would be delivered into the rooms through the inlets at *F*. The air-tubes *C* and *D* are stopped off by diaphragms just above the inlets at *F*, so as to turn the warm air rising up the tubes below into the rooms. Smaller horizontal air-tubes, with smaller hot-water pipes therein, arranged so as to form plinths to the skirtings, could be laid, when desired, from the vertical air-tubes and hot-water pipes for distributing the warm air to other parts of the rooms; or pipes could be laid from the air-tubes to the angles or sides of the rooms for this purpose. Pipes would also be carried from the centre of the ceilings to convey away the products of combustion from gas-burners, oil lamps, &c., into the air-tubes *A* and *B*.

In summer, when cold air only would be required to circulate within the rooms, the warm-air inlet-tubes *C* and *D* could be converted into cold-air tubes by turning off the hot water circulating in the pipes within them by stop-cocks placed at *p* and *q* at top and at *r* and *s* at bottom. This arrangement would tend to increase the ventilating power of the tubes *A* and *B* at such times by the increased heat which would be given off by the hot-water pipes therein. Additional cold-air tubes, of small size, could be laid from the external air alongside the tubes leading to the inlets at *G* for supplying cold as well as warm air to the rooms through the inlets at *F* for regulating the temperature when desired. Screens of perforated zinc, or wire gauze, of different degrees of fineness, would be introduced in the inlets of the tubes which convey fresh air from the external atmosphere to the tubes *C* and *D*, for filtering the air of blacks, dust, and other impurities; and the bottom of these inlets would slope upwards and inwards in the thickness of the walls for discharging the filtered impurities outside the walls. The openings at *E* and *F* would be arranged so that a brush could be introduced and worked up and down in the tubes to remove dust, and thus keep them clean. Long diaphragms would also be fixed opposite the openings at *E* and *F*, to prevent the transmission of sound or communica-

tion from one room to another. The hot-water pipes would be of strong wrought iron with screw joints. These joints would be placed opposite the openings at *E* and *F*, so that they could be examined or unscrewed, and the pipes removed, when required. The air-tubes would be of cast or wrought iron, or stoneware, with sockets, or with flanges bolted together, so as to make the joints water and air tight. The warm-air tubes would be of the same size throughout; but the vitiated air-tubes would increase in size upwards in proportion to the additional quantity of air admitted into them from each floor. The warm air would pass into the rooms at *F* through perforated zinc or wire gauze, with slides for enlarging or contracting the openings at pleasure. The outlets for the vitiated air at *E* would be fitted with sliding ornamental gratings. The draught up the columns of tubing *A* and *B* would be so strong, by the heat given off by the hot-water pipes therein, that it would be scarcely possible for a down-draught to occur. But in order to prevent eddies heating down the tubes, they would be fitted at top with turn-cups, or surrounded with projecting hollow truncated cones or pyramids. Eddies striking against their oblique surfaces would be reflected upwards, instead of blowing down the tubes.

The boiler in the basement and the cistern in the roof could be connected by an ascending pipe, with separate air-passages, formed and holed on each side of it,—one serving to admit fresh warm air into the rooms, and the other to convey the vitiated air out of them, as previously described. The hot-water pipe would have sealed wings or diaphragms between the two air passages, so as to effectually cut off communication between them; and heat would be transmitted to each passage from the opposite sides of the hot-water pipe. With this combination of a hot-water pipe with air-tubes in one column, passing up through the staircase, or at any other convenient place, all the rooms of the house could be supplied with warm air, and thoroughly ventilated, by carrying pipes from the outer air into the warm-air passages, and thence into the rooms near the floors; and by leading other pipes from near the ceilings into the vitiated-air chamber, which would pass out through the roof into the open air.

In comparatively small dwelling-houses having only front and back rooms on each story, the rooms could be warmed and ventilated by two columns of tubing, similar to *A* and *C* in the diagram, placed in the dividing partitions, one for giving warm air to, and the other for taking vitiated air from, the rooms, and carrying a hot-water pipe direct from the top of the boiler up the vitiated-air tube *A*, to a cistern in the roof, and back again down the tube *C* to the boiler near the bottom. In large houses and mansions, with rooms surrounding a central staircase, two, three, four, or more pairs of columns of air-tubing could be built in the partitions or other walls dividing the rooms, and also in the walls at the sides and ends of large rooms, with hot-water pipes carried up and down within the tubing from the kitchen boiler, or from a separate boiler specially arranged for the purpose in the basement, to a cistern and cold-water supply arranged in the roof. Houses already built could be warmed and ventilated by this system, by fixing columns of air-tubing, shaped like pilasters, and occupying but little space in the angles or other parts of the rooms, and making good the cornices and skirtings round them. Hospital wards, infirmaries, barracks, and workhouses could also be agreeably warmed, and effectually ventilated by this system. Gentle currents of fresh warm and cold air could be brought into the sleeping and sick wards between the beds near the floors, and vitiated air discharged at the ceilings; and, in addition to this, hoods, with pipes leading from them into the vitiated-air tubes, could be placed over the patients, so that the exhalations from their lungs and skin would rise at once into the hoods, and pass away without being diffused through the air in the wards. However perfect the construction of water-closet apparatus may be, foul air escapes from them into the closets when the valves are opened, and also at other times. It is extremely desirable therefore that water-closets, especially stacks of them in hospitals, barracks, &c., should be well ventilated. This may be easily done by carrying a small column of tubing, with a hot-water pipe in it, up in the partitions or walls of the closets, with openings into it from under the seats, and at the ceilings. In this way the foul air would be effectually drawn off into the upper at-



THE WARMING AND VENTILATION OF HOUSES.

sphere. The drains could be ventilated by the same means.

The volume of air necessary to be passed through rooms, in order to thoroughly ventilate them, should not be less than 15 cubic feet per minute for each occupant. In ordinary dwelling-houses it would suffice to pass 45 cubic feet per minute through the rooms in the basement, 60 cubic feet through the dining and drawing-rooms, and 30 cubic feet through each bed-room. The air should move through the rooms to the discharging orifices in or near the ceilings with a velocity of 2½ feet per second, or 150 feet per minute. At this speed the movement would be gentle and almost imperceptible; and the rooms would be found after-occupation for any length of time as agreeable and salubrious as if they had not been occupied at all. The free areas of the orifices of supply to, and discharge from, the basements, to produce these results, would be in the basement rooms $\frac{1}{16}$ of a square foot; in the dining and drawing-rooms $\frac{1}{16}$ of a square foot; and in the bed-rooms $\frac{1}{16}$ of a square foot. It should be understood that complete interchange of air in rooms, to the above extent,

cannot be produced by *natural ventilation*; that is, by the small difference subsisting between the temperature of the air inside and outside of the house when no fires or lights are burning in the rooms. It can only be obtained by some *artificial power*, either for forcing fresh air in or drawing the vitiated air out; and no better, cheaper, and safer method can be adopted than that of hot-water pipes placed in air tubes carried up in the partition walls of buildings, as previously described. The vitiated air upon entering the columns of tubing is immediately warmed and expanded; and, in consequence, it acquires an ascensional power which is proportional to the height of the tubing and the difference of temperature between the air inside and the atmosphere outside. The areas of the tubes for discharging the air could be calculated from these differences of temperature.

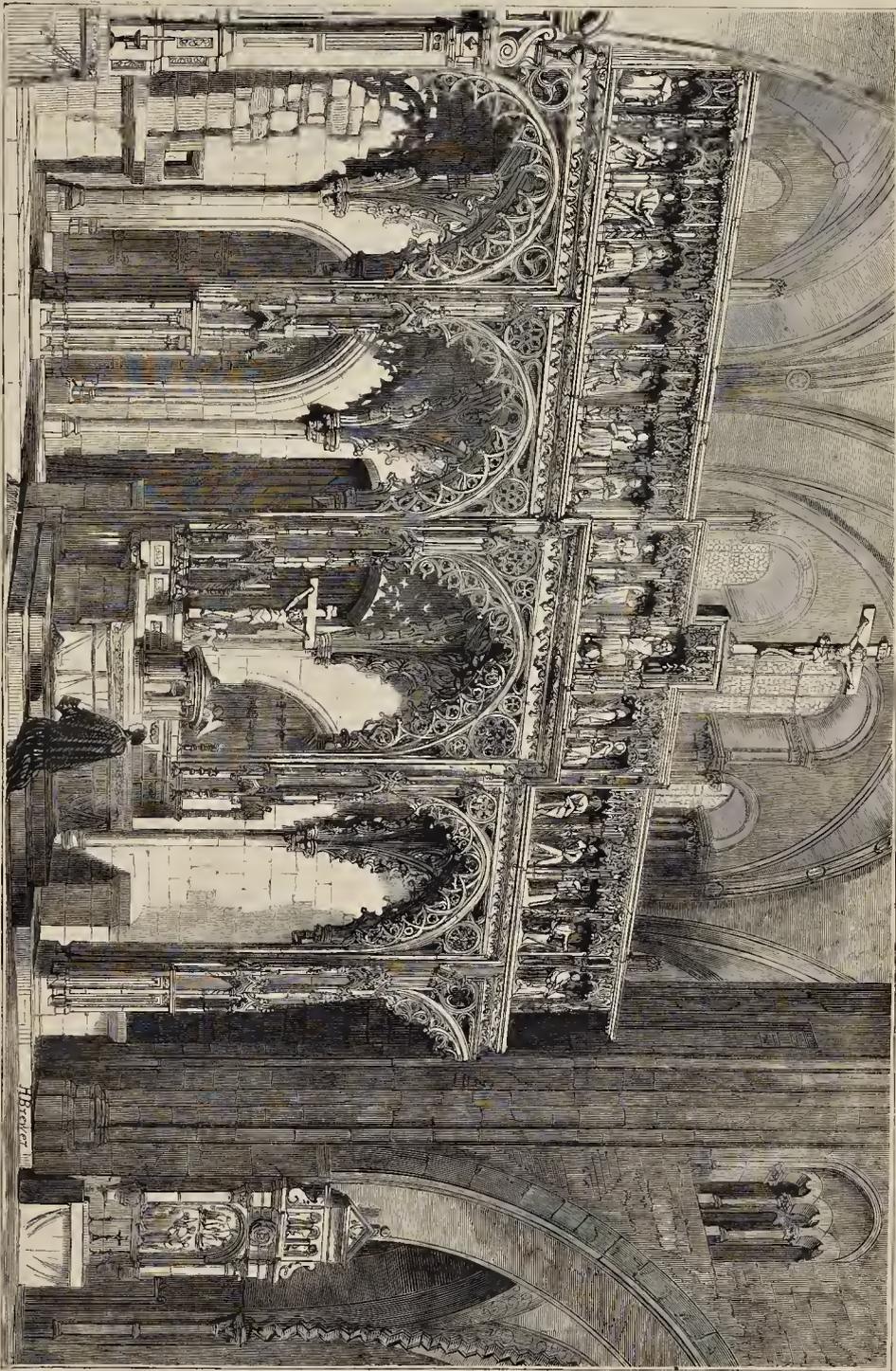
This system of warming and ventilating buildings is eminently practicable, and is adapted to every class of house, from the smallest to the largest. It is free from complication, easily put together, safe and certain in action, very economical, and not liable to get out of order

when properly arranged and constructed. As the hot-water pipes and the air-tubes would be contained within the thickness of the partitions, they would not be seen, and would occupy no space in the rooms. By this system, while fresh warm or cold air would be flowing into the rooms near the floors, vitiated air would be flowing out at the ceilings, and thus a constant interchange of air would be going on in the rooms, rendering them comfortable and salubrious.

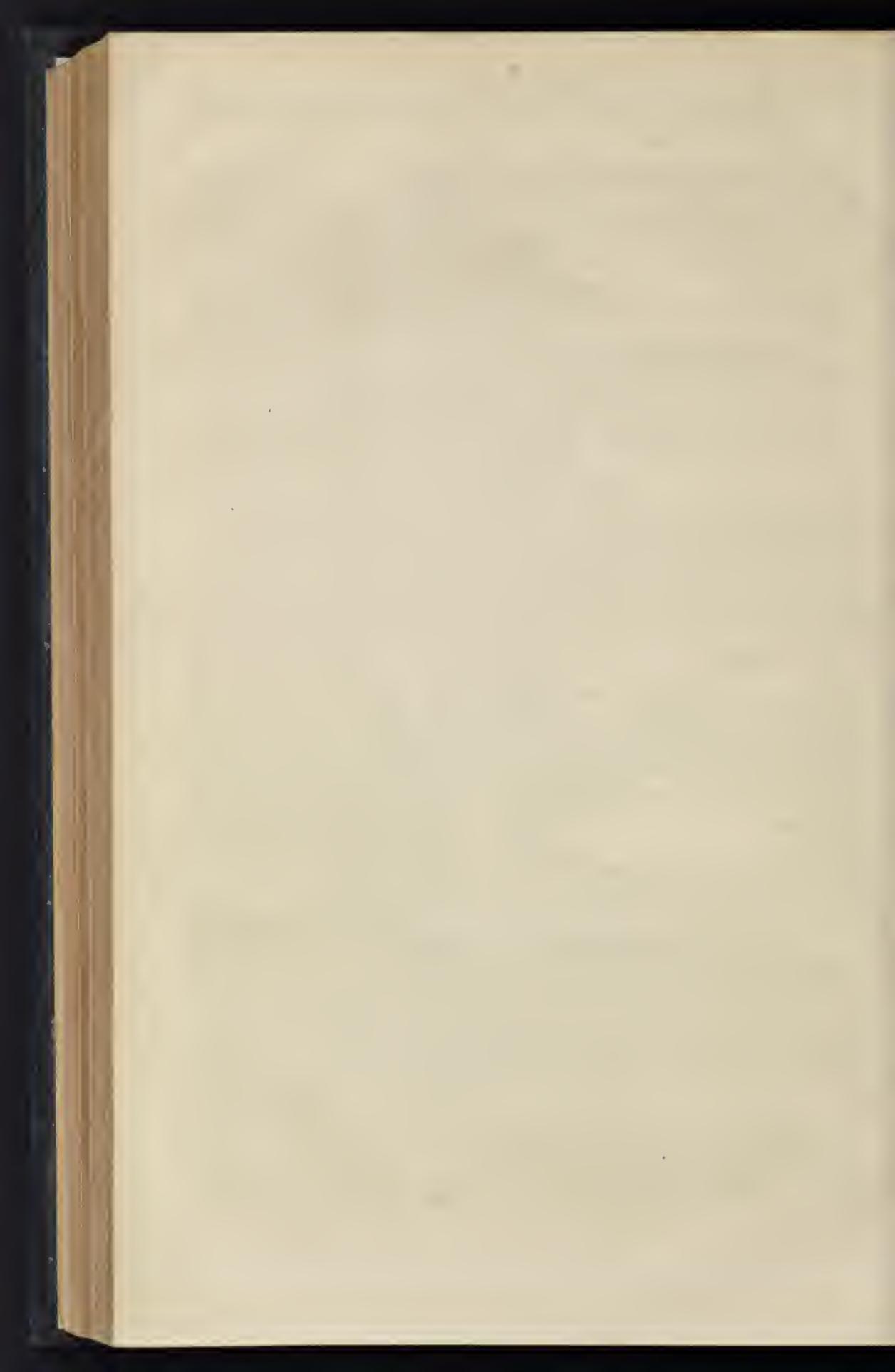
JOHN PHILLIPS.

REFERENCES.

- A A and B B. Vitiated-air columns.
- C C and D D. Warm-air columns.
- E. Vitiated-air outlets from rooms.
- F. Warm-air inlets to rooms.
- G. Fresh-air inlets to columns C C and D D.
- g. Boiler at back of kitchen-range.
- h c d e. Hot-water ascending pipe.
- f. Hot-water cistern.
- u. Cold-water cistern.
- g h i l m. Hot-water descending pipe.
- n and h o k.
- p q r s. Stop-cocks for turning off circulation in pipes n l and h o k.
- t. Escape-pipe for air and steam.



CHOIR SCREEN IN MUNSIEKER CATHEDRAL, WESTPHALIA.



ROOD-SCREEN AT MÜNSTER.

A short time ago we published a letter from Münster, in Westphalia, calling attention to the fact that the elaborate rood-screen in the cathedral of that town was doomed to destruction, and begging us to bring the matter before the public in order to see if anything could be done to save it. From inquiries we have since made, and information recently received, we fear that the removal of this ancient monument is decided upon. As it seems useless to attempt to prevent this act of destruction, all we can do is to present our readers with a careful drawing of it in its present condition.

It is sad to think that this rood-screen should have escaped the Iconoclastic spirit of the sixteenth century, the mad rage of the Anabaptists, the scarcely less destructive Italianization of the seventeenth and eighteenth centuries, only to be destroyed in our own day, when works of Medieval art are prized and cared for. And what makes the matter more astonishing is the fact that the very people who have conceived this act of barbarity have shown themselves most enthusiastic church restorers. Witness the very judicious restoration of the cathedral itself, where the whitewash has been carefully removed from the walls, bringing to light many most interesting remains of ancient painting; the removal of the hideous and incongruous organ-gallery, the opening out of the exquisite arcades surrounding the western choir, and the destruction of the walls which built out the lower stories of the western towers. Nor has this zeal for the good cause confined itself to the cathedral alone; for the restoration of the Church of St. Moritz is one of the most costly and beautiful that has been yet attempted in Germany. The churches of St. Martin, St. Ludgeri, and St. Mary have also been restored, furnished, and decorated, in a satisfactory manner; and even the hideous seventeenth-century church of St. Giles has been beautified (as much as such a building could be), by the superb frescoes of Steinle. The new Capucine church and convent form a most picturesque and spirited little group of Gothic buildings; and, although the new Jesuit Church fails in detail, it is solemn in effect and well planned.

The only reason given for the proposed destruction of this rood-screen is the fact that it shuts out the view of the high-altar from the nave; and it seems to us that this might be very easily remedied by pulling down the solid wall which forms the back of the screen, and substituting in its place open arches (which has been done at Louvain, where there is a very similar screen), or piercing the wall with open tracery panels, and removing the three altars which occupy the centre and side compartments. We feel sure that, if this alteration were made, no great cause for complaint would remain, as what would be left of the screen would form no real obstacle to a view of the choir and high-altar.

We will now give a short description of this rood-screen as it at present exists. It is (as will be seen from our engraving) a rich specimen of the latest German Gothic, and was erected in the year 1490. It consists of a solid wall pierced with two doorways, in front of which stands an open arcade of five semicircular arches with open buttresses between them, and a series of richly canopied niches above them, twenty-one in number, and each containing a statue. The centre one represents "Our Lord in Judgment," and the twelve nearest the Apostles, from which this screen is called "Apostelgang." The vaulting which connects the wall with the open arcade is very irregular in construction: it is, in fact, a "skeleton vault," consisting of ribs only. Each rib is connected with the wall, from which it springs, by open tracery, so as to form a kind of bracket, and these brackets support a flat roof, composed of slabs of stone: a roof of the same construction exists over the baldachino in the Theysen Church at Prague. On the top of the screen is a gallery or passage about 8 ft. wide, which is approached by two "newel" staircases, contained in circular turrets, which are pierced with flamboyant tracery. These staircases are at the back of the solid wall of the screen, and are entered from the choir. This screen stands under the western arch of the "crux," so that the intersection-space is included in the choir.

In addition to this screen the Cathedral of Münster contains many other ancient articles of church furniture; for instance, a fine set of double stalls, early sixteenth-century work, two

noble stone tabernacles of the same date, a very ancient clock, a bronze font, a credence-table, and a number of reliquaries of the twelfth, thirteenth, and fourteenth centuries.

Our engraving is from a sketch made for us on the spot by Mr. Brewer.

THE ARCHITECTURAL ASSOCIATION.

The annual *conversazione* of the Architectural Association was held on Friday evening, the 30th ult., at the Rooms, in Conduit-street, when the chair was taken by Mr. W. White, who distributed the various prizes. The first on the list was for the best essay on the Effect of Literature on Architecture, awarded to Mr. L. F. Day; and the second to a gentleman who answered to his motto, "Buildings, not Books," and received his prize. Mr. Walter Ewll gained first prize for the best series of sketches in the class of Design, the second being awarded to Mr. W. L. Spiers. The prize for the best summary of subjects in the class of Construction and Practice, was adjudged to Mr. Bell, and for the best figure drawings to Mr. Lewis. Mr. W. Henman gained a prize for the best measured drawings of existing buildings in England; and two prizes for designs for a town church were awarded—the first to Mr. W. L. Spiers and the second to Mr. A. Hill.

A testimonial was then presented to Mr. D. Mathews, in acknowledgment of his services as hon. secretary.

The Chairman, in his address, dwelt at some length upon the necessity for a liberal education as a sound basis for the reception of art training, and went on to say that the converse of this proposition had begun to be also recognised, namely, the importance of art training as a portion of a liberal education. The late Sir Frederick Slade had left 45,000*l.* for the purpose of promoting this object, and a plan was likely to be now adopted by University College, which was to receive a large share of the means, for carrying out a comprehensive course of art study.

The address was much too long for the occasion, and had the effect of dissipating the meeting.

After the address, Professor Kerr made a few observations, and some music concluded the evening.

THE ARCHITECTURAL ASSOCIATION CONVERSAZIONE.

SIR.—There is one feature of this *conversazione* which I wish to bring prominently before the members; and that is, that Mr. Carne's drawings for the Royal Academy studentship were upon the walls. There were other members who went in for the studentship with Mr. Carne, and I was among the number,—but our drawings were not there because we did not think of sending them. I have a suggestion to make to the committee, which I want to reach the eyes of all members, and that is, that a certain portion of the walls of the gallery be allotted for the hanging of Royal Academy probationship and studentship drawings by members; and that a bill be fixed over these drawings to announce the fact that they are members' probationship and studentship drawings. This would show a little of what members do out of the Association; and I trust that all members will aid in the carrying out of this scheme. A MEMBER.

THE ARCHITECTURAL MUSEUM.

The following gifts of materials and decorative work have been received or promised. The donors well deserve the publicity we can give them. The Caen stone for the interior of the building by M. Foucard. A figure of St. George, carved in Sicilian marble, by Sig. Fabbricotti, from a design given by Mr. Redfern.

Terra-cotta busts for the front of the building by Mr. Blashfield; subjects being William of Wykeham and Sir C. Wren.

Red granite shafts for windows by McDonald Field, & Co., and Fraser & Son, of Aberdeen.

Patent steel sashers by Clark & Co. (a similar offer from Bunnett & Co. came too late).

Tiles for the front by Codwin, of Legwardine, from a design by Lord Alwyne Compton, and for the floor by Minton, Maw, Codwin, Oppenheimer, Rust, and Malkin. Patent painted tiles, representing two processions, for front of building, by Harland & Fisher.

Stained glass for windows by Clayton & Bell, Lavers & Barrand, and O'Connor.

Iron-work for screen by Hardman, Peard & Jackson, Brown & Downing, Hart & Son, and Richardson, Slade, & Ellison.

Window casements by Burt & Potts.

A large patent stove by the London Warming and Ventilating Company.

A sun-burner by Strode & Co.

Mosaic-work by the Salvati Company, from design by Clayton & Bell; also mosaics given by Rust & Co.

Marble mosaic by Harland & Fisher.

Coloured decoration by Mr. Charles Hudson.

Carvings by Messrs. Poole & Son, being the seal of the A. M. and the heads of the architects of the Parthenon, and of St. Sophia and of William of Sens; and by Messrs. Rattee & Kell and Mr. Whitehead.

Two large figures, representing Architecture and Sculpture, by Mr. Earp and Messrs. Farmer & Brindley.

Furniture by Cox & Son and Mr. Chapman (an art-workman).

Tracery over door and door-frame in oak by Rogers & Booth, of Gosport.

Six iron principals for roof by Kalk & Lucas. Lamps for entrance, and patent springs for screen, by Hart & Son.

Washing convenience by Jennings.

Stain and varnish by Mr. Swinburn.

The Council expect to move the collection from South Kensington in January, 1869, when it will be at once enriched by fine specimens taken from various cathedrals by Mr. Octavius Hudson, some from Westminster Abbey and other places by Mr. Scott and Messrs. Poole & Son, and a complete set of figures from Henry VII.'s chapel, presented by Mr. Brucciani.

The present income from annual subscriptions will be utterly inadequate for the maintenance of the Museum in its independent existence, and ought to be at once increased by 200*l.* or 300*l.* a year.

A committee for considering the best means of ensuring practical teaching by the collection has been formed, and with such a collection the Council look to the architectural world for substantial support in carrying out their various aims.

AGRICULTURAL LABOURERS' COTTAGES.

THESE have been recently erected at Down Hall, in Essex, by Mr. Selwin Ebbatson, M.P., several cottages for agricultural labourers, each cottage containing a living-room, scullery, and three bed-rooms, with an equipment of offices and fittings, including hard and soft water supply. Some of the cottages have all their sleeping-rooms on the chamber-floor, while others are arranged with one of the bed-rooms on the ground-floor. The cottages have been built with Cambridge perforated bricks, relieved with hands of Staffordshire red and black bricks. The roofs are covered with Huntingdonshire tiles of an ornamental character, having projecting eaves, gables, and porches. The works have been carried out by Messrs. Bell & Son, of Cambridge and Safron Walden.

Similar cottages have also been erected on the estates of Mr. R. P. Long, M.P., near Chippenham, in Wiltshire, built of dark-red bricks and covered with Bridgewater tiles. The works have been carried out by Mr. George Bezzant, of Chippenham. Similar cottages have likewise been erected near Wallingford, Berks, for Mr. N. Humphrey, and in Cheshire for Mr. W. Wright. The several works have been carried out from the designs and under the directions of Mr. John Birch, whose plans have also been adopted by the Duke of Rutland.

HUDDERSFIELD CONVALESCENT HOME.

MR. CHARLES BROOK, JUN., J.P., a member of the firm of Brook Brothers, thread manufacturers, of Meltham Mills, near Huddersfield, having given the munificent sum of 30,000*l.*, to form a convalescent home at Huddersfield, the foundation-stone of this edifice has just been laid, with Masonic honours.

The Home is to stand on the summit of Meal-hill. The site is a portion of fifteen acres, and the prospect it commands is charming. Meal-hill is approached by a road branching from the Holbarn and Holmfirth turnpike road.

The style of architecture adopted for this hospital is of the domestic Gothic character, with a few modern developments. The main

ront will face north-east, and be about 190 ft. long. The centre part of this will project a little, and be devoted to the administrative department, and will contain, on the ground floor, a central entrance, with matron's parlour, surgeons' consulting-room, and patients' waiting-room. The wards branch out right and left, for each sex, and consist, on the ground floor, of capacious staircases and corridors, which, being on the south side of the building, will be agreeable for the invalids in bad weather, leading to the convalescent day-rooms and night-wards for the infirm. The patients' entrances from the recreation-grounds will be to the main staircases, under covered glass porticoes. Extending further south-west is a dining-hall, with the kitchens, pantries, and store-rooms beyond. On the first floor, the central part contains the matron's and nurses' lodgings, and store-rooms for bedding and linen. There are two night-wards for each sex, which are divided by low partitions, 8 ft. high, for privacy, each apartment accommodating two beds. There are lavatories and bath-rooms, furnished with hot and cold water. There will be accommodation for thirty males and thirty females, and the hospital will be so arranged as to be capable of enlargement. The apartments for the domestics will be over the kitchens. The buildings are to be constructed of Yorkshire stone, from designs prepared by Mr. Edward Birchall, architect, Leeds, and will be carried out under the superintendence of Messrs. Kirk & Sons, architects, Huddersfield.

BRADFORD HOUSE OF RECOVERY COMPETITION.

THE designs for this building have been on view. The instructions issued to the architects were that the general arrangement of the hospital should be on the pavilion system.

Messrs. Lockwood & Mawson present two designs, the one Gothic and the other Italian. Their designs illustrate the pavilion principle, developed in two modes of arrangement, both with the pavilions on lines from north to south, and therefore with east and west aspects to the wards. The buildings are two stories in height. Each ward, to contain twelve beds, would be 60 ft. long, 25 ft. wide, and 16 ft. high, with 24,000 ft. cubical contents, allowing 2,000 ft. to each patient, and also a private ward, containing nearly 3,000 cubic feet. The architects state their "opinion that 100l. per bed is sufficient for the cost of the sixty patients provided for in the design, or the sum of 6,000l." for the structure, and the separate building, for twenty patients, they estimate at 50l. each, making an extra sum of 1,000l.

Mr. E. Birchall's design is Gothic, two stories in height, with the administrative department in the centre, and the wards at either side, connected with the central building by corridors. He gives accommodation for fifty-two patients, the wards on either side in each story for twelve patients, who have each rather more than 2,000 cubic ft. of air, and a small ward is shown, capable of accommodating one patient. The wards run nearly north and south. Mr. Birchall considers that it could and ought to be built at a cost of 100l. per bed, but thinks that the sum might advantageously be raised to 150l. per bed.

The selected design, by Messrs. Andrews, Son, & Pepper, is treated in a different manner from the others. Their first design shows a two-story building, but in their second the wards are only one story. In the centre of the front pile of two stories, which partakes somewhat of the Gothic style, is the administrative department, where apartments for the board-room, the waiting-room, the surgeon, the matron, and other officials are located. The front faces to the north. The convalescent wards are placed right and left of the centre. The acute, or fever hospital wards, four in number—two for males and two for females—are in the rear, and on the south side of the administration, each ward having a south, east, or west aspect, and shut out from the north. The wards are each 60 ft. long, 25 ft. wide, and 16 ft. in height, lighted by five windows on either side, the space between each ward being three times their height, and they will each accommodate twelve patients. The wards will be warmed by Pierce's stoves, Sheringham's ventilators and other means being used to secure a proper supply of fresh air, and the top of each window fitted with fixed open panes of glass. The wards are attached by closed corridors of wood and glass, roofed with

slate, and another corridor leads from the administration. Each patient will have more than 2,000 cubic feet of air space, and the walls of the ward will be covered with cement, and the floors be of oak, the roof and window-frames of iron. Sixteen patients can be accommodated in the convalescent and fifty-two in the acute wards, and the cost of the building will be about 110l. a bed, or 8,000l.

NORWICH LUNATIC ASYLUM COMPETITION.

SOME months ago the corporation of Norwich invited Mr. Brown, of that city, and Mr. R. M. Phipson, to submit designs for the proposed New Lunatic Asylum, and those gentlemen accordingly did so. After some discussion, the council referred the plans to Dr. Robertson, of the Sussex, and Dr. Campbell, of the Essex Lunatic Asylum, in the state in which they were received by the committee, and each of these gentlemen was asked to give his independent opinion as to which set of plans would be the best calculated to meet the views which the council had in erecting the Borough Asylum of this city. Both these gentlemen reported strongly in favour of Mr. Phipson's plans, and at a meeting held on the 31st ult., the town-council adopted them.

The reasons given by Dr. Robertson as those on which he grounds his preference are suggestive, and may be useful to other designers:—

"1st. Mr. Phipson's plan in its general features and design is original in conception, and an advance on the present standard of asylum architecture in the direction in which the medical superintendents of asylums have long pointed, viz.—

- The means of classification and distribution of the patients is complete.
- The day rooms are all on the ground floor; it greatly facilitates the working of the house.
- There are no complicated dark corridors to intercept ventilation.
- The access to the wards from the centre block is simple and ready.
- The thorough ventilation of the wards by natural means is insured.
- The arrangements for the wards, offices, w.-o.s., &c. are of the best construction.

2nd. The general distribution of the buildings specially commends itself to my approval, and stands in marked contrast to the ill-designed crowding of the different buildings in Mr. Brown's plans.

The division into administration block, wards, dining-hall, laundry, workshops (with accommodation at the two latter for working-patients) is very complete, and a clever application of the pavilion system to the works of an asylum.

3. Above all, these arrangements of Mr. Phipson's commend themselves by the great facility which they offer for convenient and economical extension of the building, should such want arise (as in all asylums it has done)."

HERTFORD LABOURERS' COTTAGE COMPETITION.

STR.—In reply to your correspondent "Competitor" on this subject, I had my drawings returned safely (two sets), with letter, stating that the premium was awarded on the day of the Agricultural Show to Mr. W. H. Scriven, of Leamington. COMPETITOR 80 and 81.

CONCRETE HOUSES.

STR.—Referring to a letter by "Artifex" in your journal, page 788, relative to the fall of a concrete house at Twickenham, I beg to forward you plans of the building, so that you may form your own opinion; and I challenge "Artifex" to erect a house with 14-inch walls in ordinary brickwork built at the same rate per day that this concrete house was, without the same result, i.e., the penalty of falling down by the time his walls are 38 ft. high. First, "Artifex" informs you he found on inquiry the work had been superintended by me. This statement is entirely false: I saw the building once only before I was informed that part of the front wall had fallen. At the time I saw the building the walls were 9 ft. high only, and ready for the joists. The first defect in construction I complained of was the large recesses at each quoin of the building as shown on plans, and informed the clerk of works it was an absurdity to nearly sever the walls in such a manner, especially where the strength was so very essential. I was informed the space was left for a 5-inch water-pipe. I requested him, before proceeding further, to obtain the pipe and put them in with neat Portland cement without delay, but, instead of doing so, the building was

carried up 38 ft. without joists or any tie whatever; and, to make matters still worse, all the quoins were chamfered off to one-third the thickness of the wall for an ornamental water-spout. I beg to call your attention to the back front, 40 ft. by 38 ft. high, with its large openings, and without any cross wall, joist, or tie of any description. Further, I must ask you to notice the long party wall, and ask if it is practical building to construct this main stay recessed in the manner as shown for cupboards, &c., leaving only 4½ in. of concrete work at the back.

The clerk of the works informed me that the part in front which first gave way stood on the most treacherous foundation, indeed it was a complete quicksand. I must also mention, that although the gravel was some of the finest I ever saw, being clean and sharp, the proportion of sand was far too great. Had I superintended the construction I should have passed the gravel through a ½ screen: see my pamphlet.

Last, but not least, the quality of the cement was of the very worst description. There are a number of good cement manufacturers who supply cement of a quality to be depended upon. If builders will go to dealers (who must have profits), and not to manufacturers, what result can they expect? I should certainly recommend intending builders in concrete for the future to buy of the makers, and I shall at all times be ready to give them names of those I can confidently recommend; also to give advice as to the mixing of gravel concrete, which requires different treatment to burnt hallast or other material.

I attribute this failure to the defects in the construction, each sufficient of itself to cause such an unfortunate result to the proprietor.

And now, sir, in fairness and justice to myself, permit me (if I am not trespassing too much on your valuable space) to say "Artifex" is either prejudiced against Portland cement concrete or ignorant of its adhesive strength, or he would have been more candid in his communication, and mentioned that the walls were carried up 38 ft. without joists or ties of any description, and the four large chases for rain-water pipes could not possibly have escaped his notice. He then states, "I noticed that the work had broken in straight courses evidently at the level at which the machine had been shifted, showing imperfect adhesion at this point. This is, undoubtedly, a grave defect, caused by the wall being formed in layers or courses of 18 in. in height, and one layer setting before the next was added."

If, at any time the work has been standing still for a month, all that is required is to well moisten the top of the wall or mix the first 3 in. or 4 in. of concrete with more water, or a little thin grout; but this operation is not at all necessary where the work is green,—as it must be, if carried on every day. Again, concrete is always left rough at the top of the mould, and (not like smooth brick) giving a sufficient key for the next layer.

To prove the adhesive qualities of Portland cement concrete, I can show at my factory (built between two party walls of 12 ft. span) a beam, 2 ft. 3 in. deep and 6 in. thick, packed full of rough Kentish rag, large chippings from flint runs, Yorkshire stone, and brick-bats, which can be seen on the face, which beam will carry 12 tons (if the walls which form the abutments do not give way).

Lastly, I will forfeit to "Artifex" 50l. if I do not break an opening in any ordinary brickwork (not hie lias lime) in any warehouse in New-street, Southwark, in one-fourth the time "Artifex" can in the concrete warehouse now building in Great Guildford-street, Southwark, he being liable to me for the same amount if I am successful. J. TALL.

THE following letter, which we received last week from the owner of the house, puts a different face on part of the transaction as between himself and the patentee:—

"Sir,—Considerable notice having been lately taken in your columns of the accident to my house, I send you its history.

A few months ago, I was induced (from a perusal of Tall's pamphlet on his new patent machine, &c.) to erect a four-storied house in concrete. I therefore purchased the machine, at a cost of nearly 130l.; engaged a "clerk of works" a man from Tall's office, and solely on his strong recommendation (a man, it was said, next to the method and material); and in all details followed the instructions given in the pamphlet.

As to materials, I used Thames gravel and Little's cement, both of which received continual praise; and the walls, when at the third story, were visited by the patentee, and pronounced to be "very good." Nevertheless, one wall suddenly collapsed, and the remainder

proved so un sound that the whole had to be pulled down. The rains throughout showed no "blocks" of concrete, but simply wore as rubble out of a gravel-pit. In addition, the patentee, who covenants in his pamphlet, said on his bill of sale, to take back the machine (when a house is built) at half-price, takes advantage of the accident, and leaves it on my hands.

I tell the tale that others may profit thereby, and be doubly cautious—as the invention is still in its infancy—in their choice of machines, agents, and materials.

Twickenham.
Geo. LARSEN, D.C.L.

We cannot meddle with any personal differences, but we have no hesitation in saying that the unlucky accident at Twickenham tends in no way to disprove the belief that concrete, properly compounded and properly applied, will make sound, strong, and enduring walls. Our knowledge of concrete, and faith in it, date from many years ago, and we are perfectly assured that in many situations it may be most economically and satisfactorily employed.

The warehouse in Great Guildford-street, Southwark, is 70 ft. one way, 50 ft. the other, and is to be 60 ft. in height. The concrete there is compounded of crushed slag, gravel, burnt clay, and Portland cement, in the proportion of one of cement to six of the other mixture. We saw a piece cut out of the lower story, and found it as hard and as solid as stone. Where it is intended to make the walls lofty the work ought not to be hurried.

THE NUMBERING OF HOUSES.

Sir,—In reference to this subject mentioned in your last issue, will you allow me to suggest to a few enterprising fellows how they might promote the convenience of the public, and at the same time benefit themselves? Miles of houses in London and its suburbs are fitted with fanlights over the door which are illuminated by the hall gas at night. Let a man call with the requisite materials—say moveable figures, with cement for fixing them—at every house, and I believe a very large proportion of occupants would be only too glad to have the work done at once. The cost could not be great.

NUMBER FOUR.

POPULAR AND STEPNEY SICK ASYLUM.

Sir,—In your list of the estimates submitted by the architects competing for this work, you quote only one of my estimates, and that the highest.

I submitted two estimates, the lower sum being 47,000*l.* There are thus but two architects whose estimates are lower than mine. The sums named by these gentlemen are about 12,000*l.* below me, and 15,000*l.* below any of the other competitors.

Such extreme variation in the estimated cost of designs, which provide, of necessity, much the same clinical content, shows how essential it is to a just decision that all the competing designs should be submitted for valuation to the same surveyor.

You consider my elevation ugly. You have a right to your own opinion. It is, however, fair to mention that the first of the instructions to competitors directed that the building should have "no architectural pretensions whatever." I have endeavored to carry out this instruction.

G. GILBERT SCOTT, Jun.

FALL OF HOUSES, HOLLOWAY.

Sir,—Seeing in your paper of the 24th ult. a notice of the fall of three houses in the Holloway-road, Upper Holloway, and being interested in similar buildings adjoining, I must ask you to give the names of the builders of the said houses, viz., Messrs. W. & R. Carter, as it is very detrimental to the letting or selling of property adjoining to leave this in doubt.

A LOVER OF FAIR PLAY.

METROPOLITAN BOARD OF WORKS.

Finsbury Park.—A deputation appointed at a public meeting in Finsbury attended the Board at its last meeting to present a memorial in reference to the proposed buildings to be erected in Finsbury Park. The deputation was a numerous one, and was introduced by Messrs. Savage and Eli.

The memorial stated that the memorialists had heard with great surprise and regret that the Board had resolved to purchase 131 acres of land only for the purposes of Finsbury Park, instead of 250 acres, as authorized by the Act of 1857, and that 20 acres were to be appropriated to building purposes.

The Chairman said that there was a clause in the Bill enabling the Board to reduce the area sought to be obtained, and they adopted that course rather than abandon the Bill; but the circumstances were altogether changed, as the

park had to be formed entirely at the expense of the ratepayers.

After some discussion, and several motions, the Board finally resolved, by a majority of 15 to 12,

"That no reason whatever had been shown that the usual course should be departed from, and that the memorial be referred to the Works and General Purposes Committee for consideration and report."

Illegal Practices by Scavengers.—A report was brought up from the Works and General Purposes Committee, recommending

"That the Board do offer a reward of 2*l.* 2*s.* to any party or parties giving such evidence as shall lead to the conviction of scavengers and others detected in sweeping refuse into the gullies, shafts, and other works connected with sewers, and that the several vestries and district Boards be requested to co-operate with the Board by prosecuting the parties charged with reference to their sewers."

Mr. Thompson said that this practice in the parish of Clerkenwell, which he represented, cost them thousands of pounds, and he trusted that a clause would be inserted in some Bill they might promote in the coming session of Parliament empowering them to prosecute the employers of these men.

The recommendation was put and agreed to.

THE TRADES MOVEMENT.

A CIRCULAR has been sent by the secretary of the General Builders' Association to all their local branches, inclosing this form of address to be sent to operatives:—

"Name of town.....
Date.....
To the operative..... of.....

We, the master builders employing operative..... do hereby give you notice that we require the following alterations in the trade rules now in force in this district:—

I. The rules relating to the reckoning of time and quarter time, and the payment of wages, are to be altered and rescinded, and in lieu thereof the following is to be the rule:—

Rates of Wages.

That the following shall be the ordinary rates of wages for skilled operatives. Superior and inferior workmen to be rated by special agreement.

The men who have hitherto been paid..... per week, shall be paid..... per hour.

II. Any rule or custom forbidding or interfering with the employment or use of machinery or machine-worked materials is to be abrogated and entirely done away with.

III. Any rule or custom forbidding or interfering with the introduction or use of stone worked at the quarry, or anywhere else than the place where it is to be used, is to be abolished and done away with.

IV. That all trade rules, disputes, demands, and differences shall be settled for the future by conciliation or arbitration, and proper courts shall be constituted for the purpose.

And we hereby further give you notice that we are prepared at any time, upon six days' notice from you, to meet you, and publicly severally appoint our arbitrators, and mutually agree to construct the said floor as directed, and leave to the decision of the arbitration court thus appointed not only all future settlement of trade rules and disputes, demanding any assistance, but also the settlement of all matters contained in this notice and in the notice received from you.

And we hereby further give you notice that we require the alterations contained in this notice to be carried out on the 1st of May, 1869, or on such other day as is mentioned in the existing rules as the day upon which new or altered rules shall come into force.

Signed, on behalf of the master builders."

PUBLIC BUILDINGS AND THE BUILDING ACT.

ROYAL ALFRED THEATRE.

On the 27th of August last, a summons was heard at the Marylebone Police-court, and which was reported in our columns, in which Mr. Peebles, district surveyor of North Marylebone, charged Mr. Simpson, builder of the Royal Alfred Theatre, with constructing the floors of the corridors leading to the boxes upon the first gallery, and also the floor at the back of the said gallery, with combustible materials, contrary to the Metropolitan Building Act; and with omitting to construct the said floor with stone or other fireproof material, and carried by supports of a fireproof material, as required by the said Act. After a lengthened investigation, Mr. D'Eyncourt ordered that the works considered necessary by the district surveyor should be carried out by Mr. Simpson, and the necessary order was signed.

On the 27th ult. the district surveyor attended before the magistrate, to press for penalties against Mr. Simpson, for refusing to obey the magistrate's order. Having been sworn, Mr. Peebles said that defendant told him he had obtained counsel's opinion that Mr. D'Eyncourt's decision was wrong, and he should proceed with the building without carrying out the order. His (the surveyor's) clerk wrote to the defendant, asking that plans should be sent, as required by the 38th section of the Building Act, and also suggesting an appointment; but defendant took no notice of it. He was not even in court that day. The theatre was not open, with the regulations imposed by law were set at defiance.

A legal gentleman applied for a fortnight's delay on behalf of defendant, and promised that the order would be carried out by the defendant. Mr. D'Eyncourt reluctantly consented, but said if the Act of Parliament was not bona fide complied with by defendant without delay, the whole fines imposed for each day's non-compliance would be resolutely enforced.

SURVEYOR FOR METROPOLITAN POLICE.

Mr. T. C. SORBY, on account of the increase of other duties, has resigned his appointment as Surveyor to the Metropolitan Police and Police Courts; and Mr. Caiger, the Deputy Surveyor, has been appointed by the Secretary of State to the vacancy.

The principal buildings erected, and erecting from the designs of Mr. Sorby, are the Lambeth Police Court, Police Stations at King's-cross-road, Vine-street, Wapping (High-street), Blackman-street, Hammersmith, Rochester-row, Lea-bridge, Bedford, Richmond, and Ealing.

WASHABLE INDIAN INK.

ARCHITECTS and draughtsmen generally know the difficulty—in fact, impossibility—of obtaining Indian ink that will not run when coloured over. Mr. Stanley, of Great Turnstile, Holborn, has produced an ink which he describes as being simply a solution of redissolved Chinese ink, to which is added a chemical mullage that renders the ink insoluble after it has dried upon the paper. We have practically tried this with the most severe test—namely, on tracing cloth. When the usual Indian ink is used on this material draughtsmen know the result, if any attempt be made to colour over it: consequently the colour has to be applied to the back of the drawing. The new ink will neither wash up nor blur. We have tested it also on parchment, with the same satisfactory result.

As to the intimate action or effect of the chemical mullage employed, we know nothing; but the truth of the statement made by Mr. Stanley—that it will not wash up or blur, we can from practice safely substantiate; and we make this clear expression of our opinion because we believe the ink will be a boon to the architectural and mechanical draughtsman. In other words, this really is an invention that "will wash."

CHURCH-BUILDING NEWS.

Windhill (Bradford).—The memorial stone of Christ Church, Windhill, the erection of which was begun last spring, and which is now rapidly approaching completion, has been laid by the Bishop of Ripon. There has long been an increasing demand for church accommodation in Windhill. Mr. F. S. Powell, M.P., Mr. M. W. Thompson, M.P., and Mr. Benjamin Wood have contributed 250*l.* each; Mr. W. R. C. Stansfield, Mr. Edward Salt, Mr. G. Hargreaves, and Mr. Joseph Wood, 100*l.* each. A grant of 500*l.* has been made by the Ripon Diocesan Church Building Society, and of 120*l.* by the Incorporated Church Building Society. The total amount of the contributions from all sources was 3,200*l.*; and the cost of the new church, including the site, will be about 4,200*l.* The sum of 4,200*l.* does not include the cost of the spire (700*l.*), which will be erected when the funds permit. The site is on the south side of the turnpike-road leading to Idle. The body of the church is 75 ft. long and 56 ft. wide, and is divided into a nave and side aisles by circular stone shafts, having carved capitals supporting pointed arches in stone. Above, four circular windows on either side in each clerestory admit light into the nave; and the aisles have painted windows arranged in couples. The chancel, 35 ft. long by 23 ft. wide, opens from the nave by an arch the full width of the chancel. At the east end of the north aisle provision has been made for a tower, in the lower part of which the vestry is placed, separated from the chancel by an arched screen. Above is the organ-chamber, and a corresponding extension of the south aisle contains seats for the school children, with a chamber underneath for the reception of the beating apparatus, by Hayden, of Trowbridge. The end of the chancel is semi-circular, and will be lighted by seven long lancet windows. The roofs of the nave and aisle will be formed of framed timbers, supported upon stone corbels, and the spars will be visible. The roof of the chancel will be divided by moulded ribs and panels, plastered and prepared for colour. The seats will be open, and all the internal wood-work stained and varnished. Messrs. Andrews, Son, & Pepper, of Bradford, are the architects.

North Otterington.—The new parish church for North Otterington has been consecrated by

the Archbishop of York. The old parish church is situated at the extremity of the parish, nearly three miles distant from the bulk of the population, who reside in the township of Thornton-le-Moor. In consequence of that it was decided to build a new church in that village. Here was an old parochial chapel, supposed to have been built in the thirteenth century, but in the year 1811 divine service ceased to be performed in it, and the building, lost to the church, was used as a school-room and cottages for poor families, the chamber-flooring of the cottages being formed of the old pews. The eastern part of the building was the school-room, and remained in charge of the schoolmaster till 1837. Shortly after this the dissenters, having got possession, used it as a place of worship. The late vicar (the Rev. F. Starkey), supported by Sir Samuel Crompton, endeavoured to recover the building, but failed. Upon the appointment of the present vicar (the Rev. F. Seale) legal measures were taken for the recovery of the building, and this was accomplished. The old chapel was pulled down, and the new parish church (the foundation-stone of which was laid by Lord Greenock last autumn) was erected on the site. The designs for the building were supplied by Messrs. Atkinson, architects, York. It consists of a nave, chancel, and vestry at the north-east, porch at the south-west end, and bell-turret at the west end. The style is Early English. The east window is a reproduction of the east window in the old chapel. The outer walls of the church are rough Bradford sets, with Osmotherly stone facings; the inner walls are lined with pressed red bricks, varied with courses of black brick. The church is fitted with stalls of stained deal; the nave with open benches; the floors and pews are laid with encaustic tiles. The cost of the building has been £1,500, exclusive of the old material.

Tintagel (Cornwall).—It is proposed to restore part of Tintagel Church as a memorial of the late Mr. Douglas Cook, of the *Saturday Review*.

Camplen (Gloucestershire).—The Gainsborough Memorial Chapel of St. Michael's, Broad Campden, has been opened by special service. The church, which has been built after the design of Mr. John Fritchard, diocesan architect of Llandaff, consists of a nave and small apsidal chancel, with a bell-turret.

Harmston (Lincolnshire).—All Saints' Church, Harmston, has been re-opened. The restoration, or rather the reconstruction of this church, consists in new roofs to nave, aisles, and chancel, new windows throughout the whole fabric, glazed with cathedral glass of green and gold; new open seats, the raising of the chancel floor, the erection of a screen and a pulpit of Ancaster stone and Welch marble shafts. A reredos has been placed in the chancel, with white marble cross, the stonework illuminated by Messrs. Beh & Redfern. The work has been carried out from designs of Mr. R. J. Withers, architect.

Preston (Suffolk).—St. Mary's Church, the tower of which fell in 1863, has been partly rebuilt and re-opened for divine service. The church overlooks the valley of the Brett. It is of mixed architecture, principally Decorated, with Perpendicular windows, &c., inserted. There is a nave, with aisles and clearstory, west tower, north porch, and vestry. The church is built of flint and stone, with flush panelling. There are clustered piers in the nave, the shafts pear-shaped and filleted, with moulded bases and capitals. There were formerly a number of coats of arms, in stained-glass, in the east window, which were removed, and are now inserted in the clearstory window. The east window is in three lights, of geometrical tracery, and of stained glass, with Christ, as the Good Shepherd, in the centre, and the Sower and Reaper on either side. The side windows are Decorated two-light ones, with angels in the centre bearing labels. In the tracery of the side windows, and those at the east end of the aisles, are angels with extended wings, holding scrolls. The west or tower window is Perpendicular, also of stained glass, with Christ, in the attitude of blessing, in the centre, supported by Moses and Aaron, thus representing the Law, the Priesthood, and the Gospel. These windows are the work of Messrs. Ward & Hughes. The staircase to the roof-loft is blocked up, possibly done in the first instance, like that in the church of Rickinghall Superior, by a churchwarden in the brick trade. The restorations effected have been extensive, almost amounting to a rebuilding of the church. The greater portion of the tower is entirely new, and part of the walls of the aisles; and there is a new vestry on the northern side. The roofs

are also new; those of the nave and aisles nearly flat, with moulded timbers and carved bosses and corncices. The chancel-roof is wagon-shape, fourteenth-century style. All the internal stonework has been cleaned and restored, and the walls replastered. The floors are paved with Minton's tiles. The church is heated by hot-water apparatus. On the side walls are quaint paintings that doubtless were considered, when executed, very fine and appropriate. One contains the Royal arms, with many quarterings, of "Good Queen Bess," with the inscription beneath, "Elizabetha Magna, Regina Anglia." The works were carried out by Mr. Tooley, of Bury St. Edmund's, under the superintendence of Mr. A. Blomfield, architect.

Brixton.—The new church of St. Jude, recently built in Brookwell Park, Water-lane, Brixton, and which has already been illustrated by engravings in the *Builder*, has now been consecrated by the Bishop of Manritius, who officiated for the Bishop of Winchester. The new edifice is built of stone. It affords accommodation for the sitting of 1,000 persons, and one-third of the sittings are free. The cost of the building has been 6,000*l.*, raised by subscription in the neighbourhood. In addition to the information already given, we may here note that Mr. Plows sculptured the pulpit and reading-desk, and the font, from detailed drawings by the architect, Mr. Robins; and that Caen stone, red and green Irish marble, alabaster, and red Mansfield stone, are the materials employed in them, with polished oak door and book-boards, &c. Messrs. Maw & Co.'s tiles are used for the reredos throughout. The tablets are built up of tiles, the lettering being burnt in, so that the reredos is as permanent as the tile paving of the chancel, the walls of which the architect hopes some day to colour in devotions in a similar manner to those recently completed at Christ Church, Battersea.

Books Received.

Rudimentary Treatise on the Manufacture of Bricks and Tiles, containing an Outline of the Principles of Brickmaking. By EDWARD DONSON. Fourth Edition. London: Virtue & Co., Ivy-lane. 1868.

This work, originally useful, has been made more valuable, first by the revision of Mr. C. Tomlinson, F.R.S., and now by the additions of Mr. Robert Mallet, F.R.S., who has given some particulars of the greatest invention yet made in respect of the Drying and Burning of Bricks, viz., Hoffmann's kiln. It is the best handbook on the subject at present available; but a better may be made by-and-by, by bringing together the information on various heads, which in the volume as it now stands is scattered. Additional information also is needed as to moulded bricks, coloured and enamelled bricks, and the mode of cheapening them; also as to the value of covered works, and the improvements that are needed in the manufacture of bricks generally. Brick-making is not by any means in the position amongst us in which it should be. Good bricks at a much less cost than is now enforced ought to be obtainable.

We can safely recommend the little book before us as a good investment for 3*s.*, and we advise our young readers, who are constantly writing to us for the titles of cheap books that would be useful to them, to get Messrs. Virtue's list of their "Rudimentary Series," wherein they will see the titles of many works they ought to have.

VARIORUM.

A PAPER "On Mechanical Saws," read before the Society of Engineers. By S. W. Worsam, jun. There is much practical information in this paper as to saws, files, filing machines, saw frames, &c.; and the paper is illustrated by numerous engravings.—"The Increase of Material Prosperity and of Moral Agens, compared with the State of Crime and Pauperism." By J. H. Elliott. This is a reprint from the *Journal of the Statistical Society of London*, September, 1868. The paper is thoughtful and suggestive,—all the more suggestive perhaps that one cannot agree with all the author's opinions. We should not like, for example, to see people going about the streets armed for self-defence against thieves: it is easy to foresee what that would lead to: street brawls are bad enough at any

time without deadly weapons to aid and provoke them into fatal results. The author treats of various important subjects, such as the poor-law, education, wages, emigration, crime, charity, &c. He is of opinion that in England there ought to be but one charity in the whole land, that is, the national poor-law. On the subject of wages, he deprecates the pretence of mental improvement as an excuse for shortening the hours of labour, as a short sham. "Advance wages," he says, "and shorten labour if you will, but do not believe that much use will be made thereof for mental improvement." As regards the expenditure of wages, some sad facts are referred to. He speaks of "men engaged in the City who have wages of from 1*5s.* to 1*6s.* a week, but make with fees 4*0s.* to 4*5s.* weekly. If they take home 1*5s.* for the wife out of 1*6s.*, keeping one for themselves, they think they make fair contribution: they say nothing of the 2*4s.* to 3*0s.* extra. Men who two years ago employed six days in the week at 4*0s.* to 5*0s.* gave the *smallest* sum to their family on which they could drag on, and now that they get work only four or five days in the week, their families are no worse off, for they always did and do get only the minimum: the man himself has less drink."—"County Court Reform." By G. M. Wetherfield, solicitor. London: E. Wilson, Royal Exchange. Why the County Courts are a failure, and do not pay their own expenses by more than a quarter of a million, is the chief subject to which, and to its remedies, this pamphlet relates. Its special purposes are:

"To prove that the main cause of failure is in the high rate of court fees; to show that the system of procedure, as other tribunals, is its own enemy; to point out the great inconvenience of a compulsory trial in all cases; and to suggest two simple remedies by which the County Courts can be placed upon the same footing, in these respects, as other tribunals. The first is, that every case insured in a like success. These two suggestions are:—1st. To reduce the fee on a plaint to a maximum of 6*s.* for 5*l.* and upwards; the same for a consent judgment, with 1*0s.* in the case of a hearing about judgment cases above 2*0s.*, and those sent from the Superior Courts, might fairly be charged more, say 2*0s.* each. 2nd. To extend the benefit of Sec. 2 of the County Courts Act to all suitors alike, and let them have judgment without hearing twelve days after personal service of the summons where no notice of defence is given; also to extend the new scale of attorney's costs provided in the above Act, to all cases between 2*0s.* and 2*0*l.**, instead of such being limited as now to actions for goods wholly or in part sold for trading purposes."

Messrs. De la Rue & Co. have issued their "Indelible Diary and Memorandum-Book" in numerous shapes, edited by Mr. Claisner, F.R.S. and Mr. Thelwall, M.A. The illustration represents the wonderful Nebula in the sword-belt of Orion, concerning which Mr. Warren De la Rue, F.R.S., contributes an interesting article. He considers that the phenomena there going on present "a picture of the formation of new worlds in space far greater than that comprised within the limits of our own solar system." We cannot avoid observing that these excellent little books would be much more legible if they were printed in black instead of blue. Indeed, considering the class to whom they are addressed, the fancy colours seem out of place.—Part II. of vol. VIII. of the "Transactions of the Civil Engineers of Ireland," contains some valuable papers on Construction in India.—*Cassell's Magazine* gives this remarkable view of the possessions and powers of the Earl of Dudley:—

"His territorial possessions and country seats in Staffordshire and Worcestershire, his shooting grounds in Scotland and the East of England, his mansion and picture-gallery in London, his winter palace at Rome, even his valuable mineral estate in Merionethshire, fade into insignificance when compared with his mines, and collieries, and ironworks in and around the Midland town from which he takes his title. This latter estate—honeycombed by industry beneath, blackened by industry on the surface—covers an area of ten square miles. It furnishes employment for 9,000 workpeople; and reckoning in their families, wholly supported, at a moderate computation, something like 27,000 human beings—a population equal to that of the city of Oxford at the last census. It is intersected by two private canals, and traversed by forty miles of railroad. The horses employed upon these numerous canals to supply a cavalry regiment, the canal boats to furnish a fleet. The steam power used upon it is simply inextinguishable—it is so dispersed. Eight locomotives ply upon its railways; there are forty boilers in one of its works, and twenty in another; every pit and every furnace over and under the whole ten miles has its accompanying steam-engine. This vast estate yields 70,000 tons of coal and nearly 1,000 tons of pig-iron per week, to say nothing of the limestone used for flux; and it sends manufactured iron into all the markets of the world. Nearly 100 heads of departments are engaged in managing it, and it takes over three hundred clerks to keep the accounts. The annual outlay in wages does not fall far short of half a million of money."

We have lately heard of the possessions of the Marquis of Bute, and the time may be named when a future Marquis of Westminster will have an income of a million a year. There is snrely matter for thought here: perhaps for action too.

—“Greater Britain.” By Mr. C. W. Dilke, Mr. C. Wentworth Dilke, the author of “Greater Britain,” a record of travel in English-speaking countries, which will be published in two volumes, by Messrs. Macmillan & Co., this week, is the eldest son of Sir C. W. Dilke, bart., M.P., and grandson of Mr. Dilke, whose name is well remembered in the literary world as the editor, and, indeed, the actual founder, of the *Athenæum*. The author of “Greater Britain” travelled during a portion of his journey with Mr. H. Worth Dixon, who was at that time in the United States gathering materials for his “New America.” Mr. Dilke accompanied Mr. Dixon as far as Salt Lake City. Thence he travelled alone in New Zealand, Australia, and India—chiefly, we believe, with a view to observe the working of political systems in the countries which he visited. Mr. Dilke is now a candidate for a seat in Parliament as representative of the new borough of Chelsea, and very likely to be elected.

Miscellaneous.

JOINT-STOCK BUILDING, BRICK, TILE, AND OTHER COMPANIES.—From the returns of Joint Stock Companies in England and Wales, which have just been issued, we learn that there are 393 societies which have been registered between the 1st day of June, 1867, and the 31st day of May, 1868. Of this number thirty-five have been called into existence to erect houses, hotels, deal in land, and promote in other ways the building operations of the country. These societies are accredited with a nominal capital of 7,612,900*l.* In addition to these are eleven societies which have been registered for the purpose of manufacturing bricks, tiles, the getting of lime, slate, and other articles connected with the building trade. The nominal capital owned by the societies is set down at 315,000*l.*, making, with the capital sunk in building, &c., 7,927,900*l.*

IMPROVED ACCOMMODATION FOR THE WORKING CLASSES.—The *Public Health* says, “The leaseholder of a large disused warehouse, in Little Grove-street, Lisson-grove, Marylebone, conceived the idea of converting the same into a convenient, airy, and capacious lodging-house. By forming a company, and issuing shares, he raised the necessary capital, and set about the work, which is now on the point of completion. The building is laid out in dormitories, comprising 130 single iron bedsteads; the floors are covered with cocoa-nut fibre matting, and the rooms are lighted with gas and well ventilated. There is a large kitchen, and lavatories and baths, on the most approved principles. The spirited proprietor even promises a library, to relieve theedium of the winter months. The Medical Officer of Health for Marylebone has given his unqualified approval of the sanitary arrangements adopted in the establishment. We heartily wish success to this company, and as many others as shall devote their energies and their substance to the amelioration of the condition and elevating the *morale* of the working classes.

ASSOCIATED ARTS INSTITUTE.—Last Saturday evening the session of 1868-69 of this institute was opened by a *conversations* at the House in Conduit-street. In addition to the usual display of works of art by the members of the institute, the sketches of the late Sir Richard Westmacott, of which we spoke previously, were exhibited on screens in the centre of the principal room. This being the first time that those sketches have been shown in public they were the subject of much interest and scrutiny. An address was made by the president of the institute, Professor Westmacott, R.A. In the course of it Mr. Westmacott pointed out the importance of students practising the separate branches of art, so as to arrive at a state of the utmost perfection, not for their own sakes alone, but with a view of realising a great whole. He also drew attention to the facts that the object of the Associated Arts Institute is to get artists together for the encouragement of mutual intercourse, and the discussion of those subjects in which they are interested, at times when they are not engaged in more practical work. Mr. Westmacott gave some particulars respecting the progress that the institute has made and its present position, foremost among them being that it is five years old, and that it commenced with five members, and it now can boast of 144. A concert followed the president's address.

THE HAVRE EXHIBITION.—From an examination of the list of awards made at the Havre Exhibition to British exhibitors it appears that the British have reason to be satisfied with the success they have achieved.

WAREHOUSES, MANCHESTER.—A correspondent writes, “It may be as well you should say, with reference to the warehouses in Portland-street, from the designs of Mr. Waterhouse, to which you alluded lately, that the beams for the floors are not of cast iron, but of *rolled iron*,—an unusual feature of such dimensions in warehouses erected in Manchester.

A BAIT.—Sir: What do you think of the following:—

“**SERVEYOR WANTED.** For a first-class established permanent building society. Must take paid-up shares in the society (6 per cent. dividend), and be prepared to introduce members and depositors from his own connection.—Apply, stating sum to be invested, and probable amount of business that can be introduced, to—”

A SUB.

CONSERVATIVE CLUB HOUSE, ST. JAMES'S.—This building, erected in 1845, has recently undergone entire renovation. The decorations of the halls (upper and lower), vestibule, and groined ceilings, have been revived; Mr. Sapwell was the contractor and Mr. Robert Yarrow the artist employed. The right person to be called in in such a case would seem to be the original artist. This is the second renovation since the foundation of the club twenty-three years ago.

COKE.—The directors of the Watton Gas and Coke Company have just issued a notice to the effect that “from and after the 10th of November next the price of gas to the consumers will be reduced one-fourth,” that is, to 7s. 6d. per 1,000 ft. For many years the directors were not able, of course, with such absurd prices as theirs, to pay any dividend. The only wonder is that it is said they are now paying a fair one.

—New gas works, erected at Langley Mill, adjoining the railway station, by the Langley Mill and Heanor Gaslight Company (Limited), for the supply of gas to Langley Mill and Heanor, have been opened. The works have been designed and carried out under the superintendence of Mr. Thomas Crump, gas engineer, of Derby. The contractor for the building was Mr. Samuel Hunt, of Long Eaton. The Batterley Company supplied the castings and main pipes.

VALUE OF PROPERTY IN ST. PAUL'S CHURCH-YARD.—At the Auction Mart, Tokenhouse-yard, Lothbury, Messrs. Dehenham & Co., auctioneers, offered to public competition the freehold warehouse, No. 27, St. Paul's Church-yard, let on lease for an unexpired term of nineteen years at 1,000*l.* per annum, and now in the occupation of Government as the Post-office Savings Bank, the property occupying an area of 1,479 square feet. The highest bid was 20,000*l.*, and it was bought in at 22,500*l.* The two adjoining warehouses, Nos. 28 and 29, held for an unexpired term of sixty-six years at a ground-rent of 750*l.* a year, and let for twenty-one years at 1,300*l.* per annum, were bought in at 8,000*l.* The corner warehouse adjoining, held for an unexpired term of sixty-six years at a ground-rent of 350*l.* a year, and let at —, for the first seven years and 650*l.* for the next seven years, sold for 3,200*l.*

MONUMENTAL.—In the Chapel Royal, Savoy, there is a monument to the memory of Richard Lander, the distinguished African discoverer. A member of the Royal Geographical Society has bequeathed a small sum of money towards the restoration of the monument, and the Rev. Henry White, of King's College, London, the chaplain of the Savoy, has invited such as are disposed to add their subscriptions, so that the restoration may be carried out.—In a letter recently received from the west coast of South America, the writer mentions that Commodore Powell, and the officers on board *H.M.S. Topaz*, are to erect in the island of Juan Fernandez a tablet to the memory of Alexander Selkirk, whose history is popularly believed to have afforded De Foë the materials of his attractive story of Robinson Crusoe. The tablet is to be placed near a break in the high mountain ridge which rises from the bay at the northern part of the island. It is said that to that high pass Selkirk used daily to climb, in the hope of seeing some friendly sail that might convey him from his drear solitude. The tablet will be of iron. Whilst seeking for some one to do the lettering on the tablet, a man offered himself who rather claimed the job, on the ground that he had created the tablet to Captain Cook's memory at the Sandwich Islands.

THE RESTORATION OF CHESTER CATHEDRAL.—Dean Howson writes:—“Our appeal for funds in aid of our works of restoration began last spring. The architect's estimate for the whole amounts to about 55,000*l.* Towards this we have now about 28,000*l.* promised, the Ecclesiastical Commissioners contributing 10,000*l.* of this sum. The process of restoration began during the summer, attention being first given to a part of the fabric which was in imminent danger.”

ALBION ASSEMBLY ROOMS, NORTH SHIELDS.—The proprietors of these rooms have determined upon making such additions to them as will not only greatly increase their own accommodation, but will also improve the frontage of Norfolk-street, by taking in the whole of the property between them and the Masonic Hall, and adding a new building, nearly 50 ft. in height, to contain a gallery; second and third class refreshment rooms, 37 ft. by 22 ft.; and, on the ground-floor, shops, &c. The architect is Mr. J. P. Spencer.

BOILER EXPLOSIONS.—A terrible explosion has occurred at Mr. Norris's steam saw-mills, Baron's-place, Waterloo-road, Lambeth, injuring ten men and setting fire to the mills, which have been destroyed in consequence. One of the men injured has since died, and the others are in a precarious state. Surely there ought to be some Government inquiry into the subject of steam-boiler explosions, or some legislation with a view to the proper supervision of boilers. There is an association at Manchester for self-protection from boiler explosions, and the result to them is that scarcely a single explosion takes place in those supervised by the officers of the association.—The sufferers by the late kitchen-boiler explosion in the Haymarket are all doing well. One who was not expected to survive is now progressing favourably.

CLOSING OF THE NATIONAL FINE ARTS EXHIBITION AT LEEDS.—This exhibition, which was opened by the Prince of Wales, on May 19, was finally closed to the public on Saturday. During the 143 days it has been on view, the number of visitors has reached 570,000, and of that number 450,000 paid for admission at the doors, the remainder obtaining entrance by season tickets. The largest attendance was on Thursday, October 23, when no fewer than 13,231 persons entered the building. The highest weekly attendance was reached on the week ending October 16, when it amounted to upwards of 46,000 persons. On the proposition of Mr. W. Becket Denison, chairman of the executive committee, a vote of thanks was passed to the contributors. He especially referred to the warm interest taken in the exhibition by the Earl of Dudley and Lord Houghton. Both these noble lords having delivered brief addresses, special votes of thanks were awarded to heads of departments for their untiring zeal in the collection and arrangement of the art treasures; three cheers were given for the Queen; the band played the National Anthem, and the building was then slowly cleared of visitors.

SUPPLY OF ICED WATER TO PARIS AND LONDON. Every one who has visited the *cafés* of Paris must have observed the *carafes frappées*, that is to say, water-bottles with a great block of ice, often very curiously crystallised inside. The production of those frozen decanters has become a very important operation, which is carried on at ice-houses situated in the Boulevard Lannes, on the Passy side of the Bois de Boulogne. The establishment, according to the “*Journal of the Society of Arts*,” consists of ten great underground ice-vaunts, protected from the action of the sun by buildings raised over them, and covered with straw. Each of the ice-vaunts is nearly 500 ft. long, and about 36 ft. high, and the ten are capable of holding 10,000 tons of ice. The department in which the water-bottles are frozen is a curiosity. These decanters are two-thirds filled with filtered water in the receptacles of the freezing machine, and the freezing is produced by means of salt water and vapourised ether, with the help of a steam-engine of sixteen-horse power. When the water within the decanters is reduced below freezing-point, it is rapidly stirred with a stick, when the freezing takes place as if by magic. More than 6,000 of these frozen *carafes* are sent out daily in hot weather, at a very trifling charge, and each being filled up with fresh water as often as required will serve during a long summer day, and cool ten gallons of water. Why should not London and other large towns have their frozen water-bottles in summer as well as Paris?

ST. GEORGE'S HOSPITAL SURVEYORSHIP.—Mr. Stephen Salter has been elected surveyor to St. George's Hospital. Mr. Thomas H. Watson was second on the list.

SERGEANTS' INN.—The ancient state hall of Sergeants' Inn, Chancery-lane, under the auspices of the present treasurer, Mr. Serjeant Balm, has been redecorated and renovated.

WATERLOO BRIDGE.—We have received a letter from Mr. W. C. Clarke, Chief Clerk to the Waterloo Bridge Company, stating that the pier of the bridge, to which reference was made recently in our pages, has been in the state it now is for many years.

THE FALLING-IN OF THE FOOTWAY IN DOWNING-STREET, WESTMINSTER.—On the 30th ult., between seven and eight o'clock, nearly the whole of the public footway and hoarding which extends from King-street to the new Foreign Office, fell in with a crash. Fortunately no one was passing at the time, and the large number of workmen employed were all absent from the works.

ITALIAN OPERA, COVENT GARDEN.—Some good operas, by good performers, at this season of the year, are a boon to lovers of music, compelled for their sins to remain in London; and this Mr. Mapleson is affording, through the accommodating disposition of Mr. Gye, at Covent Garden. Beyond stock enjoyments he has made known to London a young singer from America, Miss Minnie Hauck, who in the "Sonnambula" produced a very satisfactory impression. Miss Hauck is very young, and if she fulfil her present promise will be a fresh delight for Europe. Signor Mongini sang admirably with her.

THE SMOKE NUISANCE.—At the Clerkenwell Police-court on Saturday a manufacturer was charged with using furnaces which did not consume their own smoke; and it was even alleged that they were constructed as if on purpose not to do so. The Government officer stated that this problem has now been most thoroughly and completely solved; and he mentioned a hewery which he inspected last week, in which were nineteen furnaces in full operation, consuming from 8,000 to 9,000 tons of coal, and from 700 to 800 tons of spent hops annually, and yet there was not a particle of smoke emitted. He also cited other similar cases. It thus appears that by a strict administration of the law the smoke nuisance may be got rid of entirely without hardship to those who require furnaces. The defendant was fined 3l. and costs.

TENDERS.

Table with 2 columns: Description of work and Amount. Includes items like 'For new detached villas, at Worcester Park. Mr. Robert W. Edis, architect:—' and 'For new entrance porch to St. Matthias Church, Richmond-hill. Mr. G. G. Scott, architect:—'

For new entrance porch to St. Matthias Church, Richmond-hill. Mr. G. G. Scott, architect:— Long (accepted) 4381 0 0

Accepted for house, at Ashton-on-Mersey. Mr. George Truefit, architect:—

Table with 2 columns: Description of work and Amount. Includes items like 'H. Davies Brickwork 4840 0 0', 'T. Kirkley Stonework 149 0 0', 'Bowden, Edwards, & Co. Joiner's Work, &c. 509 10 0', 'J. Owen Plumbering, &c. 155 0 0', 'J. Owen Painting and Plastering 110 0 0', 'J. Kirkley Stating 54 0 0', 'D. Davies Bellhanging 11 5 0'

For taking down and rebuilding two shops, Nos. E2 and E3, Artillery-street, Woolwich, for the executors of Mr. Thomas Stevens Bart, deceased. Messrs. William Gosling & Son, architects. Quantities supplied. The contractor to be allowed the old materials, and to use such bricks as the architect may approve:—

Table with 2 columns: Name and Amount. Includes Woodford 2098 0 0, Hanks 800 0 0, Richardson & Thompson 850 0 0, Ginger 760 0 0, Vicky 755 0 0, Blake 750 0 0, Lilletter 725 0 0, Carter 725 0 0

Table with 2 columns: Name and Amount. Includes 'For rebuilding No. 289, Strand. Mr. J. E. Saunders, architect:—', 'Crab & Vaughan 11,327 0 0', 'King 1,286 0 0', 'Colls & Co. 1,280 0 0', 'Little 1,267 0 0', 'Pritchard 1,253 0 0', 'Perr 1,155 0 0', 'Tripp & Co. 1,087 0 0'

Table with 2 columns: Name and Amount. Includes 'For new corn warehouse, Strood, Kent. Mr. H. Andrews, architect:—', 'Wilkins & Son 11,565 0 0', 'Baxter & Sageman 1,476 10 0', 'Ball & Co. 1,449 0 0', 'West 1,420 0 0', 'Clements 1,400 0 0', 'Sollitt 1,368 0 0', 'Naylor 1,357 0 0', 'Gates (accepted) 1,268 0 0'

Table with 2 columns: Name and Amount. Includes 'For new cottages, dairy, &c., at Worcester Park. Mr. Robert W. Edis, architect:—', 'Andrews 2819 0 0', 'Longmire & Burge 772 0 0', 'Rhodes & Roberts 765 0 0', 'Stephens & Watson 750 0 0', 'Thomas & Son 722 0 0', 'Sharlington & Cole 721 0 0', 'Brass 720 0 0', 'Conder 720 0 0', 'Colls & Son 692 0 0', 'Adamson & Sons 679 0 0', 'Lathey, Brothers 658 0 0', 'Collings 647 0 0', 'Shepherd 610 0 0'

Table with 2 columns: Name and Amount. Includes 'For villa residence, at Tonbridge. Mr. George P. Marten, architect. Quantities supplied by Mr. Samuel Cooper:—', 'Wheeler 23,098 7 7', 'Holborn 2,734 15 0', 'Huntley 2,543 0 0', 'Gorman 2,543 0 0', 'Smythe 2,500 0 0', 'Fawcett 2,467 10 0', 'Hasyham 2,419 18 0', 'Pannett 2,397 0 0', 'Dove 2,381 0 0', 'May 2,379 18 0', 'Kesterton & Head 2,370 0 0', 'Nightingale 2,345 0 0', 'Byres 2,271 0 0', 'Wheatley 2,257 0 0', 'Strange 2,154 17 5', 'Woodroffe 1,845 0 0', 'Hunt (accepted) 1,875 0 0'

Table with 2 columns: Name and Amount. Includes 'For the first portion (viz., the chancel) of the new Church of St. Matthias, East-court, Kensington. Mr. J. H. Hakewill, architect. Quantities supplied:—', 'Perrin, Brothers 22,350 0 0', 'Cowland 2,249 0 0', 'Higgs 2,177 0 0', 'Myers & Sons 1,988 0 0', 'Saunders 1,959 0 0', 'Simpson 1,650 0 0'

Table with 2 columns: Name and Amount. Includes 'For bath-houses, swimming-bath, &c., at Christ's Hospital, Newgate-street. Mr. John Shaw, architect:—', 'Axford & Whillier 23,069 0 0', 'Eyer & Co. 2,902 0 0', 'Holland & Hamon 2,802 0 0', 'Ashby & Horner 2,823 0 0', 'Brass 2,603 15 0', 'Newman & Mann (accepted) 2,562 0 0'

Table with 2 columns: Name and Amount. Includes 'For the erection of a villa residence, at Truro-road, Wood-green, for Mr. Charles Proughton. Mr. John Viney, architect:—', 'Brooks (accepted) 2600 0 0'

Table with 2 columns: Name and Amount. Includes 'For proposed new Methodist Free Church and schools, Woodford, Essex. Messrs. Hooper & Lewis, architects. Quantities by Mr. J. W. Young:—', 'Messrs. Pattenson 22,011 0 0', 'Kivett 2,000 0 0', 'Haines & Sons 1,983 0 0', 'Hall 1,877 0 0', 'Hall 1,871 0 0', 'Mundy & Hutchinson 1,900 0 0', 'Shurmer 1,858 0 0', 'Crab & Vaughan 1,868 0 0', 'Kemp & Morrison 1,810 0 0', 'Maun, jun. 1,800 0 0', 'Wicks, Bangs, & Co. 1,778 0 0', 'Baker 1,068 0 0', 'Morter (accepted) 1,693 0 0'

Table with 2 columns: Name and Amount. Includes 'For mission chapel, Kensington, Derbyshire. Mr. J. Tait, architect:—', 'Warner & Son (accepted) 2263 0 0'

Table with 2 columns: Name and Amount. Includes 'For Congregational chapel, Derby. Mr. J. Tait, architect:—', 'Messrs. Herbert 11,630 0 0', 'Bullock 1,447 0 0', 'Wright & Son 1,285 0 0', 'Stoddard (accepted) 1,263 0 0'

Table with 2 columns: Name and Amount. Includes 'For new Baptist Chapel, Shooter's Hill-road:—', 'For Picked For Suffolk Stocks, Fittings:—', 'Downs 21,826 00 21,576', 'Gerrard 1,500 00 1,544', 'Dove, Brothers 1,455 00 1,620', 'Manly & Rogers 1,450 00 1,510', 'Kirk 1,369 00 1,423', 'Cooper & Cullum 1,320 00 1,355', 'Wells 1,310 00 1,330'

Table with 2 columns: Name and Amount. Includes 'For new premises, corner of Fenchurch-street, for Mr. J. Greenbaum. Mr. W. Thompson, architect:—', 'Kirk 29,490 0 0', 'Myers & Son 8,870 0 0', 'Hanks & Co. 8,800 0 0', 'Cooper & Cullum 8,398 0 0', 'Pritchard 8,111 0 0', 'Blackmoreland & Co. 7,782 0 0', 'Hanshaw (accepted) 7,477 0 0', 'Crab & Vaughan 7,477 0 0'

Table with 2 columns: Name and Amount. Includes 'For Congregational chapel and schools, Burton Joyce, Notts. Mr. J. Tait, architect:—', 'Charles Wright 21,163 0 0', 'Wood & Son 1,113 2 0', 'Bell & Son 1,100 15 0', 'Moss 982 0 0', 'J. Wright & Son (accepted) 982 12 0'

Table with 2 columns: Name and Amount. Includes 'For rebuilding Nos. 27 and 28, Monkwell-street. Mr. B. Tabberer, architect:—', 'Willshire 22,387 0 0', 'West 2,200 0 0', 'Turner & Sons 2,076 0 0', 'Brass 1,987 0 0', 'Pearce 1,987 0 0', 'Brown & Robinson 1,997 0 0', 'Prince 1,935 0 0', 'Henshaw 1,950 0 0'

Table with 2 columns: Name and Amount. Includes 'For additions, &c., to house, Sevensnoaks. Mr. B. Tabberer, architect:—', 'Willshire 233 0 0', 'Grover 265 0 0', 'Larke 242 0 0'

Table with 2 columns: Name and Amount. Includes 'For alterations, &c., No. 7, King-street, Snow-hill. Mr. B. Tabberer, architect:—', 'Gatley 615 0 0', 'Clarke 512 0 0', 'Young 495 0 0', 'Pearce 487 0 0', 'Larke 459 0 0', 'West 459 0 0', 'Walker 446 0 0', 'Bostel 384 0 0', 'Whittingham 382 0 0'

Table with 2 columns: Name and Amount. Includes 'For the erection of new infant school, for the parish of St. Lawrence, Reading. Messrs. W. & J. T. Brown architects:—', 'Mathews 2712 0 0', 'Barnicot 650 0 0', 'Sheppard (accepted) 634 10 0'

Table with 2 columns: Name and Amount. Includes 'For the erection of a house and shop, in Broad-street Reading, for Mr. Batho. Messrs. W. & J. T. Brown architects:—', 'Kendell 2598 0 0', 'East 566 0 0', 'Sheppard 559 0 0', 'Gatley 539 0 0', 'Clacey (accepted) 507 0 0'

Table with 2 columns: Name and Amount. Includes 'For the erection of a house and shop, in Broad-street Reading, for Mr. Hiscock. Messrs. W. & J. T. Brown architects:—', 'Whiting (accepted) 2498 0 0'

Table with 2 columns: Name and Amount. Includes 'For the erection of steward's residence, at Elvaston, for the Hon. the Earl of Harrington. Messrs. Stevens & Robinson, architects. Quantities supplied:—', 'Thompson 21,309 0 0', 'Wood 1,359 0 0', 'Fryer 1,270 0 0'

Table with 2 columns: Name and Amount. Includes 'For alterations, repairs, and decorations, at No. 72, Grosvenor-street. Messrs. J. & E. Baddley, surveyors:—', 'Clarke & Manooch 4930 0 0', 'Spwail 838 3 4', 'Scrivener & White (accepted) 819 0 0'

Table with 2 columns: Name and Amount. Includes 'For building presbytery, at Battersea, for the Right Rev. Dr. Grant. Mr. C. A. Buckler, architect:—', 'Nightingale (accepted) 2500 0 0'

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The Builder.

VOL. XXVI.—No. 1345.



The Management of Heat.

T this season of the year, when winter is waiting ready crowned and robed, doubtless, in some arctic region, for the day of his reign to begin, the subject of artificial heat must be one to which most of our readers will turn with hearty approval. What ice is to us in the height of summer, so is heat in the depth of winter. By the use of both we can mitigate the effects of the extremes of the opposite seasons. But summer, with her train of honey-suckles and roses, not to say watering-carts, having turned her back upon us for the present year, there is no probability of our attention being distracted from the heat means of modifying the severities of winter. We are glad, therefore, to notice a practical treatise by Mr. Box, in which he has aimed to apply the laws of heat to the useful arts. Among the latter he has very properly included the art of heating and ventilating churches, chapels, all public buildings, and houses.*

Beginning with an explanation of the general principles and facts touching heat, Mr. Box proceeds to treat, successively, of combustion, steam-boilers, the efflux of air, chimneys, vapours, evaporation, distillation, drying, heating liquids, heating air, the transmission of heat, and laws of cooling, leaving ventilation and heating of buildings, and the effects of wind on ventilation, to the last. Reversing this order, in the interest of our readers, we will give some account of our author's theory of heating and ventilation first.

Before reckoning how much heat is required for a building there are several things we must know. One is, how much is expended. Our author divides the heat lost by buildings into four portions; or that lost by the floor, the ceiling, the walls, and the windows. The heat lost by the floor is not considerable, because the earth, at a depth of 20 ft., has the same temperature as that of the yearly mean of the air at any place; nor is the loss by the ceiling great if it is an ordinary lath-and-plaster ceiling protected by the further overing of the roof from cooling influences, though, if the roof is an open-timbered one, without a ceiling, the loss must be great. The walls are a more serious item of consideration. He states the case of a room with brick walls and no windows exposed on every side to cooling influences, with an internal temperature of 60°, while that of the external air is 30°, and goes through an intricate calculation to arrive at the temperature of the surfaces

of the walls and the quantity of heat transmitted from one to the other, in three formulae. Should any one want to know the loss of heat sustained by the wall of a furnace with the fire on one side of it and a low external temperature on the other, he would have to seek the solution of the difficulty by similar means. Then, again, Mr. Box gives the case of a room forming part of a large building in which only one side of it is exposed to the external air and radiant objects, and the formula for working out the amount of loss. The loss of heat in units per square foot per hour by brick and stone walls, 40 ft. high, in buildings where only one face is exposed, and for 1° difference of internal and external temperature, is shown by him in this manner:—

Brickwork.			Stone.		
Thickness.	U.		Thickness.	U.	
Brick.	Inches.		Inches.		
1 1/2	= 9	.371	12	= 453	
1 1/4	= 9	.275	12	= 379	
1 1/2	= 14	.213	18	= 324	
2	= 18	.182	24	= 284	
3	= 36	.136	30	= 257	
4	= 36	.108	36	= 238	

The loss of heat by glass in windows requires further calculation. As a specimen of the system pursued by Mr. Box, we will quote the case he gives of a window in which the interior walls and internal air in contact with the glass have one and the same temperature of 60°, and the external air and radiant objects one of 30°.

"The glass being heated on one side and cooled on the other by similar influences, will have a temperature in the centre of its thickness a mean between the two, or in our case $\frac{60 + 30}{2} = 45^\circ$, and with this glass we may assume that it has this temperature throughout. We may calculate the amount of heat received from within and dissipated without by the Rule $U = Q \times (T - t)$. For glass the value of R is, by Table 71, .948, and the value of A by Table 74, for a window, say 6 ft. high, is .4655; therefore $Q = .9484 \times .4655 = 1.463$, and in our case the loss is $1.463 \times (60 - 45) = 15.9$ units per square foot per hour for 30° difference of internal and external temperature, or $15.9 = 53$ units for 1°, by a window 5 ft. high; for 10 ft. and 20 ft. the losses are .515 and .594 respectively."

Besides having to make up for the heat lost in absorption and radiation, before being in a position to calculate the degree of artificial heating required for a building to be pleasant and healthy, we must consider the heat evolved by respiration of the occupants, among other matters. It is agreed that an ordinary man gives out .022 lb. of carbon per hour, which develops a heat of 12906 \times .022 = 284 units per hour. Some portion of this heat, however, is absorbed by the vapour formed during respiration, and some is dissipated by radiation to the surrounding objects, and by the contact of cold air; otherwise this amount of heat would be sufficient to set ventilation in motion. The quantity of air required by an ordinary man for his twenty respirations per minute, which are reckoned at 40 cubic inches each, is $\frac{20 \times 40 \times 60}{1728}$

= 28 cubic feet per hour. Taking into consideration the vapour emitted by him, which would saturate a small allowance of air with too much moisture to be healthy, he requires per hour the capacity of a cube 6 \times 6 \times 6 ft. For prisons, workhouses, &c., Mr. Box adds, it should not be less than 350 cubic feet, and for hospitals 1,000 cubic feet, per hour per head. This necessity involves a constant change of air to form part of all schemes of artificial heating. Our author is scarcely aware of the continuous efforts of the more advanced sanitary reformers among architects to ensure due provision for ventilation and heating in buildings, for he writes,—"The acknowledged difficulties of accomplishing effective ventilation have led to the whole question being virtually abandoned by architects and others designing our public and private buildings." Practising a little more perseverance himself—at least in theory—he gives three or four schemes for ventilating rooms, none of which have any great novelty,

but all of which are marked by a minute attention to the workings of natural laws. Upwards of a hundred little careful diagrams illustrate his statements. We will follow him through three cases he describes at length to exhibit three different plans. The first is a school for 100 boys warmed and ventilated by a certain stove; the second a chapel heated by hot-water pipes and ventilated by a compressing-fan, driven by a weight wound up by manual labour during the preceding week; and the third is a hospital, heated by hot air pipes and ventilated by a draught-chimney, in which a fire is maintained all the year round.

We must premise that the first of these schemes is ascribed to Pécelet, to whose work, "Traité de la Chaleur," our author frequently refers. The stove is placed at one end of the school-room and the chimney at the other; and both the stove and the long pipe, which extends from one to the other, are constructed with a double case, the inner space containing the fire and smoke and the outer one heated air. This case is furnished with openings, through which the highly-heated air from within is forced into the room. If there were openings at the top of the room this heat would pass through them and be wasted: so to prevent this the openings for ventilation are made about 18 in. or 2 ft. from the ground, to which level the warm air descends. Mr. Box contends that the air is distributed by these means all over the room in horizontal layers, which become cooler as they descend to give out heat to the walls. In the summer, when the stove is not heated, the ventilation is accomplished by means of a small special fire at the base of the chimney and a large register opening high above the heads of the scholars. In the winter, the stove should be lighted an hour or two before the boys assemble, because, although, as our author says, each individual emits heat enough to furnish that required for ventilation, the walls and air require warming. To give a specimen of the author's minute calculations we quote his measurement of the heat dissipated by the walls:—

"The building exposes an area of 210 square feet in windows, and 1,390 square feet of 14-in. walls: assuming for the air an internal temperature of 60° and external 30°, the loss by the windows will be 12.3 units per square foot, and in our case $12.3 \times 210 = 2583$ units per hour, and the walls (Table 78) will lose $1340 \times 109 \times 30^\circ = 6490$ units, giving a total of 8983 units per hour lost by the building after it has been heated to the standard temperature. But a great amount of heat must be absorbed by the walls before they can be brought up to that standard; by (282) and Fig. 80, we see that with 14-in. walls, and air at 60° and 30°, the mean temperature of the wall is $\frac{60 + 30 + 34.2^\circ}{2} = 41.1^\circ$, or say 41°; they have therefore to be heated in the morning from 30° to 41°, or 11°; and as they contain about 1570 cubic feet, weighing by Table 86 = 115 lb. per cubic foot, and the specific heat of brickwork (harrt clay) being .185 by Table 1, they will require $1570 \times 11 \times .185 = 327,420$ units of heat to raise their temperature from 30° to 41°. In our case they will receive it from two sources, from the heated air in the room and by direct radiation from the stove and stove-pipe. The amount that can be received by contact of air is at first, when the walls are cold, or at 30°, by (272) and Table 74 = $435 \times 30 = 13,050$ units per square foot; but at the end of the operations, when the walls are heated to their standard internal temperature of 48° we have only $435 \times (60 - 48) = 5,220$ units; the mean is $\frac{13,050 + 5,220}{2} = 9,135$ units per square foot per hour."

We must explain that the tables referred to form an important feature in the work, and present in a cut-and-dried form the result of many a careful and lengthy experiment. Our author next calculates the time required to heat the walls and cool down the building, the area of inlet and outlet openings, the quantity of fuel required, &c. We must pass on, however, to notice the more general features of the next scheme. This is the case of the chapel, which is destined to accommodate 400 persons on one day in the week, and to be abandoned to cooling influences for the other six. The first thing required of the hot-water heating apparatus is that it should heat the walls before the building is occupied, and the next, that it should heat the requisite amount of air for the congregation during the hours of worship. The size of the apparatus should be

* A Practical Treatise on Heat, as applied to the Useful Arts, for the use of Engineers, Architects, &c. By Thomas Box. London: E. & F. N. Spon, 48, Charing-cross, 1868.

determined by the greater of these two conditions. Mr. Box goes into a calculation which gives 47,816 units of heat as the amount required for heating 220 cubic feet of air per hour per unit, and 46,938, as the amount of units of heat absorbed by the walls, and then he settles the dimensions of an enclosed pipe, 3 in. in diameter, according to a table furnished by him. Some 214 ft. of pipes are carried by rollers, supported on cross-beams, built into the brick side-walls of channels, and a boiler of the common horseshoe form is placed below the level of the chapel floor. To yield the required amount of heat, 12 lb. of coal per hour must be furnished. After calculating the time required for heating the apparatus and the walls, and the time consumed in reducing these to the external temperature, Mr. Box advances a recommendation that will be echoed by most persons having authority in the matter of church-heating. He draws attention to the division of the 168 hours of the week. Fifty are spent in getting up the temperature, 14 in maintaining it during the hours of worship, and 104 in cooling down again. The weekly consumption of coals by this method would be 6 cwt. A small increase upon this would maintain the temperature throughout the week. This latter management is that recommended by Mr. Box. He says that the economy of regular and slow firing would be so considerable that the consumption of coal for the whole week would be not more than $7\frac{1}{2}$ cwt., or $1\frac{1}{2}$ cwt. more than the quantity used for the intermittent firing; and to set off against this small extra outlay would be the accommodation of finding the chapel always ready for any occasional or periodical service in the course of the week. He gives diagrams of the fan used for ventilation, with its gearing and framing. To this fan he allows a velocity of 5 ft. per second. As an ordinary man can raise 3,000 foot-pounds per minute by a wind, he calculates that the necessary weight of 18 cwt. could be raised in 13 minutes. To this plan there is the objection of the periodical winding up of the fan required, should the continuous firing be preferred to the intermittent. The destination of the air moved by the fan is a space below the floor of the boiler-house, whence, branching right and left, it enters and proceeds along the channels in which the hot-water pipes are laid, from which branch channels conduct it under the pew-seats, where it is discharged through apertures made for the purpose. A wooden casing must cover the hot-water pipes, recommends our author, and the total area of the 1 $\frac{1}{2}$ -in. diameter holes by which the air is admitted must be equal to the area of the two main channels, or 5 square feet. With his ordinary minuteness, he lays down that, with 8 for coefficient of contraction, the area of 1 $\frac{1}{2}$ is $1.22 \times .8 = .976$; and we should require $\frac{730}{.976} = 740$ holes, which, distributed on a length of 214 ft., or 2,568 in., would be $\frac{740}{214} = 3\frac{1}{2}$ in., centre to centre.

We turn now to Mr. Box's scheme for heating and ventilating hospitals. He justly observes that the ventilation of a hospital should be more perfect, powerful, and uniform than that of any other building, on account of the diseased condition of the inmates. A first necessity is that the walls should be warm. He gives a plan and longitudinal section of a small hospital or quadrangular wing of a large one, three stories high. This is heated by a coker or hot-air stove placed at one end of it, and ventilated by a draught chimney. The hot-air apparatus consists of a collection of pipes, open at both ends, and built into the side walls, and retained in position by clamp-plates and bolts. A furnace at one angle causes fire to circulate among the pipes on its road to the chimney at its most distant angle. The external air enters the pipes heated in this manner, and leaves them in a chamber inside the wall, from which it proceeds down two channels which extend the length of the building. The upper stories are heated by other channels in the walls up which the hot-air passes and descends again to the basement, warming the walls in its progress. From these perpendicular channels branch pipes are laid on each floor, which discharge the hot-air into additional channels furnished with openings into the rooms under each bed. Funnel-channels, into which orifices open near the ceiling, carry off the vitiated atmosphere and conduct it to the end of the building occupied by the apparatus, where it enters descending shafts communicating with the chimney. It must be understood that the air entering the walls must be of a much higher temperature than that required for the

rooms, otherwise when the walls have absorbed their portion of the heat it will be insufficient for the purpose of heating the room. The loss of heat by the walls, windows, &c., is duly calculated in this as in the other instances.

Allowing 1,000 cubic feet of air per hour per room, and that we have $69 \times 3 = 150$ inmates, we shall require 150,000 cubic feet of air at 60° , or $.76 \times 150,000 = 114,000$ lb. of air per hour. If we assume that the interior surface of the walls is at 60° , with a thickness of 2 ft. 3 in., we shall have by the following formula—

$$U = \frac{Q \times (t - T)}{1 + Q \cdot G}, \text{ or in our case } \frac{1.134 \times (60 - 30)}{1 + (1.134) \cdot \frac{27}{4.83}} = 4.63$$

units per square foot per hour, and as we have 11,790 square feet of wall surface (windows excepted), the heat dissipated by them will be $11,790 \times 4.63 = 54,567$ units of heat per hour. This heat has to be supplied by the 11,400 lb. of air entering the building; and to do that it must be cooled $\frac{54,567}{11,400 \times 238} = .20^\circ$, and as it leaves the walls to enter the rooms at 60° , it must enter them at 59° . The mean temperature of the air in the walls is thus $59.2 = 70^\circ$, and the internal surface would be rather more than 60° , as we assumed. The windows contain 1,449 square feet of surface, and will dissipate $1,449 \times .53 \times 30^\circ = 23,586$ units per hour, the greater part of which will have to be supplied by the air in the rooms.

The number of units of heat required to be furnished by the coker or air stove is 135,660, to produce which 23 lb. of coal per hour are consumed. In summer a fire must be maintained for the especial purpose of the ventilating apparatus in a furnace at the base of the chimney, which is so contrived as to feed upon the foul air entering the chimney. In winter the waste heat from the coker is used, and consequently no additional coal incurred.

Mr. Box gives some French examples of heating and ventilation, and states the relative expense of the mechanical and heated chimney plans. The great Prison Mazas, in Paris, is one of the examples chosen; the Prison of Provins another; and the Church of St. Roch a third. We cannot do better than refer our readers to his work for the numerous and precise particulars noted. Another point of value discussed by our author is the influence of the wind upon ventilation. He gives a table of the force and velocity of the wind, showing the amount of pressure per square foot, according to the character of the wind, and another showing the relative power of wind-vanes with single and double blades. He calculates the force necessary to overturn a chimney 80 ft. high, taking into account the two forces that resist the wind, the weight of the mass, and the cohesion of the mortar. The process is as simple as possible, and yet it is one that would not occur to every one. The brickwork is measured to contain 1,747 cubic feet, and then weighed according to a table which gives 115 lb. per foot, when a weight of 200,000 lb. is ascertained. The cohesion of good mortar fourteen years old is set down at 60 lb. per square inch, or 5,265 \times 60 = 315,900 lb., or a total weight of the chimney of 200,000 + 315,900 = 515,900 lb. To overturn this mass a force of 110 lb. per square foot would be required, a pressure of wind that is happily not generally known in this country. Mr. Box explains:—

"If the materials were incapable of crushing, the chimney would turn on that edge of its base remote from the wind, but in truth that point would be somewhere between the centre and the edge, and the chimney would resist fracture, partly by the crushing strain and partly by the cohesion assisted by the weight. By analogy with other materials broken transversely, we know that the result is very nearly the same as if the neutral axis coincided with the edge, and the force of cohesion only came into play. Admitting this, the force of 315,900 lb. acts with a leverage equal to half the diameter of the base, or 49.5 in. The centre of effort of the wind is at the centre of gravity of the surface exposed to it. The easiest way of finding the centre of gravity in our case is by cutting out an outline of the chimney on drawing paper, &c., of equal thickness, and balancing it on the point of a needle. We thus find the centre of effort in our case to be 36 ft., or 432 in. above the base, and the surface area of one side of the chimney being 449 square feet, the force of the wind that would overturn it would be $\frac{515,900 \times 49.5}{432 \times 449} = 110$ lb."

Many writers have treated of the laws of heat, but few have so uniformly applied them to the purposes of the useful arts. All the observations and calculations of Mr. Box have a practical aim. Unlike the ignorant stoker he describes, who delights in a roaring fire and sharp draught, unconscious of the loss of fuel, he is always striving after the utilization of our resources. A quiet personal of his work will help to unravel many knotty points in the minds of those who are thinking over schemes of heating and ventilation. All owners, besides tenders, of furnaces, steam-boilers, and stoves used in the different arts, will

find, too, matter of moment in his pages. For instance, he states we may obtain nearly the whole of the heat which any fuel contains by having a long flue, or pipe conveying the products of combustion from a stove to the outer air, subject to the length of the pipe, and the material of which it is composed; whereas from an open fire in a room only the radiant heat is used, the rest being wasted in passing off up the chimney; and he gives the kinds of materials proper for the pipes, and the amount of heat dissipated. One of his tablets gives the radiating and absorbing power of many bodies, such as different metals, woods, stones, saw-dust, paper, oil, calico, woollen stuffs, &c. He recommends that all pipes to steam-engines should be covered, as the loss of heat by naked pipes is very considerable. A saving of 84-horse power in a 4-in. pipe, 100 ft. long, may be effected by casing it in woollen felt, or any other bad conductor. Such scientific economy as this is well worth study. As warning, we must point out that a casing made of a good conductor, will only increase the loss. Some people think that whitewashing pipes reduces the loss; but this is not so, except to an inconsiderable degree; although the use of tinned iron, or common tin plate, is found to reduce the loss to one half.

We have already said our author devotes a chapter to chimneys. Round chimneys and square chimneys are both discussed, and their respective merits stated. The velocity of discharge is the same with both, he concludes, but the horse-power of the latter is the greater in the simple proportion of the areas of a square to the circle. A chimney 60 ft. high and 2 ft. 9 in. square, with a flue 100 ft. long, is equal to 100 horse-power, he tells us; and if we would increase its power we must decrease the length of the flue, for to double the length of it would be to reduce its power one-half. In the construction of such chimneys hoop-iron should be built into the ordinary stock brickwork at every few courses to form a bond; while in chimneys of reverberatory furnaces, in which the air rises to a temperature of 2,250°, there should be a lining of fire-brick, and wrought-iron bands placed at regular intervals outside. Tables of the draught power of chimneys under different circumstances complete the measure of information on this subject. There are few engaged in manufactures or the arts of construction on whom Mr. Box's work is not likely to confer a wrinkle. To the general student it will prove a valuable assistant.

PUBLIC HEALTH DURING THE LATE SUMMER.

As surely as the frost and cold winds of winter cause an excess of death through the fatality of affections of the lungs, so does the heat of summer produce the same effect through annual visitations of diarrhoea, with mild forms of cholera and dysentery, the mortality from which, in tropical and hot half-cultivated countries, assumes such terrible proportions. The deaths from those diseases which are in a great measure incidental to variations in climate and temperature occur in much higher proportions in towns than in rural districts, and their greatest fatality is confined to the laboring classes, whose poverty, ignorance, and habitual carelessness of the simplest precautions, render them liable to any almost invite, attack. Mortality from disease is but one of the evil consequences of the condition in which millions of our poorer fellow-creatures exist, a condition which it is the object of social science to ameliorate.

The unusual heat of last summer produced, as we are all now pretty well aware, a mortality considerably in excess of the average of summer seasons. The Registrar-General, in his quarterly return for the three months ending 30th September last, tells us that the annual death-rate in England and Wales in the quarter was 23.9 per 1,000 persons living, which was 3.7 per 1,000 in excess of the average rate in the corresponding quarters of the ten years 1858-67. This average rate is 20.2, and, if it had not been exceeded, 20,958 persons would have survived, who fell victims to the excessive death-rate. The highest rate in those ten years was 21.8 in 1866, when cholera was in some places epidemic, and we must turn back as far as 1854 before we find a rate so high as that which prevailed last quarter; the rate in the third quarter of 1854 was 24.3,

caused by the deaths from cholera, which was then merely epidemic.

In town districts the average annual summer death-rate is 22 per 1,000, while in rural districts it does not exceed 17; last quarter it was 26.5 in the towns, and 20.4 in the country. The greatest excess of deaths was shown in some of the largest towns, the death-rate exceeding 35 per 1,000 in Manchester and Salford, Walsall, and Wigan, while in very many of them it ranged between 30 and 35. In the fourteen large towns of the United Kingdom furnishing weekly returns, the death-rate in the thirteen weeks ending the 26th of September last was 27.6 per 1,000, against 29.2 and 23.7 in the corresponding thirteen weeks of 1866 and 1867. Ranged in order from the lowest, the rates of mortality prevailing during last quarter in each of these towns were:—Bristol, 21.8; Dublin, 23.4; London, 24.6; Edinburgh, 26.3; Newcastle-upon-Tyne, 27.4; Glasgow, 29.1; Birmingham, 29.8; Hull, 30.0; Bradford, 30.8; Liverpool, 32.2; Sheffield, 32.5; Leeds, 33.5; Salford, 36.0; and the highest, 37.8 in Manchester. The excess of deaths in the eleven English towns, over those which would have occurred if the average summer town death-rate, 22.5, had not been exceeded, make up a large proportion of the 21,000 excess in the whole of England and Wales.

We have at present no means of ascertaining the total loss of life from diarrhoea throughout the country during the past summer quarter,—we can only roughly estimate it between 15,000 and 20,000. In the eleven large English towns above mentioned the deaths from this cause were no less than 7,656, whereas in 1866 the total deaths in the whole of England and Wales from this disease in the three months was only 9,570, which number was considerably above the average of summer quarters. In very many of the other large English towns the mortality from diarrhoea was fully as great as in these eleven, and from the notes appended to their returns by the local registrars this loss of life was not confined to the large towns, but also occurred to a great extent in small towns and villages, and even in completely rural districts. The mortality from diarrhoea varied very considerably in the different towns, ruled, as it would appear, in a great measure by the general sanitary condition of the populations; it was at the annual rate of 4 per 1,000 in Bristol, Newcastle, and London; 6 in Bradford; 7 in Liverpool, Sheffield, and Hull; 9 in Leeds and Birmingham; and 10 in Manchester and Salford. Facts for the calculation of the rates in other towns are not yet available, but from the registrars' notes it is evident that in very many of them these rates have been equalled, and even exceeded. In Leicester, for instance, out of 785 deaths, no less than 320 were fatal cases of diarrhoea, showing an annual rate of 14.5 per 1,000 from this cause alone.

The mortality from diarrhoea in its summer epidemic form, arises principally from two sources; air-poisoning and water-poisoning. It is impossible to say to which the greatest share of the evil is to be attributed. Fortunately both are almost equally within the influence of sanitary science. The annual heat and drought of last summer, combined to fill the air with exhalations of putrescent matter, animal and vegetable, which need not poison our large towns, and at the same time so shortened the store of water in many of our large towns, that both the quantity and quality of the supply was much impaired. Manchester and Salford, on the whole, suffered more severely last quarter than any of the other large towns, as in addition to the highest mortality from diarrhoea, scarlatina and different forms of typhus and typhoid fever were also severely epidemic. The water-supply of this city is beyond suspicion, but it is only necessary to read the reports of the medical officers of those towns to be convinced that there are other causes in abundance, causes well within human control, to account for this excessive mortality. We need not, however follow the recent reasoning of the *Saturday Review*, and assert that because the high death-rate from diarrhoea in Manchester cannot be attributed to a faulty supply of water, the high rates of mortality in many other towns cannot, to some extent, arise from this cause. We entertain, indeed, an entirely different opinion on this point.

Fortunately the first two quarters of this year were unusually favourable to the public health, so that the death-rate for the nine months ending September is still rather below the average, in spite of the excess which prevailed during last quarter.

THE RIVER AND WATERLOO BRIDGE.

WE mentioned in our last number that we had received a letter from the Clerk of the Waterloo Bridge Company, assuring us that the pier to which we referred on the 17th of October has "been in the state it now is for many years."

We have great pleasure in receiving any assurance of the yet unshaken stability of one of the chief architectural ornaments of the metropolis. It would have been still more gratifying if the courtesy of the Clerk had enabled us to add, as we now do from other and direct testimony, that the course suggested by the *Builder* has been promptly and wisely followed by the proprietors of the bridge, or, at all events, by the proper parties. The stones, between which the black openings mentioned in our columns made their appearance, have been cut out, and are either replaced, or in course of replacement, with new material. The imperfections which arrested the eye of the steamboat passenger are thus removed, and, which is of more importance, it will now at once become apparent, to those who watch the repaired portion of the work, whether there is any tendency to further movement.

The explanation which has been given to us by apparently impartial and well-informed testimony, although not exactly tallying with the statement that the condition of the bridge had been unchanged for many years, is this:—When the piling was being driven for the embankment, we are told that it was found difficult to drive the piles properly under the arch in question, from want of a headway for the fall of the monkey. Lewis-holes were therefore cut in the face of the bridge, in order to form points of attachment for steadying the heads of the piles. It was merely the local defacement caused by this process, it is said, that arrested the attention of our informants. If this be really the case, the black deposit in the opening, which must have formed since the removal of the piling, will have denoted no structural injury, but merely have been a local disfigurement. This view is happily in accordance with an affirmative reply to the main question on which we wanted to be re-assured,—the stability of the bridge.

It will be obvious to our habitual readers that remarks, such as we felt called on to make on this occasion, should rather be welcomed by those who are interested, than regarded with any degree of displeasure. The function of a public writer differs essentially from that of the engineer, or other responsible officer, of any great work. It is the duty of the latter to watch carefully the safety of the works under his charge, and, on the indication of the slightest danger, to satisfy himself fully as to the exact nature of the facts before calling public attention to them in any way. With the writer the case is altogether different. The open-eyed watchfulness of the press is one of the great safeguards of society in the present stage of our civilisation. It is the duty of the public writer to raise no undue alarm, to mention no fact on vague hearsay, and to exaggerate nothing. But it is not his duty either to test the causes of the phenomena to which his attention may be called, or to suppress any intelligence he may receive because it is of a nature to claim inquiry. Such testing he expects to be, as in the present instance it very properly has been, carried out in consequence of his comments. And as in almost all cases of structural dilapidation or decay, the first external indications are usually very slight, it may often happen not only that a warning is timely, but that, happily, no real danger exists. We had, on the other hand, a very ugly instance of what neglect of slight indications of movement, in an apparently very solid wall, may occasion, in the case of the fall of part of the Monte di Dio, at Naples, described in our columns.

The best and most satisfactory reply that can be given to a question as to stability is, that the soundness of the work has been tested, and is perfect. The next best is, that the inquiry has been made in time, and that the proper steps have been taken. In the present instance the second reply has been practically and most commendably given by the proper persons. It will only add to our satisfaction should it prove that the disturbance indicated was strictly local.

In any case of new and unpleasant intelligence it frequently occurs that three answers are successively made by those who consider themselves in any way injured, or reflected on, by the statement. First, it is replied, it is not true. Secondly, it is not new—it is an old story. Thirdly, it is of no importance. We congratulate the proprietors of Waterloo Bridge that

their representatives, instead of satisfying themselves with this method of reply, to a hint that has never previously been given by ourselves, nor, as far as we are aware, by any portion of the press, have resorted to the forcible logic of fact. They have not despised warning, but they have taken the proper steps to test, and if necessary to prevent, danger. The most practical and most satisfactory reply to a word of inquiry is that which is given, as in the present case, not by the pen of the advocate, but by the hammer and chisel of the mason.

POSITION OF ARCHITECTURE AND ITS PROGRESS.

MR. FRANCIS TONNER, in the course of his address as President of the Liverpool Architectural Society, said,—Among the works exhibited at Leeds are some of special interest to the architect, the catalogue containing such names as Holbein, Canaletto, Pannini, Guardi, and among modern architectural artists those of Turner, David Roberts, Prout, &c. One picture by Pannini, of the interior of "The Church of St. Paolo Fuori le Mura Rome," belonging to Mr. J. Heywood Hawkins, particularly struck me as a most splendid specimen of the master, being an exceedingly fine specimen of architectural drawing and perspective, and excellent in colour. The subject is a very fine basilica, no doubt familiar to many. It is a picture on a large scale, and in very good preservation. While another, by the same artist, and the property of the same gentleman, of "The Interior of the Pantheon, Rome," displays great power of drawing, and boldness in the treatment of light and shadow, without losing the architectural detail, or yet verging on the other extreme of hardness.

Canaletto and Guardi are also exceedingly well represented, there being two charming companion pictures by the latter (views in Venice) belonging to Mr. John Samuel, excellent in drawing, full of atmosphere, and pleasing in tone, and entitled to take high rank as specimens of architectural landscape.

Perhaps, however, one of the most minute relics of quasi-architectural draughtsmanship which is to be found in the exhibition is a beautiful drawing in pen and water-colour, being a classical design for a cup by Hans Holbein, and which, it is said, was actually executed in silver for Anne Boleyn about 1534. This work, which formerly belonged to Horacio Walpole, and is now sent for exhibition by the Bodleian Library, seems a well-authenticated production of this artist. It is difficult to know whether to admire this work most as a specimen of correct and minute, yet spirited, drawing, or as exemplifying about as beautiful a style of design for this particular class of the manufacture in silver as it is possible to imagine, so perfectly it is adapted in all its forms and details to the material it was intended to be executed in. Truly our modern professors of ornamental design might often profit by a study of the classic and elegant conceptions of this master of his craft.

One is tempted to expatiate somewhat largely over a field so rich in subjects as the Leeds Exhibition undoubtedly is. The works, however, of our great modern architectural artists are too well known and too fully appreciated by architects to require any panegyrist.

A comparison of the productions of our British school of art, up to the early part of the present century, with the Continental works of the same date is exceedingly interesting, and as afforded at this exhibition will not, I think, in the eyes of an unprejudiced judge, prove, on the whole, disadvantageous to the former.

Among the French and other Continental schools we very generally meet with correct drawing (I am now more especially referring to the human figure); but in conjunction with this, in the same picture, if a delinquent is perceptible, it will be on the score of imagination, and a certain monotony of tone and colour. In the works of our own school, on the other hand, the reverse of all this may frequently be found; for in pictures exhibiting high powers of imaginative conception, fine in composition, and rich and true in colour, we may sometimes detect a certain evenness of drawing which does not occur even among the inferior of the French works.

These peculiarities, I think, very much illustrate the mode of artistic training pursued in the respective countries. On the Continent

much greater attention is paid to the inculcation of correct drawing than with us, and thus diligently-taught pupils of moderate talent accomplish more almost than could be expected from them; but the wearisomeness of over-labour on technical detail is very apt to cramp the mind, and to stunt the growth of the inventive faculties. The young English artist, if his studies as a draughtsman are somewhat too slender, has the greater opportunity of early cultivating whatever original talent he may possess.

One regrets to see the band of genius compromised by a lack of technical instruction; but still more unfortunate is it when the mental powers are, by an overstrained mechanical education, made subservient to the merely material section of an essentially imaginative art.

Might not a modification of the system of instruction pursued in each instance lead to advantageous results? The exercise of the inventive faculties should ever be allowed to relieve the drudgery of the mechanical lessons of art; and this observation, I submit, must apply as fully to the case of architectural study as to any other of its branches.

These galleries, however, both British and foreign, alike contain pictures of great excellence and beauty; and what I have just said must be understood as having reference only to what I conceive to be the respective results of the varying systems of art-education in different countries, and is far from being intended as depreciatory of any portion of this fine collection.

Upon such a historical picture as "The Last Sleep of Argyle," by Ward, an Englishman may be excused for looking with pride; nor does the name of Ary Scheffer reflect less honour on his country. While the goodly array of works in one branch of British art form the most striking refutation of the theory published by Winckelmann about one hundred years ago, when he declared that the English people must be naturally incapacitated by their climate from attaining any eminence in the exercise of the Fine Arts; for here we have ocular proof of the existence of a school of landscape art among us, both in oil and water colour, such, perhaps, as no other country ever possessed, and to the full development of which our humid climate itself, affording as it does a constant play of light and shadow and great varieties of aerial effect,—a climate which, according to this philosopher, was to be fatal to all our efforts, has doubtless very materially contributed.

Those of you gentlemen who have not visited the Leeds Exhibition I can only advise to do so, before the 26th of the present month, when it closes. Those who have already been there, like myself, doubtless, "still would go," to take a final leave of a collection of works of art, which our late respected president, Mr. Kilpin, whom I had the pleasure of meeting there in the summer, observed to me we should in all probability never see the like of again in our generation.

Another year has passed in which the Liverpool Academy have failed to support an exhibition! This unpalatable subject has on former occasions been so fully enlarged upon that I shall not trouble you with any further observations upon it, but simply state the fact. It is idle to expect that the public will accept, in lieu of the legitimate annual display they formerly enjoyed, any chance collection of a picture-dealer, however good, which may be brought here for sale, even when a charge is made for admission, and a catalogue provided. The Manchester Academy continue regularly to maintain their annual exhibition on a creditable scale.

Amid the strife of conflicting opinions as to the proper adaptation of styles to our modern uses, no work has, perhaps, proceeded more steadily nor stands out in brighter relief in the annals of really artistic architectural practice among us, than the restoration of our grand old cathedrals, which is everywhere to be met with in the country.

The hypercriticism of certain reviewers calling in question the propriety of every step taken, and unscrupulously laughing to scorn, with more zeal than modesty, the efforts of architects of the first eminence in their profession, is singular. While they are ready enough in manufacturing difficulties, they are wonderfully shy in committing themselves by suggestions for the practical solution of any; and if the dictum of the writer of one article in particular which I lately met with is to be followed, it is our bounden duty to allow our cathedrals to fall to ruin and come about our ears, rather than

presume to disturb their archaeological associations by attempting their repair!

In most cases, however, the question really is, which conduces most to the antiquarian and archaeological interest of the building, the hod and trowel of the mason and plasterer, and the brush of the whitewasher of the last century or two (whose incrustations upon the stone and marble shafts, and enrichments of all sorts, the architect of the nineteenth century pretty universally finds it to be his first duty to endeavour to scrape away), or the substantial recovery of the original material, and the restoration of the whole, as far as possible, to their pristine beauty?

Questions, of course, may arise as to the desirability of certain details in what as a whole we must approve. Sometimes we may be inclined to doubt whether too much latitude may not have been taken by a restorer in some particulars, as in the insertion of windows of his own design, in the place of others which we have been accustomed to regard as integral parts of a great design, and similar cases.

Such an instance occurs to me in the restoration of Worcester Cathedral by Scott, where at the west end a well-known window of Perpendicular date has been replaced by one of Geometric Decorated.

Yet an accomplished artist must be allowed a certain amount of discretion in dealing with a style of which he is master; and if the member removed, as this window, for instance, may have been deemed by him, from surrounding mouldings and details, to have been itself an interpolation, the step is a legitimate one, in the attempt to restore the supposed original unity of the design.

Take the cathedral in question as an illustration of the mode in which these restorations are executed, and I say it is an honour to our age! In point of intrinsic beauty there can be no doubt that the west end is greatly benefited by the alteration; for it can now boast, perhaps, one of the finest windows, of the best date of Gothic art, to be found in the country.

As to the general effect of the restoration, taken as a whole, no man of any pretension to taste can have seen, as I did, this noble building twenty years ago, with its columns, mouldings, bosses, and enrichments of all sorts, smothered up in yellow wash, and interpolations of all styles and no styles, and dates, disfiguring it in every corner; and now visit it with its marble shafts again brought to light, its groining, and ornamental work and tracered windows really restored, and the whole of the friggible lumber which the dark ages of Gothic (the seventeenth and eighteenth centuries) had accumulated within and around it removed, without feeling that it has indeed risen from the dust and put on its beautiful garments!

Chester Cathedral, too, through the indefatigable zeal of Dean Howson, is at length to be rescued from its present state of utter dilapidation. Nor need we, I think, keep over the removal of each decayed stone, whose only interest in general consists in the almost preternatural state of pulverization to which they have been reduced without the whole coming to the ground. A few remnants of the panelling of the upper stages of the tower alone remain to attest the original richness of its design, the character of which, it is to be hoped, will be carefully preserved in its resurrection.

I have referred to the strife which exists in the architectural world with respect to the course necessary to ensure the true progress of the art; and the difficulty of the case is no doubt very complex, arising as it does, not from the lack of material on which to work, but from its very redundancy.

It is often charged upon the architecture of our own day that it is effete, and that as an art it has absolutely ceased to exist. Now, may we not trace some parallel between the present state of the architectural art and the language which we speak, more especially in respect of their derivative character?

If our architecture is a compound of Greek and Roman, of Italian and French Renaissance, and Gothic, is not our language equally compounded of and derived from all these sources? To the Greek, the Latin, and the Teutonic races, and even to modern France, how much are we indebted for its richness, its fulness, and perspicuity?

The comparatively contracted mental development of the rude Anglo-Saxon required, no doubt, a very simple form of speech wherewith to express any ideas he might wish to clothe in

words; but, as civilization advanced, the science of language naturally became more complicated, and we find ourselves now supplied with an ample vocabulary, borrowed from all the foregoing sources, wherewith to give utterance to our thoughts. If in some particulars this fusion of tongues and dialects may lack the grandeur of simplicity which some original languages possess, it at least affords other advantages,—of being full almost to redundancy, and of forming a very perfect channel for the expression of intricate ideas. We do not, because we possess such a multitude of derivative words, therefore declare the English language to be effete; but, on the contrary, accepting its mixed character as an almost necessary result of the passage of time and our knowledge of the past, we admit at once that it is admirably suited for our state of high intellectual culture.

So with our architecture, accumulated as its knowledge has been from the lights of past ages. The researches of the archaeologist and our intercourse with foreign countries have legitimately placed this acquired experience of generations within the grasp of the practitioner of the nineteenth century, to be interpreted and adapted freely by him, and, with the additional resources which a man of talent ever has at his command, from the exercise of his own individual invention, to be used for the purpose of meeting the complex circumstances and requirements of a refined age; and thus treated as an art, it is still a living and progressive one.

Many and great, however, as are the facilities and appliances which attend a state of high civilization in the culture of science and taste, it may well be doubted whether, in respect of the latter at least, these acquisitions are unmixt benefits. May we not, on the contrary, often find in the works of our forefathers much of simplicity, of unity, of repose, and association, which our modern designs frequently lack, but which, after all, are very important elements of power.

One of the characteristics of our own day, no doubt, is that scientific knowledge and mechanical skill have advanced in a much greater ratio, even within our own recollection, than artistic feeling or taste; and there seems to be some danger of the spirit of the latter being almost merged in the general utilitarian tendency of the age. It behoves us, then, to combine in keeping alive some spark of regard for the poetic, by every means in our power; and I cannot think that for the attainment of this object, it is wise with regard to any art, not even of the art architectural, constantly to crave after some new thing.

Architecture, like its sister arts, has a noble history to look back upon; and her development has been as gradual as the lapse of years, upon whose centuries it is written in living stone.

The growth of the architecture of Greece was the work of hundreds of years; and it slowly arrived at its perfection by the patient and careful study of harmony of proportion and beauty of form; and the same truth is to be learnt from the history of the rise and progress of Gothic art.

No real advance in art was ever attained by the ignoring of any one of the elements of beauty; and beauty, we are taught by nature herself, is an essential element in all that can delight.

"Beauty," says a writer in *Frazer's Magazine*, "is everywhere, unnecessary, useless beauty, throughout earth, water, air, and the infinite of space; and everywhere developed, in metre, in balance, in rhythm, in symmetry; the grand original Poësis."

There is a great truth in this quotation; but such words as "unnecessary" and "useless" can never, in their ordinary acceptation, be applied to any works of nature.

That elements of beauty everywhere exist in nature, supplying no physical want, and ministering to no material necessity, is, I think, the most striking argument which can be adduced in proof of the vast importance of the place assigned it in the economy of creation, as a moral and intellectual agent for the mental use of man; and thus viewed, every trait of beauty to be found in the universe is in the highest sense both necessary and useful.

Founded on an innate love of the beautiful, that subtle and delicate mental gift called "feeling," is in fine art the key to truth; and all that is lofty, refined, and consistent is perceived through this faculty. To him who possesses it not, I fear it can never be supplied by reason or philosophy.

There are men to be found moulded much upon the model of our iron age, who seem ever desirous of dragging down the standard of taste to a level with their own perceptions; possessed of no sensibility themselves, they ridicule its presumed assumption by those who do possess it; ignoring the probability that the deficiency may reside in their own prosaic and matter-of-fact brain, and not in any affectation of the poetic mind of the artist. To such spurious connoisseurs as these we may reasonably assume the Poet Laureate to have addressed his objurgation:—

"Vex not thou the poet's mind
With thy shallow wit;
Vex not thou the poet's mind,
For thou canst not fathom it."

The well-informed art critic who is philosophical in thought, and moderate and judicious in the statement of his opinions, is entitled to our respect, and is often a very valuable coadjutor to the man of genius in the attempt to forward their common cause, and to raise the tone of the public mind to something like an appreciation of questions of taste. But it behoves these gentlemen to be careful that, even when perfectly honest and unbiassed in the treatment of their subject, they do not fall into the error of conventionalism, both in idea and expression; an offence which they are wont to visit somewhat heavily upon the heads of any whom they may deem amenable to it.

Among the stereotyped phases of modern criticism, intended generally to express a high meed of praise, none is more common than that of referring to certain artists as "conscientious."

Now when we happen to have had our attention called to the productions of these "conscientious artists" it has proved that this commendation is, as a general rule, bestowed on works conspicuous only for want of hearty, originality, and imagination, laborious though they might be; and our memories may recur to a particular class of pictorial works to which this epithet need to be so overwhelmingly applied that the only inference to be drawn was, that if these were indeed so conscientious, the endeavour to delineate ideal beauty must be highly "unconscientious," and therefore a moral delinquency.

Now I conscientiously believe that this term is, in the literary world of art, greatly misapplied, and has become an apology for a species of imitative pedantry, at the expense of the legitimate end and aim of fine art.

My understanding of a "conscientious artist" is one who exercises his imaginative faculties, in conjunction with his manual ability, to the utmost of his power, and thus emulates the examples of his great predecessors, under the guidance of whose genius all art has been gradually huilt up, and has culminated in every worthy school which the world has ever produced.

The opportunities which the modern architect enjoys of exercising his talents upon works of national importance or of great magnitude are, I fear, few and far between. But if this he denied him, yet many occasions must occur in the course of the practice of a lifetime which shall enable him to illustrate the true principles of his profession, and leave enduring monuments of his skill, which shall influence the future development of his country's architecture in long years to come.

But never let us assume that high ends in art can be lightly attained. To the sublime, the beautiful, the true in nature, the professor must appeal for inspiration. But his efforts will still be vain unless with this he united, in a greater or less degree, that magic talent which seems almost, as it were, a reflex of the mind of the Supreme Being, and a delegation of one of the Divine attributes to the use of man—the gift of creative power.

MIDDLE-CLASS SCHOOLS.—Among the many conversions and improvements of property in recent completion or in progress about the City, there is one which commands the deepest interest, indicating (as we believe it does), moral no less than material progress. The corporation for middle-class day-school education in London has purchased, at a cost of 29,000*l.*, a site of an acre and a quarter on the Finsbury estate, belonging to the Ecclesiastical Commissioners, and is already busily engaged in clearing it, and erecting school buildings for 1,000 boys.

THE INSTITUTION OF SURVEYORS.

INAUGURAL ADDRESS.

THE first opening meeting of this Institution was held on Monday last at No. 12, Great George-street, Westminster. In spite of the rival attraction at the Guildhall, the room was full to overflowing, and many of the well-known surveyors both in town and country attended. The president,

Mr. John Clutton, delivered an opening address. He said—it becomes my duty and pleasure, as your first president, to address a few observations to you on the nature and objects of this Institution. I shall endeavour to compress them into as few words as possible, as it must be sufficiently apparent that the success of the Institution will rest upon the practical efforts and unceasing perseverance of its members, and not upon any efforts of mine, beyond a few simple words by way of introduction, in these the earliest days of the infancy, of what I have no doubt, with the good-will and energy of its members, will become a most valuable Institution. But, before I proceed, I must state with what great diffidence I appear before you as your first president. I cannot but feel wholly inadequate to the task of properly supporting the position in which I am placed by the unanimous vote of the members who first took upon themselves the somewhat arduous and responsible duty of selecting the executive for this Institution. This, however, I may be permitted to say, that though there are very many amongst you much my superiors in intellect and skill in our common profession, there are none who feel a more lively interest in its well-being, or who have more persistently endeavoured, throughout a busy professional career, to maintain our calling in a position which many of us must have felt has not heretofore been recognized by the public. Many causes have combined to produce this result, but the principal one has been the absence of a common centre of association, to which the public might look as some guarantee of the trustworthiness of its members. Every other profession or body of men, having a common occupation, has long since perceived the necessity of association, and found the great benefits that have arisen to the members forming such associations. I can only account for the fact that surveyors have so long remained isolated, without any such common centre, into which individual experiences may flow to be discussed and matured, by the recollection that they have hitherto lived and laboured in local centres, distant from each other, formed and maintained by individual energy, but wanting a common bond of cohesion; and it is superfluous to say how much each one so labouring must have felt the need of an institution "established to secure the advancement and facilitate the acquisition of that knowledge, which constitutes the profession of a surveyor." Even the man in the largest local practice must acknowledge the necessity of that finish (so to speak), which can be alone obtained by the friction of mind with mind among professional brethren.

In speaking of local centres, I allude not only to those large country districts, in which many of our members have taken a prominent and distinguished part; but I include even this large metropolis, in which there are many local centres; and it cannot, I think, be doubted that we shall all greatly benefit by the interchange and expression of thoughts and opinions, many of which can be improved, corrected, and made more useful by discussion and intercourse. The probable reason why such an Association has only partially been attempted, was the difficulty in olden days of travelling to coaches and slow conveyances, and of inducing individuals to expend so large an amount of time as would have been necessary to attend the meetings of a society in any central district.

The advent of railways, however, effected a revolution in locomotion; and none have benefited more largely, in every way, than the surveyor, not only from a pecuniary point of view, but as enabling him to associate more freely with other members of his own profession.

The first society of which I have any knowledge was formed in 1834, and was called "The Land Surveyors' Club." It was in the early days of railways and of other great changes tending to emancipate land and trade from trammels which had, until then, retarded their development and improvement.

It became apparent to the surveyors in and around this great city that changes were in pro-

gress which would vastly affect the value of land,—the staple article with which they had to deal. In addition to the general introduction of railways, other most important legislative enactments were passed affecting land and consequently the surveyor. Of these I may enumerate, "The Commutation of Tithes Act," "The New Poor Law Act," the Acts withdrawing generally restrictions on trade, "The General Inclosure of Waste Lands Act," and "The Copyhold Enfranchisement Act," and other similar Acts, all tending to increase the demand for land. Six members of our profession, feeling the need of a common centre for mutual support, and for facilitating the discussion of subjects brought before them by the new legislative enactments, started the club; but this society was limited, as its name implied, to land surveyors only.

The Land Surveyors' Club eventually became, what its name implied, almost exclusively a dining club, and, as it was found difficult to dine in large numbers, was limited to forty members; but even the meeting for the purpose of dining was found so greatly to benefit the members in the discharge of their business transactions that as the numbers of that club could not be largely increased, others were established both in London and in other large centres of industry, taking into their society not only the land surveyor, but also the huddling and mineral surveyor. These, also, were essentially dining societies; but they all were evidence of the desire for co-operation, and to this end the gentlemen who formed this institution, and amongst whom will be found representatives of every class of surveyor, commenced their work to combine in one institution all the surveyors of Great Britain.

It may now, perhaps, be well that I should shortly state the steps taken to bring about the desired object.

On the 23rd of March last a meeting was held, at the Westminster Palace Hotel, of those persons who had given some indication of their desire to see a combination of the various branches of the profession. At this meeting the following resolutions were passed, viz:—

"1. That it is expedient that an association be formed, to be called 'The Institution of Surveyors.'

"2. That the undermentioned gentlemen do, with this object, form themselves provisionally into such association, and take the requisite preliminary measures for organizing the institution."

The following were the gentlemen who, by this resolution, formed the Provisional Association.—Messrs. Chas. F. Adams, Virgoe Buckland, W. J. Beadell, F. J. Clark, Edward N. Clifton, John Clutton, Henry Crawford, J. B. Denton, R. C. Driver, Richard Hall, Thos. Horsey, H. A. Hunt, Thos. Huskinson, Jeremiah Mathews, John Oakley, Edw. Ryde, E. J. Smith, W. Sturge, George Trist, and Francis Vigers.

At the same meeting, a resolution was carried to the following effect:—"That the undermentioned gentlemen, viz., Messrs. Hunt, Clark, Denton, Vigers, Driver, Ryde, Clutton, and Trist, be appointed a committee to prepare and submit a report to the Association." Here I am pleased to record the fact that we are indebted to our learned associate, Mr. John Horatio Lloyd, for being good enough to aid us in the preparation of the above resolutions; and that we have, throughout our labours, been much assisted by his kind and very able counsel and advice. The committee above mentioned met, and, with the very valuable co-operation of our honorary secretary, prepared the bye-laws and regulations, which were duly reported to a general meeting of the Association, then enlarged to about fifty members, and by that meeting, held on the 15th of June last, were made and established. At this meeting, also, the seventeen gentlemen whose names appear as the first council were elected by ballot; and they afterwards selected from among themselves the president and four vice-presidents. At a subsequent meeting, the council had the great pleasure of electing the two associates, Mr. Lloyd and Mr. Bramwell, who now aid us with their counsel and advice. Thus, gentlemen, this Institution first came into existence.

I need scarcely say that, in common with all things human, the early promoters of the movement met with many difficulties and some disappointments, and I regret that a few of the most eminent and respected of our brethren are not found in our list of members. As the council is from necessity limited in number, it was most

difficult to make a selection of representative men at the Board; but I can conscientiously assert that it was the object of all concerned to extend it as far as possible, so as to embrace gentlemen representing the various branches of our profession. Fortunately for the members generally, they can at the end of the first year reform (if reform is needed) the present council, which has undertaken the somewhat arduous duty of bringing the first year's operations to a successful issue.

So far as we have gone I think I may congratulate the members of the Institution upon the success which has attended our work. We have now enrolled amongst us 131 members and nine associates, and I am sure that as the Society becomes better known its members will largely increase. It cannot, I think, be doubted, that great benefit will be derived from frequent intercourse; and that the public at large will benefit by the more wholesome practice which must follow from such intercourse: for I cannot conceal from myself the fact that, as individuals, we have sometimes forgotten our true and legitimate position as surveyors and valuers, and have allowed ourselves to become partisans and advocates; and that, under the guise of giving opinions, we have allowed our zeal or our imagination to lead us somewhat astray. The business of the surveyor, I hold to be to give an unbiassed opinion upon the subject placed before him, and not to become, in any sense, the advocate. As it was once said by a respected surveyor, upon being asked if he was "concerned" for some one, he replied, "I am employed by him; but not 'concerned' for him." If we could only keep this in view, such startling differences as have been found amongst surveyors will seldom be met with; for it can scarcely be possible that such differences can properly exist between respectable men, having, as we ought to have, a proper regard for our profession, and the Society to which we belong.

This Institution has, in truth, like other similar institutions in this great country, arisen from the wants of society, and being the natural result of its present state, promises, I think, to be both useful and lasting.

Law, physic, and divinity, have long had their several internal regulations. The City trades were formed into companies so long since, that in some cases the original foundation is lost. The lovers of wisdom originated the Philosophical Society two hundred years ago, and in no part of the intervening period has that society failed in its transactions; the Royal Academy of Painting has celebrated its centenary; the Society of Arts has continued with more or less success for 115 years; and many kindred societies have subsequently been formed, and have worked great good, both to their members and to the public. One is worthy of special mention—the Institution of Civil Engineers. It appears from their records, that a society, or rather a club, was formed in 1771, mainly by the efforts of Smeaton; but the members were few, and it was most difficult to get together more than four or five members at a meeting.

This date takes us back to the time when Brindley and Smeaton were required to form canals to convey the enormous increase in manufactured goods, which ensued on Watt's improvement of the steam-engine, the foundation of the subsequent eminence of the country. The recovery of coal at a reduced cost gave the country that power of cheap production which ultimately so burdened the canals, that goods waited for weeks at Manchester for their turns of transit, and yet the canals carry to-day, between that place and Liverpool, more goods than they did before the railways were made. Canals, bridges, roads, harbours, and railways have in succession developed the latent powers of the engineers, and their institution originated when their works became of importance.

It was not until 1817 that the present Institution was established, and it is recorded, "that a few gentlemen, impressed with the difficulties young men had to contend against in gaining the knowledge requisite for the diversified practice of engineering, resolved to form themselves into a society for promoting a regular intercourse between the persons engaged in its various branches, and thereby mutually benefiting by the interchange of individual observation and experience."

How well does this describe our own position, and what we must all have many times felt.

Now, what has been the result of the establishment of the Institution of Civil Engineers, both upon its members and the public at large?

It numbers now about 1,500 members of all classes. Meetings are held weekly during the session, at which the average attendance is nearly 250 persons; and surely it cannot be doubted that the mighty results brought about by the labours of the civil engineer could never have been accomplished if the individual members had not been able to secure the aid and support of the important body to which they belong. Thus will it be with this, our Institution, if the members are only true to themselves and the society; for the surveyor's practice, like that of the engineer, is greatly diversified; and it is scarcely possible that any body of men can have to deal with more important and more constantly varying and increasing interests than the surveyor.

The Royal Institute of British Architects is also of a kindred character, but confined almost exclusively to architects in practice. It was formed in 1834, and now numbers upwards of 600 members of all classes. The Architectural Association, which consists chiefly of students and the younger members of the profession, may also be mentioned. This was established in 1842, and has now upwards of 400 members. The Mining Engineers' Society, of Newcastle, was started in 1852, with eighty members, and now comprises 320 members, publishing monthly a most valuable series of transactions. This society admits coal-owners, as having a material interest in the success of the institution, and any literary, scientific, or practical members of other professions, whose labours, talents, or professional experiences can aid its labours.

Although the Institution of Civil Engineers may be the society to which we are most nearly allied, there are many other societies to whom we are indebted for much knowledge that is essential to the surveyor. For instance, the Geological, the Botanical, and many others, which aid in the formation of that judgment required successfully to deal with land under its different circumstances of soil, locality, and climate.

The founder of geology was a surveyor who travelled more than once over the whole of England, before he made sections from side to side, and delineated with an accuracy which has well stood the test of time, the order in which the several strata, from primary to tertiary, rise successively to the surface, between the Welsh hills and the eastern coast; and to him, as a geologist, the country is indebted for the opinion that the Durham coal-field underlay the magnesian limestone. This opinion was the basis of expenditures varying from 100,000L. to 300,000L., to pierce through that limestone to the coal at a depth of 1,500 ft., expenditures most profitable, and adding nearly one-third to the area of the Durham coal-field. Now what would that man have given for the support of an institution which could have endorsed his facts twenty years earlier than he could himself force them upon an ignorant and, to a certain extent, unwilling public?

In a great and free country, where land is constantly being converted to more valuable purposes, and where the value may vary from a few shillings to a million pounds per acre, it must be apparent that the surveyor, through whose hands all these transactions pass, and by whose skill and experience the face of the country is changed from barren wastes to fertile fields, and prosperous thriving towns, with their docks, railways, and every variety of commercial and manufacturing premises, must, to discharge his duties effectually, be a person of enlarged and cultivated knowledge; and it is evident that the surveyor has not generally held his proper position amongst the professional men of Great Britain. There can be no doubt that the duties of a surveyor have increased to an extent and importance which demand the establishment of an institution; and I am proud to be one of those met together, this day, at the commencement of a new life for a profession to which many of us owe so much, and to which we are all attached.

I endeavoured just now to shadow forth some of the reasons that tended to depreciate our position in the public opinion, but there are others. A considerable number of the men in country districts called "land agents" are, in fact, not surveyors at all. Many most respectable gentlemen are entrusted with the management of land, whose education and early pursuits were directed to entirely different objects. Gentlemen learned in the law and physic, officers of the army and navy, and members of other classes of professional men, think themselves competent to manage and deal with land.

How strange would these gentlemen think it if the surveyor advised on abstract questions of law, or ventured upon a surgical operation, or undertook to manœuvre a regiment of soldiers, or to navigate the Channel fleet; yet officers of these services undertake the management of land, than which nothing requires a larger amount of professional knowledge and experience to manage properly and successfully.

I have time left only to indicate briefly some of the various duties of the surveyor, commencing with the ancient forest.

In years gone by the planting and management of the oak forests would have been one of the duties of a surveyor; but the days of oak forests are numbered, and iron supersedes wood in the walls of old England. At present, the surveyor's attention is chiefly directed to plantations for ornament and shelter, but there is room for clothing many bleak sides of bills with trees, to the profit of the owner and the advantage of the country.

The surveyor now has to devise the most expensive and ingenious ways of rooting up the remains of the forest and converting the soil into productive land, and the clearing, road-making, fencing, and draining; the erection of farm premises, and the finding suitable tenants; with the framing of leases for the due cultivation of the land, holding an even balance between the lord of the soil and his tenants. All the above are works requiring great knowledge and experience. At another period the surveyor has to convert and utilise land for building, to lay out and make roads and sewers, and in fact prepare the land for the builder. So again with docks and railways. The surveyor not only measures and maps the ground to be converted to commercial purposes, but his skill and experience are again brought to bear upon the sale and purchase of the land before the engineer can commence his operations. The surveyor's services are again required in the measuring of holdings and estimates of their value, and also in the estimate and sale of wharfs, docks, and other commercial property; and last, though not least, the services of the mineral surveyor are necessary in the management and exploration of our mines. These all afford vast fields and scope for the skill and experience of the regularly-educated surveyor, and it is evident that miserable failures must be made by men who assume to be surveyors, but who have had no proper education to enable them to carry out the important works briefly enumerated above.

There are one or two subjects which must shortly more engage the attention of the surveyor. To mention one only, and that, perhaps, the most important, viz., the utilization of the refuse and sewage arising from our population. Hitherto the object appears to have been to get rid of all such matter, at a great cost, into the nearest stream or water-course, thereby transferring to other localities the nuisance and evils arising in our towns. Scarcely any attempt has been made to convert the most valuable manuring matter to any useful purpose. It is for the surveyor to aid in the application of this matter, so as to render our fields more productive, and to convert a substance which, misapplied, is so destructive of life, to the support of life, and the increase of the nation's wealth and happiness.

I will not here enter upon the large question which are now ripe for discussion, viz., whether the dry earth system is the better method of conveying away the more valuable manures contained in sewage; or, whether we must continue to use the present expensive mode of getting rid of it by sewers which, have not only to be made large enough as at present usually constructed for sewage proper, but for the rain-fall also. The question to be discussed in this room was, whether the manuring value of this refuse is better and more economically applied in a fluid or dry state? and I hope soon that some one of our members will prepare a paper, and so lead to a full discussion upon this most important subject.

It now remains for me to indicate the line of action which this Institution is likely to take. Offices and a convenient room for our meetings have been secured, to which is attached a reading-room and library, open at all times to members of the Institution. The room will be supplied with papers, &c., for the convenience of members.

General meetings, it is at present proposed, shall be held in this room on alternate Mondays, at eight p.m., in the seven months beginning in November and ending in May. At these meet-

ings papers will be read upon subjects interesting to the surveyor, and discussion will afterwards be open to the persons present. It is proposed to print and distribute the papers, with a short statement of the discussion which may have taken place.

The bye-laws and regulations have been prepared with great care, and I hope they will be found sufficiently matured to be a basis upon which to rear an important structure. But, however sound the foundation, the ultimate completion of the Institution, its future prosperity and usefulness, and, indeed, its very existence must depend entirely on the good sense, the personal conduct, and the individual exertion of every member; and I feel assured it will be enough only to mention this circumstance to command the best efforts of the members, always bearing in mind that talent combined with respectability are preferable to mere numbers; and that, from too easy and promiscuous admission, unavoidable, and not infrequently incurable, inconveniences perplex and sometimes destroy societies.

The council hope that the members will bear in mind that it is important to have a good library, and that books and maps should be presented at an early period. It will also be of great value to have plans and reports of works executed or designed, with the result of their cost, &c.; and it is hoped in course of time to make the Institution a centre for the accumulation and diffusion of all information and matter of interest to the profession.

Our very able honorary secretary has kindly, for the present, undertaken to carry on the business of the society with the aid of an assistant secretary. The Institution, thus fairly started, must run a successful course, if the members are only true to themselves, and it will prove of great advantage both to the members and the public.

Mr. J. H. Lloyd (associate) in an eloquent speech moved a vote of thanks to the president, and, as an outsider who took a great interest in the profession, begged permission to add a few words of kindly advice and encouragement. He had seen and talked to some of the eminent gentlemen whom he believed the president alluded to with regret as not having joined the Institution. They had doubted its success, and wisely shaken their heads, but head-shaking was very easy; and he never yet knew anything worth the doing accomplished by doubters. Would Columbus have discovered the continent of America, or would those wondrous cables have been laid to connect his new world with the old if courageous minds had been dissuaded from the attempt by shaking of heads? He advised the members to discard all doubts of success; to fail in a great end was nobler far than not to endeavour. It was well not to promise or to anticipate too much, but he thought they might calculate on the attainment of three objects—intellectual advancement, social elevation, and moral improvement. As judges, as arbitrators, witnesses, or advisers both in public and private capacities, a general as well as a special knowledge was most important. Social elevation and moral improvement would go hand-in-hand, and, though it might ill become him to say to those present that any of the latter was needed, he would take this opportunity, while they were talking as friends, boldly and frankly to mention a subject that was often in his mind. He believed that as judges, arbitrators, or advisers there was no body of men more upright and responsible, and more anxious to do what was right at any cost than the surveyors of Great Britain, but he was bound to say, from a somewhat large experience, that as witnesses he had sometimes observed a zeal which must put a strain upon the conscience. No client had a right to ask a surveyor for more than an unprejudiced opinion, or get him to pander to his stupidity for his own gain; let there be less of that overweening confidence of statement, which not only does more harm than good to the client, but lowers the surveyor in the estimation of all right thinking men. The institution could only be a success by constant and combined efforts, and he specially urged on the younger members the necessity of attending the meetings, and taking part in the papers and discussions.

Mr. Richard Hall briefly seconded the motion, which was carried by acclamation.

Mr. F. J. Clark then moved a vote of thanks to Mr. Lloyd, who was always ready to assist surveyors with his purse, or with his counsel, and had so eloquently reminded them of their

duties that evening. This was seconded by Mr. Huskinson, and carried amidst great applause.

Thanks were also accorded to the honorary secretary (Mr. J. W. Penfold), and a most successful meeting terminated with the announcement that a paper would be read on Monday evening, November 23rd, entitled "Historical Notes," by Mr. Edmund James Smith.

GUILDHALL: LORD MAYOR'S DAY.

EVERYTHING passed off most satisfactorily in the City on the 9th of November. The arrangements at the Guildhall, and the hall itself, now completed, were most creditable to Mr. Horace Jones, the City architect. The lobbies were decorated with sculpture from the studios of Mr. Durham and Mr. Theed, and in the Alderman's Court-room was set up an effective scenic picture, by Mr. Frederick Fenton, representing the Attack on Magdala by the British Army. The stained-glass windows in the ball were illuminated from behind. The great Lancashire memorial window at the east end came out beautifully. A handsome carved oak screen, or rather reared, has been set up under it, at the hack of the dais. Some of the other windows were but dimly seen, probably because of the blaze of light in front of them. The scene, as a whole, was as grand a sight of its kind as ever looked upon. A little less trumpeting—two blasts, for example, to each toast instead of four,—and fewer repetitions by the toast-master, of "May it please your Royal Highness," would have left cynical visitors without a ground for grumble. The Lord Mayor, Jas. Clarke Lawrence, pleasantly indicated the wise spirit that will influence him during his mayoralty when he said, in one of the many excellent speeches made by him during the dinner, "I do sincerely hope that during my year of office the Mansion House may be regarded as the proper centre and home of all who are eminent in art, science, and the civilization of our time."

KENSINGTON SICK ASYLUM COMPETITION.

THE Asylum Board have purchased six acres of land at North End, from Captain Cunter,—a plot in between the West London Railway and Beaufort House; and here it is proposed to build an asylum for 600 patients. Six sets of designs have been sent in by the following architects. We add the amount of the estimate in each case where it is attached to the drawings:—

Messrs. Hunt & Steward.....	£55,000
Mr. Allmon.....	50,000
Mr. Williams.....	45,000
Messrs. Nesfield & Shaw.....	45,000
Mr. F. H. Pownall.....	39,800
Messrs. Giles & Bree.....	36,700

The design by Messrs. Nesfield & Shaw has been selected, subject, we suppose, to the verification of the estimate. Of this, however, there is probably not very much doubt, provided any of the other estimates be correct! It is very plain externally, and peculiar. The walls are of brick, the roofs of tiles, and in parts the walls of the upper story are faced with weather tiles. When we add that there are tall brick chimneys, and that the windows are filled with thick wooden sashes and small panes of glass, it will be seen that it presents a rural and almshouse-like aspect, such as belongs to some buildings of the seventeenth century. We have no doubt that it will produce a very agreeable effect. The plan, too, appears to have been carefully studied. The wards are to be warmed by earthenware stoves in the middle of the floor, the flues from which pass up through the other floors. The position of the W.C.s seems open to question.

DUMFRIES INFIRMARY COMPETITION.

THE conditions issued by the governors contain a very objectionable clause. After announcing that, "though they will consider favourably the claims of the architect who obtains the premium, [they] will not be bound to employ him to carry out the work," they continue,—

"It is proposed to expend the sum of 10,000*l.* upon the buildings, which sum shall include the architect's fee and the salary of the clerk of the works, the amount of which fee and salary shall be stated by each architect in a stamp sum."

The architect whose plans may be selected as the best shall not be entitled to payment of the premium unless and until the committee and governors are satisfied that the works can be contracted for at or within the said sum of 10,000*l.*, including as aforesaid."

In other words, as will be seen, the governors, in a by sort of way, invite a competition for terms amongst architects, tempting competitors to name a low sum for remuneration as a means of increasing their chance of being selected. Architects will do well to reflect before they respond to this condition. The profession is being dragged into the dirt.

The premium really offered to the successful competitor is 50*l.* A correct estimate of the cost of carrying out his design would itself cost more than double this amount.

THE INSTITUTION OF CIVIL ENGINEERS.

THE Council have issued a list of subjects upon which, among others, communications are invited for reading at the meetings of the Institution. For those approved premiums will be awarded. Amongst the subjects given are the following:—

On the present state of knowledge as to the strength of materials.

On the theory and details of construction of metal and timber arches.

On land-ships, with the best means of preventing or arresting them, with examples.

On the principles to be observed in laying out lines of railway through mountainous countries.

On the most suitable materials for, and the best mode of formation of, the surfaces of the streets of large towns.

On the construction of catch-water reservoirs in mountain districts, for the supply of towns, for irrigation, or for manufacturing purposes.

Accounts of existing water-works.

On the drainage of towns, and the ultimate disposal of town refuse.

On the employment of steam power in agriculture.

On the ventilation and warming of public buildings.

On the design and construction of gas-works, with a view to the manufacture of gas of high illuminating power; and on the most economical system of distribution of gas, and the best modes of illumination in streets and buildings.

The first meeting of the Institution for the ensuing session, to be held on Tuesday, the 17th inst., will take place in new premises erected during the recess on the old site in Great George-street.

PROPOSED SANITARIUM AT WESTON-SUPER-MARE.

A SITE having been purchased for the Sanitarium, having a house upon it capable of accommodating twenty patients, plans were prepared by Mr. Spencer, architect, Tannton, in order to show how much building may be added to, and the site utilised. The cottage system has been adopted, on account of its elasticity. What has been aimed at has been to obtain facilities of communication; but at the same time (as on the pavilion principle in hospitals) to isolate each building as much as possible for the sake of the thorough circulation of the atmosphere and complete natural ventilation. The present site will be sufficient for eight blocks, or cottages, without crowding, all connected by corridors. All the apartments used by the patients are on the ground floor, and on the same level, thus the fatigue of making use of stairs is entirely avoided.

The apartments for women are on one side, and the men's apartments on the other. They consist of bedrooms, a day and dining room for each six, with rooms for the master and matron, the kitchen and offices, common to all, being in the rear. In the rear of the sick-wards for cases of relapse, and all the usual and necessary offices adjoining. Each bedroom for convalescents is calculated to hold five beds, thus giving 1,000 cubic feet to each; but in the sick-wards 1,500 cubic feet have been allowed to each patient.

A conservatory and the corridors would serve as places of exercise in inclement weather; while, as the former leads directly on to the beach, bathing-machines could be brought up to the door and be entered by patients under cover.

A tower serves as a distinguishing mark to the group of unpretending buildings. The tower staircase leads also to the tops of the corridors, which have flat roofs, and are useful ambulatories. Numerous points of access are provided from the corridors to different plots of garden-ground.

METROPOLITAN BOARD OF WORKS.

Dangerous Structures.—At the meeting on the 6th inst. the clerk read a letter from Sir M. E. Hicks Beach, bart., Home Office, inquiring whether the Board would have any objection to undertake the duties, imposed by the Building Act, with regard to dangerous structures in the metropolis, now performed by the commissioner of police. The matter was referred to the Committee of Works.

Improvement of Park Lane.—At the same meeting, the Works and General Purposes Committee brought up a report recommending that an improvement should be made in Park-lane by purchasing the two northernmost houses on the east side of Hamilton-place, to pull down the fronts and widen the roadway to 40 ft., and that the road should be carried northwards, in a straight line with Hamilton-place, into Park-lane, and that the solicitor to the Board (Mr. Smith) should issue the necessary notice for an Act in the ensuing session of Parliament. This was embodied in a motion, put, and agreed to. It has yet to be seen, however, if the Commissioners of Woods and Forests will assent to the plan.

THE SEWAGE FOR THE SOIL.

The Leamington Local Board of Health have at length become convinced that the attempt to deodorise the town sewage is a failure, and they have unanimously resolved to adopt irrigation. At a meeting of a committee of the whole Board, a sub-committee has been appointed to look out for land suitable for irrigation. The question, however, whether the sewage should be pumped on to the land direct from the sewers, or shall first have some solid matter extracted, was left open for future consideration.

The Leicester sewage question seems to be approaching the same solution. The local *Advertiser* says:—

"The official report of the analytical investigation of the merits of the two systems of treating town sewage, namely, that of deodorising it by means of lime, and Mr. Sillar's method of treating it, will be read with considerable interest by most of our readers. They will see that no very brilliant result has been arrived at by the latter process. In the former, that of deodorising it by means of lime, much of the fertilising properties of the sewage was, as is well known, lost. Mr. Sillar's process is an improvement in this respect, but still it must be pronounced as very far from being satisfactory. By neither of the processes can the liquid be so far purified as to be fit to be permitted to enter a running stream. Science, hitherto, is at fault in this respect; no chemical means having yet been discovered that can thus far effectively purify sewage.

One strange discrepancy is apparent in this report between the calculation of chemists as to the value of deodorised manure as a fertilizer, and the price it fetches in the market. While they estimate it as worth between 13s. and 14s. per ton, experience teaches that, in the market, but 1s. per ton can be obtained for it. Farmers may, perhaps, deem it worth while to test this matter. Either the chemists must have strangely miscalculated, or else here is a manure selling at less than one-thirtieth of its intrinsic value. As a manufacture of solid manure Sillar's process is reported as being 'much superior to the treatment by lime, although it fails to extract more than a very small portion of its valuable constituents.' The report states that 'no chemical process is known which even remotely approaches irrigation in its efficiency as a purifier of sewage.'

SANITARY MATTERS.

Falmouth.—The sanitary condition of Falmouth, at the present moment, seems to be as bad as it could have been had there been no local board of health in existence. The very best parts of the town are hotbeds of fever. Woodlane-terrace, Florence-terrace, and the neighbourhood, whose proximity to the sea and great elevation would be supposed to render them peculiarly free from zymotic diseases, are declared to be the most infected parts of the town. One medical gentleman in the town has no fewer than forty cases of fever under his own care, the majority of which are situated in this district; and the other medical men, says our authority, are, to use an expressive phrase, "run off their legs;" so that the extent to which fever has laid hold of the town is

something alarming. In front of almost every house is a cesspool, the only receptacle for the whole drainage of the house, and from which noxious vapours are continually arising and poisoning the neighbourhood; whereas, in the lower part of the town, a large portion of the sewage matter is conveyed at once into the harbour.

North Shields.—An epidemic which recently broke out in North Shields continues to run its course, no abatement in its severity being yet visible. Mr. George Bell, at the Tynemouth Town Council's last meeting, said that there were from 700 to 800 cases of fever in the town. The entire prostration of those suffering under the attack has been pitiable. Fortunately, the mortality is not proportionate to the intensely violent character of the fever. The disease has been extremely severe in all the principal streets and squares occupied by the respectable classes in North Shields, and in some of the best portions of Tynemouth; and there is the same disproportion in the number of cases in the higher as compared with the lower parts of the town as was seen during the cholera visitation, the humbler classes by the river side being again come off comparatively unscathed. This is a remarkable circumstance, and narrows the search after the cause of the alarming outbreak to very small proportions. The Falmouth case might usefully be considered in connexion with it. The origin of the disorder is believed to be found, however, in some sort of water pollution, and not in atmospheric conditions. The Public Health Committee have instructed Mr. Hawksley, C.E., to make a complete inspection of the water-supply of North Shields.

THE ANCIENT MANOR-HOUSE OF SOUTH WINGFIELD, DERBYSHIRE.

In your recent review of "Guide-books to Derbyshire" no mention is made of one of the most interesting and extensive ruins in that county. I allude to the Manor House of South Wingfield (or Winfield), three miles distant from Alfreton and about eight from Matlock Bath. Allow me, then, to add to what you have said a few remarks on this charming old mansion, which, independently of its architectural features, possesses some historical interest as the place where the ill-fated Mary, Queen of Scots, was imprisoned for several years. To the traveller on the line between the Amborgate Junction and Chesterfield the ancient Manor House forms a striking object, standing out majestically amid a fine grove of trees, which almost embosom it, and surrounded on nearly every side by a deep valley. It is not exactly a castellated structure, but a specimen of a manor-house erected during the reign of Henry VI. (of the very early Perpendicular period; in fact, almost Decorated in parts), and fortified to some extent.

According to Camden, it was built by Ralph, Lord Cromwell, Lord Treasurer of England, and this statement is somewhat corroborated by the fact of carved bags or purses being introduced in the arms over the principal entrance gateway. The plan of the Manor House consists of two quadrangles, the northern of which comprises the more important rooms, the southern court having evidently been used for the inferior buildings. In the north wing of the former quadrangle are situated the banquetting-hall* (with a fine crypt, the use of which seems uncertain), having the usual arrangements of an entrance-porch with chamber over, and a bay-window of elegant design. Adjoining the hall to the west is a large room, probably the state apartments or refectory, beyond which are the buttery-hatch, kitchen, and other rooms, to which no name can with certainty be given. In the west wing, it is said, were the suite of apartments in which Mary Queen of Scots was confined. This is popularly believed to have been the most magnificent part of the building. The foundations of two bold semi-octagonal projections and portions of the walls still remain on the inner side of this wing. These are traditionally said to have been bay-windows, but the foundation is solid, and from an excavation I made some time since, resulting in the discovery of the jambs of

an archway at the side of one of these projections, they appear much more probably to have been lofty *turrets*. At the south-west angle stands what is now termed the high tower. There are some persons still living who remember the fall of a tower of similar dimensions at the opposite (south-east) angle. On the south side of the north quadrangle (which forms the north side of the south court), are the porter's lodge, entrance gateway, and a modern farmhouse, stable, &c., formed within the walls of the original structure. There are no remains beyond a portion of a wall, of the building which formed the east wing of the north quadrangle, but beyond to the east are the ruins of what was probably the chapel.

The south court was evidently used for offices. Its east wing consists principally of two large halls, which were probably barrack-rooms. At the south end of this side is an arched gateway; on the south is a barn, the greater portion of which is clearly part of the original design, and fragments of walling remain, sufficient to show that buildings extended along the whole length of this side of the quadrangle. On the west side the greater portion of the outer wall exists, and there are indications here of another external gateway. Till within about the last twenty years, the original well in the centre of the court was in use, but one night it suddenly fell in with a loud crash.

Nearly all the work is in capital preservation—some portions of the window tracery, door-jambs, &c., look as if only just from the mason's hands, so sharp and well defined are the arrises and moldings. The more important part of the building is faced with ashlar, which I am told, on tolerably good authority, was quarried on Ashover Moor, about four miles distant from the Manor House: it is a crystalline millstone grit. The material for the rougher walling was obviously obtained on the spot, as the greater part of the south quadrangle is built on the solid rock (which is a formation of the old red sandstone). Blore, in his history of South Wingfield Manor (published in the last century), remarks: "Some assaults during the civil wars between Charles I. and the Parliament, and the more deliberate attacks of its subsequent owners, have brought it into a state of irreparable ruin." However, the present possessor of this property, the Rev. Immanuel Hailton most fully appreciates the ancient building, and in a conservative spirit adopts every means to preserve and to strengthen it where necessary." E. B. F.

BUILDERS' HARDWARE.

MR. RUPERT KETTLE (County Court Judge), who, it will be remembered, was the chosen arbitrator of the Wolverhampton builders in the recent wages dispute, which he brought to a successful termination, has just been addressing the working people of Willenball on the "Ornamentation of Flat Surfaces," with especial reference to the manufactures of the district. Mr. Kettle, after an elaborate criticism of modern house decoration, particularly cornices and wall papers, referred at some length to the design and ornament of builders' hardware. "Hinges," he said, "thanks to the design of ecclesiastical builders, had been more elaborated recently; but locks and keys, bolts, and window fastenings, still retain the utilitarian character of former times." He suggested that brass ornaments in the shape of corner-pieces on ordinary door-locks, would be simple and inexpensive decorations, and would greatly improve the appearance of those articles. One eminent firm in South Staffordshire (Messrs. Carpenter & Co.), have already begun to act on the suggestion, and are preparing for the London market a series of cheap yet ornamental rim and dead locks. The Wolverhampton co-operative locksmiths, who have quarrelled with their former employers, have applied to Professor Fawcett for assistance and advice, and that gentleman, in conjunction with other well-known advocates of co-operative industry, has expressed his desire, under certain conditions, to render the applicants "permanent aid." The demand for builders' hardware in Birmingham is improved further, and the work-people are steadily employed. Builders' tools are especially in more buoyant demand.*

* In 1678, this portion of the Manor-house was altered and adapted into a dwelling-house, the remains of which still exist.

* I must express my obligations for some of these data to Mr. John Capitt, of Wingfield Manor, who has resided there for some years, and takes the greatest interest in its antiquities.

PROPOSED FISH MARKET IN THE FARRINGTON ROAD.

ACTING on the facts that upwards of 70 per cent. of the total supply of fish is now conveyed by railway, and that Billingsgate market cannot be made to meet all requirements, the Smithfield Market Appropriation Committee, entertaining strong convictions of the appropriateness of the land lying between the New Meat Market and Farringdon-road for the purposes of a fish market, have availed themselves of the professional services of Mr. Lewis H. Isaacs, architect, and have issued a plan showing the situation of the proposed market, and a view of the intended structure as seen from the Farringdon-road. The ground proposed to be utilized is a parallelogram, bounded on the north by the new road leading to the Charter-house; on the south by an intended new street in continuation of Longlane; on the east by the new street now formed at the end of the meat market, and on the west by the Farringdon-road. In the design no attempt at originality in the external appearance of the building has been sought after; and, as far as it is practicable, the fish-market has been made to appear an addendum to the meat and poultry market. The cost of the building is estimated at 150,000*l.*, exclusive of the value of the land, which is the property of the corporation. The committee in their prospectus take credit for availing themselves of a fall in the land by forming a shell-fish market below, besides the basement below that again; but the result is to render flights of steps necessary to reach the market proper, which we are disposed to think would be found objectionable. However there are more vital questions to be disposed of before this need be discussed.

RE-OPENING OF PORTSMOUTH GARRISON CHURCH.

This event took place on Friday, the 30th ult., and was conducted with considerable ceremony.

The restoration of this ancient structure has been one of some difficulty. The found the old buildings in a wretched state, windows blocked up, doors also, members concealed or fractured, the tie-beams of the roof hanging by iron straps to the outer walls, rendering it quite a matter of wonder they had not dropped from their places long before. We read that the building was the only remains of "Domus Dei," or God's house, a kind of hospital originally for poor monks; and since then the place of marriage between Charles II. and the Infanta of Portugal, &c., to celebrate which, it is supposed, the monarch presented the altar-cloth in the possession of the church, and embellished with a view of Lisbon and the Royal arms of Portugal.

According to Matthew Paris, 1238, Peter de la Roche or de Rupibus was the founder of the Hospital of Portsmouth, in the W.S.W. portion of the town, about 1205. In Slight's History of Portsmouth, we find that on the authority of Dugdale, "Peter de Rupibus, Bishop of Winchester, founded at Portsmouth a house called God's House," which was dedicated to St. John the Baptist and Nicholas." Camden and Speed are agreed on this point.

In the 20th, 37th, and 52nd years of Henry III., disputes were settled as regarded certain possessions. After several grants in 1272 and 1276, the two brothers of William of Wykeham were wardens successively. In the fourteenth century William of Wykeham himself bequeathed "a suit of vestments and a chalice."

In digging down, a broken column and portions of an archway were discovered, which proved that the proposed extension (which has been carried out) of the western end would terminate the actual original length of the building. 20 ft. have been added, making the dimensions as follows:—Nave, length, 110 ft.; width 45 ft.; height from floor to springing of roof, 32 ft. Chancel, including choir,—length, 55 ft.; width, 22 ft.; height from floor to springing of groined arches, 25 ft. The new transept on the north side of the chancel is in length 18 ft.; width, 12 ft.; and height, from level of floor to apex of roof, 30 ft. The roof, which is open-timbered and tile-covered, forms as nearly as possible an equilateral triangle, king-truss for nave and queen-truss for chancel. Vanings lying concealed beneath by the deposits of centuries have been filled in, and a substantial

hed of concrete, 6 in. thick, over-spread by a layer of cement, 3 in. thick, which will, in time, be covered by Minton's tiles, makes a dry and serviceable floor. Chairs, 750 in number, are placed in the nave. The nave, from east to west, is divided into bays, consisting of pointed arches, springing from freestone columns, and is lighted by twelve two-light windows, independently of the stained windows, which we shall describe further on. The chancel-floor is composed of encaustic tiling (Godwin's) interlaid with old white-veined marble, which formed part of the old structure, laid diagonally, and connected by hands of polished green tiling. In the chancel the old credence and sedilia have been restored, the millions of windows partially so. The stained windows above the altar are three in number, and placed there in honour of Sir Charles Napier, of Indian fame, Lord Raglan, and Lord Clyde. The large window at the west end, over the main entrance doorway, is illustrative of Christ sitting in judgment at the last day, and is placed there in honour of the officers, &c., of the 43rd Regiment, killed in the New Zealand campaign. East of the south aisle is a small one-light window, placed there by Archdeacon Wright, one of the chaplains to the forces at Portsmouth, in memory of his brothers, hearing upon it full-length pictures of David with the head of Goliath, and Jonathan in battle array. South-east of the south aisle,—a small window, containing the figure of "Sanctus Georgius," in full armour, presented by Mr. A. Smith, the contractor for the building. On the north side of the chancel proper a two-light window represents the baptism and preaching of Christ, and is to the memory of Col. Willis. In the north-east corner of the nave is a three-light window exemplifying the child-life of our Saviour, comprising the offering of the Magi, &c., and erected to the memory of Capt. Molesworth, R.E. On the north side of the choir is a window to the memory of the officers, &c., of the 67th regiment. All these stained windows are by Messrs. Clayton & Bell, of London. The church is warmed by a central pipe running down the centre of the nave below the flooring, and terminating in branches to two Gill's stoves, situated respectively at the east and west ends of the north side of the building. The gaslight arrangements are effected by fourteen ornamental Medieval iron standards rising from the floor, and carrying a total of 108 lights. These were all from the manufactory of Messrs. Hart & Son, of London. Mr. Street was the architect, and Mr. A. Smith, of Portsea (late Simms & Marlen), the contractor.

MONUMENTAL.

A MONUMENT to the late Admiral Sir Charles Napier is at last in existence, but not so much on the part of the country, as it ought to have been, as on that of private friends and admirers of the bluff old admiral. The ceremony of unveiling this monument, which is one in relief, and fills a niche in St. Paul's Cathedral, near the north entrance, has just been performed. Among the company present were the following:—Major-general Napier, C.B.; Major-general W. Napier; Admiral Sir Michael Seymour, G.C.B.; Colonel Hamley, C.B.; Captain W. Napier; Captain W. Morris, R.N.; Captain Ingledew, Captain Norton Taylor, Captain Poulter, &c. The expense of this monument was defrayed by a few friends and companions in arms of the late admiral. It is of white marble, and upon flags are the names of most of his battles. In the centre is the head in bold relief, surrounded by a wreath of laurel and oak; in the background is the ship *Wellington*, gunboats, and a fortress blown up; beneath is the simple inscription, "Charles Napier, M.P., Admiral, Count Napier St. Vincent, born 1786, died 1860." The work was designed and executed by George G. Adams, sculptor, who has now five monuments in the cathedral, two being colossal statues of the admiral's cousins, Generals Sir Charles J. and Sir William Napier.

A memorial brass, in the Medieval style, sunk in a black slab of Irish marble, has just been executed by Messrs. Hart & Son, of Brook-street, Hanover-square. This tablet is to the memory of the late and sixth Earl of Harrington, and is now being erected in Etravston Church, near Derby. The slab is 8 ft. 6 in. by nearly 4 ft. The inlaid brass is delicately worked, the enamelled portions being effective, and the colours harmonising with the general design.

The whole is bordered by texts and symbols. Under the canopy is a full-length portrait of the earl in collegiate attire. This memorial is being erected by Elizabeth, Countess of Harrington, mother of the deceased youthful earl, who died in 1866, before attaining his majority.

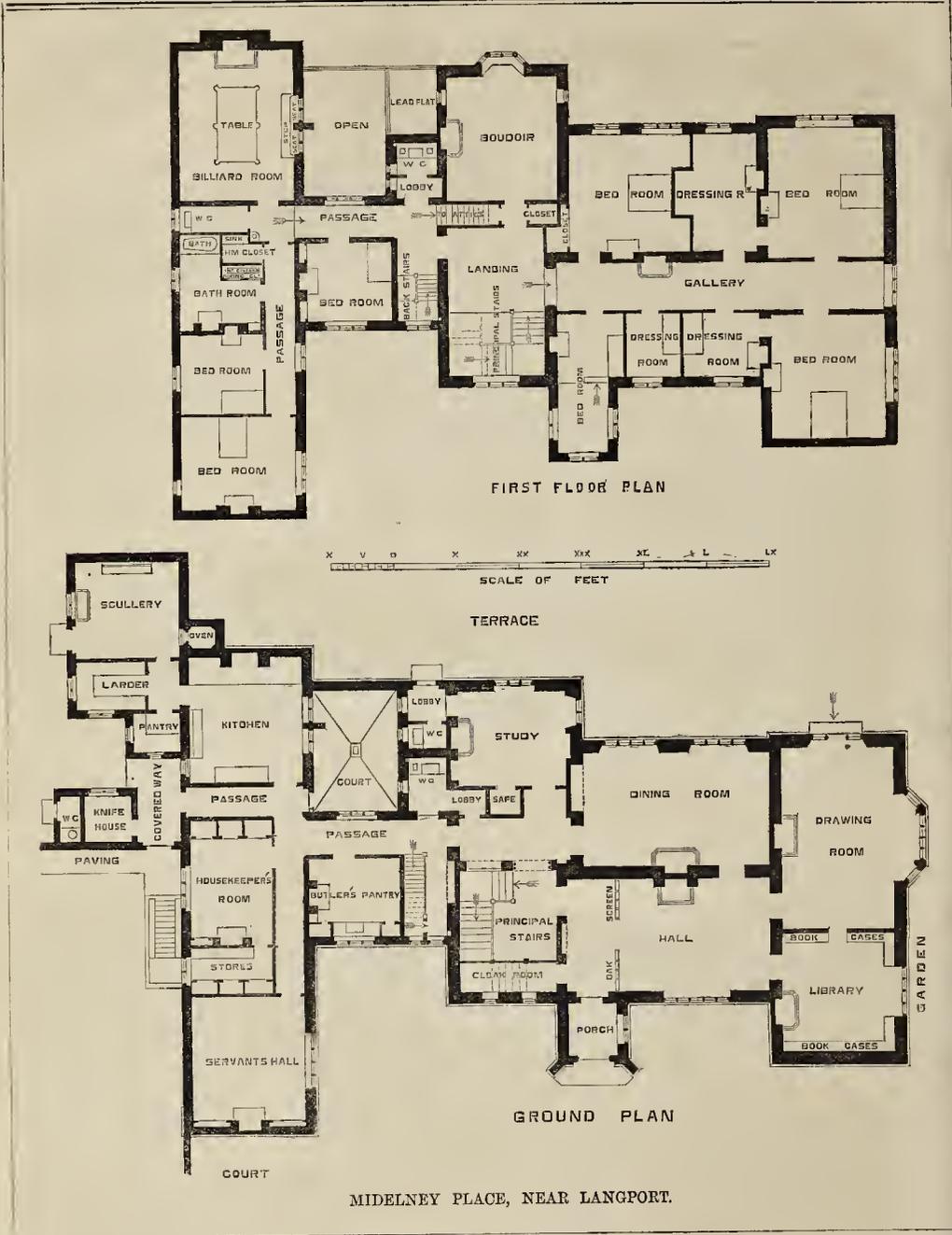
THE TRADES MOVEMENT.

Leeds.—The master builders of Leeds have given notice of their intention, in accordance doubtless with the resolutions of the general association, to adopt, on the 1st of May next, very extensive and important alterations in the rules of the various trades. Instead of 30*s.* per week, they propose to pay ordinary skilled workmen amongst masons 7*d.* per hour; plasterers, instead of 30*s.* per week, 6*d.* per hour; plasterers' labourers, instead of 22*s.* per week, 4*d.* per hour; and plumbers, instead of 26*s.* per week, 5*d.* per hour; superior or inferior workmen in each trade to be paid by special agreement. They also require the abolition of the rule or custom in the Masons' Society for bidding or interfering with the introduction or use of stone worked at the quarry, or anywhere else than the place where it is to be used. Any rule or custom forbidding piecework or sub-letting amongst masons and plasterers they also require to be abolished. With respect to the bricklayers, bricklayers' labourers, masons, masons' labourers, plasterers, plasterers' labourers, and the plumbers, the masters require that in future all trade rules, disputes, demands, and differences shall be settled by conciliation and arbitration [to "require" all differences to be settled by conciliation, we fear, is not the best way to effect such a settlement], and that proper courts shall be constituted for that purpose. They further state that they are prepared at any time, upon six days' notice from the men, to meet them to appoint arbitrators and select an umpire, and that they are willing to leave to the decision of the arbitration court, thus appointed, not only all future settlement of trade rules, demands, and differences, but also the settlement of all matters contained in the notice they have just given.

Liverpool.—A general meeting of the operative bricklayers, who are at present on strike, was held the other evening in Stanley Hall, Richmond-row, for the purpose of taking into consideration the correspondence which had taken place with the master builders with regard to the proposed board of arbitration. Mr. Bromlow, chairman of the Bricklayers' Society, presided, and Messrs. Bolt and J. Samuelson were also present on the platform. There was a large attendance of the men interested in the proposal. It was resolved,—

"That the communication of the master builders, in reply to the friendly overtures of this society, be received in an entire spirit of reconciliation; and this meeting expresses every desire to meet the wishes of the master builders and renew friendly relations with them. But, inasmuch as it would be a serious injury to the operatives, as well as contrary to public policy, that the strike should terminate before a court of arbitration has been formed, and during the present depressed state of the building trade, this society again respectfully asks the master builders to reconsider their determination, and at their convenience appoint their referees to act with those selected by the operatives; meanwhile, the members of the society are recommended to cultivate friendly relations with their employers."

An Imperial Building Society.—The *Courrier de Bayonne*, speaking of the buildings for workmen which the Emperor has decided on having erected in that town, says,—"It is on the same ground on which three specimen-houses have already been erected that the new constructions are to be built. They will be smaller than the preceding, and are intended for only one family. The Emperor, in order to design purchasing all the lots composing the block on which the first three habitations have been constructed, and to pay the price which would serve as the estimate for putting it up to auction. Each dwelling is expected to cost 4,500 francs; the tenant is to pay 300 francs a year, out of which sum 100 francs will be set aside as a sinking-fund for the capital employed. His Majesty will give the property, it is said, to the Society of the Prince Imperial, which will select the occupants and collect the rents. At the end of fifteen years the inhabitant will become the owner. If, by any unforeseen event, he cannot pay the stipulated annual sum (which may be acquitted by monthly instalments), he will be reimbursed the 100 francs a year he has accumulated towards the redemption of his house, with the addition of 3 per cent. interest."



MIDLNEY PLACE, NEAR LANGPORT, SOMERSET.

This house, which is of moderate size, has been built for a gentleman in Somersetshire. It stands on a gentle slope to the south-east, and this is the aspect of the principal rooms.

The porch, by which the house is entered, is at the back, and fronts a courtyard enclosed on the three other sides by walls, the direction of which is indicated on the ground plan, and by the stables. The approach is by an archway in the north-east wall of this courtyard.

The house is built of the white lias of the neighbourhood, with dressings of Ham Hill stone, the distant quarries of which can be seen from

the windows. The roof is tiled. The style has been followed, though scarcely hoping to attain their grace, of the numerous remains of Medieval Domestic architecture with which the district is adorned.

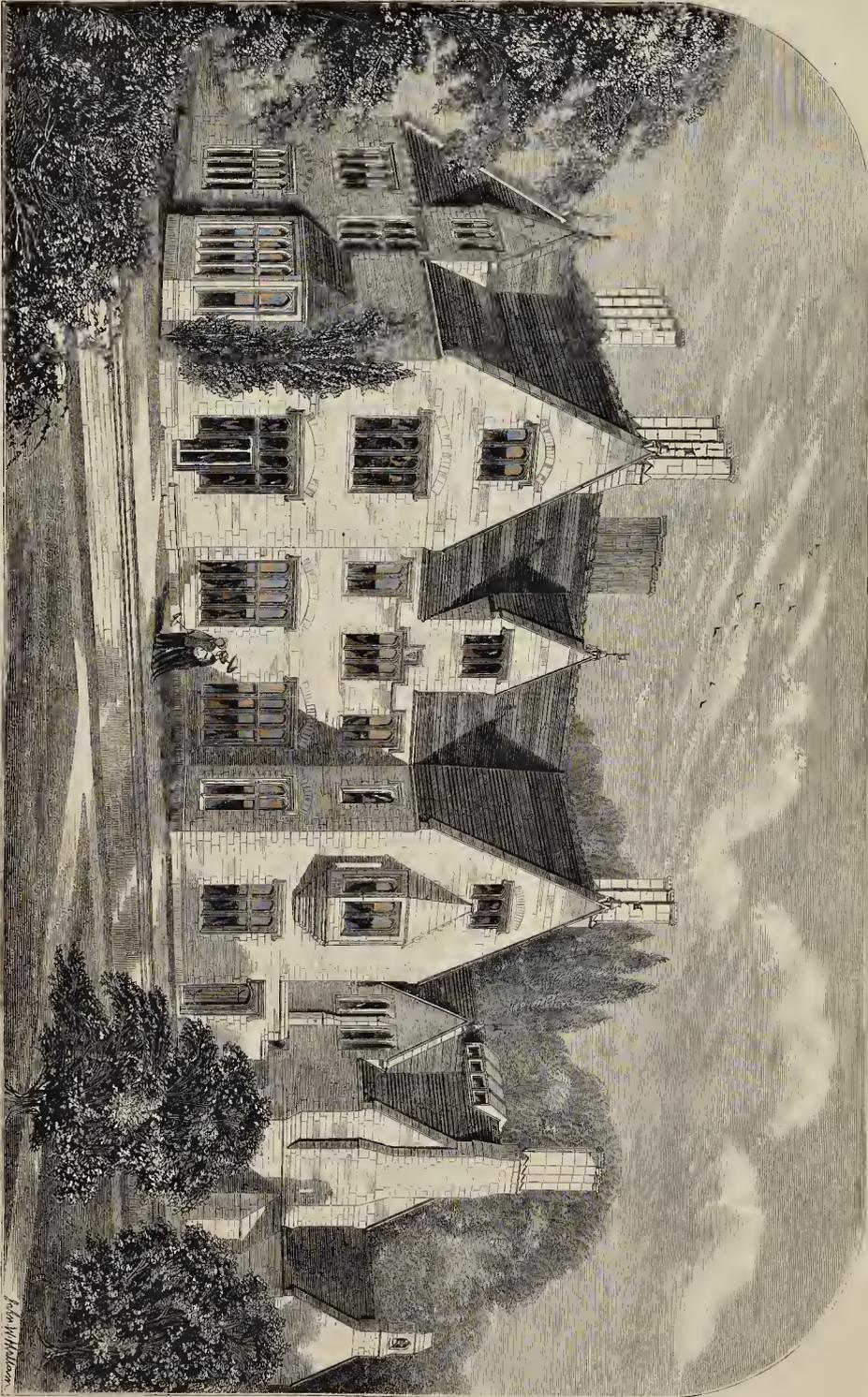
The greater part of the hall is secured against the draught from the front door by an oak screen, 8 ft. high; and as the window faces the north-west the apartment thus formed makes an agreeable summer sitting-room. It is altogether 32 ft. in length, and, as also are the three principal rooms opening out of it, is 12 ft. high, and 15 ft. broad; the dining and drawing rooms are 29 ft. long each.

On the first floor, a handsome corridor, ending in a large western window, leads to the principal

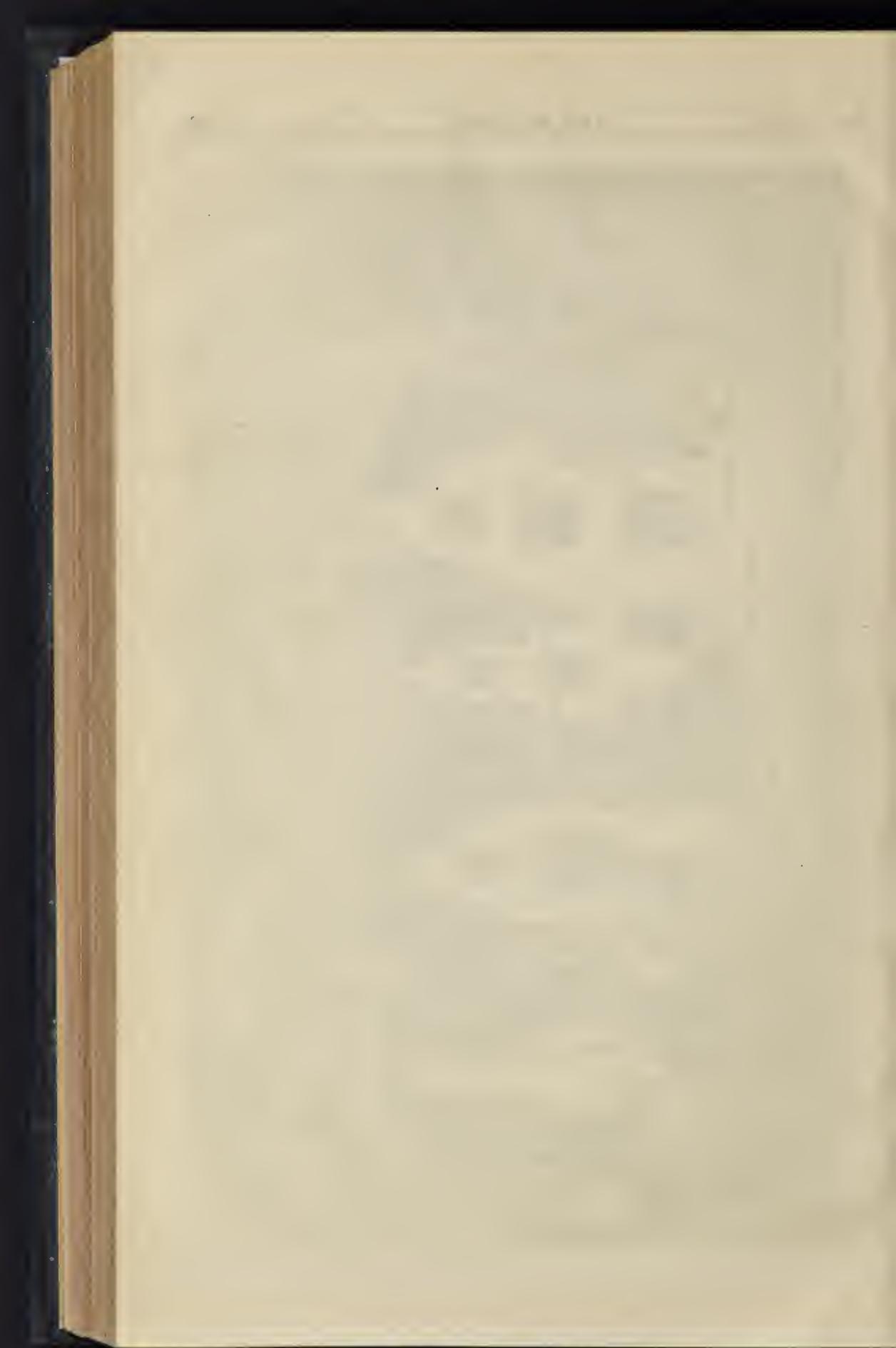
bedrooms; their height is 10 ft. Above, by spanning the valley between the two central ridges with a flat lead roof, spaciousness has been obtained in the attics. These rooms are all 9 ft. high. A billiard-room, over the kitchen, is lighted by a lantern in an arched timber roof.

The builder was Mr. M. Davis, of Langport; and Mr. J. P. St. Anghyn was the architect.

The tender for the house was 5,330l., but by additions and variations the owner increased the amount to about 5,832l. The whole of the stone for the building was dug in the adjoining field. This and other advantageous circumstances materially lessened the cost. The cost of the house, if erected in the neighbourhood of London, has been estimated at more than 8,000l.



MIDDELEY PLACE, NEAR LANGFORD, SOMERSETSHIRE.—MR. ST. ALDEN, ARCHITECT.



WESTMINSTER ABBEY.

"I see the old Abhey, both turret and tower."

It was with thoughts of the past that I rambled around the noble pile of buildings which is the glory of the metropolis and of our land, and I longed for a Hansmann's power to remove the modern buildings by which it is hemmed in, in Dean's-yard and Poet's-corner, so that the abbey might be seen in all its grandeur. The chapter-house is being restored, but its beauty is hidden by the houses that stand between it and the Houses of Parliament. While examining the abbey, I came on to an ugly hoarding adjoining Henry VII.'s Chapel and the northern transept, used as a stonemason's yard (and it has been so for several years): and to my horror I heard a steam-engine puffing away as if it wanted to damage the abbey. The steam-engine appears to be close to the buttress of the northern transept. Surely it ought not to remain for a single day, for it has been publicly stated that with the extraordinary changes in the pressure of the atmosphere there is very great danger to steam-boilers, and the slightest carelessness of an attendant might cause much mischief.

I ask you to raise a warning note in the *Builder* ere it be too late. Surely the hoarding might be removed, and a stonemason's yard obtained very near, where the steam-engine might do its work without danger to any surrounding building.

E. O. S.

THE FAIRFORD WINDOWS.

SIR,—I venture to send you some remarks suggested by Mr. Clayton's letter on this subject in the last number of the *Builder*, not with any intention of discussing the possible connexion of the Dantzig triptych and the west window at Fairford, or the authorship of the former, but with reference to Mr. Clayton's observation that the canopies of the Fairford windows are distinctively Flemish in style.

I have the greatest respect for Mr. Clayton's authority on any point in connexion with glass-painting, and it is with an honest and unaffected sense of his knowledge and my ignorance on the subject, that I ask him in what particular the canopy-work of the Fairford windows is distinguishable from Nuremberg canopy-work of or about the same date? I would also ask Mr. Clayton if he has compared the figures in the Fairford windows with those in the windows of Cologne Cathedral ascribed to Albert Dürer; and if he has minutely examined the tower architecture in many of the backgrounds of the Fairford windows? My own impression from such examination was, that much of these details was actually taken from the walls, gates, and towers of Nuremberg itself. I do not say positively that this is so; but I mention my impression, because it strikes me that careful examination of the architectural details of these backgrounds might be useful as throwing light on the origin of the windows. I have been out of town, and so have had no opportunity of seeing the letter of Mr. Waller to the *Builder*, referred to by Mr. Clayton.

TOM TAYLOR.

* * * Having enabled Mr. Clayton to see the foregoing, that gentleman writes hastily:—
"Canopy-work of Düreresque treatment can be best and abundantly seen in Dürer's authenticated works, where the contrast with that of Fairford will be at once apparent. The difference will be seen in the great exuberance of curvilinear forms and foliated detail of the former, as against the verticity and comparative simplicity of the latter."

At the meeting of the Archaeological Association, on Friday, the 6th, when the Rev. Father Russell read his paper against Dürer's authorship at Fairford, such good judges as Mr. Waller and Mr. Oldfield spoke in favour of the possibility of some of the canopies being English! so little of Nuremberg character did they see in them.

No institution of comparison between the figures at Cologne and Fairford would evidence anything in the question, unless it be first proved that the Cologne figures are by Dürer! Are not these, too, of doubtful authorship? When this matter is settled the Fairford glass may be considered in that connexion.

The architectural backgrounds might probably resemble the towers of Nuremberg, more or less, as they do those of any old city full of gables

and sharp high-pitched roofs, towers, &c. If Mr. Taylor can say distinctly that Nuremberg in particular is so represented in the Fairford backgrounds the point would be interesting, but, even then, not conclusive in favour of Dürer or any German origin, as it would be easier to suppose a reminiscence of the city on the part of a Flemish artist than that a German designed all the rest of the work in a Flemish manner."

CONCRETE HOUSES.

SIR,—Those who may adopt this method of building should be careful to procure good and sound Portland cement, and to put in sufficient to bind the rubble or ballast together. To insure this the quantity used must be regulated by the strength of the cement.

In this the secret of success, I believe, entirely depends. I have already built six cottages one story high with concrete, and I have been so satisfied with the result that I have now commenced to build a dwelling-house with the same material. The walls of the cottages are only 9 in. thick, but are I believe stronger and drier than if they had been 14-in. brick walls. The Portland cement has, however, been used in sufficient quantity, and has been good.

I have not employed Tall's or any other patent apparatus, but merely boards. My reason for doing so was simply that I considered the cost of the patent apparatus excessive.

As to the strength and stability of concrete as a building material there can be no question. General Gillmore, in his work on "Limes and Cements," says, in regard to it (para. 447), that "It is superior to brickwork in strength, durability, and economy; and in some exceptional cases it is considered a reliable substitute for the best stone, while it is always preferable to the poorer varieties." And the late Mr. Robert Stephenson, in his evidence before the Committee of the House of Commons on Westminster Bridge (18th July, 1856), stated that he had examined the concrete of which the foundations of the new bridge were made, and "that it was a great deal harder than the stone of the old bridge, or than it ever was," and added "there is no chance of any decay taking place there."

Some of the old churches in Kent, I have been informed, are built of concrete, and are in excellent preservation to this day; but to give more recent instances of its use, and which many of your readers can examine for themselves, I may mention that part of the retaining walls of the Metropolitan Railway (between the Aldersgate and Moorfields-street Stations) are made of concrete, as also near the Baker-street Station on the St. John's Wood line; and, lastly, there is a concrete bridge across the District line near the junction at the Gloucester-road Station. It would be both interesting and instructive if the engineer by whom this bridge was built would give an account of it in your paper.

W.

SIR,—The liability of concrete to crack and disintegrate, evidently increases in an enormous ratio to the size and dimensions of the wall, and the error of all its advocates lies in the supposition that, because it might answer well enough for a low wall, it will answer equally well for those of a lofty building. There is another point respecting concrete walls that has to be carefully attended to. In a word, when you want good concrete, to use a common phrase, "see that you get it." There is good concrete, and there is bad, the latter being nothing better than so much dirt, the employment of which will end in the collapse of the whole concern. We know that it is impossible to obtain in the mass those qualities that can be ensured in a smaller amount of the same material. Cast iron is an instance of my meaning. Moderate-sized castings can be turned out of the foundry in a perfectly sound and reliable condition, but these conditions cannot be guaranteed when the mass of metal passes certain dimensions. So it is with concrete, the proper duty of which is to act under pressure, as in foundations, where its sphere has been one of great utility and value. I do not mean to assert that concrete may not be applied to the building of walls, but I contend that, until some method is introduced which shall impart to it the qualities in which it is at present deficient, it will prove a failure in all instances where it is adopted upon a scale of comparative magnitude. I have used it myself as an adjunct to brickwork in retaining

walls, where it answered perfectly well, but I should hesitate to build a large retaining-wall altogether of concrete. THOMAS CARGILL.

I HAVE, amongst many others, been watching closely the progress of concrete as material for building, and was much pleased with the article in your pages on Portland Cement. I lately heard, accidentally, that at Gibraltar the Royal Engineers engaged some Moors to assist them in mixing concrete, from whom they learned the proportion of sand or other material, and other information, by which remarkable consistency was given to the mixture. Perhaps some of your readers may be able to furnish us with information on the matter. INQUIRER.

CONCRETE HOUSE AT TWICKENHAM.

SIR,—I wish to notice one paragraph of Mr. Tall's letter in your paper of last week.

He states that the cement applied to Dr. Larden, at Twickenham, was of the "very worst description." This I must distinctly deny, and, fortunately for me, who supplied it, the garden walls, which are now standing, show the falseness of his statement, and will prove to any one who sees them that no cement could be better. There is also the fact of the concrete holding together in large blocks after it had fallen from a great height, which it would not do if the cement were bad.

I think the fault in building concrete houses is in expecting the cement to go further than it safely will do.

In Dr. Larden's house, the proportion of cement to ballast was about 1 in 14, which is certainly not sufficient to be depended upon; in addition to this, there was the deficient construction of the walls, the total absence of bond or tie, the bad foundation, and the running up the building in too short a time to allow the work to set properly (and all good Portland cements are very slow in setting), which I think fully account for the falling of part of the house.

I may add that the house at Ealing, which has stood well, was constructed with my cement; and that the clerk of the works of both this and Twickenham is still being supplied by me. ASHBY, LITTLE.

TO PRESERVE A SCALING OR CRACKED PAINTING.

SIR,—I understand that Mr. Holman Hunt has written a letter from Florence on the present condition of the renowned picture known as "Titian's Venus," and that he states "it is free from the sacrifice of 'retouching,' except near the frame, where the flakes of colour which have fallen off have been replaced as well as possible. But the whole picture is covered with cracks, radiating like cobwebs from various points, and circulating all over the canvass. The entire surface of colour hangs therefore in little scales, which are in danger of being shaken off or chipped by even the most careful moving or brushing." I have no doubt that there are many preservers who well know to those engaged in the art and science of restoring paintings; but having myself discovered a simple preparation which possesses the property of fixing the colours of pictures when they are in a state to chip or scale off from the canvas, as pointed out by Mr. Holman Hunt, I think it may be worth publicity. The preparation is a mixture of equal parts of linseed oil and methylated chloroform. It is to be poured over the painting if the colours are too brittle to bear the friction of a soft brush. After remaining on the surface of the painting for a day or two, the excess of oil may then be removed by means of a piece of cotton-wool, or a soft brush, and a fresh portion of the preservative applied, and the excess removed as before. The process must be repeated from time to time until the colours are firmly fixed, when the painting will bear friction, and may be submitted to the cleaning process or varnished. It is advisable, however, to remove as much of the dirt as possible from the picture, by careful washing with soft water, previously to the application of the fixing agent.

In order to illustrate the value of the preparation I experimented, some years since, on an old oil painting, and accidentally removed the oil and turpentine with which the colours were originally mixed by the artist, thus causing the colours to crack all over, and to fall off in minute pieces when the painting was raised on its side. To prevent further destruction I flooded the painting with the oil and chloroform, and soon found the colours firmly fixed to the canvas, and presenting the appearance of being varnished, owing to the action of the atmosphere and the combination of some of the old varnish embedded in the painting. I sometimes use a mixture of one part of methylated chloro-

form and two of linseed oil for reviving the colours of paintings. A small portion is rubbed over the pictures, after washing, with cotton-wool, and on the following day the painting is wiped over with a soft silk handkerchief. I have found the oil and chloroform, when used in the proportion which I have given, to possess the property of restoring the faded colours of paintings, and I have succeeded in developing colours which had perished, to the eye, by age. It is said that peroxide of hydrogen possesses this property; but I found it to fail when the oil and chloroform succeeded.

In conclusion, I would mention that the methylated chloroform which I have used is the English manufactured article, which differs in some respects from that of the French, though the latter may answer the purpose equally well, but care must be taken in regulating the quantity of oil required for dilution. I believe it would not be safe to use more than equal proportions, even of the English methylated, as there would be some risk of starting the colours or causing diffusion. Lastly, I would suggest that linseed oil and chloroform might be advantageously used by artists for mixing the colours for painting instead of oil and turpentine or varnish.

I wish it to be understood that the fixing agent will not restore the cracks in a painting, but simply fixes the colours, and renders the painting, I have sometimes found, as elastic as the oil-cloth table coverings.

I have now tested the process over a period of three years or more, but my opportunities have been very limited; nevertheless, I think the preparation may be worth the attention of your readers.

HENRY OSBORN, M.R.C.P., &c.

PAINT FOR HOT METAL.

Sir,—Having seen the answer your correspondent from "Sussex" gives to a "Subscriber's" question regarding a paint for hot-water pipes, I beg to inform you that the waterglass paint to which he refers may be obtained from Messrs. Keilan & Gummi, at Nussdorf, Vienna, Austria. About ten months ago I saw at Vienna a sheet-iron stove, which had been continually at a red heat during the cold season, and the waterglass paint, with which it had been covered for a period of more than twelve months, had preserved its colour unfaded, in spite of this severe test. Allow me further to state, that the waterglass paint has been, to my own knowledge, successfully used at Vienna, in places where no description of paint could have withstood the effect of the weather.

The various paints may be had at the above-named place, at prices ranging, according to colour, from 1l. to 6l. per owt.

H. WINKLER.

THE ARMOUR AT SOUTH KENSINGTON.

Sir,—It was with a great deal of pleasure that I saw the announcement in your publication that Meyrick's beautiful collection of armour is to be exhibited, on loan, at South Kensington. Now, I think, a happy time has arrived, and that with the kind help of collectors, such as the Marquis of Westminster, Lord Londeshborough, Lord De Lyle, Mr. Maniac, and others, together with the assistance of the Government from the Tower, and the crown from Windsor Castle, a few lines from your able pen, and the aid of Mr. Planche and Mr. S. Pratt to arrange it, a more perfectly historical and chronological exhibition of armour than was ever seen before could be made. I do sincerely hope the good chance so very interesting an exhibition may not be lost.

H. W. TUCKER.

THE COSMICAL DISTURBANCES OF THE EARTH'S CRUST.

Sir,—I have read with great interest your remarks upon the above subject, it being one upon which science has little condescended, as yet, to enlighten the vulgar mind. Scientific investigation is, unhappily, at variance with theological exegesis with regard to various portions of the revealed Word which are supposed to embody secular facts: the reconciliation of these may be critically dependent upon the question of the permanent or varying dimensions of the earth's diameter. The theory of the gradual expansion of the earth has been more than once brought forward, but always to be overborne by the weight of astronomical assumptions.

Yet, more than one astronomical and geodesical difficulty remains, from which this theory affords apparently a means of escape.

There is a singular absence of data from which to deduce conclusions respecting the direction and extent of primary disturbances, which can only be supplied by sections, through large areas of the globe, showing the profile of the sabbatic formation as it at present exists. These, accompanied by borings in those portions of the formation which are sufficiently exposed, and by careful thermometrical observations, would probably lead to a closer acquaintance with the processes by which the different strata were arranged, and with the mode in which they have been made to regulate the effects of internal forces. We might then, perhaps, arrive at satisfactory conclusions respecting these forces themselves.

F. H.

A PLEA FOR THE TOWN CHILD.*

CHILD of the Town! for thee I sigh;
A sombre roof's thy golden sky,
Thy fragrant air is thick with smoke,
It is thy shroud and mourning cloak,
Alas! poor child, thou art confined,
At once from sun, and light, and wind.

Child of the Town!—'tis sad to sing
Of such a rank and noisome thing
Thy home is foul, thy air is fair,
Sweet life and joy are unknown there.
Alas! poor child, thou art confined,
At once from all that's pure and kind.

Child of the Town! thy danger's great
When thou attempt'st to cross the street.
Thy groves and hills are thine no more,
And rough's thy path for miles and miles.
Poor child! they should ram ground and stone
By steam, and not by man who groan.

Child of the town! for thee, alas!
The *Boards* won't plant nor trees nor grass;
Nor jolly sun, nor cloaking awe,
Will they prevent, or try to cure.
Alas! poor child;—care for his health!
It is his all—his strength, and wealth.

LOCAL BOARDS AND OTHERS v. PRIVATE PRACTICE.

Sir,—I beg to inclose herewith an advertisement, cut out of a Yorkshire newspaper, inviting engineers and architects to offer themselves as candidates for the office of surveyor of bridges to the North Riding of the county of York. You will see, sir, that the salary offered is 300*l.* a year, and no expenses whatever are allowed. The duties are various, and their name is legion; also that the officer appointed is to give the order, in his time, and is debarr'd from any private practice whatever. Seeing in the *Builder* of last week a list of the salaries of twenty borough surveyors, and that only *two* out of the *twenty* are permitted to *have private practice*, I beg to offer a few remarks upon that system. I trust I shall not be considered to be encroaching too much on your space with a subject which is of such importance to so many gentlemen of the architectural and engineering professions.

I need not say that the above is quite a munificent salary compared with many others, and under similar restrictions; but, sir, why should a county or borough surveyor be hampered in this manner? Surely the employers have their remedy if the employed should neglect his business, by their intimating to him that, if he continues his neglect, he must give up his berth; and if it be worth his while to accept an appointment of this kind, it is worth his while to keep it, and not to neglect its duties. But, certainly, if he can determine to resign or superintend other work in the neighborhood, I say it is very unjust and illiberal policy to prevent him.

I know a gentleman who was a county bridge-surveyor for over twenty years, with more than 300 bridges to visit twice a year, with frequent additional visits, and meetings of magistrates to attend, in a large county. The magistrates of that county were more liberal, and allowed him to do other work, thereby enabling him to make a living by combining his bridge-surveying with the superintendence of other local work he may have had in hand, as it was impossible otherwise to make both ends meet with the small salary (50*l.* a year, including all expenses) and excessive travelling expenses. This gentleman held also an appointment as a city surveyor, and likewise designed and carried out many engineering works in that part of England during a period of more than thirty years, and neither his employers in the county nor the city had ever cause to regret their liberality, and on his retirement a few years since no one could say that he ever neglected the duties of the one appointment for the other, or either for his private practice. Now, what kind of a county surveyor do they expect to get for North Yorkshire? Certainly one who has no other business. If a gentleman accept such a post. Perhaps the "justices" do not wish to have a man with any opinion of his abilities, but would prefer a gentleman with no opinion, who would defer entirely to the justices' abilities. If a gentleman, under these restrictions, there are many clever engineers (considering in what a stagnant state the profession now is) in North Yorkshire, I have no doubt, and many of Yorkshire, who would be glad to offer their services, and even reside "within three miles of the Court-house at Northallerton," if they saw any chance of rising in their profession by constructing other works. It may be said that in many of these appointments to the higher or surveyor shows that he can do other work without interfering with his duties, after a time he is often allowed to take private practice. It may be so; but still I present many young men of ability, from offering themselves for these berths, and is, I consider, a great stumbling-block in the way of young men by whom I should like to see these offices held, being positions with a certain income while they were engaged in the higher or branches of the profession. This may be said to be a very Quixotic view of the matter. However, I think that engineers and architects will agree with me in wishing that a

* See Allan Cunningham's poem of "The Town Child and the Country Child."

state of things existed different from that which I have depreated, and also in believing that were it so more competent men would often hold these minor appointments.

It may be objected that the heads of the professions would go in for these berths, and that the youngsters would stand no chance against them; but the former would soon find out that they were no *careers*, and that they would not pay them for the keeping. I have alluded here only to the North York county surveyorship, but the same remarks will apply equally to any of the many appointments as surveyor to local boards, highways, &c., which we see advertised.

Of course, in the case of the more important appointments, and where in such cases as Halifax, Bradford, &c., waterworks and gas are included in the surveyor's duties, it would not be possible for the engineer to devote any of his energies or time to private practice, as he would be entirely occupied with his duties. But where the salary is insignificant, as in small towns and districts, or such appointments as county bridge surveyorship, I do say that it is a bad policy to restrict a man from accepting private practice.

CIVIL ENGINEER.

GENERALISATION IN ARCHITECTURAL EDUCATION.

Sir,—My letter seems to have stirred up a very muddy pool, and I have to thank you for having exposed the filth more fully and in better language than I could possibly have done. I was sorry you thought my letter so unbecomingly and unbecomingly. I am I feel sure that there are many poor fellows who have not had the good fortune to be articled to as good a master as mine was. It is the rottenness of the system of pupillage, and of the system so common among us, of sending a certain class of architects, of making pupils do the work of assistants, that I complain. Every one who desires the welfare of the profession is striving for something better; and, as long as that, some one else, and lead a grand charge of noble men against the mass of ignorance which lurks beneath the name of architect.

We see "our Continental neighbours" systematically educating young architects; and are we, without a desperate struggle, to allow them to ride over our heads? I trust that this matter of education will never be allowed to rest until something really permanent is done. A great deal has been said, but where are its fruits? Some young men have been awakened, perhaps, but we want more; we want to see them clamour for reform, and we want to see a body of the ruling spirits of the profession put themselves into such an attitude that they may be able to reform it coming.

The present system has worked enough harm; it has wasted enough precious time, and turned out enough useless men. Reform is in the hands of the sufferers, and I trust they will fearlessly strive for it, if it comes. We, like certain reformers of the present day, cry for disestablishment, but must look to older men for a new and enlightened system, believing that their love for that profession to which they have bound their lives will carry them through all difficulties.

But let all young men remember what Mr. Spiers said in his presidential address at the Association, about the little use made of the present means of education; and let us with the means we have; for until we do this we cannot expect better things. If anything I do me success will depend upon the amount of patronage it receives, and if this its failure will not be brought about for want of this.

I have to thank "A Subscriber" for his letter last week, and trust that all correspondents will be so generous, come forward and help us.

ABERDEEN.

MAGNESIUM LIGHT.

Sir,—Is there any person who undertakes to light public buildings by means of magnesium? A. M. M.

RATING THE STANDARD THEATRE.

Douglas v. St. Leonard, Shore-ditch.—This was an appeal at the Middlesex Sessions, November 9th, by the proprietor of the Standard Theatre against three rates made by the vestry of St. Leonard, Shore-ditch, in January, April, and July of the present year, on the ground that he was unfairly assessed to a larger amount than the real net value of the premises. Mr. Douglas has been for a long time a successful theatrical manager, and when his theatre was destroyed by fire in 1866 he rebuilt it on a much larger scale. He purchased two houses in George-street and three houses in Holywell-lane, besides enlarging the superficial area by other arrangements, and when the new theatre was opened in November, 1867, it was found to be the largest and most commodious in London. The vestry assessed it at 1,200*l.* net annual value, exclusive of the five houses; and upon Mr. Douglas making complaint, it was arranged that Mr. Castle, a surveyor, should estimate the value and should carefully consider the facts and state the amount to be assessed. Accordingly, in the July rate the net annual value was entered at 800*l.*; but Mr. Douglas refused to be bound by the understanding referred to, and hence these appeals.

There were technical difficulties in the way of the appellant getting his case heard at all, and it was arranged by counsel that the vestry should reduce the rates to a uniform sum for theatre and houses—viz., 800*l.*—and that Mr. Douglas should bear the costs of the appeals.

FALL OF HOUSE AT DEVONPORT.—Part of a house building at Morice-town, Devonport, fell suddenly a few days ago. Several persons were near the spot at the time, and eleven were buried in the ruins. Mr. Oliver, a master builder, was killed, and six others were injured.

CHURCH-BUILDING NEWS.

Church Stretton.—The church of St. Lawrence has been restored and reopened. The new works completed consist of additions to the north and south transepts, both as side aisles opening by arcades into the transepts and nave, the clearing out, concreting, and ceiling of the area, removing the plastered ceilings and wall coating, cleaning and pointing the walls and masonry, recovering the roof, building parapets to the four old gables, re-flooring, and effecting general repair and cleaning. The additional buildings are wholly of masonry, the walling dressed on both sides. The roofs, of selected pitch pine and English oak. The fittings in the church and chancel are of English quarter oak. The floor tiles are 4-in. encaustic in patterns; the chancel and altar space of figured tiles. The style adopted in the additions is varied to suit their relative requirements and surroundings. Thus the low lean-to of the north aisle is thirteenth, and the south aisle, which is gabled, follows the fourteenth to the fifteenth century work. The old roof of the nave, dating back to the thirteenth century, is particularly fine; the "comple" unusually massive, each rafter being 9 in. by 8 in., and set at 9 in. apart upon wall plates. The roofs of the north transept and chancel are also on the framed couple principle, but less massive than the nave. The work has been effected from the designs and under the superintendence of Mr. Pontauy Smith, of Shrewsbury. The contractor is Mr. Pugh, of Hungerford, Much Wenlock. The total cost of the work is about 1,500l.

Hempstead.—Alterations have lately been carried out in the church here by which its interior arrangements have been completely renovated. The old high pews have been replaced by open fittings. The pulpit, reading-desk, and clerk's seat—which rose tier upon tier, in the old three-decker style, completely enclosing the chancel from the view of those sitting on the north side of the church—have been removed, the prayers and lessons being now read from desks at the end of the chancel seats, and a simple open pulpit having been fixed against one of the pillars which support the central tower. The chancel has been paved with encaustic tiles of a quiet pattern, and raised by two broad steps of Forest stone. The heavy wooden railing which enclosed the communion-table has given way to a single rail of polished oak, supported by iron standards. The cost of the alterations has been defrayed, and a harmonium provided, by the subscriptions of the rector and inhabitants. The alterations were effected without closing the church for more than three Sundays, during which the necessary painting and graining were completed. The carpenters' work was entirely executed by a mechanic (Charles Wilson), living in the village. The paving, masons' work, and altar rail were provided by Messrs. Wingate. There are in this church several monuments to the Lysons family, to which a large part of the parish belongs. Closely adjoining the churchyard is the site of an early Roman camp, of which traces are clearly visible, and "Our Lady's Well"—a spring covered by a porch, on which is sculptured a rude image of the Virgin. The parish boasts of a very ancient stone cross, the upper part of which was recovered some years ago from the bottom of the Severn, to which some zealous iconoclasts of former years had consigned it.

Rawmarsh (Yorkshire).—There is a movement for the restoration of Rawmarsh Church. With a view of carrying out the main object, that of rebuilding the tower, a voluntary church-rate of 6d. in the pound has been laid at a vestry meeting, and it is anticipated that sufficient money will be raised towards carrying out the desired object. The architects appointed to prepare the necessary plans are Messrs. Blackmore & Mitchell-Withers, and under their inspection the demolition of the tower, which has recently shown further symptoms of instability, will shortly commence. Such is the insecure condition of the tower that for some time past it has been considered unsafe to ring the bells in the usual way. Along with the rebuilding of the tower will be carried out the work of restoring the interior of the church, the cost of which has already to some extent been provided.

Bingley.—The newly-erected church of Holy Trinity has been consecrated by the Bishop of Ripon. The site is at Duhb, on the high ground between the canal and the railway; and the parish assigned to the new church divides Bingley in two. The church has been built from

the designs of Mr. Richard Norman Shaw, of the firm of Nesselife & Shaw, London. The style of architecture adopted is very Early English, with some traces of Norman. The cost has been 5,000l., exclusive of a tower and spire, which will at some future time be built over the chancel. Mr. Forster, of Bingley, was the contractor for the works.

Sutton-in-Ashfield (Notts).—The parish of St. Mary's Church, of Sutton, has been restored, and re-opened, so as to accommodate a greater number of people. The church, which, in its late form, was probably erected about the end of the fourteenth century, had arrived at such a state of decay and disrepairment as to be not only unfit, but absolutely unsafe for public worship. The plans for the restoration contemplated the removal of the chancel eastward, so as to increase the length of the nave and aisles; also the erection of an organ-chamber and vestry on the north side of the chancel. This extension had to be abandoned for want of funds. The tower and spire, the latter seriously damaged by lightning last year, still remain to be restored. The whole of the galleries have been removed, and increased space has been obtained by widening the aisles and extending them westward on each side of the tower. Abundant traces of a much earlier structure were found in pulling down the walls of the aisles, and some interesting but mutilated drawings and inscriptions in distemper were discovered under the numerous coats of whitewash on the old walls. The defaced and dilapidated portions of the bases, shafts, and capitals of the columns have been exactly restored, and the whole of the colourwash from the ashlar-work has been chiselled off. The open roof and also the new benches throughout the nave, aisles, and chancel are of deal, stained and varnished. The windows are glazed with cathedral glass. The pulpit, a gift of the parishioners in memory of the Rev. W. B. Stevens, the late incumbent, is of stone. The cost of the restoration was about 1,600l. Messrs. Fisher & Sons, of Mansfield, were the contractors for the builders' work; Messrs. Haden, of Manchester, for the heating; and Mr. Rhodes, of Nottingham, for the gasfittings. The whole of the works have been completed from the designs and under the direction of Mr. C. J. Neale, of High Oakham. This restoration, commenced in February last, is mainly due to the energy and zeal of the Rev. Charles Bellairs, the present incumbent, who, by himself and his relatives and personal friends, has contributed a very large proportion of the funds.

Hessle.—A formal commencement of the work of restoring and enlarging the parish church of All Saints, at Hessle, has been made by the laying of the corner stone by Lieutenant-Colonel Pease. The contractors are Messrs. Simpson & Malone, and their contract for the whole work required to be done, including the erection of the chancel, is 5,543l.; contract for work at present in hand, 3,430l. 2s. The estimated cost of the north and south aisles is 1,058l. 19s. respectively. It has been proposed to take down the chancel, with its aisles, and the chancel arch and east end of nave, and rebuild them 25 ft. 6 in. further eastward, lengthening the nave to that extent by building two new arches on each side of the nave arcade, and by taking down the north and south aisle walls and widening the aisles, the present aisles being only 7 ft. wide. The alterations contracted for at present embrace the removal and rebuilding of the chancel and its aisles, and the lengthening the nave as at first proposed, and the building (to the extent of the addition) the aisles to the width originally intended, so that at any time, should the committee be provided with funds, the continuations of the aisles can be carried out. The work at present contracted for will give an additional area to the church of 1,785 ft. The restoration and enlargement are being carried out under the superintendence of Mr. R. G. Smith, of Hull, architect. During the removal of portions of the fabric several relics of Norman work have been discovered, also a corbel with a representation of Sagittarius carved thereon, and suggesting the existence of a former church, probably erected in Stephen's reign.

Moreton.—The restoration of the chancel of the church is now finished. In 1855 Mr. Chancellor, of Chelmsford, substituted open seats in the place of pews, and put down new ties, &c. A window which had been covered up for many years was restored at the east end. Under a thick coat of whitewash the remains of mural paintings were discovered, probably of the same date as the church itself, viz., Early English,

A.D. 1189, 1272, Richard I., John I., and Henry III. A copy of this painting was preserved for future restoration, but this could not be done until the walls were perfectly dry. The work has been done by Mr. Lea, of Lutterworth.

Leamington.—The new public cemetery in the Whitnash-road is now completed. It comprises fourteen acres of land; and two chapels, in the Norman style of architecture, have been erected, one for Episcopalians and the other for Nonconformists. The chapels were designed by Mr. G. W. Candall, of Birmingham, and have been erected by G. W. Green, of Leamington. The total cost of the land and building will be about 8,000l., which have been borrowed on security of the poor-rates of the parish.

Heanor.—The church in this place is rapidly progressing towards completion. The whole of the church has been rebuilt, but the old tower has been untouched. The edifice has very little ornament, excepting some stone-carving on the corbels in the chancel and round the spring of the arches. The old monuments have been restored. A memorial window, which was in the former building, has been placed in the north aisle, and another has just been put in the chancel by Mrs. Ray, of Heanor Hall, to the memory of her son and daughter. For the warming of the church an apparatus has been presented by Mr. F. Wright, of Osmaston Manor, the patron of the living.

Pleshey.—The church here has been re-opened. In designing the restoration it was determined to adhere as closely as possible to the architecture of the original church, built by Thomas of Woodstock, Duke of Gloucester. Such portions, therefore, of the original edifice as were sound, and which were principally confined to the lower arches, the ringing-chamber of the tower, and portions of the transept, were repaired and restored, the roof being renewed and the external walls stripped of plastering and the pebble facing repaired. The nave and aisle walls were refaced with pebble work, and new open timbered roofs added, and the upper part of the tower was taken down and rebuilt in character with the lower part, with parapet and lead flat roof. The original ascent to the bell-chamber being by a series of hngo ladders fixed in the north transept, and consequently very unsightly and very much in the way, it was determined to construct a staircase turret at the north-east angle of the tower. Two-light windows have been introduced on either side of the nave, with a three-light west window, and a four-light window has been put in the chancel. The north wing of the nave is protected by an oak porch, and a vestry has been added to the south side of chancel. In consequence of the tombs to the Tufnell family which are put up in the chancel no side windows are there introduced. The whole of the external walls are faced with the pebble-work of the original church, which was found in excavating the nave and transept; the windows, doors, copings, &c., being executed in Bath stone. As regards the internal arrangements the nave is fitted with open benches, with paved gangway. The organ is set up in the south transept with the children's seats surrounding it. The north transept is left without benches, and both transepts are paved throughout. The font is new, with red Mansfield stone shafts and white stone base and top. The east window is filled with painted glass to the memory of the late Mr. John Jolliffe Tufnell, and the west window is filled with painted glass to the memory of the late incumbent, the Rev. James Hutchinson. The south window of the transept is filled with painted glass, the other windows throughout being glazed with tinted cathedral glass in patterns. Rimmington's heating apparatus has been adopted. The restoration has been carried out under the superintendence of Mr. Chancelor, architect, by Mr. James Brown, of Chelmsford and Bocking, builder.

Bradwell.—The new church, dedicated to St. Barnabas, in this village, has been consecrated. The edifice is built after the designs of Mr. C. C. Townsend, of London.

New Shildon.—The Bishop of Durham has consecrated a new church, dedicated to All Saints, and also a burial-ground, at New Shildon. The church stands on high ground, about a quarter of a mile south of Shildon, adjoining the Redworth turnpike road, on a site of an acre of ground given by the Earl of Eldon, who has also granted a similar quantity adjoining for a parsonage house. The building is designed in the Early Decorated style of architecture, with a good deal of the Early French character about it.

In the clock chamber will be placed a clock with illuminated dial, and machinery for striking the hours and quarters on bells in the belfry. The clock and bells are promised by Mr. Pease, of Darlington. The seats, which provide accommodation for 400 adults, are all open, with low standing backs and moulded standards. The churchyard is surrounded by walls and railing, and is laid out with paths to afford easy access to the graves. The whole of the works have been designed by Mr. J. P. Fritchard, of Darlington, who has also superintended the works.

Tamworth.—The parish church of Crossall, near Tamworth, which has been closed for some months for alterations and improvements, has been re-opened for divine service. The old square pews have been replaced by oak benches, carved. A new pulpit, of Mansfield stone, has been placed in the north-east corner, near the chancel arch. The organ has been removed from the west end of the church to a recess specially built for it on the north side of the chancel. Here also are two rows of stalls. A new warming apparatus has been laid by Mr. Mellard, of Rugeley. The other works have been done by Mr. Lilly, of Measham, from plans drawn by Mr. Street, architect, at a cost of about 500l.

Kettering.—A new church is being built in the small market-town of Kettering, and the foundation stone has just been laid. The new church will be made to accommodate about 550 persons, and the sittings will be all free and unappropriated. The architect is Mr. Street, and the builders are Messrs. Butlin & Barlow, of Rothwell. The rector gave the site on which the church is to be erected. It will be dedicated to St. Andrew the Apostle.

Welford.—The chancel of this church has been re-opened, after very considerable restoration, and the erection of a window in memory of the late Mr. E. Cox, surgeon, Welford. At the bottom of this window are three subjects,—the raising of the son of the widow of Sarepta, by Elijah, the raising of Tabitha, by St. Peter, and, between them, the raising of the widow's son at Nain by our Saviour. Above is the crucifixion, between the entombment and the resurrection. The architect employed in the restoration was Mr. Law, and the builder Mr. Gee, of Daventry. The window was by Mr. Usher, of London.

Broadwindsor.—The parish church has been re-opened by the bishop of the diocese. It had been rebuilt by Mr. Charles Hamilton Malan, major in the 75th Regiment, as a memorial of his wife. The restoration has been effected so as to perpetuate the style of the old building. On one side of the church the pillars were Norman, marking the original structure as having been erected about the time of William the Conqueror. On the other side the pillars were Early English. This has been carried out in the restoration. The nave has been lengthened 10 ft., and, with the chancel, has been entirely rebuilt. A heating apparatus has been built beneath the vestry, and the drainage around the church renewed. The north aisle has been enlarged. The west window has been opened up by the insertion of a western arch. The porch of the south entrance has been rebuilt. Mr. John Mountford Allen, of Crewkerne, was the architect of the new building, and the contracts for the masonry and woodwork were undertaken by Mr. Davis, of Langport, and Mr. Charles Trask, of Ham. A new organ by Walker, value 200l., has been obtained by subscription, principally by the efforts of Mrs. Joseph Stedley.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

Cotton.—The chapel at Cotton, near Oakmoor, has been re-opened, after having been closed upwards of ten years. The church was built from the designs of the late Mr. Pugin, by the last Roman Catholic Earl of Shrewsbury.

Swinerton.—The foundation-stone of a new church has been laid at Swinerton, near Stone. It will be built from the designs of Mr. Gilbert Blount, of London, and its cost will exceed 4,000l., which will be defrayed by members of the Fitzherbert family. The style will be that of the transition between Early English and Decorated. It will consist of chancel, with aisle, trifune for the family at the hall, sacristies, porch, and belfry. The erection of the building has been undertaken by Mr. Heveningham, of Wolverhampton, builder. The site is close to the hall, and within a stone's throw of the ancient parish church of Swinerton.

Whitehaven.—The new church of St. Bees, which has been erected on a site near to the coach-road, Whitehaven, has been opened for divine service. The new church has been built from designs by Mr. Wolby Pugin, architect, and is a Gothic building of the Decorated period. The whole of the work in connexion with the structure was undertaken by Mr. Cousins of Whitehaven. The church consists of a nave and two aisles, and has a clearstory lighted by eighteen oriel windows. The architect has preserved the ecclesiastical separations, consisting of an apsidal chancel and two lateral chapels, and the whole is so arranged that the altar can as easily be seen from the aisles as from a nave. The east end aisle is terminated by a chapel on the south side, to be dedicated to "Our Blessed Lady," and on the north side by another, to be dedicated to "The Blessed Sacrament." Adjoining the latter there is a vestry, which measures 30 ft. by 20 ft. The church measures 124 ft. long by 61 ft. wide, and is 64 ft. high, or 61 ft. from the level of the floor to the top of the ridge. The exterior is built of white stone walling, with red stone dressings, the former having been obtained from the Walk Mill quarries, and the latter from Mr. Cousins's quarries at Brigham. The pillars and arches in the interior are built of red and white stone, from the same quarries, and the entrance-doorways are lined with alabaster. The roof of the nave and aisles is formed of open-timber work; those of the chancel and side chapels are divided by wooden ribs into panels. Each bay of the nave measures 18 ft. from centre to centre, and is divided by quatrefoil and octagonal columns, formed of varied coloured polished stones. Each division of the aisle is almost entirely filled with one window. The west end measures 108 ft. from the bottom of the steps to the top of the cross of the belfry, which is flanked by two buttresses 56 ft. high. The main gable is filled with three lancet windows, below which is the principal entrance. The roof is covered with pale green and dark blue slates, the former obtained from the slate quarries at Batemere, and the latter from Wales. Toward the east of erecting the new church of St. Bees, the first contributor was Mr. Francis Charlton, county surveyor of Northumberland, and the descendant of an old Catholic family, who gave the donation of 1,000l. Mr. Dees has provided two windows of stained glass at the east end of the church. The total cost of the structure will be a little over 5,000l., and more than 1,000l. yet remain to be given before it is entirely free from encumbrance. It is proposed to convert the old church of St. Joseph—which closely adjoins the new building—into a school to be taught by nuns, for whom a convent near at hand is to be prepared; and to the new church is to be attached a priory for the use of the priesthood.

SCHOOL-BUILDING NEWS.

Salburn-by-the-Sea.—The foundation-stone of new British schools has been laid at Salburn, by the Earl of Zetland. The new buildings, when complete, will occupy three sides of a quadrangle, and comprise three school-rooms, with class-rooms attached, affording accommodation for 600 children, and dwelling-houses for the teachers. The style adopted is Gothic. The materials used are red bricks, relieved with white bands and stone dressings. The walls of the school and class-rooms will be lined up to a height of 4 ft. with white glazed tiles, resting on a stone plinth, and finished with an ornamental border and stone capping. Care has been bestowed in the arrangements for heating and ventilation to render them thoroughly efficient. The estimated cost of the buildings is 2,500l.; and the works have been let to Messrs. Shaftoe & Barry, of Salburn. The architect is Mr. John Ross, of Darlington.

Fownhope.—New schools have been opened here. They have been erected through the liberality of Mr. Gwatkin, of Gore House, Twickenham (who, however, does not possess any land in the parish). The master's house has been built by subscription. The structure, which is in the Gothic style, and is built of red sandstone, with Bath stone dressings, has been erected by Mr. William Ford, of Fownhope, from the design of Mr. Nicholson, the diocesan architect. The glazing and painting have been performed by Mr. W. Evans, also of Fownhope.

Great Horton.—The school-rooms, which are being erected in connexion with the Congregational Chapel at Great Horton, and of which the

foundation was laid in June last, are now rapidly approaching completion. The contractors are Messrs. B. Illingworth & Son, of Bradford. The school covers an area of 550 superficial yards, and its dimensions are 120 ft. by 41 ft.: the height from the floor of the lower story to the ridge of the roof is 52 ft. The structure is three stories in height on the north-east side, but only two on the front and on the side facing the chapel. The building of the tower with which the school is to be ornamented, has not yet been commenced. The accommodation includes an assembly-room capable of seating 600 people, above which there are sixteen class-rooms; there is also a large lecture-room. The undertaking will cost upwards of 5,000l.

Reading, Berks.—It is proposed by the vicar and churchwardens of the parish church of St. Lawrence, Reading, to erect a new infant school, on a plot of ground given by Mr. J. H. Blagrove, of Calcot Park, for that purpose. The cost of the school will be about 700l. Messrs. W. & J. T. Brown, of Reading, are the architects, and Mr. Sheppard the builder.

Abingdon.—The foundation-stone of the new Abingdon Free Grammar-school has been laid. The spot which has been selected forms a portion of the ground adjoining Albert Park, an open, dry, and salubrious situation, immediately contiguous to the town. It is near to eligible building-ground, on which residences are already springing up. The school, when built, will be capable of holding forty or fifty boarders, and will be large enough to accommodate one hundred day scholars.

Books Received.

Illustrated Books for Children and Young People. Annet Mavor's Toy Books,—"The Little Hunchback," "The Enraged Miller," &c. (Routledge); "Puss in Boots" (Routledge); "Every Boy's Annual," "Jack the Conqueror" (Partridge & Co., Paternoster-row); "The Broadway Annual" (Routledge).

When the history of art in connexion with the periodical literature of England comes to be written with that attention to truthful detail which the subject demands, the names of men like Catnach, Hodgson, and several others whose reputation does not at the present time stand high, either in the world of art or letters, must not be forgotten. In their generations, when the days of art were dark in comparison with the present, they did useful service amongst multitudes, and paved the way to those improved conditions which in so many instances afford the means of recreation to large masses of persons.

General education is advancing in Great Britain; but it is unfortunately the case amongst the millions in this country,—and, to a considerable extent, the same may be said of other communities,—that the instructor, which the pencil, aided by the graver and printing-press, can convey, has not been rightly brought into use and made available for a numerous and comparatively uneducated class,—we mean that important portion of our community who are in the impressive years, when all matters of guidance in good or evil are so marvellous in their effect.

The age of childhood is most important, whether it is in connexion with taste, the practice of art, or those principles which in more matured life lead men and women to be a means of affording pleasure and comfort to those who have reared them, and to others with whom they may have become associated while fighting the battle of life; but it is only those who have taken a deep interest in this most important subject, and watched with care the sure result of right or wrong infant teaching, that can form a just estimate of the consequence of early home and general education.

In many ways there is much to be regretted in the general plans of childhood tuition; but in what is connected with taste and art, the state of affairs is most deplorable. This is to be attributed to various causes, but certainly the want of demand for children's books, particularly those which have a pictorial character, cannot be named as one; for it is probable that in no department of literature has there been such an extensive production of books as in that which caters for the amusement and guidance of very young England. Nor should we complain that there has been altogether a want of contempo-

DEPUTY SURVEYOR TO THE POLICE.—We mentioned last week the appointment of Mr. Oaiger (late deputy surveyor) to the surveyorship of the metropolitan police. We have to add that Mr. John Entler has been promoted to be deputy surveyor.

WATER FOR EDINBURGH.—Edinburgh is about to rival Glasgow in the attainment of a good water supply. The town council has decided upon taking measures for the construction of works for conveying water to the city from St. Mary's Loch, a source believed to equal in some respects the famed Loch Katrine.

BADGERS AND DRAINS.—At Penquite House St. Blazey (Cornwall), some radical defects in the drainage were satisfactorily ascertained to be due to the digging of badgers. Three of these animals were captured, although two showed fight, and were only "dug out" after a severe contest with some dogs, who were pressed into the service.

THE LATE FALL OF WAREHOUSES AT HULL.—The inquiry into the fall of the old sugar-house at Hull, when several persons lost their lives, has been terminated. The jury have returned a verdict of "Accidental death," at the same time recommending that legislative measures should be passed for the supervision of old buildings used as warehouses.

HYDRAULIC JACK.—Mr. T. Armstrong, an ingenious mechanic, has invented a hydraulic jack, which, from experiment, it is said, promises to be of great advantage both on the score of efficiency and economy. By the old system it would require ten men to sling a wagon, &c., weighing 12½ tons, but by means of this invention two can lift a wagon of the same weight, or a 23-ton gun, with the greatest ease.

PRINTERS' ALMSHOUSES.—At the last council meeting of this corporation a letter was read from the treasurer, announcing that the late Mr. Henry Wright, of Kingston, had bequeathed 2,000*l.* to build the second wing of the above most worthy institution. The collector was requested to endeavour to obtain the remainder of the 1,000 guineas (now being collected) required for erecting the first wing, so that the bequest of the liberal donor may become available for the completion of the almshouses.

THE BURSTING OF WATER-PIPES.—Does water expand on becoming ice? *Scientific Opinion* asks this question, and says.—When a bottle of water is frozen, the bottle is usually burst. Hitherto this has been explained by the assertion that the water on solidifying suddenly expands. M. Barthélemy, one of the professors in the Lyceum of Pan, denies this explanation. In a memoir which he has written on the crystallization of water, he alleges that bursting of the bottle is caused by the disengagement of a large quantity of gas—hitherto in solution—by the water at the moment of its solidification. It is alleged, in support of this, that if a bottle of water be placed outside a window in frosty weather, it will be observed that the rupture takes place at the bottom side, viz., that next the window. Some of our correspondents may have made experiments on this point, and we shall be glad to hear what they have to say to this opinion.

DESTRUCTION OF FIRE-DAMP IN MINES.—Our readers will recollect the suggestion in our pages some time since with the view of destroying fire-damp in mines. We are curious to know whether the following originated in these suggestions; for it is rather remarkable how often some Frenchman discovers an invention after it has been suggested in the *Builder*, another instance of which we shall have occasion shortly to particularize. A new invention, it is said, by M. Delannier, of Paris, for destroying fire-damp in mines, has been lately laid before the Academy of Sciences. It consists of a copper conductor, broken at intervals, but joined by very fine gold wire soldered to the copper; the gold wire being surrounded by flowers of sulphur, which ignite easily. By passing strong currents of electricity through the copper wire, the gold wire becomes red hot, and thus ignites the sulphur, which burns any noxious gases which may be present. It will, of course, be understood that the electric current is made to pass through the apparatus before the descent of the miners into the mine. The Academy of Sciences have, it is stated, reported very favourably on M. Delannier's invention.

HOUSE BUILDING IN BELFAST.—During the past month the plans of upwards of 300 new houses were passed by the surveyor and the improvement committee of the town council. This is the largest number of houses approved of in any month in many years, and it is at the rate of 3,600 new houses in the year.

EXPLOSION AT THE ROCHDALE GAS WORKS.—A workman cautioned another that there was a "back pressure" on a new meter in course of fixture in a part of the works recently built to increase the supply, and the hole was plugged up with a wooden plug. Either forgetting or neglecting the caution, the workman pulled out the plug at the back of the meter, and the gas then passed without obstruction from the gas holder into the purifier, and thus into the building, where a number of workmen, employees of Mr. Charles Bigmore, of Stockton, were engaged in painting the purifier. The gas ignited, and a terrible explosion took place. The inside of the building was one volume of flame, and the workmen with difficulty managed to get out alive. Some of them were frightfully burnt. As the building and roof were both fireproof, the flames gradually died out, and the works and the building sustained but little damage.

A PAINTER AND A PICTURE.—Rare works of art have been picked up for a few pounds, worth as many hundreds; but these incidents of picture-dealing rarely come within one's own personal experience. A startling case of good fortune is (says the *Worcester Journal*) a topic of conversation in Worcester. A few weeks ago J. L. Albert, a working painter, residing in the Trinity, saw at a broker's, we believe, a picture, of which he formed a very high opinion. He bought it for five or six pounds, carried it home, cleaned it, and began to persuade himself that he had come into possession of a valuable work. He invited several gentlemen to see it, and his opinion was endorsed by some who are looked upon as judges. By-and-by Mr. Albert had successive offers of 50*l.*, 100*l.*, and 250*l.* for his purchase. He rejected, however, all these overtures of purchase. People from all parts came to see the picture, and he was offered 500*l.* for it. This, too, he rejected. This would have turned the head of some men. The picture is a representation of Christ bearing the cross, and is without doubt very beautifully painted. The figure of one who is scourging our Saviour is a marvellous study, and the work bears strong marks of originality. For Albert's sake, we are glad to learn, says our authority, that he has sold it for 700 guineas. We shall be glad to hear more of this work of art. Who bought it? If the story be true, Albert's canvas has proved even more satisfactory than that of some of our electrotyping friends.

NEW MACHINERY FOR CHARGING AND DRAWING GAS RETORTS.—An interesting and successful trial of Messrs. Holden & Best's patent gas retort charging and drawing machine has taken place, at Messrs. Handyside's, Britannia Foundry, Derby. The machine travels on rails from one end of the retort-house to the other, immediately in front of the benches of retorts, and consists of three long wrought-iron rakes, mounted one above another on a moveable carriage; also three long scoops mounted on a similar carriage, and in the same relative position as rakes. These carriages travel on a strong wrought-iron cradle. This cradle also carries the engines and boiler that actuate the machine and propel it along the rails. The action, as described, is exceedingly simple, most of the motions are self-acting, and so precise and regular that one might almost fancy the machine was endowed with intelligence. The usual average time for drawing and charging a bench of nine retorts by manual labour is forty-five minutes; this machine accomplishes the same amount of work leisurely in ten minutes, and has drawn and charged that number in six minutes. In labour the machine dispenses with fifty-four men out of seventy-two. The reduced time necessary to keep open the retort-doors effects a very considerable saving. In dispensing with so many men, the experience of the Alliance Gas Company, Dublin, is said to prove that the machine does its work for something under 9*d.* per ton, whereas, by manual labour, it used to cost them about 2*s.* per ton. In a gas work carbonising 1,000 tons per week, at 2*s.* per ton, this would cost 100*l.*, while with the machine, at 9*d.* per ton, the cost, it is said, only amounts to 37*l.* 10*s.*, thus saving 62*l.* 10*s.* per week.

THE ARCHITECTURAL ASSOCIATION CONVENTION.—"A Member" requests us to say to the gentleman's name whose drawings he mentioned is CAME, not CARNE, as misprinted.

TENDERS.

For rebuilding a warehouse, No. 15, Watling-street City. Mr. Herbert Ford, architect. Quantities supplied:—

Lawrence & Sons	£2,587 0 0
Meyers & Sons	2,409 0 0
Barton & McCreland	2,432 0 0
Couder	2,313 0 0
Fritchard	2,306 0 0
Abby & Sons	2,285 0 0
Brown & Robinson	2,263 0 0
Henshaw	2,256 0 0
Brass	2,118 0 0
Webb & Son	2,173 0 0
Piper & Wheeler	2,147 0 0
Craib & Vaughan (accepted) ..	1,964 0 0

For alteration and additions to Station Hotel, Acton City. Mr. George Hillington, architect:—

Mitchell	£148 10 0
Bliek & Bliek	135 0 0
Cardus	133 10 8

For building five cottages and finishing five carcasses near North Woodwich Gardens, Messrs. W. & T. Stone, architect:—

Batterley	£1,625 0 0
Davis	1,600 0 0
Clerk	1,266 0 0
Perry	1,120 0 0

For repairs, &c., to Nos. 2 and 3, High-street, Broadstairs, for Mr. Chapman. Mr. John R. Collett, architect:—

Hillar	£275 0 0
Blackburn (accepted)	230 0 0

For restoration of Sutton Church, Isle of Ely, Cambs. Mr. Frederick Preedy, architect:—

Fresman, Broc.	£2,631 10 0
Bell & Sons	2,344 0 0
Bennett	2,200 0 0
Bardell & Son (accepted)	2,159 6 6

For restoration of Mickleton Church, Gloucestershire. Mr. Frederick Preedy, architect:—

Easley	£1,872 0 0
Tomes (accepted)	1,820 0 0

For rebuilding chancel and adding vestry to Elmbech Church, Bucks. Mr. Frederick Preedy, architect:—

Cooper	£1,156 10 0
Haddon	1,100 0 0
Flakin	1,040 0 0
Holland (accepted)	1,000 0 0

For the erection of villa residence, Nightingale-lan Clapham. Mr. Wimpie, architect:—

Blatt	£1,886 0 0
Howard	1,877 0 0
King & Sons	1,890 0 0
Notley	1,850 0 0
Woodward	1,840 0 0
Piper	1,787 0 0
Eaton	1,758 0 0
Morter	1,693 0 0

For house at Westcroft-place, Hammersmith. M. C. E. Barlow, architect:—

Thomas & Son	£279 0 0
Key	463 0 0
Howe	645 0 0

For the erection of a minister's house, schoolrooms, &c. in connexion with the Congregational Chapel, Stoke-s Hamdon, Linlithers, Somerset. Mr. R. C. Bennett, architect:—

Tucker	£2,077 0 0
Wilton	1,968 0 0
Padding & Kendall	1,880 0 0
Chapman	1,800 0 0
Sieple and Bartlett (accepted) ..	1,488 0 0

For sewerage extension, Kingston-on-Thames. M. C. Slagg, borough engineer:—

Vignore	£2,349 0 0
Morton	2,325 0 0
Walker	2,316 0 0
Yells	2,145 0 0
Harri	2,090 0 0
Robinson	2,090 0 0
Voss	2,032 0 0
Neave & Fry	1,975 0 0
Blackmore	1,890 0 0
Bugbird	1,888 0 0
Hayward	1,875 0 0
Burges	1,810 0 0
Belsham	1,800 0 0
Cole	1,598 0 0
Young	1,568 0 0
Bloomfield	1,512 0 0
Porter	1,469 0 0
Killingbeck	1,411 0 0
Floyd	1,409 0 0
Nicholson	1,313 0 0
Osaston & Carter	1,285 0 0
Hubbard	1,261 0 0
Jackson (accepted)	1,250 0 0
Edible	1,315 0 0
Frays	1,240 0 0
Irons & Porter	1,210 0 0

Accepted for alterations to the W. J. public-house, N Church-street, Lissos-grove, for W. J. Simpkins, Messrs. Mayhew & Calder, architects:—

General Contract.

Curtis	£246 0 0
Comyn, Ching, & Co.	32 15 0
Resolving Shuttleers	28 9 0
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The Builder.

VOL. XXVI.—No. 1346.



Taste in the Household.

NOTWITHSTANDING all that has been said and done to improve the public taste, much more must be written and told, retold and reiterated, before those working in any department of this reformation may dream of ceasing from their labours. One hook, one lecture or series of lectures, one exhibition devised for the purpose of elevating public taste, in the matter of articles of household furniture, for example, is but as the oft-mentioned drop in the ocean. It is the untiring repetition of a text that calls attention to it and causes it to strike the imagination, dwell in the heart, or fasten upon the memory. We

must have piles of books, scores of lectures, repeated exhibitions of worthy art-work, before we can expect to see an appreciable difference in the taste of the great bulk of our fellow-subjects. It is now upwards of thirty years since Pugin first brought before the public, in a practical form, the possibility of making the interiors of our homes as picturesque as the ancient mansions of our forefathers, without detracting from their comfort, by attention to beauty of form in domestic furniture. He not only pointed out what we should aim at having and the principles that should lead us to the selection he recommended, but he showed what should be avoided. In our own columns, through the intervening years, the subject has been treated over and over again. Then we must not forget the chamber of horrors at Marlborough House, before it was a royal residence, where articles of bad taste were gathered together and exposed to scorn; nor the continuity of instruction in truer taste provided, by the same teachers, at the South Kensington Museum. The praiseworthy dictionary of M. Viollet-le-Duc, copiously illustrating the domestic furniture of the thirteenth, fourteenth, and fifteenth centuries, from a foot-stool to a canopied seat, a cradle to a state-bed, a *dressoir* to the jewelled and enamelled *dragoirs* displayed upon it, and so on through every apartment in a French chateau, with like comprehensiveness, proved another notable accession to our stores of information and instruction. But all these must be looked upon as only initiatory steps in the grand march of progress. They form but a faint trackway, through a region beset with

monstrosities. This trackway has yet to be beaten into a fair, broad path; and the monstrosities have to be driven into the background, if not into a bonfire.

It is then with a conviction that, although much has been said of the nonsense, vulgarity, and want of thought displayed in the matter of household furniture by the public, and the desirability of fostering an appreciation of beauty combined with fitness, it is not too late to say a great deal more, that we turn over the pages of a work on "Household Taste," by Mr. Eastlake.* His treatment of the subject differs from that of some previous writers in this particular: instead of contenting himself with ancient examples, or selections of these contrasted with modern mistakes, he aims rather at pointing out from the actual stocks of leading firms in different branches of the furnishing trades, such materials, designs, and objects as are not flagrant violations of good taste. This has the drawback of conferring upon his work somewhat of the character of a trade circular; but it is advantageous so far as it brings the practicability of procuring inoffensive articles before the reader's eyes. One closes M. Viollet-le-Duc's fascinating pages with a sigh of regret that all poetry, beauty, and artistic feeling have departed from our houses for ever, for the exquisite objects he delineates as being household realities in former times are no longer to be sought for love or money. But if Mr. Eastlake's volume falls short of awakening such an ecstasy of admiration, it has a homely usefulness in directing attention to reforms that can be carried out, and purchases that can be made, any day in the week, that would invest homes with somewhat of the old interest and comeliness. We will not, however, unreservedly endorse all his suggestions. For instance, he would do away with castors to tables. He says, "Such an appliance is by no means necessary or desirable. A dining-table rarely requires to be moved from its ordinary position. It should stand firmly on its legs at each corner. When it is fitted with castors, servants are perpetually pushing it away." Now, round the legs of a table without castors in everyday use there would inevitably come to be a halo of dirt, because no sweeping or scouring brush in the hand of a housemaid would be able to thoroughly cleanse the floor close up to each leg. Again, when a change in the position of the table was required for any special purpose, if there were no stout serving-men at hand to lift it, the carpets would get dragged and torn by its being shuffled about. In some minor matters of this kind we disagree with Mr. Eastlake.

After a preliminary chapter on street architecture, illustrated by a street in Nuremberg, more *cherry-riquettesque* than picturesque, our author begins a tour through the principal apartments of a modern house at the entrance-hall. Here he recommends the use of staining fluid for the woodwork instead of paint. But if the latter must be used because it has been already applied, then he prefers a flat tint of dark green or chocolate, instead of graining in imitation of oak. He regrets the disappearance of the old-fashioned brass knocker, whose bright spottiness gave such an air of industrious cleanliness to the threshold of a house; and considers its present cast-iron substitute a "frightful invention." Three illustrations of wrought-iron knockers, two antique and one modern, kept in stock by a well-known metal-worker, show how we can best meet this requirement. Door-mats and rugs are not overlooked, and our author fails not to deprecate the use of those "silly lumps of hinc, or manvo-stained wool, called drawing-room door-rugs;" also made in white, and which are out of all correspondence with their purpose. He gives, too, a series of patterns of encaustic

* "Hints on Household Taste in Furniture, Upholstery, and other Details." By Charles L. Eastlake, London: Longmans, Green, & Co. 1868.

tiles and tiled borders out of a trade catalogue suitable for the floor, and suggests what should be done with the walls. He approves either a sort of dado of encaustic tiles, 3 ft. or 4 ft. high, with the wall painted, or the plaster washed with flatted colour above, or distemper painting. For colours, where there is but little light, he suggests pale green or drab; and the Pompeian and Egyptian red for halls that are well lighted. He gives a design for a hall table, which differs from those in present use by the addition of a raised dorsal furnished with a narrow shelf. For hall chairs he makes no recommendation, but gives a sketch of one at Cotehele, a Tudor Cornish mansion, as an illustration of what they used to be before the present decadence of taste set in.

In the dining-room there is not only more to find fault with, but more to commend in modern manufactures, in our author's estimation. Beginning with the table, he says:—"It is generally made of planks of polished oak or mahogany laid upon an insecure framework of the same material, and supported by four gouty legs, ornamented by the turner with mouldings which look like inverted cups and saucers piled upon an attic baluster." A sketch of an end of one of these graceless uninviting modern tables is supplemented with one of a handsome Jacobean make, a design in which the strength and form of the latter is combined with the telescopic capacity of the former, and two illustrations of old German tables. With reference to the sideboard, he urges, as we have often urged, the reinstatement in the dining-room of the ancient *dressoir*, now only known in the kitchen as the dresser. The modern sideboard is but the torso of this noble piece of furniture. We have, indeed, the wide board, useful in the service of the dinner; but where are the shelves upon which treasures in ceramic ware and metal-work can be suitably displayed? Mr. Eastlake gives a design for a sideboard based upon the ancient form, not quite so graceful as some of the old models, but still a great improvement upon the present dwarfed fashion. For dining-room chairs he gives examples from Earl de la Warr's seat at Knowle, belonging to Stuart times; and from modern manufacturers' stocks selects those known as the Cromwell chairs as the least objectionable. Following others he inveighs against the modern upholsterer's method of hanging window curtains. But he goes further. We must admit he is a brave man; for time after time he attacks the taste of the ladies—we must add, the young ladies particularly; and in this apartment he takes them to task about their "lace trimmings and edgings used for 'antimacassors,' and similar articles of household use." After exhorting them all to inspect the specimens of ancient lace in the South Kensington Museum to improve their taste in designs for this class of work, he saves his credit by gallantly making an exception in favour of the productions of one fair lady—sly Mr. Eastlake!—and gives an illustration of her hand-made lace, the design of which he contents is "exactly in accordance with the spirit of old and sound principles of manufacture." Of stuffs for window-curtains he enumerates several kinds:—

"In the early part of this century window-curtains were only made of silk or damask. The material known as 'rep' was next introduced, and was in many respects superior to what had been used before. But the Germans have invented a still better stuff, a mixture of silk, wool, and cotton, called *coteline* in the shops, which is often worked in diaper patterns of excellent design. It is one of the most artistic examples of modern textile fabric which I know. To the French we are indebted for a heavy ribbed material, decorated with broad bands or stripes of colour running transversely to its length, and resembling the pattern of a Roman scarf. This stuff has been much in vogue of late years, particularly among artists and people of good independent taste. Another French material called 'algerine' appeared for a short while in the London shops. It was made chiefly of cotton, and was also designed with horizontal stripes of colour on an unbleached white ground. In effect it was all that could be wished, and it had, moreover, the additional advantage of being washable; but, of course, because it was cheap and about the best thing of the kind which had appeared for many years, it found few admirers and but little demand."

This is not quite complete; for, besides the silk and damask, there was a stout stiff woollen material, called "moreen," in very general use from forty to twenty years ago. We know artists are subject to strange enthusiasms, else how could we account for an incongruous mixture of alternate strips of velvet and common horse-girths for curtains, mentioned by our author as the device of artistically-trained minds? We must pass on, however. Before entering the library, the writer lingers to make a chapterful of observations on floors and walls. In the matter of carpets he altogether parts company with English manufacturers. He prefers the "humblest type of Turkey carpet or cheapest hearth-rug from Scinde," to anything they can show. Their wreaths of roses, their malachite marble patterns, their crimson moire antique, with borders of vine-leaves, he consigns to Madame Tessand's extra-sensational chamber; but when he touches upon paperhangings, he makes them some amends. These mural decorations have been as execrably bad as English carpets could possibly have been at their worst; but there are now exceptions to be found that should infuse courage into the carpet trade. Although, from the improvements in this manufacture, it would appear not to be so much a matter of necessity, our author gives a series of patterns for wall-papers, modified by himself, from diapers shown by some of the old Italian masters.

In modern library furniture there is less to find fault with than in that of other apartments. Contrary to the dictates of the principle that requires that everything should appear to be what it really is, Mr. Eastlake suggests the staining of unpolished mahogany with black for book-shelves. This imitation ebony, he says, looks well when covered with a thin varnish and contrasted with white metal for hinges and escutcheons. He gives a design for a bookcase in which the most novel feature is a sloping roof instead of the usual flat top finished with a cornice. For access to the space in this new top he has devised a trap-door in the centre of it, which has a miniature gablet projecting from it. This sloping top is introduced also in a design for a cabinet. But for the super-imposed pigeon-hole it would have the merit of not harbouring dust. A second utilization of space is more effective. This is the addition of upper shelves to the ordinary single shelf over the fireplace. When there is no *dressoir* in the dining-room, the library becomes the best place in which to place any specimens of art-manufacture that are worth looking at. "Few men care for a mirror in such a room; but if it is indispensable to the mantelpiece, let it be a long low strip of glass, stretching across the width of the chimney breast, about 18 in. in height, and divided into panels. Over this may be raised a capital set of narrow shelves,—say 6 in. wide and 12 in. apart,—for specimens of old china, &c. The plates should be placed upright on their edges, and may be easily prevented from slipping off by a shallow groove sunk in the thickness of each shelf. A little masonry may thus be formed, and remain a source of lasting pleasure to its possessors, seeing that 'a thing of beauty is a joy for ever.' In his own sketch of this arrangement he shows but two shelves over the usual mantel-shelf, the lower one decked with tall handsome vases, and the upper one with circular dishes. The effect is good. He properly bestows upon the work of the smith as much care as upon that of the cabinetmaker. The miserable designs of the cast-iron ornaments, set like braids of patryness upon modern stores and fenders, deserve all the blame they receive at his hands. A fender should be a *fender*, a protector, and to this end he recommends a form for it that should fulfil that condition. A library fender shown consists of four rods following the contour of three sides of an octagon, supported, at even distances apart, by four uprights, up to about half-way the height of the opening of the fireplace, the space between the two lowermost being filled in with sheet iron or brass, perforated with a slightly pattern. The library fender curiously suggests the breakfast urn, upon which our author falls with all the severity it deserves, as "the most contemptible instance of perverted taste" known to him; and, with more connected sequence, modern gaseliers and moderator lamps. Some examples of ancient German and Swiss metal-work, supplemented by drawings of samples of the modern candlesticks and vases kept in stock by leading firms close the inspection of the library.

The young ladies and the upholsterers are both rated soundly by Mr. Eastlake when he uncovers the shortcomings of taste in the drawing-room. It is to be hoped they will be improved by his Spartan asperities. He seems to think, if it were not for the young ladies' preference for the attributes of millinery in the aspect of everything, however unsuitable for that frail description of feminine decoration, the upholsterers would cease to manufacture the absurdities they now launch upon society; and if it were not that the latter debased the young ladies' taste by the tempting exhibition of such frivolities, they would know better. Especially, if upholsterers were to wear themselves from the production of meaningless curves at every turn they would be wisor men. On this subject he remarks,—

"The tendency of the present age of upholstery is to run into curves. Chairs are invariably curved in such a manner as to ensure the greatest amount of ugliness with the least possible comfort. The backs of sideboards are curved in the most senseless and extravagant manner; the legs of cabinets are curved, and become in consequence constructively weak; drawing-room tables are curved in every direction—perpendicularly and horizontally—and are, therefore, inconvenient to sit at, and always rickety. In marble washstands the useful shelf, which should run the whole length of the rear, is frequently omitted in order to ensure a curve. This detestable system of ornamentation is called 'shaping.' It always involves additional expense in manufacture, and therefore, by avoiding 'shaped' articles of furniture, the public will not only gain in an artistic point of view, but save their pockets."

Influenced by these sentiments, there are no handy-legged drawing-room chairs either in our author's sketches from ancient examples or in his own designs. He gives a settee, a sofa, a chair, and an arm-chair of the date of 1620, from a set preserved at Knowle, which are interesting. As an improvement upon the modern round table resting on its hollow cylinder and three claws, he suggests that the central stem should be made solid and have a substantial base, and that four struts should stretch diagonally from the stem to support the table-top. For chairs, tables, and couches he prefers marquetry to carving, which he would leave for cabinets, coffers, and sideboards, where hard projections are not likely to be so much in the way. The garish looking-glass frame of the present day he would have banished to give place for real carved work, or, as a substitute for this, plain solid frames of wood, either enriched with suitable mouldings or incised ornament. Common woods ebonyised, and set off with narrow gold stripes, form another alternative. For pictures he recommends classification. Thus the dining-room should enjoy the undisputed possession of family portraits; while in the drawing-room should be placed more miscellaneous works. Oil and water colours should not be contrasted with one another, nor placed in juxtaposition with engravings and photographs. One row only should be placed in a room, and that should be hung at a height of 5 ft. 6 in., measuring from the floor to the centre of the picture. This arrangement he says happily, would make a sort of coloured zone round the room, especially pleasing if varied by the introduction of small ornamental mirrors, sconces, brackets supporting statuettes, vases, &c. No picture should be suspended by less than two nails at the triangles outlined by the cord; when one only is used it is always at variance with the horizontal and vertical lines of a room.

But if our author is unhappy in the drawing-room, he has, and finds, good reason for being inconsolable in the bedroom. The gaudy chintzes, the flapping wall-papers, the bewildering carpets, the unbrushing French-polish, the distorted landscapes depicted on the chamber-ware, would be enough to make any reformer consider the case hopeless; but when these are supplemented by a veiled dressing-table, all ribands and muslin, that looks very much like a lady dressing for a ball without her head and shoulders,—nothing but retreat seems open for the bravest. For this last-mentioned item of bad taste our author has suggested an exchange to a low straight chest of drawers, covered with a fair cloth with fringed ends; but this is not likely to be accepted by those whose delicate health, or fatigue attendant upon a fanastically got-up headgear, requires the accommodation of a chair while making this part of their toilet. A table made open under the centre, with the drawers on both sides of this space, would be preferable in most cases.

He gives a design for a wash-stand, made in accordance with his horror of curves, which is a sensible and substantial piece of furniture, suitable for its purpose. Among

other matters discussed, the bed, of course, comes in for stricture. He says,—

"The design of metal bedsteads is generally very poor, especially where anything in the shape of decoration is introduced. For instance, it is usual to connect the joint which occurs where the tie-rods intersect each other with a small boss. A circular rosette would be obviously the most appropriate feature to introduce at this joint, whether in wrought or cast metal. But instead of this, the iron-bedstead maker (*elegantia gratia*, as the grammarians say) insists on inventing a little lumpy bit of ornament, which possibly intended to represent a cluster of golden slugs, and this abomination is repeated not only a dozen times in one bedstead, but on some thousands the same pattern."

Against this he sets a design which, so far as the suspension of its canopy from the ceiling is concerned, is a modernization of an ancient French bedstead given by M. Viollet-le-Duc. The transverse stripes on the curtains, the horizontal stripes on the trim box-plated valances round the head, the open metal-work footboard, group together exceedingly well, and confirm the impression that a very little alteration in some of the designs of our most common commodities would bring them within the pale of propriety.

The latter portion of this volume is devoted to crockery, table-glass, dress and jewelry, and plate and millinery. In all these matters the superiority of the labour of the art-workman's hand over the machine is advocated. If the forms of plates, dishes, and saltcellars, for instance, are less rigidly symmetrical, if the glaze is unequally distributed, if the colour is fainter on some parts than others when made by hand, there is a power of attraction in them for the educated eye that no machine-made pottery can have; and there is life in them, and man's mind and skill. Like as he prefers the Oriental carpet to the mock gaudous of our manufacturers, and for the same reasons, so an Indian preserve-jar or a Moorish plate is beyond any of the spiritless and loveless productions of most of our potteries. A point of departure in the minds of the Oriental potter and the English designer is the separation of the pictorial idea from the decorative. The former conventionalises the objects he depicts on his ware for its adornment; the latter aims at the most realistic representation of a landscape, or perhaps sea-view, as though its fidelity and minuteness of detail were of the first consequence, and the general effect of the piece of ware of none whatever. Again, ancient glass is infinitely preferable to modern, because in its manufacture its natural properties were considered; whereas at the present day they are nearly forgotten in the desire to produce vessels that are accurately symmetrical, colourless, and flawless. "To the eye of the artist," says our author, "the delicate gradations of natural colour, the slight imperfections and streakiness of old glass, render it infinitely more attractive than a purity of texture, which has nothing but its clearness to recommend it, and which can only be acquired by a sacrifice of more precious qualities. For the simple transmission of light through the best piece of flint glass that could be manufactured, is of small value compared with the mellow and often jewel-like effect produced in the design of a Venetian beaker." And in accordance with the scheme of his task, he points out where glass, approximating as near as may be to the ancient perfection, can be obtained. For all such information, however, we must refer the reader to the work. We have only to show, in the present case, the mode in which our author has carried out his aim to improve the taste of the general public. The only reform in the department of costume that he ventures to advocate, is the adoption of knickerbockers, though hats, hoops, boots, and coats all come under his lash.

Mr. Eastlake is not correct in attributing the "moustache movement" to the visit of foreigners in 1851. It was commenced and carried on persistently by the *Builder*, at first specially with reference to sanitary considerations for workmen, and was continued by writers and lecturers admittedly prompted to action by our pages.

The young ladies escape censure as to dress, for the simple reason that while he writes the details of colour and form in their costumes will change so considerably, that his words will no longer apply by the time he comes to the end of his remarks. But their jewelry, being a little less evanescent than their millinery, is open to more serious criticism. Too often, he fears, it is valued more for the money it cost, or would sell for, than for its intrinsic beauty, either in material, design, or workmanship. He thinks if diamonds were cheap and common, no one would wear them.

"They would be at once and for ever banished from the necks and heads and stomachs of every court belle in Christendom." As it is, he finds fault with the way they are worn, grouped together, in some instances, in quantities sufficient to make a blaze of light, instead of being isolated like the stars above us; and the cutting and paring of them down to obtain lustre, as in the case of the Koh-i-noor, he considers of questionable propriety. But this is not worse than the taste for strings of large single diamonds, devoid of all artistic accessories. Less expensive jewelry, particularly that which is either directly copied or adapted from antique precedent, is often in better taste. But the best specimens are those of other countries and other ages. The rudely-made trinkets the Russian peasants treasure, the still more myrtle-looking manufactures from Central India, as well as the ancient work of the earliest of Rhenish Byzantine artists, are all preferable to the commonplace thoughts expressed in modern English goldsmith's work. Those who would know what really good jewelry is like, must search the cases of the South Kensington Museums from time to time when ancient specimens are displayed. Coming down to plate, he misses the spirit that designed the apostle spoons of old. "Take," he cries, "the ordinary 'fiddle pattern' fork: can anything be more senseless than the way in which modifications of that form are decorated,—now with a raised moulding at its edge, now with an outline of heads, now with what is called 'a shell,' but what is really a bad copy of the Greek honeysuckle ornament, at the end of its handle, now with a Rococo scroll or a representation of natural flowers in low relief on its surface?" If Dame Quickly had placed one of these novelties before her guests it would have taken the favour out of their sack. Sweet Anne Page would have scoured such a spoon. But if the merry wives of old would have disdained our prosaic spoons and forks, with what discontent would they have regarded our tasteless turcons, side-dishes, crust-stands, salvers, and card-tables? Surely nothing quaint, they would argue, could come out of such fumbling, feeble pretences. For guidance, our author says, "Round silver dishes and salvers are preferable to those of an oval or square shape, for many reasons, and especially on account of the mode in which such articles are manufactured. Richly-moulded edges are, for a like reason, inappropriate; moreover, in precious metal they necessarily increase the cost, and in plated goods they are liable to be rubbed and look shabby." The loss of the old appreciation of an artist's work is remarkably noticeable in our modern cutlery. The machine only is recognised in this department of the world's industry. We are not surprised to find the richly-carved and gently-curved knife-handle of the past contrasted with the plain, smooth, small bone or ivory parallelogram of the present day, in the pages before us. Staining bone-handles is recommended as a substitute for the shagreen that once was so effective, and studding dark wooden handles with flat steel ornaments is indicated as a fashion that might be revived. Mother-of-pearl handles are preferred for desert knives and forks, as more agreeable in touch and appearance than silver or plated goods. Whilst the silversmith's and cutler's arts remain at their present stage there would be less vexation of spirit, our author infers, if an intending purchaser make his selection from the stock of some of the old jewelry shops in Hanway-street or Wardour-street; against which last-mentioned place, by the way, as the head-quarters of sham ancient cabinet-work, the unwary are especially warned in a former part of the work. There are many metal-workers who have aimed at reviving the ancient taste and dignity of the silversmith's art, but then they charge for their goods treble the price of similar articles of the ordinary makes, and while they cannot see that a good design should not cost more than a bad one, because it need not involve more labour in execution, there is no immediate prospect of any appreciable reform in this department. If manufacturers do not assist in educating the public taste by the production of goods suited to everyday life that are designed upon true principles, the unaided influence of our museums will make but slow way. As appealing from purchaser to producer, bestirring first the one to create a demand and the other to supply it, and vice versa, pitting them against each other as it were, Mr. Eastlake's work will help on the issue.

COSMOPOLITAN BRITAIN.

THE Grecian colonists, who pushed adventurously across the Adriatic, and founded the cities of South-Eastern Italy, and the yet erect temples of Paestum, gave the name of *Magna Grecia* to their new country. They were the missionaries of a civilisation which has outlived the political term of the republics of peninsular and insular Greece, as well as that of the stern iron empire which absorbed the Italian Crocks. Greek letters, and Greek science, resting from an Eastern exile, gave a tone to the civilisation of Europe, being adopted by the students of that graver Roman law which would otherwise have yet more profoundly modified our manners and our faith. The colonising impetus, stimulated by the discovery of a new world, sent the most restless of our own race on a new mission in the Tudor times. "The development of the England of Elizabeth," we have here a traveller who tells us, "is to be found not in the Britain of Victoria, but in half the habitable globe. If two small islands are by courtesy styled 'Great,' America, Australia, India, must form a Greater Britain."

Greater, there is no doubt, in territory and in population. And yet there is a sense in which the term may be taken, and will, perhaps, be taken too, by the enemies of England herself, which might make the author wish he had sought some other appellation for our giant offspring. Some may even think at first, as they accompany Mr. Dilke through the lands where the shadow of a terrible and relentless war is cast over his brilliant pages, that some such covert satire was intended by his title. But amid the invigorating breezes of New Zealand the shade disappears. The gloom with which he so often speaks of the inhabitants of one set of free states as "rebels" against the inhabitants of another set, is charmed away by the soft cadence of the Maori song. The second part of the first volume of "Greater Britain," containing the chapters which treat of Polynesia, we have read with unmingled pleasure. There is much in them that is novel,—much that ought to be known. The picturesque description of scenery and inhabitants enables us to glance over the traveller's shoulder, or at least to see through the clear vision of his memory. The peculiarity of the climate is reflected no less in the unusual character of the vegetation, than in the strange features of social life.

The highway of 170 miles in length, which, crossing the New Zealand Alps, connects Canterbury with Christchurch, is "corduroyed" with the trunks of the tree fern; and in the swamps these trunks have again taken root, and shot forth fronds, forming a grove that rises out of the very bones of the road. The semi-tropical vegetation grows up to the very limit of the eternal snows, and the most graceful form of all flowerless plants, the natural production of the botanical belt that immediately succeeds the equatorial growth of palms and bananas, is found on the very edge of a glacier. As to this, too, Mr. Dilke tells us that the glaciers of Mount Cook are the longest in the world, except those at the source of the Indus.

The political importance of the labours of the engineer receives ample illustration in New Zealand. The settlements in this island are historically distinct, and, in the original absence of roads, were totally separated from each other by impenetrable bush. Hence resulted the establishment of no less than ten cabinets and ten legislatures, for a population of 200,000 souls. Thus it came to pass that the taxation of the inhabitants of New Zealand is nine times as heavy as that of those of Canada.

Landing in Virginia in June, 1866, Mr. Dilke's rapid line of travel runs on through New York, across Canada, over the never-ending sweep of the Great Plains, to the Mormon State, and to the "Golden City." He steamed along the shores of Lower California to Mexico, and sailed from Panama for Wellington in New Zealand, the longest steam voyage in the world. Thus the first part of the book is entitled "America," the second, "Polynesia." Australia forms the third portion, containing chapters on Sydney, Victoria, Tasmania, and Adelaide. The fourth part is devoted to India; Ceylon, Benares, Simla, Umritsar, Lahore, and Bombay, being the local headings of chapters. In this division of the work the chapters on overland routes, and on

France in the East, will prove especially interesting to our readers.

On the former of these points, Mr. Dilke is of opinion that the Brindisi route from Alexandria, by which he returned to England, is the proper line for our Indian mails to take until the Euphrates road is made. It is more than twelve years since we became convinced of the truth of this opinion. The completion of a line of railway, running by Constantinople, bestriding the Bosphorus, and striking on the head of the Persian Gulf, would only leave the distance from Bassora to Kurrachee to be performed by water. We cordially agree with Mr. Dilke "that the direct route to India is one of the most pressing of the questions of the day."

In the chapter "France in the East" Mr. Dilke gives less distinct information, as to the actual condition of the Suez Canal, than we have already laid before the readers of the *Builder*. He has rather addressed himself to the political side of the question, his views differing from those which we have expressed rather in unvarnished plainness of speech than in principle. His remarks, without however citing any authority, that the difficulty of keeping clear the channel at Port Said, at the Mediterranean end of the canal, is well known to the Pacha and his engineers. He adds that it is not difficult to get through the bar, but that such cutting must be continually renewed, as the effect of the great piers will be to push the Nile deposit seawards; and that new bars will certainly form in front of the canal. Something similar to this was the opinion of Mr. Stephenson. The statement is denied by M. de Lesseps and his friends. As the opening of the canal is advertised for October, 1869, we shall probably have more distinct knowledge on this subject long before the completion of the Mont Cenis tunnel places us in unbroken railway connexion with the port of Brindisi,—unbroken, that is to say, from Calais. "I shall not rest," said King Ferdinand II. to an English engineer, "till you can enter a railway carriage at Brindisi and not step out of it till you reach Calais."

The feature of "Greater Britain" which, while exciting unqualified admiration in some readers, will cause pain in others, is the thorough-going partisanship with which it espouses the views of the dominant majority of the American Congress. It is hard for an Englishman to form an absolutely reliable judgment on the most disastrous event of modern civilization. It is impossible for any man yet to tell what will be the result of that sanguinary and stubbornly contested war. And although we hold and always did hold that the North was in the right and the South was in the wrong, it may be well to suspend judgment as to some of the results. The broad and sound philosophy of which we welcome so many indications; the admission of the essential importance of the ethnological element, in all questions of politics, properly so called; the clear perception and honest admission that economics are not politics, and that what may be economically wrong may yet be, for a time, politically right; the kindly human feeling, that yet warns to the Teutonic rather than in the Latin blood, and craves even a tinge of old English prejudice against our French neighbours—all these are too closely related to the principles which we have not infrequently advocated in the pages of this journal to need any more formal expression of adhesion on our part. We may mark, in passing, the firm and level pace of the diction of at least the greater portion of the book, and the hearty appreciation of all that is good and noteworthy. There is a genuine sense of humour and love of fun, too, displayed in not a few of the pages. The list of the "titles" which the Americans "invented for their children" when the Scripture vocabulary was exhausted, is worthy of permanent commemoration, and the apothegm, "Let every man skin his own skunk" is worthy to rank among the raciest and most pointed proverbs of the older world.

The great ethnological question, Mr. Dilke agrees with us, underlies not only the form of political institutions, but that of civilisation itself. To inquire as to community of origin, science as yet can give only vague and tentative replies; replies, however, which comparative philology is yearly making more articulate. But, come whence they may, the present distinctive features of race seem now to be only eradicable with the race itself. Among these features one of the most marked is that of adaptability to climate. Three centuries have not acclimatised the Teutonic blood in Hindo.

* "Greater Britain: a Record of Travel in English-speaking Countries during 1868 and 1867." By Charles Wentworth Dilke. In two volumes, with Maps and Illustrations. London: 1868. Miscellaneous & Co. Pp. 434, 428.

stau. Draw the line where you may, a zone, lying somewhere about the fortieth parallel of north latitude, divides the natural home of the white and the black races, speaking in the widest acceptation of the terms. Mr. Dilke has pointed out with truth that races, or families, that *whiten* by removal to hotter climates (as English children do in the South of Europe), cannot take root there. Labour, with the thermometer above 80 deg., is unendurable, permanently, by the Saxon races. It looks as if intellectual labour became impossible to the brain somewhere about that temperature. Where the natural tillers of the earth, and working pioneers of humanity, cannot live their natural life, Nature exacts no toll from her dusky children. The fig, the cocot-nut, the banana,—fruits innumerable,—require only the simple toil of plucking them. In the damp seaboard air, which is fatal to English life, through the long gloom of the tropical night, the races whose skin has a peculiar provision for resisting heat, dance and sing and chat after the unlabouring day.

It is with the utmost pleasure that we have accompanied our author in his scamper round the world. In such a fight he can but have given a glance here and heard a whisper there; but his reproduction of the impressions made on his own mind is clear and vivid. We believe it to be, for the most part, impartial and truthful. There is a great advantage in the perusal of a series of notes separated at once by so small an interval of time, and by so large intervals of distance. The contemporary life of the English-speaking races comes thus before us with greater reality than is the case when we read more patiently compiled descriptions. We fly with the author round the world, putting on the magic girdle, not in forty minutes, but in the time which it may take us to read, and at times to re-read, 800 pages of well-printed letterpress. Sometimes the glance has been, as is natural, a little too rapid, the whisper too partial. Thus Mr. Dilke expresses a wish for the destruction of the fort at Bombay; while the fact is, not only that the fort was destroyed before the end of 1864, but that it was the proceeds of the sale of the ground on which it formerly stood that had furnished the funds for the erection of the detached forts, the absence of which Mr. Dilke notes, and was intended, further, to provide means for filling the city with large public buildings,—a scheme which collapsed in the panic.

"Greater Britain" will be read with pleasure and with profit in, we doubt not, repeated editions. We are not yet sufficiently cosmopolitan to recognise, or to wish to recognise, a greater Britain. But we give our hearty good wishes to the book so called, no less than to that younger Britain at which it affords us so brilliant a glance. Such a journey was an admirable preparative for public life, and Mr. Dilke, who is now the Parliamentary Representative of the new Borough of Chelsea, will find the advantage of it throughout the career which lies before him.

THE MANUFACTURE AND USE OF TERRA-COTTA.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the ordinary meeting of the Institute, held on Monday evening last, a letter from Mr. Sydney Suirke was read, which stated that the new exhibition-rooms of the Royal Academy will be completed and opened for the reception of works next March, and it was a great satisfaction to him to be able to assure the members of the profession that their works will no longer be condemned to be crowded into a mere passage-room, as hitherto. There are (wrote Mr. Smirke) altogether fourteen galleries, none of which are less than 41 ft. by 31 ft., and not one of them is inferior to the rest in light or position, so that architects may now rely on justice being done to their productions. He expressed an earnest hope that architecture would be well represented on the occasion of the opening of the new Royal Academy, and that she would vindicate her position as one of the Three Sisters.

The subject fixed for this evening, was the discussion of Mr. Charles Barry's paper "On Terra Cotta," read in the previous session.

The discussion was opened by some supplementary remarks by Mr. Barry, who said it was

commonly assumed that terra-cotta is nothing more than baked clay, or baked clay and sand, and a large proportion of the terra-cotta made use of in buildings recently erected, and now in progress, is of no other character. He did not consider that to be a worthy material for architectural purposes, and it was certainly very inferior to the ware used by him at Dulwich College. Terra-cotta, he said, to endure the severities of change in these northern latitudes, should be a hard vitreous body of a peculiar character. To compound such a body for cream-coloured ware, we must use Cornish, Devon, or Dorset clays, with ground flint, Cornish granite, sand, and old potsherds composed of like materials. If the colour is required to be of a warm stone hue, clay or marl from the colts beds in coal measures are used to brighten the mixture; also sands containing protoxide of iron. Glazes are prepared from frits composed of Cornish granite, flint, red lead, soda, and borax. To these frits, after grinding, is added white or red lead, flint glass, and Cornish granite. The proportions in which these materials are used is the secret of the manufacturer, and the goodness of the ware will differ according to his scientific knowledge. Pecuniary considerations sometimes induce manufacturers to omit these materials, and a terra-cotta may be manufactured that is nearly equal, when new, in appearance to the best "body," but which is liable after a few years to disintegrate or flake on the surface. A perfect equality or homogeneity of the body of clay used throughout the mass of blocks of considerable size is almost essential to durability. When this is not done the effect is to cause a cracking of the surface, which may probably end in the decay of the whole. After some further remarks on the composition and manipulation of the best qualities of terra-cotta, Mr. Barry observed, that one fruitful source of bad work in terra-cotta is the want of sufficient time being given for the air-drying, but it is so essential to the durability of the future work that it cannot be passed over negligently. If a piece of terra-cotta either bad in material, or imperfectly dried and burnt throughout, he soaked for four or five hours in equal parts of sulphuric acid and water it will lose in weight, and, when dried, will show efflorescence over its surface, and the liquid will be found to be charged with sulphate of alumina, or alum. As to the heat and weight of fuel required for burning in the kilns, to burn duly a body of such materials as he had described will require an equal amount of coal to the weight of the ware. As to the heat required there is difference of opinion, it having been stated by some at 3,000° Fahrenheit and upwards. One good test of a heat necessary to fire terra-cotta that shall be really durable, is to put it at the heat at which soft iron readily melts when introduced into the kiln. As to absorption of rain-water by terra-cotta in the building, Mr. Barry remarked that it was a pretty well established fact that the durability of stone and other materials for building is almost directly in proportion to their non-porosity. Since his paper was read he had had some experiments made on this point: pieces of terra-cotta, Portland stone, Bath stone, and Ketton stone of equal bulk, viz. 12 in. square and 2 in. thick, were thoroughly dried in a moderately-heated oven, carefully weighed, and then plunged into water, and left there for thirteen days. At the expiration of that time they were again carefully weighed, with the following results:—

Portland, dry, weighed, 22 lb. 10 oz.; wet, 23 lb. 6½ oz. Increase of weight, 1 lb. 6½ oz.
Bath, dry, weighed, 21 lb. 14 oz.; wet, 23 lb. 15 oz. Increase of weight, 2 lb. 1 oz.
Ketton, dry, weighed, 21 lb. 11 oz.; wet, 23 lb. 8 oz. Increase of weight, 1 lb. 13 oz.
Terra-cotta, dry, weighed, 20 lb. 9 oz.; wet, 21 lb. 8½ oz. Increase of weight, 15½ oz.

With these remarks he left the subject for discussion.

Mr. Blashfield, of Stamford (manufacturer of the terra-cotta used at Dulwich College), narrated the history of his connexion with pottery works applicable to architectural purposes, which, he said, arose in the first instance from his intimacy with the late Mr. Herbert Minton at the time that gentleman introduced tesserae to public notice. About the year 1850 he (Mr. Blashfield) first began to make terra-cotta, the composition of which, and the method of manipulation adopted by him, were described in considerable detail. He urged the

great importance of employing proper fluxes, which in the burning of the ware should become infused throughout the whole mass, by which alone durability of the material could be obtained.

Mr. Redgrave, jun., brought under the notice of the meeting some specimens of the terra-cotta used in the new buildings in progress at South Kensington, which, he said, differed entirely from the material employed by Mr. Barry at Dulwich. The question, he said, was not so much which particular clay was the best as a building material. In the matter of clays he avowed himself a latitudinarian. The clay of which the terra-cotta used in the Albert Hall and the buildings at South Kensington was made was obtained from the coal measures commonly known as fire-clay, and which produced a material of the hardness and durability of which, he said, there could be no question; whilst elaborately prepared clay on which manufacturers had expended a vast amount of trouble had come to grief a few years after it had been put up in London. The terra-cotta at South Kensington was simply a fire-clay—almost a pure clay, which, after being ground fine, was mixed with a proportion of what is technically called "grog," or clay which had already stood the highest heat of the furnace, and is used to prevent shrinkage, which would destroy the straightness and beauty of the work. It therefore became a question whether a mixed material or a pure material best fulfilled all the requirements of the architect. He submitted that a great advantage in the use of a pure body was a uniform rate of shrinkage, which he said was of great importance when the material was used in lengths of several hundred feet in mouldings, &c. The superior capabilities of terra-cotta such as he had described to sustain weight as compared with ordinary bricks had been fully demonstrated; the crushing-weight in the former case being 100 tons, and in the latter 15 tons only. Directing attention to the specimens brought from South Kensington, he said they had in them an imperishable vitreous material, impervious to heat and moisture, and to all the influences of London atmosphere. He especially referred to the glazing and colouring, which, he said, were produced at very little cost, and only needed a second firing. Valuable as this material undoubtedly was, it was not a rival to stone or brick. For beauty of line stone would always maintain its supremacy; but in the use of terra-cotta they obtained a beautiful surface, and a variety of colouring, which could be obtained in no other known material.

Mr. Medlock made some observations upon cements in general; and pointed out the effects of the introduction of various silicates into the composition. With regard to the constituents of terra-cotta he submitted it was a subject which called for strict scientific experiment, in order to ascertain the proper proportions of the various ingredients employed, which he said was at the present time regulated by the rule of thumb, and not upon any fixed principles.

Mr. Canning (manufacturer of the terra-cotta of the Albert Hall and South Kensington Museum) said his friend Mr. Redgrave had entered so fully into the description of the material used by that gentleman in the structures to which he referred that Little was left for him to add. He complimented Mr. Blashfield upon the great excellence of the ware exhibited by him, which he regarded as a very successful result of the rule of thumb described by the preceding speaker, considering, as was alleged, that manufacturers knew little or nothing of the components of the material with which they had to deal. As far as he (Mr. Canning) was concerned, he had only to deal with a very simple pure clay, as compounded by nature, and which had only to be dug out of the bowels of the earth, and moulded into shapes which architects directed. This, he said, was done without addition, excepting a little of the same material burnt and mixed with it, which they called "grog." That was all the mystery in the manufacture of terra-cotta, so far as he was personally concerned, for the last twenty years, and he was not aware of any failures having occurred. Having directed attention to his specimens of glazing and colouring, he expressed his readiness at all times to compare notes with his fellow manufacturers, and to cultivate a spirit of emulation among them which would benefit the trade at large, and tend to the more extended application of this material.

Mr. Etheridge spoke on the subject of the

valuable deposit of clay lately discovered at Watcombe, in Devonshire, which he said was between 30 ft. and 100 ft. in depth, and extended over a very considerable acreage. This clay, being in his opinion adapted for the finest class of pottery works, he regarded as one of the most important discoveries of the age. Mr. Morrell, who had made experiments with this clay, pronounced that all could be done with it that was done with the clay of the ancient Roman and Greek times, and the most beautiful objects of art had been manufactured from it. The shrinkage of the Watcombe clay was stated to be very small indeed.

Mr. Blanchard expressed a very high opinion of the clay spoken of, and with respect to terra cotta in general, it had been so fully treated of in Mr. Barry's paper, and the subsequent discussion upon it, that he felt he could not profitably occupy the meeting by any observations of his own.

Mr. Henry Doulton considered great credit was due to Mr. Blashfield for the high standard to which he had brought his terra-cotta. Special attention had not been paid to that material at the Lambeth Works, but lately some little effort had been made in that direction. The best test of the durability of terra cotta was that of a sharp-pointed steel instrument. If it made an incision in the terra-cotta, the tooth of time would attack it; but if it turned the sharp point of the steel they might be sure it would be imperishable. The other test was that of acid, which in a short space of time would affect the material in a manner that it would take years of time to produce. He did not agree that fire-clays had any great advantage over other kinds if they required to be fired at excessive heat to make them imperishable.

Mr. Page, C.E., remarked that he had taken great interest in the development of the manufacture of terra-cotta, and was much gratified with what had been done by Mr. Barry at Dulwich College. He looked upon the revival of this material in that instance as an era in art, and he trusted it would be extensively introduced in all future buildings. Terra-cotta, he said, was a material with which even granite could not compare for durability. As one who had paid some attention to art, and who hoped to see the day when there would be no engineering work which was not also an artistic work, he begged to thank Mr. Barry and the other architects who had done so much to revive the employment of a very beautiful material in buildings of the present day.

Mr. C. F. Hayward mentioned the satisfactory results which had attended the use by him of terra-cotta supplied by Mr. Blashfield in a building he had erected in the vicinity of Plymouth. Speaking of the economy of the material as compared with stone, he stated that the cost of the triple-light windows with all the parts complete, and containing ninety pieces, was 6l. 11s. each, or 19l. 13s. for the three, and that of single windows 4l. 11s. each. The columns cost a little over 20s. each, and hollow blocks to carry weight, filled in by the contractor, cost 10s. each. The manner in which Mr. Blashfield and his principal workmen devoted themselves to the carrying out of his designs had given him the greatest satisfaction. He mentioned that in the progress of the works a strike of masons was threatened, and he believed the arrival of the terra-cotta had a very beneficial effect upon the men, and induced them to alter their mind, lest they might be deprived of the stone-work which remained to be executed by the substitution of a greater amount of terra-cotta than was originally contemplated.

Professor Kerr, in proposing a vote of thanks to Mr. Barry and to the visitors who had taken part in the discussion, remarked that the subject was one of great interest, introducing as it had done two separate schools in reference to this material of terra cotta. Mr. Redgrave, as representing the operations at South Kensington, started a different idea from that which Mr. Barry and Mr. Blashfield had laid before them as regards the practical use of terra-cotta. Mr. Redgrave raised the question whether the material should be composed of natural clay or clay artificially compounded. He thought the argument in favour of the natural clay was scarcely borne out by the facts. The specimens of the South Kensington material, he believed, were from the natural clay, untouched by the tool before burning; whilst those exhibited by Mr. Blashfield had been tooled carefully before being placed in the kiln. Mr. Blashfield said, in effect, "Look at the fine arras and the smooth

and perfect lines, and the refinement and finish of these specimens." South Kensington said, "We would rather have less refinement and more artistic 'touch.' On the other hand, Mr. Blashfield was content to sacrifice artistic touch for the sake of refinement; and he (Prof. Kerr) thought the English mind in the present Gothic day would prefer the latter. These were the chief points of difference between the two schools which remained to be determined in the future. The speaker having expressed an opinion unfavourable to the specimens of colouring exhibited, and a hope that it would never be employed for the beautifying of London, included in the vote of thanks the practical gentlemen who had taken part in the discussion.

Mr. Barry briefly replied upon the discussion, and the resolution having been passed, the meeting adjourned.

THE PROPOSED NEW BRIGHTON RAILWAY.

A PREGNANT comment on our remarks as to the suicidal policy of the Brighton and South-Eastern Railway directors, has been given by the Parliamentary notices just deposited. A new direct line, from the Dulwich station of the London, Chatham, and Dover Railway to Brighton, will be applied for in the ensuing session. The novel and commendable plan of issuing 1l. shares, for the purposes of survey, deposit, and Parliamentary expenses, has been adopted; the holders to have the prior right to the subsequently issued definitive shares, if the Act of Parliament be obtained.

With the whole country seething and foaming in the turmoil of the most heatedly contested election that has taken place for the third of a century, it is impossible even to give a guess as to the manner in which the new Parliament will regard the rights and interests of the travelling, or indeed of any portion of the public. If the new House of Commons prove to be so far an improvement on its predecessors as to have a definite, intelligible, and honest policy—we speak with reference to railways, he it understood,—the most probable event will be, that the existing companies will again bid for legislative protection, by proposing to bind themselves to a more equitable treatment of their customers. For all parties this would seem to be more desirable than the construction of a new duplicate line.

The daily journal which in very many quarters is looked up to as the most consistent authority on subjects similar to that of which we speak, has taken a tone with reference to the present application with which we do not altogether agree. The *Times* sees many and great advantages to be expected from the consolidation of railway management and the distribution of dividend over as wide a system of returns as possible. So do we. But we do not hold that, until this consummation is attained, the Brighton directors have no option but to adhere to the recent augmentation in their fares. We may yet have some time to wait before we are in a position to define exactly how much the net returns have been improved, or how much deteriorated, by a policy which has been so generally condemned; but it is our belief that the most fertile source of income is to be found in giving the utmost facilities to the travelling public. On no other view is the erection of enormous structures, like the Cannon-street and London Bridge stations, and the Thames bridges, to be for a moment justified. It is because we hold the recent action of the Brighton and their associated directors to be, not conservative, but retrograde, that we are of opinion that it is an unwise policy for the shareholders, as well as an aggressive policy as regards all those locally interested in the rate of fare. It is by good service, cheap service, and punctual service, that the utmost returns on the expended capital are, if we do not grossly err, to be obtained. The mere fact that the deposit for an opposition line has been provided shows, more distinctly than any words can do, the feeling with which the present management of the Kent and Sussex system of lines is regarded by the public. It speaks well for public spirit, under all the depression of the long financial stagnation, that proof should be given that the travellers who now reluctantly use the Brighton Railway will not fail to resist monopoly, unless monopoly shows some convenience. It is also highly encouraging to see so novel and so sound an application of the over-

wrought principle of "limited liability" brought into practice. Either as affording the basis for an equitable arrangement, or, failing that, as an act of self-defence against monopoly, we look with pleasure on the project of the new Brighton Railway. What we most desire, however, is that the present company should render a new one unnecessary.

DECORATION OF ST. MICHAEL'S, CORNHILL.

CONSIDERABLE alterations, it will be remembered, were made at St. Michael's Church, Cornhill, between the years 1858 and 1860, including a new doorway next Cornhill, designed by Mr. Scott, and an elaborate series of carved benches by Mr. W. G. Rogers. The interior was partly decorated also, and the windows were filled with stained glass by Messrs. Clayton & Bell, much of it very effective. Quite recently some considerable additional works have been done. Amongst other things, the reveals and columns of the aisle windows have been richly decorated with colour, and a scroll enrichment has been painted on the shafts of the main columns forming the aisles. A pavement of encaustic tiles by Minton has been laid. The north porch, next Cornhill, has been elaborately decorated, we might say over elaborately, and includes a biblical subject, creditably painted in oil by Mr. Brophy, in the head of the doorway opening into the church. A new cloister, leading from St. Michael's-alley to the churchyard, has been formed in Portland and Caen stone, with red Mansfield stone shafts and carved caps, executed by Bevers. For this part Messrs. Barnsley were the contractors. The decorative work has been done by Messrs. Trollope, under the direction of Mr. Herbert Williams, the architect to the parish, and his son, the assistant architect. The organ has been restored by Messrs. Bryceson, and an electrical arrangement is applied to enable the organist to play from one side of the chancel to the other. In the whole some 3,000l. have been spent. The church is well worth a visit.

SEWER VENTILATION.

ALTHOUGH the question of sewer ventilation has of late years engaged the attention of many thoughtful men, its importance has not been generally appreciated. The efforts of sanitary reformers to impress upon Boards of Health the necessity of sewer ventilation have been but partially successful. The reason of this may in a measure be owing to the fact that no satisfactory method of grappling with the difficulty has yet been discovered. Every engineer may have given the subject more or less consideration, but professional men have never discussed the question in a comprehensive manner. We are daily reminded of the importance of trapping the drains to prevent mephitic gases from entering human habitations, but seldom are we told that, under certain circumstances, sewer gases will find their way into dwellings notwithstanding traps and other ordinary precautions now in use.*

Gas evolved by decomposing organic matter is always dangerous to health. In small quantities it poisons the blood, and produces typhoid and those other diseases commonly termed zymotic. In a perfectly undiluted state the gas would cause instant death. Sewage should have sufficient velocity to prevent accumulation and deposit, but this degree of perfection has seldom been obtained. In well-regulated towns much is done by means of constant flushing to keep sewers comparatively wholesome; but, owing to the surface configuration in many districts, sewers are necessarily constructed with flat gradients, and, the velocity of the sewage being insufficient to keep the solid particles in a state of motion, a deposit is formed. It is well known that these deposits rapidly putrefy and evolve most dangerous gases.

In his evidence before the Select Committee on the Sewage of Towns, Dr. R. A. Smith states that sewage is oxidised even before it leaves the town, and that poisonous gases (especially carbonic acid gas) are evolved in large quantities. Whenever the temperature rises to about 54°, oxidation is intensely rapid. The gases will, of

* This has been often urged in our pages.—Ed.

course, vary slightly, according to the nature of the sewage, but are generally as follows:—

Carbonic acid	95.0
Nitrogen	2.6
Sulphuretted hydrogen	2.0
Carbonic oxide, hydrogen, and carburetted hydrogen	0.4
	100.0

The temperature in sewers being never less than 54° these gases are produced in prodigious quantities. The motion of the liquids constantly exposes fresh matter to the influence of the air, and the solid matter deposited in the sewers or adhering to the sides being in an advanced state of decomposition the exhalations are of the most deadly character.

We naturally ask, What becomes of these gases? It has been supposed by some that the carbonic acid gas being heavier than air (its specific gravity being 1.529) finds its way to the outfall and is dissipated in the air: this is clearly an error; the law of gaseous diffusion, and the well-known habit of all gases to mix and diffuse themselves without reference to the force of gravity, militate against this theory. The constantly accumulating gas is soon rendered highly concentrated by the temperature in the sewers, and as soon as the pressure of this exceeds the hydrostatic pressure of the water in the traps it escapes. The bubbling noise not uncommonly heard in water-closets and sink-traps is caused by gas escaping in this way; moreover, sewer gases are extremely soluble: water readily absorbs more than its own volume of carbonic acid gas, consequently the water in the traps rapidly becomes highly charged with sewer emanations, which cause it to putrefy and evolve most dangerous gases into the apartment.

Carbonic acid gas is non-inflammable, and is incapable of supporting animal respiration; it does not simply cause death by excluding oxygen as some other gases do, but is positively poisonous. It will cause death by its presence even if otherwise there be sufficient oxygen to support life. This fact cannot be too strongly impressed on the memory, that although a candle will not burn where there is less oxygen than will support life, it may burn where carbonic acid is present in sufficient quantities to destroy life: accidents have frequently occurred to persons ignorant of this important law, in sewers and in brewing-vats where fermentation is carried on.

The system of ventilation adopted in London and Paris is simply to insert an iron grate over the manhole, and allow the gases to escape into the streets, without passing through any process of deodorisation. The advocates of this method have received encouragement from Mr. R. Rawlinson, who has omitted no opportunity to bring the matter under the notice of municipal authorities. Some years since, before water-closets came into general use, street gullies were left untrapped, and no inconvenience was experienced; but after water-closets became common the sewers were made receptacles for everything foul and unwholesome. The nuisance soon became intolerable, and the cry was raised, "Trap the gullies!" The gullies were trapped accordingly; but it was quickly found, that instead of the streets, the houses received the contaminated vapours. We have now to consider what we are to do next: shall we adopt some means of ventilation not hitherto tried, or shall we revert to the old system of untrapped gullies?

To allow foul gases to escape into the streets will cause a nuisance in proportion to the necessity for ventilation. The gases will come up under our very noses, and will be received into our lungs before any very extensive mixture with the atmosphere can possibly take place. Those who advocate the open grate system frequently quote the death-rate of London and Paris as convincing proofs of the correctness of their arguments; but they forget to consider the peculiarities of those cities, which make them quite exceptional, and their example of no practical value to towns differently situated.

The bill of mortality does not give a correct history of the sanitary condition of any place. For instance, a healthy and salubrious neighbourhood may show a higher death-rate than a dirty and notoriously unhealthy place; and for this reason, that invalids congregate there in large numbers, many of whom do not recover, and their deaths go to swell the average of a small population. The converse holds equally good. Large and wealthy cities are centres to which men of means are attracted. These live in comfortable and healthy dwellings, in clean and aristocratic districts, and of course live longer than their less favoured neighbours.

Again, although London is not blessed with a constant water supply, the dilution of the sewage is much greater than in any other considerable town in England. The sewer gases are, therefore, less noxious, as the excessive quantity of water tends to keep the sewers wholesome. The same applies in Paris, where there is no attempt at trapping, and no need for it, as the "soil" is collected in cesspools, and does not pass into the sewers. The streets are also washed with vast quantities of water, and the sewers are flushed every day.

The open-grate system is so barbarous that we dismiss it from further consideration. It may continue in use for a short time, but like other expedients it must soon be abandoned, and something more worthy of this progressive and scientific age be introduced.

No plan of sewer ventilation ought to be entertained which is not perfectly self-acting, and in which the first cost does not cover the whole expense likely to be incurred, as it is well known that municipal authorities in their zeal to cut down expenses have sometimes fallen into the grievous error of neglecting preventive measures as soon as all fear of an immediate epidemic outbreak has passed.

To disinfect sewer gases before they can reach the street, vegetable charcoal spread lightly on a perforated tray or basket has been fixed in connexion with the manholes or the gullies. When dry it effectually purifies the gases, but as it absorbs water rapidly it requires to be renewed frequently. The steam and damp vapours from the sewers will in a short time render it useless. Elaborate and expensive ventilating chambers have been erected in West Ham and some other places, the object being to purify the gases by means of charcoal before they escape. This process is theoretically correct, but its practical value is very doubtful, owing to the charcoal absorbing damp and becoming impervious.

It has been proposed to connect the sewers with factory or other chimneys, so that the gases may either be consumed in the furnace or be discharged into the air at a great elevation. I have tried this method, and have reason to believe that with care it may be made perfectly successful. The expense of building special chimneys and keeping up a furnace would be too great to be entertained, unless all other reasonable schemes result in failure; but if a factory chimney exists near the summit of a sewer a connexion can be made with very little expense. An enthusiast once proposed to ventilate all the sewers of Manchester by means of one immense chimney and furnace, to be erected in some central situation: fortunately this proposal did not meet with much favour. If a central chimney and furnace should be constructed so as to extract air from the sewers, no benefit would be felt more than a certain distance from the furnace; as the air would be drawn with the force of a hurricane into the sewer, through the gullies and traps in the neighbourhood; while the sewers at a distance would not be affected in the slightest degree. We see no chance of successful ventilation other than by establishing outlets at frequent intervals.

Rain-water spouts have been used in some instances; but the objections to this system are numerous. During heavy storms, when the sewers are being rapidly filled with water and when some outlet is specially required, the spouts are required for their legitimate function; besides which, leaves and birds' nests cause frequent obstruction and stoppage. The gases would, moreover, be discharged into the immediate neighbourhood of bedroom-windows, an objection which cannot be overlooked or excused.

The corporation of Liverpool has recently incurred great expense in the endeavour to solve this all-important mystery. Until last year there was no attempt at ventilation, and the sewers were in a most unwholesome condition; but after some discussion it was decided to ventilate freely, and during that year 1,000 ventilators were constructed. The sewers are now comparatively wholesome. Iron shafts or chimneys, about 8 in. in diameter, with revolving tops, in connexion with which is an archimedean screw, to cause a constant upward draught, have been fixed in corners or recesses. These shafts are joined to the sewers in convenient places, and are also carried far above any windows, so that there is no danger of particles of poisonous gases finding their way into human habitations. These shafts have been found to answer their purpose admirably. A great reduction in the rate of mortality has

taken place since their adoption. This fact alone speaks volumes in their favour, besides which they are not very expensive, require no attention, and do not cause inconvenience or annoyance to any one.

There is probably no subject of every-day interest so little understood or regarded as this now under consideration. In almost every house complaints are made of "bad smells" arising in the neighbourhood of the sink-stone, but a kind of intuitive horror of trouble prevents the householder from taking steps to protect himself and family from the evil effects of vitiated atmosphere. Generally sink-stones are fitted with what are called "bell-traps." These are supposed to keep down all bad smells, and at the same time allow water to flow away freely. In practice, however, the water does not get away fast enough, and the traps are removed. The course is thus left quite open for the escape of gases, which quickly penetrate into every room, filling the house with a deadly poison, which destroys the stamina of our town populations, and lays the foundation of many of the diseases from which humanity is doomed by its own ignorance or carelessness to suffer. V.

TECHNICAL INSTRUCTION.

This subject appears to be making satisfactory progress and creating a good deal of interest. During the past few weeks the provincial papers have reported meetings which have been well attended by a good proportion of the working classes, who do not as a rule give much attention to educational questions. The meeting at Huddersfield was presided over by the new mayor, the place having recently become a corporate town, and men of all shades of political and religious opinion took part in the proceedings. At Sheffield the Rev. Canon Sale presided; at Newark, the mayor; at Burslem, the Right Hon. C. B. Adderley, M.P. At the latter meeting Mr. Baresford Hope, M.P., Mr. Melley, M.P., Mr. Roden, and Mr. Buckmaster, from the Science and Art Department, delivered instructive and appropriate speeches. The importance of scientific instruction is making steady progress, and in many places evening classes are now in operation for instruction in science.

Classes are about to be established in Liverpool for imparting practical and theoretical instruction in the mechanical arts and sciences, and to afford opportunities to the working classes of competing for the prizes and medals of the Science and Art Department, as well as for the Whitworth scholarships. A sub-committee of the School of Science, aided by one or two large employers of mechanics, have met to carry out the scheme. A suitable teacher will shortly be appointed (the committee having already one in view), who will be remunerated partly by the School of Science, and also by students' fees (which will, however, be very low), and by the grants given by the State. It is considered highly desirable that a chair of engineering science should be endowed, and, as the books required are expensive, it is hoped that liberal donations will be forthcoming to aid these desirable objects.

A public meeting has been held in St. Mary's National School, Lewisham, for the purpose of organising classes for instruction in geometrical, mechanical, and architectural drawing, under a science teacher, certificated by the Department of Science and Art. Mr. Buckmaster attended from the Science and Art Department, and delivered an address, in which he encouraged the young men to earnest work, and said that success in life depended more on continued effort than extraordinary natural gifts. The classes will commence at once.

A public meeting has been held in the Grammar School, Daventry, for the purpose of inaugurating a class for instruction in magnetism and electricity, which will be conducted by Mr. Righy, a certified science teacher. The mayor, Mr. W. Line, presided, and briefly introduced Mr. Buckmaster, who delivered an appropriate address, which was well received.

A large meeting has been held in the County Hall, Abingdon, on the occasion of the second annual distribution of the "Queen's" and local prizes. The mayor occupied the chair. The secretary reported the excellent success that has attended the labours of the master (Mr. E. J. Gubb) and crowned the commendable application of the pupils to their study in the past session.

The first annual meeting for the distribution of prizes to the students in the Science and Art Classes, at Northampton, gained in the recent examination, has been held in the Town-hall, Earl Spencer presided. The science classes have not been established more than six months, and the late examination was the first, therefore, that had been held. The result is regarded as very encouraging. The classes are already equal in number and success to those in the largest towns in the kingdom, and the Inspector of Science Schools for the Midland District (Mr. G. C. Bartley) speaks of them in high terms. In the fifteenth annual report of the Science and Art Department, Mr. G. C. Bartley says,—"The science classes in the Midland districts are in a flourishing condition, particularly the one held at the Guildhall, Northampton." These classes were established in October last, and in five months after their establishment the students were examined in free-hand drawing, in geometry, in perspective, and in model drawing. Sixteen students were successful in free-hand drawing, six of them taking prizes; ten students were successful in geometry, one taking a prize; four students were successful in perspective, two taking prizes; and nine students were successful in model drawing, one gaining a prize. There were other successes among the students.

open to science-trained men, there need be still less fear for the education of the middle and upper classes. Teachers and schools of science would soon spring up if the people found that science would 'pay.' The demand having once been created, it is against all the experience of commerce if the supply does not keep pace with it."

SCHOOLS OF ART.

The Oxford School.—The annual meeting for the distribution of the awards to the successful students of this school, took place in the Town-hall, when a very large and influential audience attended. The Lord President of the Council of Education (the Duke of Marlborough) occupied the chair. His Grace opened the proceedings in an able address. In it was considered the bearing of art upon the prosperity and commercial institutions of the country, the growth of it since the Great Exhibition of 1851, and the position which it occupies in England at the present time. The Rev. E. L. Wignifield read the Government report, which was very satisfactory, and the list of those pupils who had obtained Government prizes and certificates. The chairman said it was a gratification for him to know that Mr. Macdonald, the master of the Oxford School of Art, had been awarded a honours of 10l. during the past year. The Department was anxious to do what it could to increase the number and efficiency of these schools, and he trusted the public would give them credit for the exertions they were making in order that the money which was freely given by the public might not be bestowed in vain. In conclusion he signified his intention to give a donation of 10l. annually to the funds of the school.

The Bristol School.—The prizes have been distributed to the successful pupils of this school at the recent Government examination. The Mayor occupied the chair. The report stated that the school is in a satisfactory position so far as the success of its students can be a test; nevertheless, the debt of 655l., and the decrease of annual subscribers, continue seriously to fetter the expansion of the school.

The Ipswich School.—The public distribution of the prizes awarded by the Government Inspector at the last examination, took place in the School of Art, Northgate-street. There was a large and interested audience. The Rev. C. H. Gave, rector of St. Matthew's, presided. Three pupils have won for themselves free studentships. Mr. W. T. Griffiths, the master, said this school almost stood alone in one respect—it had no subscriptions. In other towns they would generally find a long subscription list. They had been established ten years, and had not come upon the inhabitants for one farthing, excepting for such expenses as were connected with the fitting out of the room at the outset. It had been supported entirely by the fees of the students. Those fees were drawn up so as to meet all classes, and the teaching was of an essentially practical character.

The Coventry School.—The annual meeting of this school has been held in St. Mary's Hall. Mr. James Darlington presided, and there was a numerous and influential attendance. The annual report says—

"The friends of the Coventry School of Art may fairly look upon the past year as the most successful of its existence. The South Kensington Department of Science and Art has this year awarded to it one silver and three bronze medals, an increased number of book-prizes, an increased number of successful examination papers, one national scholarship, seven free studentships, and a bonus of 20l. to the master in recognition of his success.

The total number of students who have attended the school during the year has been 183, and although the hot summer caused a temporary falling off, the attendance has been very regular.

The Department of Science and Art has this year awarded eight book prizes for drawings in elementary stages, against five last year; one also secured honour, able mention. Twenty-one works were selected for national competition, against sixteen last year; to one of these a silver medal was awarded, three had bronze medals, and one a book prize. Last year, one bronze medal and three book prizes were obtained.

The examination in free-hand, model, geometrical, perspective, and mechanical drawing, held in March last, were conducted under the superintendence of the local committee. The number of students who passed is 135, against 27 last year. The number of successful papers 50, against 36 last year.

Seven scholars have had free stewardships granted to them for one year by the Department of Science and Art, and Mr. John Frost has succeeded in obtaining a national scholarship, with an allowance of 1l. per week, for one year. These scholarships are now given to a limited number of the best students who are, or intend to become, professional designers for manufacturers, or art workmen.

Bonuses, consisting of one sum of 50l.; three of 40l.; five of 30l.; ten of 20l.; and twenty of 10l., were this year awarded to the head masters of schools in which the results of instruction, as tested by the examinations of the department, were the most satisfactory. Of these Mr. Anderson obtained 27l., this school being the fifteenth on the list, which comprises altogether 102 schools."

The Taunton School.—The annual meeting for the purpose of distributing the prizes awarded to this school by the Department of Science and Art has been held at the school. There was a good attendance. The company first examined the works of art executed by the master (Mr. John Rowe) and the pupils during the past year. The drawings and sketches by the students numbered 141, embracing all the stages of instruction; and were supplemented by thirty-one studies in oil, water-colour, chalk, and pencil by Mr. Rowe, all from nature, with the exception of a copy of Titian's Ignatius Loyola. The productions of the students were executed in the morning and evening classes of the school. Six of the students' works were selected by the Department for national competition, and of these Mrs. Malet's gained the distinction of Queen's prize. The Rev. W. Arthur Jones (honorary secretary) read the report, which said—

"The committee have the satisfaction of congratulating its friends and supporters on its continued efficiency and on the success with which, under the able direction of the head-master, Mr. Rowe, the pupils of the school have pursued their studies during the past year. The payments on results received from Government this year have been more than double the amount received from the same source last year. This circumstance is especially encouraging, because it is a sure and undoubted proof of increased diligence and activity on the part both of pupils and master."

A stirring address to the students was given by the head-master, and the meeting was also addressed by Mr. Malet, the chairman, and the hon. secretary.

The Newcastle-under-Lyme School.—The annual meeting of this school has been held in the town-hall. It was well attended by the pupils and their friends, a large proportion being of the working classes. Mr. W. S. Allen occupied the chair. The report of Mr. Bacon, now head-master of the Stoke schools, was read. The reporter said—

"I am glad to state that sixty-eight students have availed themselves of the instruction offered in the classes. Sixty-one students attended in the evening and seven attended the private classes which met in the morning.

In March an examination, conducted by members of the committee in accordance with the Science and Art department's regulations, took place. Sixteen students presented themselves and were examined. Of these, ten passed and three obtained prizes.

The drawings which were finished in the school during the previous twelve months were sent to London in April to be examined. The works of ten students were satisfactory, three obtained prizes, and one honourable mention. At the national competition, at which about 100 schools compete for ten gold, twenty silver, and fifty bronze medals, one bronze medal was awarded to this school. Two of the students, viz, W. P. Rhodes and E. J. Watkin, have been appointed free students, the Science and Art Department paying their fees for twelve months."

The meeting pledged itself to give support to the school, fully recognising the importance and advantages which such an institution offered to the locality.

A Sherborne School.—It has been resolved at a public meeting that a local school of science and art, in connexion with the Department of Science and Art, shall be established with as little delay as possible. A committee and secretaries were named, and it was stated that Mr. Fraser, who is conducting the school of art at Salisbury, will probably undertake the duties of conductor of the Sherborne school, assisted (*pro tem.*) by Mr. Stephens, the master of the Sherborne National Schools.

ST. SAVIOUR'S CHURCH, PRESTON, LANCASHIRE.

This church was consecrated on the 29th ult. by the bishop of the diocese. It consists of a broad nave and north aisle, the latter sufficiently wide and lofty to receive a spacious gallery without extending up to the arcade dividing the two.

The east window has detached shafts, carved capitals, with moulded archivolts, interceded, and plate-tracery of a simple and early type. The communion-rail and standards are wrought in iron, decorated with colour and gilding.

The chancel and footpace are paved with Godwin's tiles. The chancel-stalls have open fronts, and the bench ends are decorated with the symbol of the Christian faith, and an ancient monogram expressing the name of Christ in Greek, by the use of the first letters of that name combined. The pulpit is the gift of Mrs. Newsham. It is of oak, with polished stone substructure and steps.

TECHNICAL INSTRUCTION FOR THE BUILDING TRADES.

A MEETING on this subject has been held at Bradford in connexion with the building trades. Its purpose was the inauguration of classes for the operatives and apprentices employed in the Bradford building trades. In connexion with the trade of the joiners there has been formed a board of conciliation and arbitration, which it is hoped will extend to the whole of the building trades. The early workings of this Board are hopeful for the future. The proposed schools originate with this board of arbitration, and though the joiners have the honour of their foundation, it is hoped that all the building trades will share in their advantages. The objects sought were stated by Mr. A. Neill, the umpire. The meeting was enthusiastic in character, and the speeches of the several gentlemen who addressed it were loudly cheered. The proceedings were commenced with tea, and about 800 persons sat down. The classes have commenced, and are to meet twice a week in the Unitarian school-room, the services of an efficient and practical teacher having been secured.

THE TECHNICAL INSTRUCTION MOVEMENT IN SCOTLAND.

The President of the Royal Scottish Society of Arts, Mr. George Robertson, C.E., in an able address to the Society on the 9th inst., treated chiefly on the subject of science education. In the course of his address he said—

"The question as to the exact character of the schools, graded or otherwise, it would be desirable to establish, on the large scale of a purely technical nature, such as those on the Continent, I do not think (and I say it with deference) can be settled just at once. In the present state of matters the country is hardly ripe even for immediate, certainly not for hasty action in this respect. Full use is not made of the technical institutions now in existence, such as the School of Mines; and a healthy and not spasmodic demand must first set in before any purely scientific establishment on a large scale would be quite free from the risk of failure."

"Professor Huxley says that this want of success is because the great mass of the manufacturing interest do not, even at the present moment, understand that such instruction in the groundwork of technical education is what they want to prevent their manufactures going to ruin."

"After all, perhaps, the most valuable and practical way of promoting scientific education is to rouse up interest and convince the employers of labour of its value. Were the manufacturers all over the country thoroughly convinced of this, and determined to show that they appreciated it, by promoting and giving higher wages to those workmen who were technically trained, they would rouse up such a demand as would satisfy the most ardent well-wishers of the cause. It is the employers of labour who may be said to have the great prizes of life to give away, in comparison with which all the medals and certificates a department can grant are only the means towards an end. If the artisans who are employed in engineers' shops find that they get on because they know the principles of mechanics; if those who are engaged in dyeworks, glass-works, and the like, find that they advance because they know something about the science of chemistry; if the stonemason finds himself promoted because he is acquainted with descriptive geometry and drawing; if the miller finds himself the captain of a mine because he understands geology,—then, there will be no fear for the technical education of either the present or the future race of artisans. And if the results of life, whether at college or in professions, be in like manner thrown more



ST. JAMES'S CHURCH KIDBROOKE.—CARVED CAPITALS: GAS FITTINGS.

The organ remains to be added, together with the prayer-desk, the present one being temporary. The lectern is an eagle, of very old oak.

The roof-ridge of the chancel and nave is continuous, but the point of separation is marked by greater richness and size of the principals, the carved rafters of which are decorated with various devices of a symbolic character, as the cross and the emblem of the Trinity. At the apex is a conspicuous emblem of the Holy Ghost as a descending dove.

The wall principals at the east end are similarly decorated, and the emblem at the apex, directly over the communion-table, where the sacrifice is commemorated, is the Lamb of God. The roof principals over the sacarium are decorated with conventional representations of the vine and the passion flower. The stone carvings also symbolic in many instances. The two corbels to the chancel principals represent angels.

The gas-standards are Skidmore's work. The gallery ceilings are divided into bays by the supporting timbers, decoratively treated, and each bay is further ornamented with coloured stencil bordering. The space below the west gallery is immediately near the principal entrance, and being partly screened off from the open nave, forms a quasi narthex or vestibule. Here the font will be placed, the present one being only temporary. The sacarium window is filled with Powell's stamped quarries, and represents the sacramental elements in the forms of wheat and vine. The east end is about to receive a large memorial window, the gift of Mr. Edward Swainson, by Ch&ell, of Paris, the subjects being figures of Christ and the four Evangelists. Messrs. Hardman, of Birmingham,

are also commissioned by the widow and family of the late Mr. John Smith and the architect with two memorial windows for the west end, of their best workmanship, the subjects being respectively "Christ Blessing Little Children" and "The Harvest of the World, and the Putting in of the Sickle."

The completion of the exterior requires the tower in its upper stages, the enclosure of the site, and the removal of the cottages in Queen-street. The principal entrance under the tower is surmounted by a medallion of the head of Christ. The west windows of the nave and aisle have tracery of an early character. Stone crosses surmount the east and west gables of the nave, and over the aisle gable is a crown of thorns in wrought-iron work.

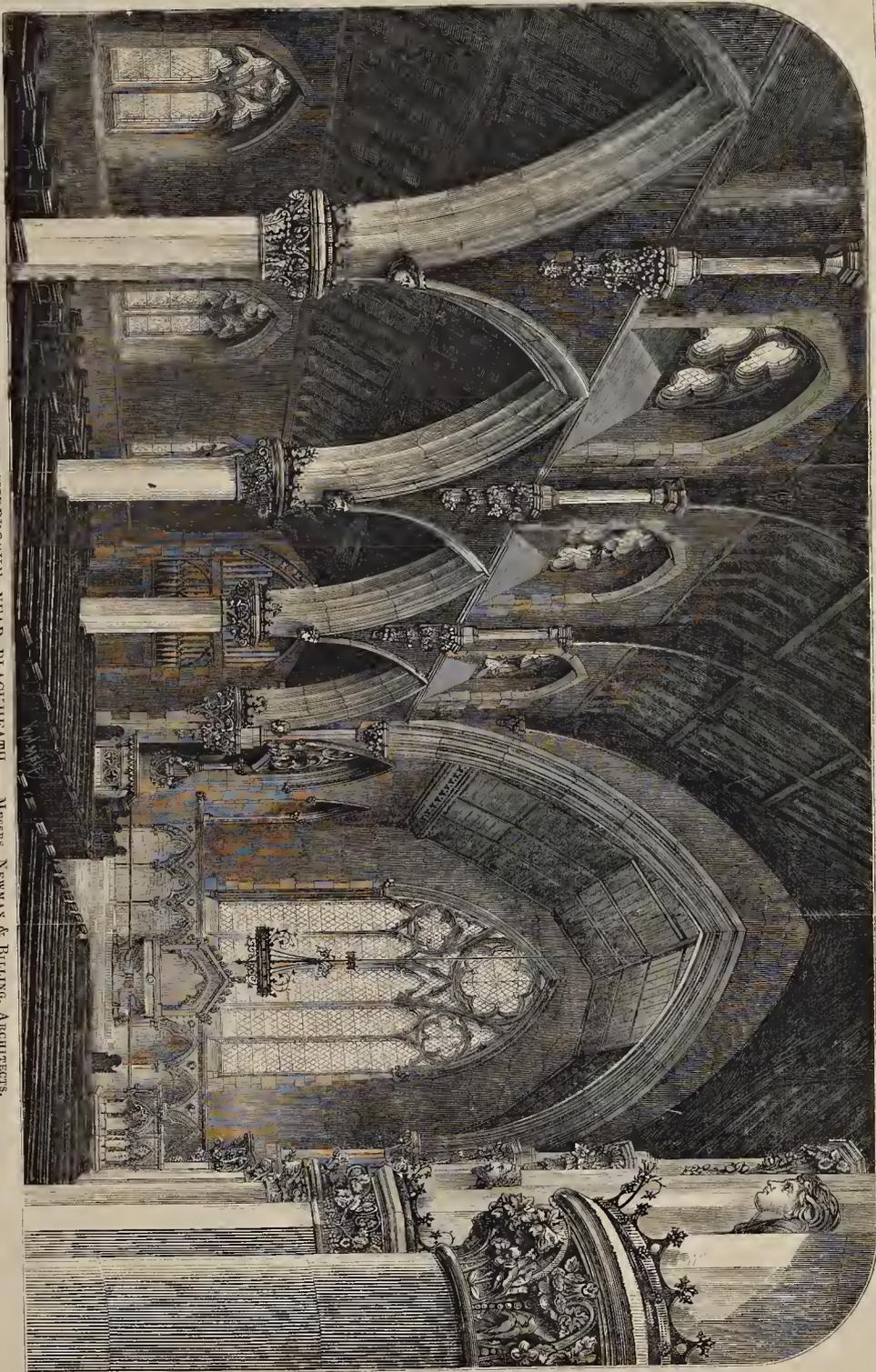
The architect was Mr. Hibbert. The whole of the carving and parts of the decorations have been contributed by various persons interested in the church, without trenching upon the general building fund.

THE EDUCATIONAL PRIZES AT THE POLYTECHNIC INSTITUTION.—The prizes and certificates from the Society of Arts, the Science and Art Department, City of London College, and Royal Polytechnic have been distributed to the successful candidates of the evening classes at the Polytechnic. The gold medal of the Science and Art Department was gained by Mr. W. J. Wilson, engineer's clerk, and the silver medal by Mr. Robert Wilkins, clerk, both for animal physiology. Besides three bronze medals, various books, money prizes, and certificates were distributed.

SAINT JAMES'S CHURCH, KIDBROOKE.

IN consequence of the rapidly increasing demand for residences near Blackheath, the land adjoining became eligible for building purposes. The freeholder of a large estate at Kidbrooke, Earl St. Germans, having offered a site for a church and rectory, steps were taken in 1866 to build the former, which resulted in the erection of the church of St. James, Kidbrooke, and a parish was accordingly formed. The church was consecrated by the Bishop of Rochester in July, 1867. It contains accommodation for 1,000 persons, and cost, exclusive of the organ, reredos, pulpit, fenees, lighting, &c., about 7,000l. The plan consists of nave, aisles, and chancel, with a tower and spire 160 ft. high at the east end of the north aisle, and a vestry on the opposite side. The organ-chamber is formed on the ground-floor of the tower.

The reredos, pulpit, reading-desk, and font, which are wrought in Caen stone, with alabaster and marble columns introduced, as well as the carving generally, were executed by Mr. Seale, of Walworth, from the designs of the architects. The church is built of brick with Kentish rag-stone facings, and Bath-stone dressings. The pewing and stalls are of deal, stained and varnished. The aisle passages are paved with red and black tiles, and the chancel is laid with eucastic tiles. The whole of the windows are filled with geometric tracery. The east window, which has five lights, will shortly be filled with stained glass by Messrs. Ward & Hughes, at the expense of a lady in the congregation. The organ is by Robson. The architects employed were Messrs. Newman & Billing; and the builders Messrs. Dove, Brothers.



ST. JAMES'S CHURCH, KIDBROOKE, NEAR BLACKHEATH.—MESSRS. NEWMAN & BELLING, ARCHITECTS.

THE LATE MR. EDWARD WELCH,
ARCHITECT.

We regret to hear of the death of Mr. Welch. He was born at Overton, in Flintshire, in 1806, and died at his house in Southampton-row, Bloomsbury, on the 3rd of August. In former years he was in partnership with Mr. Hensom, and the Birmingham Town-hall was built by them conjointly, the firm being "Hansom & Welch." They also built St. John's Church, Toxteth Park, Liverpool; the Beaumaris County Gaol; the Terrace and the Balkeley Arms Hotel, Beaumaris; a church in Hull; the Dispensary, York; King William's College, Isle of Man; and several churches there. The firm suffered greatly through the building of the Birmingham Town-hall, and their sureties, or rather the sureties of the builders, Kendall & Thomas, lost all the money they had advanced to assist the building, amounting, we believe, to something like 4,000l. or 5,000l.; but Mr. Welch's father, as one of the sureties, was compelled to pay a further sum of 1,000l. to get rid of his responsibility. This loss to the sureties was a great grief to Mr. Welch for many years, and he did all he could to repair the damage, but the hard world said a contract was a contract; and though subscriptions were raised to indemnify the sureties, the amount collected was but very trifling.

Mr. Welch, alone, was the architect of the Northern Hospital, Liverpool, and several churches in and around that town; the Monk's Ferry Hotel, Birkenhead, &c. Of late years he had devoted his attention to the ventilation and heating of houses by means of a hot-air chamber behind the ordinary fire-grate, and lately had succeeded well in the application of the principle, especially on a patent taken out in 1865. The St. Pancras Relief Office, designed by Mr. Robins, was recently provided with Welch's stoves; and the same architect, with one of these stoves, has since arranged the warming and ventilation of three apartments,—the ball and a room besides that containing the stove,—in a residence at Godstone.

Mr. Welch was highly esteemed by all who knew him intimately. He was a man of liberal and expansive ideas, and generously open to the merits and abilities of others, while modestly undervaluing his own.

THE DRAINAGE OF OXFORD, ETON,
WINDSOR, AND ABINGDON.

A REPORT on this subject by Colonel Ewart, of the Royal Engineers, commanding in the London district, has been made to the Home Secretary, and printed by his order. The reporter recommends the separate system as explained in the treatise on "Sanitary Management and Utilization of Sewage," by Mr. W. Menzies, Deputy Surveyor of Windsor Forest and Parks. At the conclusion of his report the reporter says—

- 1. That the 'separate system,' of drainage as above described, is the proper principle of drainage to be adopted in the towns of Oxford, Windsor, Eton, and Abingdon.
- 2. That a complete system of sewers should be laid out in the above-mentioned towns, to receive all the sewage matter of the towns; and that such sewers, so far from being of such a size as to enable a man to work in them, should be of such dimensions only as may be sufficient to afford a passage to the sewage matter.
- 3. That the rainfall should not be allowed to enter into the foul sewers, but should either be stored in tanks for domestic use, or be allowed to flow into its natural channels, care being taken, in the event of its running into a river, that it is freed from noxious impurities by careful scavenging of the streets, or, if necessary, by passing it into settling beds before allowing it to enter the stream.
- 4. That, as soon as possible, a complete system of water supply should be provided where it does not already exist, and arrangements should be made for enabling such supply to be used for flushing the sewers.
- 5. That the water and sewage works of each town should, if possible, be under the control of the same local authority.
- 6. That all drains communicating with the foul sewers should be trapped where in connexion with the houses, and elsewhere when necessary; the traps to be beyond the control of the inhabitants; bell-traps to be considered inadmissible.
- 7. That stables or cow-houses should have surface drainage carried through the walls into trapped cesspits, clear of the walls, and thence enter the foul sewers. Examples of which may be found in recently constructed Cavalry and Artillery stables.
- 8. That refuse from gas and other factories, when injurious to vegetation, should be collected into a tank at each establishment previous to the drains from it entering the public sewer, and the noxious constituents be separated by precipitation and filtration; the deposited matters to be frequently removed at the cost of the manufacturer.
- 9. That proper ventilation be provided for all the foul

sewers. Ventilating shafts should be carried above the level of the highest windows of the houses, and to such a height as to prevent the noxious gases being blown down the chimneys; the shafts to be connected to the crowns of the sewers by air pipes, and ventilation in no case to be effected by rain-water pipes.

10. That a sufficient area of land be selected and purchased, or leased, for the purpose of being laid out for irrigation; and that the sewage be conducted over or through that land in such manner as not to create a nuisance, and to entirely disinfest the sewage matter. The 'carrars' should be covered.

11. That the total quantity of land required will depend upon the nature of the soil; but as a maximum, two-thirds of an acre per 100 of the population will suffice, although it would be better to provide one acre per 100, in order to admit of farming the lands subject to the judicious rotation of crops."

The true method of dealing with the subsoil water in the valley of Thames, the reporter adds, must depend on an efficient method being devised of bringing the river under control.

An appendix to the report contains memoranda, after inspection, as to the Bedford sanitary improvements.

FROM IRELAND.

Lurgan.—A new town-hall has been opened here with Masonic ceremonial. The building, which was commenced early in the summer, is modern in style. It is three stories high, and the interior consists of two large rooms and a basement story. The dimensions of the building are,—length, 105 ft.; breadth, 36 ft.; and height, 64 ft. The basement story, which is intended to be used as a poor-law dispensary and butter market, measures 101 ft. by 22 ft. The second floor, which is almost on a level with the street, is intended to be used as a town-hall and assembly-rooms. Its length is 86 ft., and width 36 ft., and at the north end of the hall there is an orchestral gallery capable of accommodating sixty persons. The body of the hall, it may be stated, would seat 500 persons comfortably. The upper room, which is lighted by thirty-two arched windows, will, when completed, be used as town commissioners' board-room, town clerk's office, and for other town purposes. The estimated cost of the entire building is about 2,000l. The architects were Messrs. Young & McKenzie, of Belfast; and the builder Mr. John Archer, of Lurgan. The new hall, which is almost completed, is built on the vacant space between the police barrack and the Mechanics' Institute, in Union-street, and is connected with the latter building. The gasfittings for the hall were put up by Mr. Stewart, of Belfast, assisted by Mr. John Long, of Lurgan.

FROM SCOTLAND.

In Dunfermline there have been a considerable number of erections of different kinds during the last two years. Three large power-loom factories, besides extensive additions to a number of others, a new foundry, and a number of dwelling-houses have been put up. At the present time the burgh intend erecting new public slaughter premises. They are shown on the plans to cover three-quarters of an acre. The extended burgh boundaries are intended to be drained, and the streets properly repaired. Fees at Comely Park are rapidly being taken off for building purposes. There are two villa residences at the above place, nearly completed. Mr. Maccallum is the architect.

PROVINCIAL NEWS.

South Shields.—Messrs. Wright's new premises in Dean-street consist of one large shop for general business, a suite of private offices, entered from Dean-street and Ferry-street, a bond store of three stories, with the ground-work laid for another bond, both in Ferry-street. There is also in Dean-street a preparation for shop extension, with a large suite of offices on two floors above. The character of the building is Byzantine, worked out in plain red and white bricks. The windows are relieved with double reveals, stopped by quarter rounds, and splayed on different outlines. The front is broken by corbelled pillars and strings, worked into dentil blocked head moldings, and terminated by a cornice, also having a dentil blocked cornice, relieved with white brick recesses. The whole is slated and finished with a ridge cresting. The shop will be lighted by two gaseliers,

instead of the ordinary burners. The size of the shop is 34 ft. long, 24 ft. wide, 19 ft. high, and fitted with British plate-glass of very large size. The architect was Mr. Martin Greener, of Sunderland and South Shields. Messrs. Wright & Son have just given a dinner to a number of friends and the workmen who had been employed in the construction of their new premises. The party numbered about 100.

Upwell.—The new Public Hall has been opened by a conversation. Upwell contains a gas company and erected gas-works; this year they formed another company, and so raised funds for building the public hall, with the idea that by supplying it with books and newspapers, the delivery of scientific and moral lectures, the young men might be kept out of the public-houses, and their minds instructed by rational amusement; it is also designed to impart sociability among the upper and middle classes, too little known to each other by reason of the scattered nature of the ten farms and the indifferent roads. Concerts, balls, tea-parties, &c., in the Public Hall will bring together the persons now isolated; angularities will thus get rubbed off, and friendships be formed for the general benefit of all. Mr. C. V. Townley presented the site, which is near the church. The new building has been erected by Mr. William Elworthy, of Upwell, from the design of Mr. R. Reynolds Rowe, F.S.A., of Cambridge, the Isle surveyor. The style is Italian; the walls are of the local bricks, with dressings and arcading in red and black bricks. The hall is 60 ft. long by 30 ft. wide in the interior, and is covered with an open-timbered roof. Arrangements are made for the erection of a gallery opposite the platform, when needed. There are retiring and cloak-rooms; and the rooms are all lighted with gas.

ROAD-MAKING.

Sir.—As a Road Surveyor, horn and bred in it, my father having been one of M'Adam's pupils, I have again and again noticed the extraordinary ways surveyors, and especially the surveyors in London, have of making and repairing roads. I can account for it in no other way but that commissioners appoint men not really qualified to undertake the duties of their office, and, in fact, whether they be town commissioners or highway boards, the appointment is gained, for the most part, by local influence, and not by the personal qualifications of the candidate. There seems to be however, generally speaking, better management not only in the election of surveyors, but in every other matter, by turnpike trustees, whose offices are now being so rapidly abolished, they being better educated, and filling superior positions in life.

I think it is wrong to place a thick metalling on roads, for these reasons:—It is far more expensive than a thin coat, as more stone is required. People are too fond of applying the epithet "good" to a thick coat of stones. A thick coat will take longer to settle than a thin; each separate stone forming "the coat," requires a matrix before it can settle; if therefore stones are spread thickly, they have no matrix whatever, and before they can settle, they must wait until a large portion of the coat is pulverised, which pulverised matter then acts as the matrix for the stones. A thin coat, on the contrary, being spread on the soft road, at once finds its matrix by the mud of the road, or by the pliability of the road itself; the individual stones in a thick coat will by attrition rub themselves nearly round,—at any rate, lose all the sharp angles caused by the fracture, thus adding to the length of time the coat will take to settle, as a sharp angular stone will find a bed for itself quicker than a round or rounded stone. A thick coat will not wear in evenly; it will wear "pitty" or "bunchy" because it cannot be kept raked properly: it is more expensive to keep raked, for the longer it takes to settle, the more attention it requires. Then a thick coat does not last as long as a thin coat; for in a thin coat each individual stone sinks at once into its matrix, and one of its faces only is exposed to friction of traffic, while in a thick coat much is wasted in attrition; it settles, and then, after all, it does not settle so "sweetly" as a thin coat. The sooner a coat of stone is settled, the longer it will last, and of course the less expensive will it be; for that reason alone, a thin coat is preferable.

Another objection to thick coats is, that laying periodically an embankment on roads of 6 in. of metalling soon makes the road higher than the trottoirs.

I consider that a coat of stones is of sufficient thickness if one stone touches the other with an extra scatter in the centre of the road to bring it up to the proper convex form.

Regarding the letter to you signed "B. Baylis," I challenge the writer to point to a single spot, either on "town roads" or "suburban roads," in which 6 in. of metalling are required. It is downright cruelty to put on such a coat, whether in once or twice,—cruelty to the ratepayers, cruelty to the owners of carriages and horses, and cruelty to the poor horses themselves.

Mr. Baylis advises the coat to be covered "with a good [] coat of binding material, clean gravel, or screenings of metalling," that implies the metalling he uses is screened. What is the use, where is the advantage, of screening the metalling, and then putting the screenings back again amongst the stones when they are spread?

He has "grave doubts" as to whether macadamized roads are indispensable: I entreat him to get up by the side of the driver of the first bus he sees, and ask him which he likes best to drive over,—a steined road, or a paved road; and which his horses like best. Nay! I entreat him to watch for himself, and he will see horses on a paved road stepping with short, timid steps, slipping about (falling down perhaps), and profusely sweating; and on a metalled road he will see the same horses stepping out fearlessly, tossing their heads, masters of their work.

The difference in expense, too, is immensely in favour of a metalled road. I say nothing as regards the difference of comfort to the inhabitants of the street in less noise.

Raking the coat is very important, only skilful men should be employed; for if a coat of stones be not kept with as level a surface as possible, how is it possible to have a level face when it has settled? But before the coat of stone is put on, there is first a considerable outlay generally incurred by "lifting," why I cannot see. Mr. Adam introduced "lifting" because, before he began with the roads it was the practice to repair a road with stones broken as big as a man's two fists, and not to pay any further attention to the coat after it was on. "Well," Mr. Adam said, "there is such an immense depth of stones, that I can repair these roads and make them smooth and well-shaped simply by lifting" them, breaking the "lifted" matter so that it shall go through a 2½ in. ring, and then re-coating the road with it, taking care to keep it raked well." And he did what he said he could do; on the strength of that, and because the roads under Mr. Adam's care got so much improved, surveyors went on lifting, lifting, lifting,—they are lifting now,—and, upon my soul! I believe they will go on lifting when you and I, sir, are not. What their reason is for this expensive process I have again and again asked, but I have obtained no other answer than "Oh! it is all very fine for you not to do it, but it has always been done here, and I shouldn't fancy a coat without." My father stopped lifting after his roads got into shape. He never lifts now (unless, of course, the road is out of form); and I never lift, except when it is to form a road made by surveyors who thought big stones, and plenty of them, necessary to make good roads. If the road is left until the winter comes in, frost, rain, and snow will lift it without costing a penny-piece, and far more effectually than any artificial means can do it. By lifting a road, a thicker stratum of stones requiring to be settled is added to the coat; the old coat, already weakened by friction, attrition, by the natural effects of its porosity, and all the rest of it, is ground to mud, or ground so small that it is comparatively of no use to the road, so the road is positively weakened by "lifting."

As to breaking, which I ought to have written of first to be in the natural sequence of things; in no case, unless of the most extraordinary character, are large broken stones admissible for road repairing. A coat of stones ought to be broken so that each separate stone can be passed through a 2-in. ring. In breaking the stones smaller, there is too large a proportion of gravel (stones broken to gravel) in the heap; breaking them larger is a waste of material; for a cubic yard of stone broken 2-in. ring size will cover more space than a cubic yard broken 4-in. ring size, a coat of large broken stone (I mean stone broken larger than 2-in. ring size) will not settle as soon as a coat of properly-

broken stone. Each stone requires a larger matrix for itself. It has, therefore, to displace a greater portion of the road's surface, and yet it has but the same force exerted on it to drive it into its place as a 2-in. stone; and as I have already implied, the longer a stone is "up" the more unfit does it become for its place, its angles will wear off, and with that its power of becoming really settled in its place. And too, a greater extent of wearing surface is presented; so unless the stone settles well it will "tip" with passing carriages, wear a too large hole for itself, and then there are mud, holes, loose stones, and all the other unpleasantnesses of a bad road. There is not either such a chance for the road settling, or "running" smoothly, as in the case of a coat of well-broken stone. It is impossible to find a quarry in which the stones are all precisely alike in the quality of durability. Then it is still more important that the stones should be broken small, for in a coat of stone in which each stone is subject to the same wearing influences, if one stone is softer than the other, the softer stone will wear first. Thus the surface of the road in this way becomes "pitted" or nodulous. And, too, in a coat of large stones, there must need be larger interstices than in a coat of small stones. In this therefore, the coat of large stones is inferior.

Another needless expense, is sifting the broken stone. I should like to ascertain why surveyors insist upon having the broken stones supplied on their roads sifted. If a road is in good order, it has but little dirt on it, even when it requires stoning: what then can more rapidly and more naturally be the means of uniting a coat of stones than the gravel found in a heap of broken stones, as the breaker leaves the heap? The gravel in the heap acts as a sort of concrete for uniting the stones. Brush a road after wet weather that has been made of large sifted stones, and you will find you can push the blade of your knife into the interstices. Mr. Hickey, the well-known surveyor of Truro, in Cornwall, not only puts on the stones he uses unsifted, but in addition, when the coat is partially settled, he scatters small broken grey granite over it, the granite being easily broken by a passing wheel, crushes into gravel, and acts as an additional means of getting the coat rapidly settled; and, what is very valuable, he finds that a coat so metalled will not "break up" in the summer. Pro.

Sir,—In answer to "Z. Y. Z.," upon road-making or repairing, I partially agree with Telford's system. There can be no possible doubt that the laying on of equal-sized stones, free from extraneous matter, is correct, as whatever is of a softer material naturally works up to the surface. My experience is, never allow your road to be so far neglected as to form ruts, but the loose stones carefully drawn to the crown of road, and this done by an experienced man, if you want a smooth surface instead of a patchy one. I also find placing layer upon layer does not answer, for the simple reason, if you allow the surface of road to be worn partially smooth before laying the required extra coat or covering, the stones are not thoroughly bonded together. My practice is, never allow your road to get into that state of neglect as to require 4 in. or 5 in. to be laid on at one time, as a stitch in time, &c.; but lay them on at the proper road-repairing time, keeping the centre well up, so that the road may drain itself dry, the channels open, and the water got rid of as quickly as possible. If these simple matters were attended to, a great saving of labour and materials would be the result.

JOHN MCLINNAM,
Surveyor to Parish Board of Health.

HAVING devoted much attention to the subject of making and repairing roads, I consider the system introduced by Mr. Adam very much superior to that practised by Telford, both as regards durability and economy in their construction and maintenance.

In making roads according to Mr. Adam's system, no pitching or rough set pavement for a foundation is necessary, as an average depth of from 9 in. to 10 in. of broken stones is sufficient for any road. All the stones should be broken sufficiently small to pass through a ring 2 in. in diameter.

In my practice I have the formation properly drained and well rolled before laying on the material, which consists of broken stones 10 in. deep in the middle and 8 in. deep at the sides, the surface of the road being segmental in form,

with an inclination of half an inch to a foot from the crown of the road to the side channels. The broken stones are laid on in three separate coats, each coat being well raked, watered, and rolled until it has become consolidated.

On roads where there is but little traffic, a sprinkling of finely-sifted road-scrappings may be used to facilitate the setting of the stones; but this can be better effected by constant watering and rolling for a short period.

It is a matter of great importance for the stability of the road that it should be impermeable. This is difficult to accomplish when stones of irregular sizes are used, and can only be secured when the broken stones are as nearly as possible of one size, forming a compact and solid mass.

I do not agree with the practice of using gravel "binding" as mentioned in Mr. Baylis's letter in the *Builder*, as I find the smaller stones have a tendency to work downwards, and in so doing displace the larger stones.

I consider the subject of the efficient maintenance and economising materials in the making and repairing of roads is one deserving of more careful consideration than is generally given to it.

A. MORGAN, C.E.

LIGHT RAILWAYS.

MANCHESTER INSTITUTION OF ENGINEERS.

At the first meeting for the Session of the Manchester Institution of Engineers, the president, Mr. W. W. Hulse, read an address "On Light Railways," in which he considered what would be the best system for suburban traffic. This he concluded would be a 3½ ft. gauge line, unless where intended to interchange with the usual 4 ft. 8½ in. or the 7 ft. The 3½ ft., he urged, could be constructed and equipped for less than two-thirds the cost, and he maintained and worked at a corresponding reduction of expense, by comparison with the 4 ft. 8½ in. system. The 3½ ft. system is already largely adopted in Queensland, Ceylon, Norway, Belgium, and other places, and with complete success.

In designing the carriages for the local line, the 3½-ft. gauge is found to give ample accommodation. The carriage which promises to be most suitable is what may be termed of the omnibus type, with seats arranged on each side, and a longitudinal passage, say 30 in. to 36 in. wide, down the middle, with doors opening inward at the ends. The leading dimensions are 20 ft. long, 6 ft. wide, and 6½ ft. high inside. Carriages of this size would accommodate twenty-four passengers, twelve on a side, and give over 30 cubic feet of space to each. The floors of the carriages would be on a level with the platforms, and this, with the wide passage, would give the requisite facility of ingress and egress, which is one of the essentials of a local traffic, where there is a great frequency of trains. In speaking of light railways it is not intended to convey the idea that the works or rolling stock for such a system would be in any respect less substantial and durable than on the heavy 4 ft. 8½ in. system, but rather that the works, engines, and carriages would be, though lighter, sufficiently strong and durable in proportion to the reduced loads and speed of the trains, and that a closer approximation of the paying to the non-paying load would be effected.

ARCHITECTURAL EDUCATION.

ALTHOUGH I have read with great interest the various letters from "Adelphi" and others, which have appeared on the above subject in your journal, I have hitherto refrained from entering into the correspondence, in the hope that the Architectural Association would take up the subject on a more extensive scale than could be done by individual members writing to your journal. These hopes are now about to be realized, and the report of the delegates of the Architectural Association to the Architectural Alliance, which will be submitted on Friday, the 27th of this month, at the meeting of the first-named society, will contain much of the information which "Adelphi" has been in search of, and will also suggest a scheme of education for young architects, which I hope will be taken up seriously, and brought to some definite issue. I take the opportunity of calling the attention of all those who are

interested in the matter to this meeting of the 27th, in the hope that they will attend and bring forward their quotas of suggestions and information.

R. PHÉNÉ SPIERS.

P.S.—I would further add, that in future, at the ordinary meetings of the Association, frames will be hung up containing prospectuses of the various colleges and schools where lectures are given or instruction afforded of direct use to the architectural student, and also the particulars of all the honorary prizes offered by the Academy, Institute, and Association.

DANGER IN THE CEILING.

ALLOW me to call attention to a matter which I consider to be of great importance, inasmuch as it affects not only the comfort and convenience but the safety of ourselves and families.

Within a short space of time, nine instances of the plaster of the ceiling falling from the laths have come under my notice, two of which occurred to the house in which I reside. In one instance the plaster which fell was about 2 in. in thickness, and the quantity more than 1 cwlb., the ceiling being very lofty. Nobody at the time was in the room, but it is needless to say that it might have resulted in a fatal accident. As the falling in of ceilings may be occasioned by a variety of circumstances not necessarily consequent upon their being badly put up or on indifferent materials being used, I think the following or some such method might be adopted to prevent the possibility of their falling (at any rate, in very large pieces). If eyes were fixed in the wall on all sides, and strong copper wire taken across the ceiling embedded in the plaster, and here and there fastened to the joists above by staples, there would be little chance of a ceiling (unless very rotten or shaken by an earthquake) coming to the ground. F. T. ARNOLD.

GALVANIZED IRON CISTERNS AND PIPES.

SIR,—I am building a house in a provincial town, and have specified galvanized iron cisterns and pipes to be used throughout for the water service. However, the secretary of the local water company has been at the building, and said that he should recommend and prefer lead pipes being used, as their water was so very soft. The company obtain their water from the river which runs through the town, and which may receive the sewage of two small villages some distance higher up, and might therefore have a slight taint of sewage.

I have a horror of lead pipes and cisterns, and believe that galvanized iron is the most wholesome and durable material that can be used. I should be much obliged if some of your correspondents would state their experience as to the employment of galvanized iron, and whether soft water, or water with a slight taint of sewage, can have any prejudicial effect upon it.

A NATIVE OF ESSEX.

MAGNESIUM LIGHT.

SIR,—There is no difficulty in lighting a public building with magnesium if expense be no consideration. Mr. Henry Larkin, of 6, Portico-cottages, Kentish-town, N.W., lighted up a large pavilion for two nights at the meeting of the British Association at Nottingham, in 1866, and the same at the Guildhall, London, on the evening of Lord Mayor's Day the same year; and Mr. Larkin would be ready to do the same again if required. There is now a fair prospect of a reduction in the price of magnesium through some recent improvements in its manufacture, and it is probable that in the course of next year we shall see the metal retailed at or under 1s. per ounce.

W. W. E.

FORM OF FLUES.

SIR,—I shall be much obliged if any of your correspondents will give me information about the form of oval flues or chimneys. I see them recommended in various books on buildings, but can meet with no one who has any practical knowledge as to their advantages or otherwise. I am building a house in London, and shall be very glad of any early information on the subject.

STAT. VERITAS.

CASES UNDER METROPOLITAN BUILDING ACT.

At the Clerkenwell Police Court, before Mr. Ellison, Mr. William Thomas Parkins, of Belle-Vue-villas, Seven-Sisters-road, was summoned by Mr. John Turner, the district surveyor of the eastern division of Islington, for having erected a building at the rear of No. 40, Grafton-road, after the same house had been built, with walls only 4½ in. thick, the door-frame flush with the face of the brickwork, and the roof covered with boarding, contrary to the rules of the Metropolitan Building Act. Mr. Parkins not being in attendance at the time mentioned in the summons, the magistrate, after deferring the hearing until the other summonses were disposed of, then considered the case, when Mr. Turner stated the building was erected at the end of the main building of the house, between it and the dust-bin; that it was about 6 ft. in length and 4 ft. wide, and about 4 ft. 8 in. high; and that there were eleven other buildings exactly of the same construction situate at the rear of the other houses erected by Mr. Parkins in the course of the Act, when, upon his referring to the statute, he decided it to be so, and ordered that the building be amended as required by the district surveyor, or removed within the period of one month, and that 12s. 6d. costs be paid.

A second summons for a similar building at the rear of No. 2, Gloucester-road was then gone into, when Mr. Turner explained that the building in this case was larger than the former; and there were eight others similar in construction at the rear of the houses erected by Mr. Parkins in the Gloucester-road. The magistrate made a similar order and award of costs as in the preceding case.

THE FALL OF A WAREHOUSE IN LIVERPOOL.

THE inquest on the bodies of the four men who were unfortunately killed by the fall of a warehouse to Rigby-street has been closed. In the course of the inquiry Mr. Nowlands, the borough engineer and surveyor, was examined. He said the promises in question were built before he was appointed borough surveyor. The Act of 1812 would be the only authority under which the then building surveyor would be called upon to interfere in the construction of these premises. Since the accident he had carefully surveyed the building, and found it in conformity with schedule B of the Act referred to. He submitted a report upon the construction of the building, its present condition, and the probable cause of the accident. In reply to the Coroner, he said: "The condition of the girder was such as to lead him to the opinion that it had been injured before the accident. The fibre of the beam had been injured by a cross cutting and a screw bolt. There was a natural defect in the beam, but an ordinary examination of it before it was used would not have indicated its actual internal condition as now seen. The ordinary

warehouse beams were generally of much greater strength than this, and of somewhat less bearing. They were generally 14 in. by 14 in. Wooden girders,—or, indeed, girders of any kind—if constantly overworked, would gradually deteriorate, so as to become unsafe. He considered that practical good would come out of this investigation, if, as he had no doubt he would, the coroner called attention to the fact that the limit of safety on the floor in question would have been a 3-ft. load. He would suggest that those places which, like this one, were not built originally for the express purpose of warehouses should be inspected by professional architects, so as to ascertain whether they were in the limits of safety.

The jury gave the following verdict:—

"That the deceased were accidentally killed, owing to the floors Nos. 3, 4, and 5, falling in upon them whilst at work on No. 2 floor, such floors falling in consequence of a wooden girder in the 15th floor being latently faulty and defective, and so giving way under the weight of hoisted stored upon it."

Accompanying the verdict was the following presentment:—

"The jury beg to express their entire concurrence in the suggestion made by Mr. Nowlands, that warehouses, which have not been originally constructed as such, should, as a matter of safety, be inspected by a competent person; and they entirely acquit the Messrs. Wallace of all blame."

PILES IN A PEAT-BED AT TROWSE.

At the last monthly meeting of the Norwich Geological Society the principal subject of the evening was a paper read by Mr. J. E. Taylor, honorary secretary of the society, "On the Occurrence of Piles in a Peat Bed at Trowse." Some oaken piles, one of which was exhibited, have been found during excavations at Trowse for sewage purposes. Mr. Morant, the Board of Health surveyor, had written to Mr. Taylor concerning them, and both these gentlemen had investigated the subject. In their opinion there was no doubt that here were indisputable evidences of ancient "lake dwellings," or "crannoges." The excavation in question was a large deep trench, 5 ft. in diameter and 8 ft. in depth, which had been cut across a meadow at Trowse, in order to lay the pipes for conveying the sewage to Crown Point. In the space of twenty or thirty yards no fewer than thirty piles had been found, all standing erect. Each was rudely cut and pointed, and had been driven into a hard layer of gravel. Resting on this gravel was a bed of peat, 3 ft. or 4 ft. in thickness, which surrounded the piles, and contained great quantities of fresh-water shells similar to those now living in the neighbouring rivers, as well as bones of deer, horse, ox, sheep, hare, &c. The tops of not one of the piles passed vertically above the peat. Overlying both peat and piles was a bed of yellow sand and loamy clay, 4 ft. in thickness, and which was thoroughly undisturbed. The antiquity of the piles, therefore, is indicated by the fact that over 3 ft. of peat had accumulated around them, whilst the whole of the overlying sand and clay had been deposited since they were broken off or decomposed to their present level. In about 9 in. of "made" earth or surface soil, too, there were found the small roots of very large ash and willow trees, which were themselves at least 200 years old. Similar evidences of "pile buildings" were discovered in the same county, when the late Mr. Birch drained the West Mere, at Wretham, in 1851, and the Great Mere, in the same locality, in 1853, in depths varying from 8 ft. to 20 ft.

CHURCH-BUILDING NEWS.

Chaltenham.—All Saints' Church has been consecrated. The edifice has been erected from the designs of Mr. J. Middleton, of Chaltenham. It is built of Cleveo Hill stone, with Bath stone dressings. The interior is lined entirely in Bath stone, with bands of blue Forest stone. The style is Early French. The shape is apsidal, and the plan comprises chancel, chancel aisles, nave, north and south transepts, and north and south aisles, with porches to each, and a massive tower at the south-west angle. The length of the chancel is 45 ft.; the width 25 ft.; the nave is 93 ft. long and 28 ft. wide, with side aisles, that on the north side 70 ft. long and 14 ft. wide; the south aisle is made rather shorter than the other by a portion of the tower projecting into it. The chancel is approached from the nave through a lofty arch. The chancel has a

SEFTON HIGHWAY DISTRICT—WANTED, A SURVEYOR!

SIR,—I was very much gratified by the perusal of your account of the proposed doing of the Institution of Surveyors, and trust that the society will have for its main object the raising of the standards of the orthodox surveyor. This gratification, I regret to add, was sensibly increased by an advertisement in the same issue from the Board of the Sefton Highway District, setting forth their wants of a surveyor. Knowing as I do some of the gentlemen forming the provisional committee of the Surveyors' Institution, I can well imagine they, with myself, must feel ashamed at the estimate surveyors are held in by the above board.

Only to bid adieu to the profession in the summer of 1868, and to devote the whole of his time to the supervision of seventy miles of highway, for the magnificent sum of 100 guineas per annum! Surely, sir, it would be but charitable to conclude that such a man would transmute these amounts; that the 300l. should take the place of the 100 guineas, the latter sum being the surety required; otherwise my knowledge of the profession over twenty-five years assures me that the legitimate surveyor will not apply to the honourable acquaintance of Sefton Highway District Board; their choice must necessarily rest with some whose fitness to discharge the duties of the office satisfactory will be on a par with the competency thus publicly proclaimed by this board to reasonably appreciate the services of a duly qualified surveyor by their liberal offer.

The calve of this board would appear to be no better than the great Telford described to the legislature the condition and components of highway boards generally years ago. No wonder, then, at the wretched attempts at road-making and repairing so recently alluded to in your publication, when the ability to execute such works properly is held at so unreasonably low a figure as by the worthies of the Sefton Highway District Board.

REDUCED LEVEL.

PRACTICAL AID.

SIR,—I thank you for noticing my endeavours to give instruction to workmen in the building trades; but allow me to say I do not claim the professional title of an "architect." I am a builder, and though I was able to give a little instruction to young men—journeymen and apprentices, in many things that would be useful to them, and create a desire to study for themselves.

Since the greater number (?) than I had first fixed my limit at, and have had to refuse recent applications for want of room. I am pleased with my beginning, and will let you know in two or three months' time how we go on.

JOSEF B. BOWENKAMP.

* The following is the hand-bill:—"Technical Education. Mr. John D. Botwright, builder, Bangay, is desirous of giving free instruction during the winter months, every Wednesday evening, from seven to nine o'clock, at his house, to a limited number of youths and young men—journeymen, apprentices, and workers in the building trades, viz., bricklayers, carpenters and joiners, and stone-masons. The instruction will consist of the study and illustration of some of the elements of practical geometry, useful to artisans in the above trades; preparing and explaining detail and working drawings; the principles of construction, &c., &c."

semicircular apsidal termination, and is lighted by five two-light windows with carved caps, and arranged for four marble shafts to each window. These windows, it is hoped, will soon be filled with stained glass. Two have already been given by Mrs. Dobson, in memory of her late husband, for many years Principal of Cheltenham College. The roof of the chancel will be formed of wood groining, springing from marble shafts. The sanctuary arch will be placed at a point where the circular end commences, and will be supported on each side by two marble shafts. The roof of the chancel, as well as those to the other portions of the building, are intended to be decorated with colour. The reredos is designed to be of great beauty and richness, formed by an arcade of fifteen arches of alabaster marble, the effect of the three behind the altar being further heightened by filling in the spaces within the arches with glass mosaic. The chancel aisles are separated from the chancel by two arches on each side, supported by granite pillars in the centre, and respond pillars of Devonshire marble. The nave produces an effect from its height, 55 ft. The arches between the nave and aisles are supported on highly-polished red granite shafts, and at the responds, with short marble shafts, resting on corbels. The transept arches are similarly supported. The clearstory windows are large three-light windows. The west end is lighted by a large circular window and two two-light windows under it. The transepts are similarly lighted. The aisles are lighted by two two-light windows; the one at the west end of the north aisle has been completed with its marble shafts and stained glass, the gifts of a lady. This glass is by Hardman, and consists of full-length figures of Edward the Confessor and St. Alban. The roofs are supported by a series of stone arches. The architect has availed himself very largely of the blue stone found in the Forest of Dean. The arches, including those to the windows, are composed of this and Bath stone alternately, while bands of it on the plain walling relieve the whiteness of the Bath stone and make it harmonise with the richer colours of the granite and marble. The roofs are high pitched throughout, and are covered with Broseley tiles. The tower has only been built to the height of 45 ft., but is intended, with its spire, to be more than 200 ft. high. The church will seat nearly 1,000 persons. The works generally have been executed by Mr. Thomas Darby.

Accrington.—The new church of St. John here has been opened by licence for divine service. This church was originally planned to occupy the south-west corner of the plot upon which it now stands, leaving space on the side next the railway for the erection of a school at a future time; but in consequence of another plot being promised for the schools by Mr. Peel, the church was placed in the centre of the plot, and the late Rev. G. Garbett and the committee approving of the arrangement of the plan as then designed, little or no alterations were made. It consists of a nave 92 ft. in length, and 40 ft. wide in one span, the object being to avoid the obstruction of columns as much as possible, and the usual objection to a wide single span roof: a simple arrangement of the roof timbers admits of lightness in appearance, combined with strength. The wood is stained and varnished, and the space between the spans coloured blue. There are two transepts, each 26 ft. wide and 21 ft. deep, separated from the nave by stone arches in a single span, springing from the caps of half circular columns on each side. On the north side of the nave is a porch, and at the south-west corner is a baptistery in the lower part of the tower, and having arched openings into both the nave and side aisle. There is one side-aisle occupying the space between the tower and south transept, 39 ft. 4 in. long by 12 ft. in width, and separated from the nave by an arcade of three equilateral arches. The chancel, which is approached in the centre by two steps from the nave, is 29 ft. long by 19 ft. wide, having on the north side the vestry, and on the south the organ chamber, which is open by arches both to the nave and chancel. The lower portion of the reredos has four buttresses, having the three spaces between filled with moulded stone panels, laid with encaustic tiles, and the upper part is divided into three arched panels (intended by the architect to be filled with marble mosaic) by green marble short columns, having carved caps and moulded bases, with bands of white marble, the whole supporting a moulded cornice at the level of the window sill, and having the spandrels of panels filled with tiles. The east window has

three lights, with cusped opening in the head above, enclosed within an arch, over which, in illuminated letters, on a coloured band, is the text, "Holy, holy, holy, Lord God of Hosts." The window is a memorial one, in stained glass, to the late Rev. G. Garbett, the centre light having, under an ornamental canopy, a figure of Christ, and under similar canopies on one side are figures of the Virgin Mary and St. Peter, and on the other St. John the Evangelist and St. Joseph, with the emblems of each underneath. Externally, the church is of plain and simple detail, nearly all label moulds and other moulded work having been objected to at the commencement of the work, as likely to add unnecessarily to the expense. The general architectural effect of the building was therefore sought to be obtained from the arrangement of the plan, so that the church, approached from Burnley-road or from Dowry-street, should present a well-grouped effect, and give a broken and picturesque outline. The lofty has coupled arches on all sides, filled in with slate louver, ornamentally cut on the outer edges. Above this the tower has a cornice, surmounted at the angles with pinnacles, taking the form in the lower part of circular stone columns, with caps and bases. From here the spire rises in an octagon form, having plain hands of stone at intervals; this method of breaking up the plain surfaces of walling being adopted throughout the exterior, together with the arches over the windows, &c., being composed of alternate plain and pick-faced stones. The roof is covered with alternate bands of cut and plain slating, in two colours. The ordinary leaded windows with small panes are superadded in this church, by the architect having introduced zinc frames, forming a network of geometrical tracery, the bars being nearly as light in appearance as lead-lights, but much stronger, and requiring no saddle-bars to interfere with the design, and having the further advantage of being able to be glazed like an ordinary window-frame. The whole are glazed with $\frac{1}{2}$ -in. plain rolled plate,—transparent, but not transparent. The whole of the internal fittings are of varnished pitched pine, from the architect's designs. The heating is by water circulating in square pipes, which run round and are level with the raised floors of the open benches; the boiler, &c., being placed under the floor of the baptistery, with an approach from the outside. The lighting of the nave and transepts is by brass standards of nine burners each, the chancel by two corona standards and two brackets, and the side aisle and remainder of the interior by wall brackets. The masons' work was executed by Mr. John Riley; the joiners' work by Mr. William Roberts; the slating and tiling by Mr. Richard Holden. Mr. Henry Macanlay, of Accrington, was the architect.

Sheffield.—The foundation-stone of St. Mark's Church has been laid. The architect is Mr. Crossland. The site has been given by Mr. William Butcher, and lies immediately behind the present temporary iron structure.

Bolton.—Holy Trinity Church, Bolton-le-Moors, has been re-opened after an interval of several weeks, during which extensive alterations have been effected. The old pews have been replaced by others, but they do not extend so far eastward as the old ones. In the two eastern bays of the nave is a chancel-like arrangement. The floor is raised three steps, and laid with Maw's ornamental tiles. The chancel-fittings are of pitch pine. No part of the main fabric of the church has been touched. New gas organs, with a few brackets and standards, take the place of the old and shabby gas-fittings. The church has received some coloured decoration. The ceilings are a soft blue, and in the centre of each of the fourteen nave panels is an ornamental medallion, two devices being placed alternately. The walls are of a cream colour, and the mouldings, cornices, and other parts are slightly touched and relieved with different colours. The baptistery has somewhat more ornament and colour. The fittings were all prepared before the workmen entered the church. Mr. W. Clark, of Manchester, was the joiner employed. The tiling was done by Messrs. T. Dale & Son, and the painting and decoration by Mr. B. Park, of Preston. The architects, from whose designs and under whose superintendence the whole work has been executed, are Messrs. J. Medland Taylor & Henry Taylor, of Manchester.

Ryton.—Mr. J. Walford, J.P., of Trengo Castle, Ross (and the largest landowner in Ryton), gave the money for executing the work in

a new font for the church; and the architect, Mr. H. Percival, gave the design and the working drawings, and saw it erected. The font was executed by Mr. Bonebill, of Manchester, carver, &c.; it is done in Bath stone and marble shafts, on York stone base.

Bicester.—Ambrosden Church, which has been undergoing a repair, has been re-opened. The restoration has been superintended by Mr. C. N. Beazley, of London, and the work has been executed by Mr. Lewis, of Bicester. The cost of the restoration is 1,400l.

DISSENTING CHURCH-BUILDING NEWS.

Market Weighton.—A Wesleyan new chapel has been opened here. It occupies a site near to the old chapel, having a frontage to the principal street. The building is designed in the Italian style by Mr. Wm. Botterill, of Hull, architect, and externally it is executed in white stock bricks, with dressings of stone from the Harehill quarries. The principal elevation exhibits three compartments (in which are placed the doorway and window openings), divided by pilasters with moulded bases and carved capitals. The central arch connecting the pilasters rises into the gable, which is finished with a modillion cornice and ornamental apex. The side elevations are also divided by pilasters and arches, with two tiers of windows, the one below and the other above the galleries. There is a low flight of steps to the entrances in front of the chapel, with vestibules to communicate with the aisles on the ground-floor, and staircases to the galleries, which are on three sides of the building. Internally, the dimensions are,—length 51 ft., width 34 ft., and height from the floor to the ceiling 30 ft. At the further extremity of the chapel is a back entrance, with ministers' vestry, and staircase communicating with an organ chamber or recess above the same. The pews and other internal fittings generally are of red deal slightly stained and varnished. The ceiling of the chapel is divided into moulded panels, with ornaments in the centre, and surrounded with a denticular cornice. The lighting is by gas pendants from the ceiling, and the warming by hot-water apparatus. The accommodation provided is for nearly 400 persons, and the cost will be about 1,600l. The bricklayers', masons', and plasterers' work has been executed by Mr. R. Pape, of Beverley; the carpenters' and joiners' work by Mr. James Jackson, of Hull; the plumbing and glazing by Mr. H. H. Law; and the painting and varnishing by Mr. James Richardson, both of Market Weighton; the slaters' work by Messrs. T. Smith & Co., the gasfitting by Messrs. Stones, Suttle, & Wilkinson, of Hull; and the heating apparatus by Messrs. A. M. Perkins & Son, of London.

St. Dominic (Cornwall).—The opening of a new Wesleyan chapel at St. Dominic, took place on the 22nd ult. The building is a simple Gothic structure, suited to the locality in which it is placed. The materials used in its construction are local stone, with granite quoins and Polyphant stone for columns of main entrance, &c. The chapel will accommodate about 200 persons, and has been erected at a cost of 500l. A schoolroom and other buildings will be eventually added. Particular attention has been paid to the ventilation of the chapel. The contractors for the work were, Messrs. Consens (carpenters) and Pood (mason), of St. Dominic; and Mr. Henry Pearse, of Stonehouse, was the architect.

Ollerton.—We understand the deposit money has been paid for ground for a new Primitive Methodist Chapel at Ollerton. The site is in a desirable situation, being in the principal street in the town, and consists of the butcher's shop formerly in the occupation of the late Mr. Henry Turner, and the house adjacent. The building will be about twelve yards long by eight yards wide, and is to be built close alongside of the cottage occupied by Miss Elizabeth Ward: the work to commence in the spring. It is intended, when the edifice is completed, to have a resident minister at Ollerton, for whom, if possible, a house will be provided near the chapel. The chapel about to be built will make the fifth erected in twenty years.

Godalming.—The new Congregational church has been opened for divine service. There was a difficulty in regard to the foundation of the building; 2 ft. below the surface the contractors came upon a quicksand, and were obliged to concrete the bottom to keep out the damp. This

operation had entailed an expense of 80*l.* or 90*l.* beyond what was anticipated. The following details of expenditure have been given:—Purchase of land, 300*l.*; building of chapel, 1,712*l.*; tower, 200*l.*; stained glass, 78*l.* 15*s.*; railings, &c., 104*l.*; organ, 120*l.*; heating apparatus, 45*l.* 10*s.* The total cost was 2,600*l.* 5*s.*; the expense of schools bringing that sum up to 3,600*l.*

SCHOOL-BUILDING NEWS.

Earl's Barton.—The new British school at Earl's Barton has been opened. It has been built by Mr. Renshaw, from plans and under the direction of Mr. Sharman, of Wellingborough. The site of the school, with the adjoining yards, consists of 1,200 square yards, and the building has been erected in accordance with the rules of the Committee of Council on Education, by whom the plans and specifications were approved. The building is of a semi-Gothic character, and consists of one large room, an infant school, and a class-room. The school-room is 71 ft. by 18 ft., the room not being in one length, but one part of it at right angles to the other. The school is a mixed one for boys and girls, who are taught in the same room, but there are two distinct playgrounds, with swings, &c., and distinct lavatories. The cost of the site was 90*l.*, and the lowest tender was 974*l.*, the whole cost of the building, including the expense of conveyance, of architect's charges, of school fittings, &c., being 1,364*l.* 11*s.* 11*d.*

Slough.—The plan of Mr. Edgington for the boys' school and teacher's house of the proposed National School was returned with the request that a reduction might be effected so as to bring the estimate for both within 1,000*l.* This has been done, and the Messrs. Passidge, of Exbridge, will at once commence the work. Mr. Edgington's plan for the infants' school has also been adopted, and will be carried out by the Messrs. Passidge at the same rate of cost as the boys' school. The infants' school will be built adjoining the present school in Herschel-street, the latter being converted into a girls' school. The buildings in question will be made to contain,—boys' school, 140; girls' school, 100; infants' school, 80. The boys' school and teacher's house will stand on the piece of ground which lies at the junction of Hencroft and Osborne streets. The National Society have made a grant of 160*l.* towards the new schools and teachers' houses at Slough and Chalvey, and the Government Council of Education have made a grant of 205*l.* to the building fund for the Chalvey schools and teacher's house.

Elmley Castle.—The foundation-stone of new schools at Elmley Castle has been laid by Lady Pakington, who for many years past has done much to promote education in this village, where she possesses considerable property. Mr. Rowley, of Walsall, architect, furnished plans, which were accepted. The site upon which the building will be erected is an eligible one, at the entrance to the village, and within a few minutes' walk of the church. It is intended that the structure shall be a blending of the domestic Gothic and Tudor in style, and of brick with stone facings, and oak ornamentation. It will consist of school, classrooms, and mistress's dwelling, on the Government plan, together with garden and playground. Lady Pakington has given 500*l.* to rear the edifice, and promises 50*l.* more if required.

Books Received.

Macdonald's History of Dumfries.

THIS is a useful and carefully-written, although somewhat over-voluminous, account of the ancient and royal Border burgh, together with its surrounding relations. There is, however, no doubt of the general attractiveness of the subject. Our readers will, perhaps, remember that we printed some articles on Dumfries and the neighbouring district of Annandale in the *Builder* two or three years ago; and those who are interested in the subject, and care to pursue it, will find some very good material in the present volume. The only quotation we can find room for is one which gives us an account of the Domestic Architecture of Dumfries during the period of King Robert the Bruce:—

"All the houses in town or country, except those occupied by barons, were built of wood or clay, roofed with straw or heather. 'Generally,' says Tytler, 'we connect the ideas of poverty, privation, and discomfort with a

manion constructed of such a material [as timber]; but the idea is a modern error. At this day (1829) the mansion which Bernadotte occupied as his palace when he was crowned at Drontheim,—a building of noble proportions, and containing very splendid apartments,—is wholly built of wood, like all the houses in Norway; and, from the opinion of the Scottish burghers and merchants during the reigns of Alexander III. and David II., there seems good reason to believe that their mansions were not destitute either of the comforts or what were then termed the elegancies of life.' For ages afterwards this perishable material continued to be put to the same use. Streets so formed could easily be destroyed by an enemy; but then they could be restored at a much less expenditure of time and labour than if stone had been employed. The Dummies of Bruce's day was a town of timber. The freestones quarries of Castle-tykes and Locherbriggs had been partially drawn upon, but only for building the castle, the bridge, and the few ecclesiastical structures of which the burgh could boast; and stone tenements for any but the middle and upper classes were rare within it till the reign of James III. About that time houses began to be erected with a ground story of stone, and a projecting upper one of wood,—a style which continued long in favour with the burghers."

We may add that Mr. Macdonald has devoted considerable space to the subject of the old bridge across the Nith,—the pious gift of the devout Devorgilla (the foundress of Balliol College, Oxford), whose biography also constitutes one of the most interesting episodes in the History.

Historical and Architectural Notes on the Parish Churches in and around Peterborough. By the Rev. W. D. SWEETING, M.A. London: Whit-taker & Co. 1868.

This volume consists of a valuable series of notes and extracts, from registers and other documents, relating to the various churches and parishes in and around Peterborough, and is illustrated with thirty photographs of the buildings. These are rather too small for the practical architect, still with a glass even the details can be made out. But for the doubt that still remains as to the long endurance of ordinary photographs, no equally good mode of illustration could be employed. Several of the churches will, doubtless, become better known through Mr. Sweeting's very useful labours than they have hitherto been.

Architectural Foliage, adapted from Nature. By JOSEPH BARLOW ROBINSON, Sculptor.

A Series of Designs for Carved Panels, suitable for Headstones, &c. By J. B. ROBINSON. London: Bemrose & Sons, Paternoster-row.

The examples of "Architectural Foliage, adapted from Nature," in six parts, are intended for the enrichment and decoration of buildings, monuments, furniture, and other ornamental works. They include a series of designs for capitals, bosses, crockets, finials, diapers, and corbels, and show a considerable amount of taste and skill.

The designs for Carved Panels are in two parts. The designs are adapted from natural foliage, with scrolls and monograms, and will afford many serviceable hints to cemetery sculptors. Mr. Robinson has also published a cheap book of headstones and crosses, some of them meritorious.

The Feudal Barons of Powys. By MORRIS C. JONES. London: Smith, Soho-square. 1868.

POWYS, or Powis, was the ancient British name of an eastern principality of Wales, of which what is now called Montgomeryshire formed a part. The archaeology and history of this district form the chief subjects of interest to the Powys-land club, of which Mr. Morris Jones, of Welshpool, an energetic archaeologist, is one of the honorary secretaries, and the Earl of Powis, of Powis Castle, is the president. The members of the club, which is a new one, are limited to 100, and they already number eighty-seven, although the association has only been formed since the end of last year. The sale of the volume under notice is itself limited to 100, and the net proceeds (if any) will be devoted to an "Illustration Fund" which it is wished to establish in connexion with the club. The work contains an account of the Lords of Powis and the abeyant Barony; and in an appendix are the proposals, laws and list of members of the Powys-land club.

VARIORUM.

We have received No. 3 of "Sloan's Architectural Review and Builders' Journal," published monthly in Philadelphia, U.S. It contains a considerable amount of readable and instructive matter, and a number of very well executed illustrations.—The *Dombay Builder* for October, includes a view of the "Poona Engineering

College," which originated with Mr. Cowasjee Jehangoor Ready-money, who gave 50,000 rupees (justifying his name) towards the erection of the building. A number of small domed turrets and the stone cresting on the parapets, give an Eastern character to the building, securely agreeing with the roofed tower. The *Dombay Builder* says,—"The design is attributed to Mr. Trubshaw, formerly architect to Government. We say attributed, because we have been given to understand that Messrs. Paris & Molecy, who were the assistants to Mr. Trubshaw, are the real designers."

Miscellanea.

BUILDERS' BENEVOLENT INSTITUTION.—The annual dinner of this Institution, which is entitled to the support of our readers, will take place on Thursday, the 26th inst. Mr. G. F. Trollope will preside.

THE ARTISANS' DWELLINGS ACT.—The Poplar District Board of Works have taken action under Mr. Torrens's Act. Two houses in Barr's-alley, Robin Hood-lane, were reported by the medical officer as being unfit for human habitation. The Board passed a resolution ordering the landlord to demolish the houses within a period of three months.

TRADES UNIONS AND ARBITRATION.—A crowded meeting of delegates from most of the metropolitan trade societies was held at the Bell Inn, Old Bailey, on Saturday night, to consider what steps should be taken to forward the adoption of arbitration in trade disputes. It was resolved:

"That this meeting of trade societies' representatives approves of the principle of arbitration, in the belief that it is the best method of settling disputes between employers and the employed; and recommends that trades committees in their various localities seek to bring about meetings of masters and men, with the view of establishing boards of conciliation and arbitration; and this meeting feels deeply indebted to Mr. Mundella for the successful efforts he has made to establish such boards."

HORTICULTURAL BUILDINGS AND APPLIANCES.—The trade-book of Horticultural Buildings, hot-water, and hydraulic appliances, issued by Mr. T. G. Messenger (of Loughborough), will be found useful and suggestive. Mr. Messenger has some special arrangements of his own, of which he gives the following outline:—

"Upon a sill of wood, iron, or stone, as may be preferred, but usually of wood, cast-iron muntins, with bracket-heads to receive rafters, are erected. Upon these muntins rests a light plate to receive sash-bars, and carry girders. The rafters are of wood of very small scantling, so as to offer the minimum obstruction to the admission of sun-light and heat; but as any one acquainted with the strengths of timber will be well aware, such scantlings, when placed as is usual at distances of 4 ft. or more apart, are themselves inadequate to bear either the stress of snow, workmen climbing upon them for painting, &c., or even of a heavy crop of fruit. In order to obtain the required strength without increasing the scantling of the timber, these rafters are trussed with iron tension rods, which are secured to the iron muntins at foot of rafter, and to an iron saddle at the ridge, giving to these light rafters as much strength as was formerly obtained by the use of rafters 9 in. or 10 in. deep. The iron saddle, besides being available for securing tension rods, effectually connects the rafters and the ridge."

PICTURES FOR SALFORD, LANCASHIRE.—At a recent meeting of the town council of Salford, the ex-mayor read a communication from Mr. Alderman Agnew, containing the following passage:—"In taking leave of my friends I must avail myself of this opportunity of expressing my cordial thanks to them. For many years past I have occupied myself in the collection of pictures, and especially of portraits of eminent Lancashire men, with a view to bequeath them to an institution in which from its establishment I have felt the highest interest. I refer to the Royal Museum and Library in Peel Park. I ask you, my dear Mr. Mayor, to make known my desire to present this collection to the corporation at the present time for the use of the Museum. I enclose a list of the pictures herewith. If upon the occasion of my retirement from public duty the gift of this collection gives increased interest to or promotes the usefulness of the Museum, I shall see no cause of regret in the necessity there exists of my severance from my respected friends in the corporation." A resolution was passed expressing regret at the retirement from the council of Mr. Alderman Agnew, tendering him the best thanks of the council for his valuable gift, and expressing a hope that he may be long spared to witness the growth and extension of those educational and benevolent institutions and objects of which he has during a long life been a warm supporter.

ENGLISH CHURCH NEAR SMYRNA.—On the 4th of November the Bishop of Gibraltar consecrated a new church at Bordjaj, near Smyrna. On that occasion there was a repetition of the same fraternal courtesy on the part of the Archbishop of Smyrna as has been exhibited by the Patriarch of Constantinople on another occasion.

METROPOLITAN TRAMWAYS.—Notice has been given of application to Parliament for power to form tramways to run from Archway Tavern, Highgate, and Seven Sisters-road, along the Holloway-road and High-street, Islington, to the Angel, and thence through the City-road to Finchbury, Whitechapel, &c., and as far as Stratford.

BRITISH MUSEUM.—The mighty series of glass sheds, built up between the columns in front of this noble building some ten or twelve years ago, is now in course of demolition. It is not easy to say why these sheds were allowed to disfigure the building for so long a period, especially as it was generally understood there was sufficient room in the museum itself for the marbles there stowed away.

MEMORIAL WINDOW, CAMBRIDGE.—It has been resolved to obtain subscriptions in order to fill the east window of St. Michael's Church, Cambridge, with stained glass, as a memorial of the Rev. W. J. Beant, vicar of St. Michael's. Whatever surplus may remain is to be spent in establishing prizes of books, to be given to promising students at the Cambridge School of Art, to be called the Beant prizes.

THE "POLLRAD DOG."—Mr. F. T. Pollard has recently secured by patent an ingenious form of "Dog," mounted in a slide, and adjusted upwards or downwards by simply turning a hand-wheel under the bench. The hand-wheel is connected to chuck or plate, in the face of which a volute groove is cut, and a pin projecting from the "Dog" into this groove receives vertical movement from the rotation of the volute. The whole apparatus is mounted on a bracket, which is screwed to the underside of the bench. The "Dog" can be raised or lowered from the side, or from the end of the bench, and the whole is constructed so as to move quickly, and be easily adjusted to its work.

THE TOWER SUBWAY COMPANY.—The first ordinary meeting of this company, which is proposed to make a new tunnel under the Thames from Tower-hill to Southwark, for the conveyance of passengers and goods, has been held at the Guildhall Coffee-house. It was stated in the prospectus that it is intended to run a steam omnibus on a steel railway through the tunnel, to be brought to the surface by hydraulic lifts, the time of the journey to be three minutes. The tunnel is expected to be finished in eight months, and the cost is not expected to exceed 16,000. Mr. P. W. Barlow, F.R.S., one of the directors of the company, took the chair. The report having been read, the chairman stated that the prospectus of the company were excellent, and that the remuneration of the enterprise would be on a scale not generally imagined. The report was unanimously adopted.

THE VELOCIPÈDE MOVEMENT.—The French have taken up this subject in earnest, and if any one could now apply some simple and easily-obtainable motive power to velocipedes he would be certain to profit largely by it. The *Salut Public* of Lyons informs us, that in certain departments, and especially in the Aube, even the rural postman may now be seen riding on three-wheeled velocipedes, behind which is fixed a box for holding small parcels which they undertake to deliver. The men not only perform their service in three hours less time than on foot, but are able in a few months to get back the cost of their vehicle by their earnings from the increased commissions they are able to execute. In this country, too, an interest in the subject seems to be increasing. A velocipède journey lately took place, in which a person, who resides fifteen miles north of Bristol, drove and rode a velocipède, which he built himself, from thence to London, a distance of 135 miles. He left home at four p.m., and reached Reading the same night. Next morning he left for London, arriving at ten a.m., scarcely at all fatigued by his long journey. Residents in suburban and out-of-the-way places near London, who have daily business in town, might have healthful exercise and be independent of railways were they to use velocipedes. The vehicle would soon repay its own cost.

WEST LONDON DISTRICT SCHOOLS.—The second premium has been awarded to the design submitted, in competition, for these proposed schools at Ashford, Middlesex, by Mr. R. H. Burden.

FEVER IN BELFAST.—During the month of October, eighty-seven cases of fever in Belfast were reported to the Sanitary Committee. This is a slight increase, but the health of the town generally is said to be good.

ANOTHER EXPEDITION TO THE NORTH POLE.—Doctor Petermann has received official information from the Geographical Society of New York that the United States intend to send another exploring expedition to the North Pole. England ought not to give up.

COMMERCIAL TRAVELLERS' SCHOOLS.—Two new wings, at a cost of about 6,000*l.*, have been added to the Commercial Travellers' Schools at Pinner. At a luncheon, which subsequently took place in the dining-hall of the institution, it was announced that the day's subscriptions, with 1,200*l.* previously received, amounted to 5,000*l.*

DEATH OF MR. WM. THOMAS.—We hear with regret of the sudden death of Mr. Wm. Thomas (successor to the late Mr. C. H. Smith). Mr. Thomas was well known for his practical experience in all matters connected with stone. He was intrusted by her Majesty with the superintending of the Prince Consort's Mausoleum at Windsor, now in course of completion under Mr. A. J. Humbert. The consideration of the Queen was marked by the attendance at the funeral of one of her Majesty's private secretaries.

WEST SURREY WATER-SUPPLY.—Notice has been given of an intention to apply to Parliament for the incorporation of a company for supplying with water the towns of Walton, Weybridge, Chertsey, Byfleet, Cobham, and Shepperton, in Surrey; Walton and Shepperton, in Middlesex; and the districts and places adjacent to these towns, and for other purposes. The water is to be taken from the Thames and from various springs and brooks, and led into reservoirs, whence it is to be taken by conduits or lines of pipes to the respective places to be supplied.

IMPROVED GOVERNMENT FOR THE METROPOLIS. With the view of early action in the new Parliament, on the now most urgent question of the government of the metropolis, the Metropolitan Municipal Association have given the requisite Parliamentary notices for their bills to establish municipalities and a corporation for London, with the intention of proceeding, at the earliest opportunity the forms of Parliament will permit, in their discussion. It is anticipated other schemes will be proposed, and that the Corporation of London will have taken preliminary evidence by the committee of the Corporation appointed by the Court of Common Council, with a view to a definite policy on their part, and in view of the imminence of some decided action on this all-important question.

OPENING OF A CORNISH BARROW.—A barrow on Tredinney-hill, six miles west of Penzance, has been opened. The barrow is nearly a complete circle, with a diameter of 38 ft., enclosed by an outer circle of large granite slabs set on edge. A trench having been sunk in the middle of the mound, to a depth of about 18 in., the explorers came to a large pile of granite rocks, heaped together promiscuously. The course of one of these, which sloped in an easterly direction, at a distance of 7 ft., was followed, and led to a flat stone, 3 ft. by 2 ft. On raising this stone the rim of an urn was seen, filled with fine dark earth, and further exploration proved that this was one of the ancient Celtic kists, and one which has turned out to be unique in the district. Instead of being formed in the usual way, of four stones set on edge, it was constructed of two stones to each wall, the upper one slightly overlapping the other in such a manner that the urn, which was placed mouth downwards, was tightly wedged in. The only other kist of this description ever discovered in Cornwall was at Gwiltian, in 1741. The urn is ornamented round the upper part by three hands of rude irregular indentations, which extend over four knobs or handles protruding from the sides. The style of pottery is rude, and the vessel is not well baked. It was filled with human bones, very much less burnt than those found on previous occasions, and identified as those of a woman.

FIRST STONE LAYING.—On the occasion of laying the first stone of a residence in the Finchley-road, the owner, Mr. A. J. Woodhouse gave a dinner last week to the *employés*, sixty or seventy in number, of Messrs. Mather & Read, by whom the house is to be built, Mr. Mather presiding. In the course of the evening attention was called to the gradual prevalence of a better feeling between employers and employed than did exist, and to the growing conviction that a mutually conciliatory policy was the best adapted to the interests of both.

TENDERS.

For building chapel-of-ease, Hollybush Castle, Morton, Worcestershire (portion of materials given). Mr. Fredk. Freedy, architect:—

Inghes	4738 0 0
Wall & Hook	652 0 0
Garbutt	632 10 0
Ivwood	597 0 0
Griffiths	583 0 0
Smart	583 10 0

For rebuilding north aisle and restoring part of Yellin Church, Huntingdon. Mr. Fredk. Freedy, architect:—

Thackray (accepted)	£613 0 0
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For putting new roofs and attics to Slubbing House, Maidenhead, for Mr. H. D. Skrine. Mr. Fredk. Freedy, architect:—

Silver (accepted)	£1,180 0 0
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For pipe-drainage at Greenford, for the Board of Guardians of the Brentford Union. Mr. J. Figg, surveyor:—

Floy	£135 0 0
Bell	129 0 0
Batley	119 0 0
Brandsen (accepted)	113 0 0

For brick-drain, &c., at Honslow, for the Board of Guardians of the Brentford Union. Mr. J. Figg, surveyor:—

Hirons & Porter	£250 0 0
Nias	150 0 0
Burchett	115 0 0
Brandsen (accepted)	113 0 0

For building a dwelling-house on the British Estate, Horsaey, for Mr. W. Chapman. Mr. C. W. Horne, architect. Quantities not supplied:—

Tull	£465 0 0
Storer	395 0 0
Taylor	365 10 0

For the erection of a public-house, stabling, &c., Acton-lane, Acton, W., for Mr. Wm. Williams. Mr. Edward Monson, jun., architect. Quantities supplied by Mr. D. W. Young:—

Harding	£1,585 0 0
Messrs. Chamberlain	1,339 0 0
Adamson & Sons	1,328 0 0
Wright (accepted)	1,200 0 0
Welch	1,195 0 0

For model dwellings, Grosvenor-mews, Bond-street, for the St. George's Parochial Association. Mr. R. H. Burden, architect. Quantities supplied:—

Morris	£445 0 0
Patman & Fotheringham	2,875 0 0
Fish	2,690 0 0
Gammam & Son	2,685 0 0
Longmire & Burgess	2,643 0 0
Stoner (accepted)	2,615 0 0
Keyes & Head, too late.	

For alterations and additions to the parish church of Raibon, North Wales. Mr. B. Ferrey, architect. Quantities supplied:—

General Works.	Porches.
Black & Readie	£3,300 0 0
Higham	3,150 0 0
Yates	2,891 0 0
Dove, Bros.	2,795 0 0
Chester	2,593 0 0
Potter	2,430 0 0
Williams	2,218 0 0

For new baths, Cowes, Isle of Wight. Mr. James Woodman, architect. Quantities supplied:—

Chinnock	£4,965 0 0
Nightingale	4,567 0 0
Winchell	4,450 0 0
Stephens	4,100 0 0
Thomas	3,903 0 0

For alterations and additions to No. 15, Hereford-road, Bayswater. Mr. Wilson, architect:—

Blease (accepted)	£248 0 0
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TO CORRESPONDENTS.

Engineer Competitors for India.—A rejected candidate requests us to insert copy of a letter addressed by him to the Secretary of State for India. Were we to do so it would simply cease to justify the position.

July's Window.—Next week.

F. A.—J. P. St. A.—W. B. S.—H. L.—W. W.—J. G.—H. E.—Amateur.—M. T.—D. W.—G. M.—A. S.—A. B.—W. H. L.—C.—J. F.—P. W.—A. H.—W. G. S.—E. M.—F. S.—R. H. R.—J. P.—W. F. N.—J. T.—W. T.—P. H.—E. B.—J. S. (what is the object of the company, and how has the profit been made?)—Q. E. D. (ought certainly to be allowed to omit date his work by adding the gages' hat, of course, has no power to control his employer's will.—M. B. K. (nearly excavated first).—W. M. Jan. (letter is an advertisement).—J. G. W. (next week).

Country newspapers should be marked.

We are compelled to decline pointing out books and giving addresses.

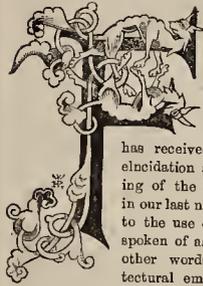
All statements of facts, lists of Tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

The Builder.

VOL. XXVI.—No. 1347.

Moulded Brickwork, or Terra-Cotta.



EV subjects can offer more intrinsic interest to the architects of Great Britain than that which

has received such interesting elucidation at the recent meeting of the Institute, reported in our last number. We allude to the use of what was there spoken of as *terra-cotta*, or, in other words, to the architectural employment of clay, moulded by pressure, or by the hand, into artistic forms, and then hardened by fire. We wish to avoid, in the first instance, the exclusive adoption of a name which is not ordinarily applied to a structural material, because the most correct method of dealing with the subject is, to regard it as merely a late improvement (carried to a high state of perfection, four centuries ago, in Italy) of the most ancient artificial material of the builder. The moulding of clay, and the application of the heat of the sun to harden the object moulded, was almost the earliest art of which we have any record or relic. The separation of this art into two branches, that of the potter and that of the builder, is as yet among the undated inventions of a very remote antiquity.

So late as in an Egyptian tomb of the eighteenth dynasty, we find representations of the fabrication of vases without the use of the wheel. Thus the application of this simple implement, the use of which gave a distinct artistic position to the manufacture of utensils, as separated from the manufacture of bricks, can hardly be carried back with certainty to a date much more remote than 3,000 years.

In a monument erected during the reign of the same eighteenth Egyptian dynasty, we find a representation of the whole process of brick-making. It was carried on almost precisely in the same manner as it is with us in the present day, with the sole exception of firing. The mixing of the clay, the fetching water in a bucket from a pond, the moulding in a wooden mould (with a fixed head, wider than the mould itself, instead of our present strike-stick), the carrying of the bricks suspended to a sort of yoke, and the setting them in order to dry,—all these things were done in Egypt 3,000 years ago, with a precision of which we have distinct contemporary testimony.

The step in the manufacture of brick which first converted a temporary into a permanent building material, was the substitution of kiln-drying for sun-drying. Exact date may here again fall on us, yet we are not without some chronological information on the subject. The brick-kilns near Pharaoh's palace at Tahpenes are mentioned in the book of Jeremiah. The Egyptian monarch referred to was Ouaphris, the Apries of Herodotus, and the Pharaoh Hophra of Scripture, who reigned at Sais from 588 to 569 B.C.

Again, there is such a reference to a furnace in the Book of Daniel as to lead to the impression that bricks were burned at Babylon in the reign of Nebuchadnezzar, which was partially contemporary with that of Apries.

The bondage of the Israelites in Egypt is spoken of as passing through the "iron furnace." Here, again, it is rather inference than direct proof which points to the use of the kiln.

But in the British Museum we have the actual bricks of Nebuchadnezzar, Nabonadins, and other Chaldean and Assyrian kings, fired to a hardness that has resisted the tooth of time for twenty-six centuries, and stamped with the names of the great kings in whose works they were employed. These Assyrian bricks were, more properly speaking, tiles, varying in square dimensions from 15 in. or 16 in. downwards, and running about, or under, an inch in thickness. The most ancient monarch whose name has yet been deciphered on the Asiatic bricks is that of Uruck, whom few will doubt to be that same Aricoh, king of Ellasar, who was contemporary with Abraham. Thus we have in our museum a signed piece of *terra-cotta* (baked earth) more than 4,000 years old.

The next ancient form of brick with which we are familiar, not only from the study of foreign architecture but from that of Roman work in this country, is only a reduction of the Assyrian brick or tile, of which, indeed, the later specimens are smaller than the earlier. The Roman brick was a thin tile, laid generally in three courses, in excellent lime cement, as a bond in honeycomb (*opus reticulatum*), rubble, or other work. The Italian building brick of the present day is very similar to the ancient Roman form; and in those parts of Italy where tufa forms a cheap and readily-available building material, *maltona*, or brick, is considered as the nobler substance, as being less liable to injury from weather. Little, if any, progress has been made in Italian brickwork since the times of the earliest specimens.

Of the English brick,—its price, its hardness, its ugliness, its durability,—it is unnecessary here to speak. With the exception of certain kinds of fire-brick and face-brick, the present form, colour, and workmanship of our bricks are such as to justify the language of the architects who speak of brick as "a low material." The elevation of this form of material, by the application of careful manipulation and of artistic form, is the object of what may almost be called the *terra-cotta* movement.

The object, then, of architects and of manufacturers is, to produce that union between the structural and the decorative treatment of burnt clay, in order to its use as a building material, which will result from the combination of the work of the potter with that of the brickmaker. That the plain portions of a building should be constructed of square and simply-moulded bricks, relieved in proper proportion by more elaborately wrought work, of similar, but more carefully prepared material, is a proposition so simple and natural that our only wonder on the subject must be that it has been so long unrecognised as an object to be constantly sought by the builder.

When the important question of durability is raised, the first consideration to bear in mind is, that of the known antiquity of brickwork. Further, we are aware that, of all human work, that which is apparently the most indestructible, except by violence, is the rudest form of earthenware. The lamps, the vases, the pitchers, of the earliest Italian tombs, are instances of this durability. In the debris of ancient ruins, amid the 70 ft. of fragments that hury the base of the Haram walls, at the bottom of Swiss lakes, deep in the alluvial deposit of the Nile mud, discoverers are continually stumbling on pieces of ancient earthenware. If an urn can be made to last for four or five thousand years, why should not a cornice or a column?

In fact, so far from there being any cause to fear for the durability of clay mouldings, when properly mixed, tempered, and fired, there can be no doubt that such a material is far more

enduring than almost any natural substance. Mr. Page called the attention of the Institute to the weathering of Waterloo Bridge; and, on a recent examination of that graceful structure, we made a similar remark. The slow decomposition of the felspar, has given a granulated face to the wrought granite. In the present stage of decay, the appearance is highly picturesque. But it is clear that granite will not be eternal in the atmosphere of London. Marble is more rapid in its disintegration. Bronze itself is not able absolutely to resist the tooth of time; and, in all these materials, *ce n'est que la premier pas qui coûte*. It takes far less time to convert a slightly decayed surface into a deeply decayed surface, than it does to effect the first lodgement for the process of dilapidation. What is the ultimate result of the process may be seen on the sides of Vesuvius. The lava which, as we write, is pouring in a fiery river from the cone of the volcano, solidifies into a stone, which is harder than granite. Blocks of this stone may be seen at any time in process of being quarried from the site of ancient lava streams. The streets of Naples are paved with this material. So were the streets of Pompeii two thousand years ago. But many parts of the side of Vesuvius are covered with vegetation; and the soil which now supports the vine or the fig-tree, is nothing but lava disintegrated by time.

For this important question, therefore, of durability, the only thing that remains uncertain is, the best selection or admixture of material. On this point the main difference of opinion lies between the use of a mixed substance, one of the constituent parts of which should, when the whole is fired, act as a flux; and the employment of a simple fire-clay, or the protection of the surface of a homogeneous clay by a glaze, applied by means of a second firing. In addition to these two principal types of work, our readers may have observed, a fine, pure, red clay from South Devon was shown to possess very high qualities as a plastic material. As to its durability no evidence was given.

The point, however, which, as it appeared to us, was left out of sight was this. What is the exact chemical constitution of the most indestructible *terra-cotta*? The most successful modern manufacturers rely upon "rule of thumb." The scientific speakers dwell on the advisability of well-directed experiment. But to take a rude Etruscan vase, of the coarsest description, and to ascertain by exact analysis of what it actually consists, seems to us to be the first desideratum.

In all descriptions of pottery, except in such as consist of pure homogeneous clay, fragments of older material of the same nature (burnt, of course), crushed to powder, form an important element. The process of haking has produced an ascertainable chemical effect. It is important to know what that effect is. When we know exactly what old stoneware chemically is, we shall be in a position to ascertain what part its fragments play in the paste we are to-day mixing. When we know what we have, we shall know what we want. We shall then, there can be little doubt, be able to attain this in the most direct and simple method. Let it be known what is the constitution and what are the conditions of indestructible pottery, and we shall be able, with little question, to produce indestructible *terra-cotta*.

Of the architectural value of this knowledge it is almost unnecessary to speak. When we remember how the great desiderata of cheapness of original material, of durability (without which there is no real cheapness), and of ready facility for receiving any requisite form, are combined, or, at all events, may be combined, in *terra-cotta*, there can be no room to doubt that an immense impulse will be given to decorative architecture by its employment.

Nor are we entitled to speak of this employ-

ment as novel, or as of altogether our own invention. There is, indeed, much that is new, as well as much that is beautiful, in the specimens that adorn the elevation of the new "God's Gift" college, as well as in the floors, and walls, and columns of the Kensington Museum. But let the architect recall the noble moulded brick chimney-stacks of some of our Elizabethan mansions. Let the decorator remember those ancient and honoured "Dutch tiles," from which so many, besides Dr. Doddridge, were taught Scripture history by the lips of a mother. Let us glance at the enormous *glazie*, containing the arms, and mottoes, and badges of the good King René, blazoned in their appropriate colours, which is to be seen at Kensington, as fresh as when it was moulded and fired some four centuries ago. Let the visitor to Cintra recall that fantastic apartment, floored and walled with tiles, in which converging streams of water are suddenly directed on the unwary guest. In those climates where the free sprinkling of water, whether by hand or by the jets of a fountain, is the most grateful luxury of the hot summer weather, the employment of glazed earthenware for structural and for decorative purposes has long played a most important part among the materials selected by the architect.

We do not altogether sympathise with those who expect that London is to be made "beautiful for ever" by the introduction of the glazed, polychrome, moulded, china-work, of the manufacture of which the artists at South Kensington are attaining such facile mastery. It is a very great question how far such a style of decoration is suited either to the grey tints of our climate or to the sober tastes of our people. In many cases the power to command a cheap, imperishable, obedient material, easily and indelibly stamped, at the will of the artist, not only with a certain sharpness of outline, but with a distinct variety of colour, may be of extreme value. But for long lines of street architecture, the paler tints of *terra-cotta* will no doubt be generally preferred. Nor do we think that, if durability can be secured without it, as there is every reason to expect, a high glaze is to be chosen, excepting in the case of fountains, or of work unusually exposed to the action of water. Yet in obtaining a full knowledge, and an absolute command, of a material of such wide and varied applicability, the architects of the present day are making a great stride in advance. We hope that the well-earned reward of full pecuniary success will attend the exertions of the several manufacturers who have so worthily emulated each other. There is room for them all. There will be more room, and more custom, when they have replaced the "rule of thumb" by the exact knowledge of the chemist. It is all very well for them to ask Government to aid them in this respect, but are they not competent to set their own shoulders to the wheel? However rapid may be the future progress of this latest development of one of the most ancient methods of manufacturing a structural material, the gratitude of all those who take interest in the progress of architecture is due to the men who have, whether professionally or commercially, done so much to shed on this important subject the light of practical and successful experiment.

NOTES ON ARCHITECTURAL DETAIL.*

ALL great works of art, whether in poetry, painting, music, or architecture, depend upon the elegance and proper application of detail for the realization of the effect aimed at. There is, however, in the case of architecture, this difference, that its products being utilitarian as well as ornamental, the detail must be subservient to the purpose for which the building is erected, for wherever the property of usefulness is lessened by the ornamentation there the ornament is had. An architectural work is not produced to insure a mere transitory sensation of pleasure; it is a lasting monument of the ability or incapacity of the designer, and must be treated in a serious and conscientious manner. Mere whims and vagaries may be allowed in ephemeral works of poetry and music created to please the passing hour, and even in the more perishable and less obtrusive art of painting; but in architecture they should be altogether eschewed as inapplicable to

so serious and substantial a thing as a building. Like the work of the historian, it may have the grace of style and a certain play of the imagination, but these should be strictly confined within the bounds of truthfulness and reality. This appears all the more evident when we keep in view that the works of the architect, although first produced on paper, are intended to be reproduced in the most substantial and least perishable materials, and that they cannot be pushed out of sight or destroyed without much labour, cost, and inconvenience.

The first attempts at art by a nation emerging from barbarism are invariably characterised by magnitude and rudeness of construction; but as a feeling for art grows, less attention is paid to mere bulk, and greater care is evinced in the preparation of the materials and in the endeavour to produce good proportion and elegant detail.

The architecture of Nineveh and Egypt commands our admiration for its massiveness, and consequent grandeur, more than for its beauty: it is not high art, in the truest sense of the term. There is much good art shown in parts, but the waste of labour and material is enormous, and, indeed, that it would be impossible to command in modern times, were we disposed to imitate it: we shall, therefore, pass at once to the architecture of the Greeks, whose works of art have never been surpassed by those of any other nation, whether as regards beauty of detail or elegance of proportion. And, first, I would observe, that the finest sculpture will not compensate for had proportion and inelegance of outline; accordingly we find that the Greek architect bestowed the utmost care upon the attainment of this essential of good architecture. Unity, rather than multiplicity of effect, was his constant endeavour, and every detail was subordinated to the general effect and outline of the structure; but at the same time the element of variety was called into play in the adjustment of the various parts. Thus, in the columns and the frieze, the detail is repeated, while in the pediments and metopes it is varied; in the latter the leading lines are diagonal, in the former they are vertical. Another thing to be observed is, that the hearing members do not show high relief in the ornamental detail,—that is only found in the pediment and such parts upon which the eye can rest, and where depth of shadow is obtained by the enrichments.

It is instructive to observe that the Gothic architects acted upon an entirely different principle, producing an entirely different result. Classic architecture produces the impression of repose, Gothic of unrest; the one clings to the earth, the other soars heavenwards; the one is the product of intellectual culture, the other of a spiritual faith. The Classic sculpture, although exhibiting more action than the Gothic, is characterised by greater repose. The Greek architect concentrated his forces; the Mediaevalist dispersed his; while, luxuriating in an endless variety of detail, the Gothicist gives a monotony of attitude to his sculpture, whereas the Classicist, while repeating his detail, varies the attitude of his figures; and yet the eye dwells upon the group in the pediment, and it wanders from figure to figure on the Gothic façade. Then, again, there is this marked difference between the two styles: in the Classic temple the human element is prominent, in the cathedral it is subordinated; the figures in the pediment are visible at a great distance, the saints in their niches require to be sought out; and, to complete the catalogue of contrasts, the sculptures in the Greek pediment and frieze were less conventional than those placed amongst the Gothic fretwork; whereas the foliated enrichments of the Classicist were more conventional than those of the Gothicist. Is further proof necessary of the truth that no definite rules can be made to apply to works of architecture? for it cannot be denied that the two great styles are each of them possessed of peculiar beauties, although these are obtained by diverse methods.

The detail of Greek architecture is so perfect of its kind, that there is nothing in it to censure or avoid, unless, indeed, it be the spiritless copying and misapplication of it.

Beautiful, wonderfully beautiful, as is most of the Gothic detail, there is much of it that should be avoided in our modern practice.

The architects of the Renaissance, in their endeavour to be original, abused the beautiful features of the style they professed to admire in the most senseless manner. The pediment, the crowning beauty of the Greek temple,—with its group of statuary sheltered within the triangle,—

they broke at the apex, producing one of the greatest abortions in architectural practice. I had thought that its deformity was so manifest to every one having a due appreciation of the beautiful in art that it would not have been repeated in these days of enlightenment; but it has, as you have doubtless all of you observed, recently cropped up in this city.

The complete triangular pediment, again, is sometimes used over an arch, and it only requires a glance at our Tron church to perceive how incongruous is the association. A love for littleness and friter of detail is shown also in the breaking up of the frieze into small parts, whereby all repose is lost, and a feeling of discord between that feature and the column is produced. When this practice is followed, each pillar seems isolated, and to have no other duty to perform than to air itself in front of the structure it professes to strengthen. Perhaps it supports a vase or a statue; but that only renders the absurdity more apparent: it always brings to my recollection a figure in bronze I once saw representing Atlas, who seemed to be straining every nerve to support a glass globe between his shoulders, which a Cupid could have balanced between his fingers and thumb.

There is another practice to which I cannot reconcile myself, the use of half or three-quarter columns. A column, I conceive to be a structural feature required to support a weight; and it appears to me to be misapplied when used to strengthen a wall surface. Where that is necessary, a well-developed pilaster seems more appropriate, as it is a mere thickening of the wall surface. The engaged column, again, has a disagreeably sack-on look; and this peculiarity is still more apparent when it runs up two stories of the façade. This remark does not apply to slender shafts, which are not, and do not present the appearance of, structural features.

Rustication applied to a wall surface or angle is useful where emphasis is required, by giving an impression of strength; but the reverse effect is produced when it is used in a column. It has in that position the additional fault of disturbing the harmony of the lines, and producing a feeling as if the work were unfinished. A lintel formed of one stone, and cut into to appear as if built in several pieces, is one of the most absurd shams extant; it not only weakens the lintel in reality, but has the appearance of weakness. In a *bona fide* arch the case is quite different. Rustication should, I think, be confined to the under story of a building, and never be used above a plain wall surface. In short, as I before stated, its use is to give emphasis and an effect of weight or strength, and it should, as a rule, be sparingly applied, unless there is a considerable surface of unpierced wall.

When you see a door-knocker in the shape of a leg, a bell-pull in that of a hand, a foot-scraper on which you have to clean your boots upon dragon's wings, a column surmounted by a vase doing duty as a chimney, and such like, it is a sure sign of the weakness of the inventive faculty of the inventor. And such is still the case when inverted consoles are used as buttresses, and where buttresses in miniature are carved on bench ends, and even when buttresses of any size are used where not required as a structural necessity.

Excessive relief in carving is one of the exaggerations adopted by the architects of the Renaissance,—a practice which they carried to the excess of attempting to produce perspective in bas-reliefs,—an attempt which has ever resulted in failure, and which is often productive of the most comical effects,—effects never intended by the designer.

All ornament that has the appearance of being stuck on to the wall-surface should be avoided; and such is the impression produced by festoons of fruit and flowers, which look as if hung on nails inserted in the wall, and in late Gothic a like effect is provided where shields are made to appear as if suspended in ribbons. Still more should any detail be avoided that appears ready to fall off. Some of the finest Gothic doorways have this defect. Statues are tortured into the form of the arch, and seem ready to topple from under their canopies upon those who enter or leave the sacred edifice. There is another mode of using details to which I would call your attention,—viz., the reducing of important features to infinitesimal proportions, and the opposite practice of magnifying small members into undue proportions.

I have a lively recollection of my first visit to the British Museum, seventeen years ago, when

* By Mr. W. G. Shiels. Read at the meeting of the Edinburgh Architectural Association, on November 16, 1868.

I stumbled upon an example of the former practice. I had spent some time in the narrow cell which contains the Elgin marbles, examining with a feeling of awe what I hardly comprehended. I then threaded my way amongst specimens of Egyptian art, and found myself in a corridor with a flight of steps at one end of it, the stoue parapet of which was wrought into the form of *Doric columns*, of about 2 ft. in height, surmounted by an entablature. Of all features the Doric column, with its simple dignity and massiveness of proportion, is the least suited for such a purpose. I have read somewhere that "the baluster is the most successful invention of the moderns;" and certainly no more appropriate feature can be found as a boundary to a balcony or terrace, but it should be of such a height as to be easily seen over. I once crossed a railway bridge, intended to be ornamental, as it led into the grounds attached to a mansion-house. The parapets were formed of balusters nearly 6 ft. in height, and anything more hideously ugly I have seldom beheld.

The spiral form is only assumed by those plants which require support, as in the tendrils of the vine and the branches of the honeysuckle; it is never found where there is a weight to support; and a column, when convoluted, has a weak and bizarre effect, but slender shafts and mouldings, when so treated, are appropriate and beautiful.

Breadth and simplicity may be obtained by extent of wall-surface, and by giving depth of relief to the openings; but this effect is destroyed if ornament is scattered in patches over a wide surface; it fatigues the eye, and produces a sensation of restlessness and disgust. The eye should rather be encouraged to dwell upon what is beautiful, and be drawn by a well-regulated gradation from one point to another. The distance of the ornamentation from the point of sight should also be carefully considered. The figure of a man, or of one of the lower animals, correctly proportioned, will not appear so when placed on a height, and the individual features will be indistinguishable at a certain distance; a conventional treatment and exaggeration of parts is therefore required to produce a good effect. The posture of the figure and the flow of drapery must also be restrained, especially when the statue or group is detached from the wall-surface, or appears against the sky-line. The object sought after must not be the display of the sculptor's art, but the proper adornment of the building. This does not imply that the sculpture should be of inferior design, but that it be treated in an architectonic manner.

In the sculptures of the temples and palaces of Nineveh and Egypt, we are presented with representations of the daily life and customs of the people, so that we can form a pretty accurate idea of the social position of peoples who flourished 4,000 years ago; and so has it ever been when a true and living art was practised. We, on the other hand, think it a requisite of good taste to copy not only the general form of buildings designed ages ago, but to represent scenes and incidents in which we take so little interest that we hardly trouble ourselves to decipher their meaning. Why do we decorate our Gothic mansions with men in armour and crossbowmen in trunk-hose? Is it impossible to find good models amongst our dragoons and artillerymen? Would it not be more to the purpose to give a representation of a Lord Mayor's Show upon a City Hall, than a copy of a frieze from the Parthenon? A corporation banner might be made as jolly a sight in stone, and to afford as much pleasure to many as the reality.

I doubt not that some centuries hence our dress and customs will appear as quaint to those who then strut upon this world's stage as do those of the Middle Ages to us. A true and living art can only be obtained by delineating the social characteristics of the times, and the adoption of this course will be the necessary concomitant of a new style.

In this architecture of the future, I believe that colour will form an important element, and the proper application of it is well worthy of consideration and study. It appears to me to be a mistake to introduce different materials in the construction of a wall in order to produce variety of coloured surface. This is better effected by means of inlays of marbles or encaustic tiles, and the most appropriate positions for such enrichments are the wall surface between windows, and in string courses and friezes. A moulding, either plain or enriched, and of small pro-

jection, would be an appropriate framework for these inlays. Detached shafts and columns are also very effective when executed in a rich and durable material; but in this and every other application of colour, care should be taken to avoid harsh contrasts, and a meretricious glitter or spottiness of effect.

My remarks have been somewhat disjointed and fragmentary; the subject is a wide one and would need more time and knowledge than I can command to do it justice. It is easier to advise as to what should be avoided than what to follow; each must be left to choose a path for himself, and you will allow me to conclude by throwing out a hint that it will be more to your profit if you employ the time often spent in searching out tit-bits from the works of others in designing details of your own. Study the details of every style, but copy none; a comparatively poor original is of more value than a copy of a superior work; it is only the unsuccessful artist who takes to copying; he may make a livelihood by that means, but his name will die with him. An architect whose ambition is limited to mere money-making would be better employed in a more mechanical pursuit; and I cannot help thinking that many good hutchers and bakers, shoemakers and tailors, have been spoiled to make most miserable architects. I hope better things from those I have been addressing.

SURVEYS OF SYRIA AND ARABIA.

Our readers will remember the hearty support which, on several occasions, we have given to the appeals of the Palestine Exploration Fund. While we are given to understand that this undertaking is still asking for aid, we are called on to help the promoters of a supplemental or complementary scheme for the survey of the peninsula of Sinai.

The object, no doubt, is one of importance, as well as of deep interest in many points of view. The names of some of the supporters of the undertaking, and especially of the Engineer officers who take charge of the survey, are such as to guarantee proper application of the funds which may be raised, and to promise reliable results. We do not know that the earlier explorers, our Palestine friends, claim, or wish to claim, a monopoly of the public support. Still we cannot help thinking that it would have been better to avoid such a duplication of machinery for objects so similar. There is no such immediate hurry. The accurate survey of Palestine would naturally be extended, in process of time, to the whole district covered by the description given in the Pentateuch. The wilderness of Sinai is but a portion of the land which must be delineated for our future Scripture maps. Palestine, the site or the vicinity of "Shur, that is before Egypt," Gerar, between Kadesh and Shur, the seat of Abimelech, who may, very probably, have been one of the Hyksos kings of the fourteenth dynasty; Goshen, the pastoral district, "in the best of the land, the land of Rameses;" Talpahas, where stood the palace of Ouphris, or Apries, the seventh king of the twenty-sixth dynasty; are as intimately connected with the early Hebrew history, and as much demand the careful investigation of the practised surveyor, as does any portion of the Sinaiic peninsula. What is required is, first a clear and distinct programme of the work to be done, and then, a patient, well-ordered scheme for the application of the funds, which may be forthcoming, to the orderly prosecution of the details of the enterprise.

If we have a lit here, and a scrap there,—in one case the photographer left out for want of funds, in another the naturalist omitted,—in short, if enthusiasm directs the undertaking, instead of wisar forethought, we shall fritter away our means, and disgust the public by repeated and ill-considered applications, before the real object of pursuit is attained. The field is wide and rich. Those of our readers who are acquainted with the exquisite engravings of "Forty Days in the Desert" can form some idea of what photography may do for the cave temples and ruined cities of Edom. There seems ample ground to conclude that the ruins of Repphidim, where Amalek fought with Israel, are to be traced near Wadi Feiran. Of the "eleven days' journey from Horeb by the way of Mount Seir unto Kadesh Barnes," the spot where Jordan, before the great geological convulsion that depressed the central part of its course, and formed the evaporating surface of the lake Asphaltites, fell

into the Red Sea, there seems every reason to suppose that we shall be able to recover every detail. But we think it is taking a very narrow view of the question to assume that the thirty-eight years which intervened between the "turning" of the Israelites at Kadesh, and their crossing the brook Zered, were spent in the small peninsula of Sinai. They took their "journey into the wilderness by way of the Red Sea." That this was the retracing of their steps towards Egypt, seems to be inconsistent with more than one passage of the Sacred Record. Of the eighteen stations mentioned by name as resting-places, between the time when the spies returned to the wilderness of Paran, and the encampment at Ezion Gobar, or Akaba, not a single name is that of either of the former halting-places, a fact discordant with the idea of so limited an area, for the nomadic period of the Exodus, as that which is usually assigned to it. To fix these stations, it is therefore probable that a survey and exploration, on a far more extended scale than that which is now proposed, will be necessary.

We have on more than one occasion expressed our own views as to the principles which ought to regulate the proceedings of the explorers of Palestine. While the value of such a survey as our own Royal Engineers are in the habit of executing, is very great, still, at least from one point of view, the architectural information which may be gleaned by a methodical investigation is the most important object of research. Amid the desert intervening between inhabited Egypt and the Holy Land proper, there is much of a structural character to delineate and to investigate. In Palestine itself, as we have so fully urged, the important task of identifying the exact localities of the Holy City, by the systematic tracing of the foundations of those enormous walls which yet await the persevering investigator, seems yet to be unattempted. What the case really demands, then, is not dispersion, but concentration, of effort, not multiplication of enterprises, but more systematic pursuit of the investigation for which funds have been actually collected. We wish good speed to the explorers who have already sailed for the survey of the peninsula, as well as to those who may yet be sinking shafts and running galleries among the *débris* accumulated in the valley of Kedron, or in that of the Tyropoeon. But to all those who, in the quiet of English parsonages or country houses, devote their leisure hours, and their spare guineas, to the search of local knowledge illustrative of the scenery and of the language of the Greek and Hebrew Scriptures, we would recommend combination of effort and well-directed unity of aim. The explorers of Palestine and of Sinai seem to be sadly in want of an engineer-in-chief.

NOTES FROM ABROAD.

Brunswick.—A second and exact copy of the celebrated Quadriga, in bronze, that crowned the chief front of the palace which was destroyed a few years ago by fire, is now being erected upon the former site, the entire building having been restored to its previous glory. The palace has always struck us, like that which was begun at Cassel, but was never continued beyond some 10 ft. from the ground, as much too large for the requirements of a third or fourth rate German court, and the rebuilding of this Brunswick palace would seem to indicate a greater reliance on Prussian non-annexation than we should have.

Berlin.—The municipality have determined to do away, as much as possible, with the system of the nightily and unduly open markets at present held in the principal squares of this city. A large market-hall is forthwith to be erected upon the Dönhofs Platz, and a second upon the Gendarmen Markt.—Another free hospital has been determined upon, and the plans have received the sanction of the "director of charities," Councillor Dr. Von Esse.

Hamburg.—An International Floral Exhibition is to be held here in September next. The programme just published contains a section for "Garden Architecture," to which will be admitted ornamental green-houses, conservatories, summer-houses, park-lodges, small rustic bridges, entrance-gates, park-palings, iron railings, and other objects of landscape gardening. A committee has been formed under very high local patronage, and a guarantee fund of about 10,000*l.* will be formed, the greater part of this

sum being already subscribed.—The Church of St. Nicholas, by Professor G. G. Scott, contains a number of external niches, and these are gradually being filled with statues, thanks to the liberality of the citizens, thus adding materially to the finished beauty of the whole edifice. Thus there are now in their respective places: the four Evangelists on the tower; St. Ansharius (by Professor Siegel, of Athens), Luther, and Melancthon, at the south porch; Erwin von Steinhilber, Peter Vischer, and Albert Dürer on the south aisle; St. Nicholas (an old statue, restored by the Society of Christian Arts), Ziegenhagen, and Winkler at the north porch; Gutenberg, Handel, and Schieermacher on the north transept; besides eight angels, four of which are on the gable of the south transept, and the other four on the tower, at a height of 200 ft. from the ground.—A very interesting exhibition of photographs by German artists is open here, and contains some perfect triumphs both as to clearness and colour, as also in regard to verticality of lines. A very pretty wooden building has been erected on some waste land near the Exchange for this purpose, by Herr F. George Stammann, architect.

Prague.—Some months ago a building society was formed here, for the purpose of erecting houses for the working classes on a very extensive scale. It seems to have answered so well, even in this short time, that several other towns of Bohemia are now following the example set in the capital.

Trieste.—A very large fish-market, to be supplied by the Adriatic, is about to be erected here. Twelve designs were received, in answer to public advertisement, six being from local architects, and the committee is now deciding upon their various merits.

ON THE ANTI-PATHIES OF ARCHITECTURAL GRAMMAR.

GLASGOW ARCHITECTURAL SOCIETY.

At the last meeting of this society, a paper was read, by Mr. Horatio K. Bromhead, "On the Antipathies of Architectural Grammar," being a consideration of how architectural ornament ought and ought not to be combined. He said:—

Before more definitely pointing out the precise section intended it were well to express that the absence of a predecessor's footsteps must be the apology for any incomplete and crude treatment of the subject; the "Grammar of Ornament," by Owen Jones, being the only work known to me as approaching it. But that magnificent work does so, as it were, from the opposite side from that selected for this paper. The "Grammar of Ornament," as understood by me, principally tends to show the inevitable and grand principles that must exist in architectural aesthetics; whereas it is now attempted to take the negative view, and consider as much as possible what may be argued as not allowable, by indicating for consideration adverse or restrictive principles, founded upon those great and glorious relics which our noble art has bequeathed to us.

In art generally, the restrictive principles are so simple, and the issue is so evident, that they have not required much study. This clearness is, perhaps, largely owing to the plain and facile verdict which so inevitably follows any violation of aesthetics. If we for a moment imagine the production of a piece of ideal painting or sculpture with an error destroying its general harmony, we at once think with satisfaction of the unremunerative limbo to which it would be consigned. Fortunate it is for the world that artists and sculptors are able to see their own works first themselves, and rectify errors then apparent; and further fortunate for them that many causes irresistibly lead to the formation and activity of a tribe of critics whose volubility is so irrepressible, that the recipient can silently take advantage of the one good point, while deriding the empty garbularity accompanying it. But it is well carefully to bear in mind that it can be said we are not blessed with an architectural limbo. We are enabled to see in the works of architects how admirably some are able to preconcite and avoid errors, and the want of this power in others, as evinced in the painful monumental proofs which they set up, and are unable to destroy. This may appear to be wandering from the end in view, but a careful consideration will make apparent that we are at the very foundations, for how can we study architecture to the advancement of art, if we accept every existing

erection as beautiful and perfect, without measure or qualification? at the same time overlooking the possibility that some of the architects, after they had seen the completion of their works, would gladly and publicly have repented in sackcloth and ashes, if they could only have thereby been enabled to remove some of the accomplished errors then for the first time detected.

It has been most generously asserted by some of our esteemed art-brothers, the artists and sculptors, that architecture is entitled to a first rank among arts on account of its universal need. I do not enter into the question further than to suggest that, if architecture be entitled to such an important position, its first claim would probably be founded on the necessary absence of experiment with regard to the production of its great works. We cannot point out what we do not like, and designing our model, full size, in soft clay, is equally impossible. With this argument I to some extent account for much that is had. Looking through works, one cannot help thinking that some are prominently good in planning arrangements, or aesthetics, or acoustics, or engineering construction, or carpentry, or masonry, or painting, &c., to the injury of other important requirements. Here I am not aiming at men who were trained as engineers, carpenters, masons, &c., and afterwards became architects; for most men, after so changing, could earnestly work through a great quantity of the remaining architectural knowledge in a few years, overcome the bias of the first education, and perhaps equal the average number of those who have been properly-trained architects for the same length of time; but am pointing out that some works indicate an unbalanced, biased, or lamentably deficient education by an error in some one, or more, essential yet neglected item; and also a tendency to give objectionable prominence to one section of architectural knowledge or building material. This, as I term it, negative way of looking upon art, appears to me very much neglected by the present generation of architects. The greater number of people are quite alive to the fact that the disagreeable man seldom says more than one offensive thing in an interview. The most notorious liar earns his reputation as easily; yet an architect who is quite aware of this and regulates his conduct with the utmost propriety, will sometimes be found, apparently without the least care or thought, blindly setting up buildings with at least one grave error; and when he has erected sufficient to stamp his character, feels particularly aggrieved that the public look upon the good points of his works as nothing but what was his duty to do; and, seeing the faults, set him down as of no great ability, and try the next new man in the hope of something better. I believe that an unduly large proportion of important buildings erected during the last few years could be identified by the mention of the worst architectural feature in each, and that the farther back the time under consideration is extended, the smaller the proportion will be; and, if so, there is cause for plain speaking and serious consideration. Taking the matter, however, at its smallest, it is assumed that all will admit the existence of errors in some of the architecture now existing; and, therefore, the difficulty lies in defining what is erroneous, and more particularly in endeavouring to lay down some propositions which, though they may require to be maintained with sufficient leniency for exceptions, may yet be considered generally good and sound. The following propositions have been hastily made out with a view to affording some definite ground on which the discussion to follow this paper may be continued, and the more easily become interesting and valuable:—

Proposition 1.—The origin, continued existence, and increasing isolation of the various styles of architecture indicate the opinion of many ages as most remarkably decided in asserting that there are sympathies and antipathies among architectural forms and colours that a correct taste cannot ignore, and that there are varied wants and requirements that have demanded and maintained a variety of style.

Proposition 2.—An architectural work should not have a single detail of form or colour that is not in harmony with every other detail, and with the use and situation of the work, but should be treated as a harmonious whole.

Proposition 3.—A new discovery, feature of design, method of construction or coloring,

material for execution, or locality for erection, has often caused a transition time of modification, finally resulting in the rejection of a previous feature and the production of a different style of architecture that avoids the discord occasioned by the novelty. Transition styles are, therefore, of confused and imperfectly developed grammar; and a combination of styles containing unmodified parts of two or more distinct styles is flatly discordant and ungrammatical, and much to be condemned as a violation of aesthetics.

Proposition 4.—Architectural features, when used in several styles, though retaining the same name and skeleton, should not be so used without being modified in detail and outward form so as to possess a sympathetic character for each style. The principles and methods of coloring should also be subject to this proposition.

Proposition 5.—If a well-known feature or detail that is to be found in many buildings is very seldom to be found in the same building with another well-known style, feature, or detail, without modification, the combination, without the customary modification, is a discord that requires marked and careful sympathetic modification to become grammatical.

I cannot hope to exhaust the subject in the necessary limits before me, so will only attempt a single illustration—that of the column. In the great works of all ages we find each particular style of architecture a carefully-modified base, shaft, and capital to its columns. First, confining the argument to any one style of one age, we find the detail so completely corresponding in sympathy that the designs of one building can generally be interchanged with those of another without any violation of grammar. Second, extending the argument to every age of one style, we find the sympathy fluctuating, being advanced, refined, and headily clear when architectural art was prosperous, and debased and partly lost when art was neglected. Third, still further extending the argument to be without limit, we strike, as it were, the very key-note. Where is the style without its columns? Consider them regardless of style. We may say that no good column exists without being clearly marked out as possessing base, shaft, and capital—ever the same names, ever the same triplet representation of honest strength. Consider them with reference to style. It is impossible to marshal forth in memory the different modifications of columns to be found in the different styles without being convincingly struck with the remarkable facility with which their sympathetic modification of detail enables every style to be distinguished. They may, indeed, be described as the very landmarks of style, endlessly varied, yet always a triplet "thing of beauty and a joy for ever."

HER MAJESTY'S THEATRE, HAYMARKET.

A REPORT has been circulated to the effect that the money provided for rebuilding Her Majesty's Theatre was exhausted, the structure being simply in carcass, and that the works would be stopped unless other persons came forward to provide funds. We are enabled to say, not merely that this is incorrect, but that there are not the slightest grounds for the assertion.

The theatre is in course of erection, our readers may remember, from the designs of Mr. Charles Lee, assisted by his sons and partner (Messrs. Lee, Brothers, & Pain). A considerable amount of work has been done, considering the limited time which has elapsed since their commencement, by Messrs. Geo. Trollope & Sons, the contractors. The building is now roofed in, and the greater part of the ironwork and the stone stairs are fixed; and there appears little doubt, judging from the forward state of the building, as to the theatre being completed by the end of next March, according to contract. Scenery and properties would have to be provided, but that, of course, is a separate question.

The late theatre was burnt down on the evening of December 6th, 1867, and steps were at once taken to clear the site; but, for various reasons, the owner, the Earl of Dudley, did not finally arrange to rebuild until early in March this year, and on the 29th of May the works were commenced. We will before long give plans showing the old and new theatres.

In rebuilding, care has been taken to provide

the additional stage accommodation, before so much required, without materially encroaching upon the area of the auditorium; also to improve the entrances and exits; and the staircases have been arranged so that no part of the theatre will be without two, at least, staircases or passages of communication. There will be three saloons exclusively for ladies (the late house had no such accommodation); the boxes have been increased in height, and they will consist of four tiers and a half. No use will be made of the roof over the auditorium or stage, and the roof being of iron, the risk of fire will thereby be reduced; the carpenters' shops and painting-rooms, before in the roof, have been placed next the Haymarket, on the east side of the stage; the properties and stores have been provided for on the basement.

The stage is separated from the auditorium by a thick wall, continued through the roof, without openings, except for the stage; the floors of all the saloons, dressing-rooms, passages, and landings will be formed with Dennett's oement arches, and all the staircases will be of stone, inclosed with brick walls.

THE GRAVE OF ROBERT HOOKE.

NEAR to the site of old Gresham College, in the ancient church of St. Helen, Bishopsgate, lie buried, without a memorial stone to mark their last resting-place, the remains of an eminent philosopher and marvellous mechanic, Robert Hooke. Whether the fault rests with those who inherited his great wealth, or whether a tomb was erected and has since fallen to decay, I cannot ascertain; but at present he lies in an unhonoured grave in the midst of a city which has largely profited by the results of his earnest labour. The variety and extent of Hooke's inventions and discoveries are scarcely so well known as they deserve to be, and while drawing attention to his neglected grave it may prove useful to give a short account of the most important. The following, chiefly derived from a highly appreciative exposition of his mechanical inventions, by Bryson,* will, I think, prove that Hooke is justly entitled to a grateful remembrance.

Hooke in early life was delicate, so that his parents had small hopes of rearing him; but after his seventh year his constitution seemed to gain strength. His mechanical genius, the strongest intimation of his nature, was first developed. In a short extract from his diary, Waller,† his biographer, says: "Being subject to headache, which hindered his learning, his father laid aside all thought of breeding him a scholar, and finding himself also grow very infirm through age and sickness, wholly neglected his further education, who, being thus left to himself, spent his time in making little mechanical toys, in which he was very successful. His father, observing by these indications his great inclination to mechanics, thought to put him apprentice to some easy trade (as a watchmaker or limner), he showing most inclination to those or the like mechanical performances." His taste for the fine arts seems to have recommended him to the notice of Sir Peter Lely, with whom he served but a short time, as the odours from the oil colours produced aggravation of his headache, which, beginning in his earliest years, continued to afflict him through life. This was, perhaps, for his fame and for science a fortunate adversity. In the year 1653 Hooke, then in his eighteenth year, went to Oxford, and by his mechanical genius soon gained the notice of the Hon. Robert Boyle. Here he seems to have found more employment suited to his tastes from meeting Wren, Wilkins, and other eminent philosophers, who shortly afterwards founded the Royal Society of London. It was while residing at Oxford that he contrived for Boyle the first really efficient air-pump, and applied the balance or pendulum spring to a watch, by which and his subsequent discovery of its isochronal properties, he converted the machine which he found but a rude toy, into an almost perfect measurer of time. From a suggestion of Wren's, he made a series of observations of the barometer for the purpose of testing the truth of the hypothesis of Des Cartes, that the tides resulted from the pressure of the moon upon the air in

its passage by the meridian. Hooke found that the oscillations of the mercurial column did not comport themselves according to the moon's motion, but were due to the varying density of the air. Thus the barometer became, in the hands of Hooke, not merely the Torricellian tube, but a weather-glass, or as he quaintly calls it, the "weather wiser." To him we are also indebted for the double barometer, the four-legged barometer, the wheel barometer, the diagonal barometer, and the marine barometer. About 1690 he invented what he calls his circular pendulum, it has, however, been termed a conical pendulum, being continuous in its motion. It was applied by Hooke to a telescope mounted equatorially, so as to keep the instrument always coincident with the star's motion, both in right ascension and in azimuth. This invention is more familiar under the name of Watt's governor or the steam-engine. Watt most ably applied it, but (with very few know) Hooke was the inventor. In the year 1662 Hooke was appointed orator of the Royal Society; and, in April of the succeeding year, he read before them an account of his discovery of the rising of fluids in capillary tubes. He also discovered that mercury was not subject to the same law, but was depressed in tubes in the ratio of their diameters. He also here hinted, what was afterwards discovered, that mercury in tubes made of different kinds of glass has a different ratio of depression. He also proposed a system of telegraphy by connecting between distant stations a wire, acted on by a series of vibrations or musical notes, and thus communicating almost instantaneous intelligence. In 1663 he invented the watch wheel-cutting machine, and in the following year a method of grinding spectacle lenses, by means of which more than 100 could be ground at once to the same focal power. This ingenious contrivance is daily used in our manufactories at Sheffield, but few know the name of its inventor. On the banks of the Avon you may be asked the question, Who was William Shakspeare? and in the workshop of the optician, Who was Robert Hooke? In the same year he invented an instrument to determine the refractive index of fluids. His life, indeed, at this time must have been a busy one. Macaulay eloquently tells us "how necessary it was for the fine gentlemen of the court of Charles II., when science had become the fashion, to have something to say about telescopes and air-pumps; and even fine ladies now and then thought it becoming to affect a taste for science, went in coaches and six to visit the Gresham curiosities, and broke forth into cries of delight at finding that a magnet really attracted a needle, and that a microscope really made a fly look as large as a sparrow."

In 1664 Sir John Cutler having founded a lectureship in connexion with the Royal Society, Hooke was appointed to the office at an annual stipend of 50*l*. Although science has, perhaps, gained by the publication of his Cutlerian lectures, to Hooke it proved a source of great trouble; as, through some misunderstanding, he became involved in a long and vexatious lawsuit for the recovery of his annual allowance, which appears to have soured his disposition for the remainder of his life. In the same year he was appointed professor of geometry in Gresham College, and continued for some time to read general astronomical lectures, showing a wonderful fertility of invention in devising instruments for astronomical purposes; describing a plan for a weather-clock, a quadrant, and erecting the first transit instrument. As this is intended more as a catalogue than a description of his earnest labour in the pursuit of scientific truth, I can only enumerate the subjects to which Hooke devoted his mind during his long and useful life.

In the year 1666, the Great Fire of London, though it disturbed the labours of the Royal Society, increased those of Hooke. On the 19th of September, we find him presenting before the Society a model for the rebuilding of the city. "What this model was," says Waller, "I cannot well determine; but I have heard that it was designed in it to have all the chief streets, as from Leadenhall to Newgate, and the like, to lie in an exact line, and all the other streets turning out of them at right angles; all the churches, public buildings, market places, and the like in proper and convenient places." This plan was not accepted, but it led to his appointment as surveyor by the City magistrates. In this situation he laid out the ground to the several proprietors for rebuilding the City, and acquired most of his

wealth; none of which, it is believed, he ever used, as it was found in a chest after his decease.

The invention of the reflecting telescope has been awarded to Newton, to Gregory, and Hooke: the share which he had in the invention was in perforating the larger speculum, thus enabling an observer to view the object directly. In one of his discourses he clearly indicates the stethoscope. He invented the spring balance, now known as Salter's spring balance. To him we also owe the steelyard: although unknown to Hooke, it had long been used as the standard instrument for determining weight in China. He proposed the catenarian curve as the best form of arch; employed a heavy weight moving in a short arc for the pendulum, from which its sole advantage is derived. He had the earliest suspicion of what keeps the planets in their orbits, discovered that the density of the air in a diving-bell is doubled at the depth of 34 ft., invented a water-pump having an elliptical rotary motion acted on by a spring, and discovered the various forms which sand assumes when placed on a vibrating plane. He attributed the revolutions of the planets to the combination of a projectile motion with a centripetal force. Had his mathematical powers equalled his practical sagacity, he might have obtained the laurel which Newton so soon afterwards bore away. He discovered that Jupiter revolved in about eight hours. That he possessed the secret of the steam-engine is undoubted; he, however, hid it in the form of an anagram, which Waller thus translates,—"The air presses with force the vacuum left after the use of fire." As an astronomer he did much; as a geologist his views were in advance of his age. Speaking of fossil remains, he says that they belonged to extinct species, and even suggested that they may have disappeared in consequence of earthquakes in former ages, to which he attributes the elevation from the sea of the strata containing marine remains. In conclusion, Bryson remarks that, "Had Hooke been born fifty years after Newton, Newton would not have been less. Had he been born fifty years before the great philosopher, Hooke would have been more exalted." II.

PLANS OF PARIS.

A LIST was given in these pages* of the most ancient plans of London and Westminster known to be in existence: to this list, which must be of the greatest interest and assistance to all who are addicted to antiquarian or historical researches, as well as those who desire exact knowledge of the locality of facts connected with general literature, we are enabled to add a similar inventory of the plans of the City of Paris, from the last issue of the *Chronique des Arts*.

A collection will be made of all the plans of Paris that can be obtained, which will be placed in the Historical Museum of the City of Paris as soon as the alterations to the Hôtel Carnavalet, the former residence of Madame de Sévigné, in which the Museum is to be formed, have been completed. In point of number the ancient plans of Paris are inferior to those we possess of London, but they are sufficient to enable us to trace the progress of the city during the last four centuries, and if they could all be collected under one roof their usefulness would be greatly increased.

The following is a list of the most ancient plans extant:—

1. A manuscript plan found in the Abbey of Saint-Victor representing Paris about the year 1400. This plan was engraved by Dhuelland in 1756.
2. Another manuscript plan, constructed from a tapestry of about the same period. There are no illustrations of Paris of a date anterior to, or contemporary with, these plans, with the exception of some views of public buildings on the margin of an illuminated manuscript of the fifteenth century, formerly belonging to the Duke of Bedford, and purchased by the city of Paris from M. Firmin Didot.
3. The plan of 1560, executed in the reign of Henri IV., and now in the Imperial Library.
4. An Italian plan dated 1565.
5. Quésnel's plan in twelve sheets, dated 1609 (reign of Henri IV.).
6. The plan of 1615 engraved at Amsterdam by Witt.

* Vol. xv. p. 642.

* Edin. New. Phil. Mag., 1858.

† "Posthumous Works of Robert Hooke." London, 1765.

7. Another plan engraved in Holland in 1620.
8. The plan of 1651, which only shows the streets.
9. The plan by Boisseau, 1652, and another by Gomboust, of the same date.
10. Cochin's plan, 1669, in three sheets.
11. Defer's plan, 1692.
12. Jouvin de Rochefort's plan, 1697.

From the beginning of the eighteenth century to the present time, the plans may be counted by hundreds. The principal are those by Félibien, 1725; the plan of the great Turgot, 1739; the curious plan by Bonamy, in 1740, in which year Paris was visited by a severe inundation; and the plan of Verniquet, in 1789.

A plan of Paris, on a large scale, showing the recent alterations, is in course of preparation by Baron Haussmann.

THE INSTITUTION OF CIVIL ENGINEERS.

GLASS FOR LIGHTHOUSES.

The first meeting of the present session was held November 17th (Mr. C. Hutton Gregory, president, in the chair), in the new building erected during the recess, and upon the completion of which, according to the promise made by the council, the president congratulated the members; taking occasion to remark, that the council had placed upon their private minutes a unanimous vote of thanks to the architect, Mr. T. H. Wyatt. The president observed that the contractors, Messrs. Holland & Hannen, were also entitled to commendation, for the manner in which they had carried out the works within the time specified in the contract—a result to which the personal care of the secretaries had largely contributed.

The paper read was "On Lighthouse Apparatus and Lanterns," by Mr. David M. Henderson. It was stated that the glass used in lighthouse apparatus was nearly all made at Saint-Gobain or Birmingham, and was of the kind known by the name of crown glass. Different mixtures had been employed for the purpose; but M. Reynaud, the director of the French lighthouse service, now gave the composition as—

Silica	72.1
Soda	12.2
Lime	15.7
Alumina and Oxide of Iron }	traces.
100.0	

At Birmingham various mixtures had been tried, of which several examples were given, the following being about an average:—

	wt. qr. lb.
French Sand	5 0 0
Carbonate of Soda	1 3 7
Lime	0 2 7
Nitrate of Soda	0 1 0
Arsenic	0 0 3

English glass was supposed to be of the refractive index of 1.51. That produced at Saint-Gobain had formerly an index of refraction as low as 1.50, but now it was 1.54, and frequent experiments were made to ascertain that the standard was maintained.

The furnace for melting glass was generally rectangular in plan, and was constructed of the most refractory materials; and the sides were arranged so as to allow of the easy withdrawal of the pots. Six, and sometimes eight, pots were placed in the furnace, arranged in pairs with a firegate at each end. The flame filled the whole interior of the furnace, and, after circulating round the pots, which were covered to prevent the colour of the glass being injured by dust, or impurities in the coal, found its exit by flues. Great care was necessary in the preparation of the pots, which were made of about one-half new fire-clay, and one-half old potsberds, finely ground. The length of time a pot would last depended upon (1) the quality of its manufacture; (2) its being slowly and thoroughly dried,—a process occupying about six months; and (3) the care bestowed upon it in the furnace, and whilst withdrawn for casting. The average number of castings from each pot was about twenty; and the time the pot was out of the furnace at each casting was about three minutes. It was mentioned that Mr. Siemen's regenerative furnaces were now in use for the manufacture of lighthouse glass with perfect success. When the metal was ready for casting, each pot was lifted from its seat, with-

drawn from the furnace, and carried to the foot of a crane, the lifting chain of which had attached to its end a clip to embrace the pot. A mouth-piece of wrought-iron was fitted to the pot before casting, to facilitate the pouring, and the workmen tipped over the pot by means of long handles.

The casting-table was circular, and was mounted on a frame, so that by means of a handle it could be turned round, and each part of its outer circumference brought consecutively under the pot of molten metal. The moulds into which the glass was to be cast were arranged round the outside of this table, and were caused to revolve slowly under the continuous stream of liquid glass flowing from the melting pot, so that each mould was filled in succession, thereby enabling the immediate return of the empty pot to the furnace. The moulds were of cast-iron, of a uniform thickness of $\frac{1}{2}$ -inch, and were supported on feet cast on, the size being such as to allow $\frac{1}{2}$ -inch thickness of glass all round for the grinding process. The small lens-rings and prisms were cast in one piece, but the larger ones were cast in segments. The large bells, or central lenses for fixed lights, were generally cast flat, and were afterwards bent on a saddle to the required curve in a kiln.

Sand, emery, rouge, and water were the four necessities for glass grinding and polishing. The sand had to be applied, with abundance of water, until it lost its cutting qualities. The emery, after being ground to a fine powder, was agitated in water, and the mixture was passed through a series of vats or tubs, so that the emery was divided into as many qualities as there were tubs, the coarsest being deposited in the first tub, the finest in that furthest from the supply. The rouge, which was an oxide of iron, was prepared from the sulphate, and was separated into qualities by means of water-tubs, as in the case of the emery. The glass of optical apparatus was ground on horizontal circular tables, securely fastened to the tops of wrought-iron vertical spindles, which received motion from the main shafting in various ways. The surfaces of these tables were divided out, like the face-plate of a lathe, to receive of cast-different sizes of "carriers," or supports of cast-iron, which were bolted to them, and were arranged to hold the lenses or prisms to be ground. Plaster of Paris was then laid on the "carriers" in hands, the hands being reduced to the exact size by turning the table round under a gauge secured to the framing of the machine. The glass was laid on these strips, and was secured in place by means of pitch, care being taken in the larger sizes, which were ground in segments, to place a thickness of pitch between each joint, so that glass did not touch glass.

ENGINEERING ARCHITECTURE.

In the course of the address delivered to the "Civil and Mechanical Engineers' Society," by Mr. B. Haughton, the president, the speaker said:—The last discussion was, perhaps, the very best of the season, prompted by joint papers on "Engineering Architecture," by two of our oldest and most valued members. The meeting discussed the question with a spirit worthy of the combatants in the battle of the styles, even the visitors warmly assisting. This is a subject on which there is a great deal more to be said, and we will look forward to further consideration of it. It is one which the Society would do well to keep continually before it, because it is a line in which we can see our way, and in which every one admits there is room for improvement. It is, indeed, humiliating to think of the vast sums that have been spent in England on grand engineering works with an utter disregard of appearances, and where a modicum of æsthetic skill would have given us so much effect and beauty. It will be said that nobility, and not beauty, should be the cry of the engineer; but this is, after all, only the twaddle of incompetency, for it is well known to those who have given attention to art that it costs no more to arrange materials in effective and pleasing forms than to pile them in the shapeless masses that attract the eye.

We must at once dismiss the assertion that beauty is costly; it is not meretricious ornament that is advocated, such as may be seen in at least one of the latest engineering works, and which is a reactionary effort, worthy of praise, as showing a step in the right direction, but still

unworthy as having overshot the mark, and having given us, as it were, "a jewel of gold in a swine's snout." I allude to the Abbey Mills Sewage Pumping Station, the design for which is the more remarkable, seeing that it has come from the hand of the engineer who has shown so much artistic excellence in the severe lines in which the Thames Embankment is conceived.

What I ask you to aspire after in those engineering works upon which you are, and shall be in the future, engaged, is form in the æsthetic sense, in place of that deformity which is so often broadcast around us, in which the British engineer has hitherto gloried himself, and in which he would seem to wish to idealize and deify sheer strength, which in his simplicity he sees to be incompatible with beauty of outline. How, then, is this desideratum to be attained? The British engineer in his efforts to redeem engineering architecture must look to himself, and to himself alone; and the present recess is perhaps an opportunity given him for this very purpose, and to enable him to direct his mind to a subject which demands his closest attention. He will again, notwithstanding our prophets of evil, be called upon to construct works on English soil equal to, if not surpassing in magnitude, those of to-day. Let him endeavour in them to improve on those of a bygone generation, and to hand down to posterity a legacy of beauty in connexion with such works, as he has received from the past its legacy of strength and endurance.

Let him above all things refuse to entertain the thought that veneration for the beautiful is beneath him as a man, or derogatory to the dignity and character of his race; for during all time those races which made themselves famous for their prowess and their majesty, their power alike over matter and mind, were equally renowned for the beauty and for the magnificence of their public works—those monuments of glory by which, history apart, we can now alone judge of their aristocracy of race. If Egypt has had her Pharaohs of the camp and the battle-field, she has also had the Pharaohs of the Pyramids, of Thebes, and Phyle; if Greece has given to the world an Epaminondas and an Alexander, who has left his traces visible to this day upon the banks of the Siltledge, the Dethum, and the Indus, she has also given it a Phidias, an Apelles, and a Praxiteles, who live at this moment in the columns, entablatures, and friezes of the Acropolis, in the inimitable statue of the Venus, and in the thousands of miracles of art which have made their countrymen as a race nigh upon earth; if Rome has had her Romulus, her Pompey, and her conquering Julius, who has left his stamp upon these banks of Thames, she has also had her Augustus and her engineers and architects by the score, beneath the walls of those grand buildings the Englishman loves to wander during the period of his own dark winter; and if Carthage has had her Hannibal, she was also one of the most exquisite of cities. These facts should at once disabuse us of any idea that being possessed of an eye to admire, a head to conceive, and a hand to construct what is beautiful, is incompatible with those qualities of *physique* and of *morale*, and of general manhood on which we as a nation rely and pride ourselves; on the contrary, history tells us that the very highest types of the human race are those in which all these qualities have been combined, and, further, that wanting in any of them, we cannot claim to rank as equals, but only as degenerate and effete imitators of the mastering races named, sent into the world by the King of Kings and great Engineer of Engineers for the guidance and instruction of the 1,200,000,000 of his creatures who incessantly inhabit it, and whose instruction and example they stupidly reject and ignore.

Let us then look for better days for engineering art, and if we shall succeed in our aspirations and efforts to restors and to perfect it, when the time comes that we are to be conquered as a people—it may be by the Cossack, it may be by the Western Vandal—as conquered we shall be, if history is to repeat itself, we shall have that glorious consolation, which Horace describes as having remained to Greece after her conquest by Rome—"Captive Greece took captive her fierce conqueror and introduced her arts amongst the rude Latins. Thus, their rough Saturnian manners became polished, and delicacy expelled rank virulence; though for a long time remained, and this day remain, the traces of rusticity."

SCIENTIFIC INSTRUCTION.

The annual distribution of prizes has been made to the pupils of the Lower Islington Public School Science Classes in connexion with the Science and Art Department. The room was crowded by the boys and young men, with their friends, who were gratified at the success that has attended the instruction given students by Mr. John Howard and his assistants. Professor Heeslow, Mr. Edgar, of the School of Mines, Mr. Howard, and other gentlemen addressed the meeting. The Professor pointed out that in the hands of an able teacher the driest scientific subject might become wondrously interesting, and made the means of developing to the fullest extent latent mental powers.

Some inquiries have lately been instituted in Yorkshire respecting the means available for scientific instruction. Nothing effectual, it is thought, can be accomplished until there is a good supply of teachers, and it will, of course, be for the direct interests of the masters if they can earn further grants from the Government. To qualify them for scientific teaching the Yorkshire Board of Education is organizing special classes, and in Leeds thirty-five schoolmasters have already joined these classes. Altogether, no less than 100 schoolmasters in Yorkshire are now busy qualifying themselves for the Government certificate. When this is attained, the boys in 100 common schools will be able to learn the elements of science as a part of their ordinary education. The Board is endeavouring to supply the link which will be necessary to connect this elementary education with the higher grades of instruction. They propose to establish professional lectures for the elder pupils of primary schools, which will supplement the lessons of the masters. The boys will assemble weekly for this purpose in convenient centres, and it is hoped that a basis may thus be afforded for trade-schools in our chief manufacturing towns. One of the wishes Mr. Whitworth expressed was that the Government would assist in providing professors of mechanical science throughout the country; and, if this design could be carried into execution, it would exactly fall in with the plan proposed in Yorkshire. If the scheme thus sketched be completed, it is evident that a complete and graduated course of scientific instruction will be established; and it will have been provided in the only satisfactory way,—by local efforts, supplemented and guided by the Government.

PUBLIC IMPROVEMENTS IN OXFORD

From the annual *resumé* of improvements in the University and City of Oxford, in the local *Journal*, we give an abstract:—

Christ Church.—The window on the north side of Christ Church Hall has been filled with lights, commemorating the visit of the Princess of Wales and Denmark last year. The work has been executed at the cost of the Ven. Archdeacon Clerke, sub-dean of the college. A new road, 600 yards in length, is being formed across the Meadow, from that part of the Broad Walk facing the new buildings to the path opposite the boats. It will be lined, when completed, with an avenue of elms. Christ Church is further carrying out its excellent design for the improvement of the parish of St. Thomas. The notorious "Hamel" will soon be a thing of the past. In addition to the thirty tenements known as the "Model Dwellings," which have been built within the last two years, there are now in course of erection, and nearly finished, nine other new and commodious dwellings for the poorer classes. Two facing the High-street are for shops, seven front the old street or alley known as the Hamel, now widened to 30 ft.,—a good open airy street. These houses are solidly built, well designed, and fitted up with all necessary conveniences for the family of a working man. Each house has a sitting-room, wash-house or kitchen, and three bed-rooms, good drainage and water supply, and separate walled garden. They are being built by Messrs. Jos. Castle & Co., under the direction of Mr. Branton, the surveyor of the College. The object sought in the improvement of the dwellings in flats and the cottages, is to provide for the accommodation of all grades of the working classes. The contrast between these cottages and those just pulled down or about to be removed, is very striking.

Exeter College.—The glass mosaic by Salvatii,

at present confined to that part of the chapel beneath the east window, is intended to be continued throughout the arcade of the apse.

Queen's College.—The east pediment of this college was found to be out of the perpendicular, and as Mr. Wilkinson deemed it unsafe, it was taken down immediately the long vacation commenced, and was soon rebuilt. The carving in the tympanum was also restored.

Merion College.—The ante-chapel of this college, which had become much decayed, is being thoroughly restored by Mr. J. Fisher, under the direction of Mr. Backeridge, architect. The stonework of the windows, columns, and other parts of the structure is being renewed.

New Inn Hall.—A small chapel has been added to New Inn Hall, consisting of brick, with stone windows. The builder is Mr. Guise, of this city.

The New Museum.—New buildings are being erected on the north-west of the Museum, in connexion with the department of Experimental Philosophy. They will comprise lecture-theatre, students' and private laboratories, workshops for turning, photographic room, and examination room for Professor Clifton. These additions are being made out of a fund given to the University by the Clarendon Trustees. In general appearance, design, and material of construction, they will resemble the Museum itself. The architect is the same, Mr. T. N. Deane, of Dublin; and Mr. Symm, of this city, is the builder. The north front is to present a handsome elevation of nearly 100 ft. in width; the west of 51 ft. in width. The new additions, which will be connected with the Museum by a corridor, and will have a central court, are to be completed about May, 1870. The contract is for 10,255*l.*

London and County Bank.—The new premises for the London and County Bank, just completed, occupy a commanding position in the High-street, at the corner of Alfred-street. The style adopted is Tudor or Collegiate. The materials used have been the best white bricks of the neighbourhood for the several fronts, with Bath stone for all the stone details. The exterior is relieved by buttresses, projecting chimneys, and windows of varied design, and the angle is further diversified by an octagonal projecting window, which rises to the summit of the building and terminates in a turret with coped top, and iron terminal. The public room measures 43 ft. by 34 ft., and 16 ft. high, with boarded and panelled ceiling, with carved corbels and pateras. The gas-fittings are by Hart & Co., Strand. The whole of the works, including the adjoining premises, will cost about 4,000*l.*; they have been executed by Messrs. Jones, from the designs of the architects, Messrs. Francis, of London.

St. Barnabas Church.—The Church of St. Barnabas is the title of the new edifice now rapidly approaching completion in the district of Jericho. The plan is of the Basilica type, and is a long parallel building with an apsidal termination at each end, that at the east for the altar, and that at the west for the baptistery. The choir place is at the east end of the nave, and will be marked off by a low railing. The clearstory is remarkable for its height, which gives to the nave a fine lofty effect. The aisles are divided off by arcades in the usual way, but the arch opening the baptistery to the nave, and the fine round arch and ceiling over the sanctuary are not common features. The roof, which is not of a sharp pitch, is of simple but effective construction, and boarded on the inside, the timbers being all exposed. The walls are constructed with rough wall stones of the district, put together with ground Haslams and Thames sand, and covered on the outside by a rough coating of Portland cement and sand. The window cills and heads, and those portions usually constructed of wrought masonry (except the columns and their capitals and bases, which are of Bath stone), are built with a concrete of cement, gravel, and other hard materials, made and cast in moulds of the requisite shape. The church will seat about 1,000 persons; and, it is said, will cost, owing to its peculiar method of construction, not much beyond half the sum usually required for churches of that magnitude. The architect is Mr. A. W. Blomfield, of London; and the builders are Messrs. Castle, of Oxford.

St. John's Mission House.—This is the name given to an Ecclesiastical and Collegiate establishment in Marston-street, in the newly-made Ecclesiastical district-parish of Cowley St. John, the new suburb on the east side of the city. It has been built by Messrs. Joseph Castle & Co. for the Rev. E. M. Benson, the incumbent of the parish. It has spacious offices and refectory in

the basement, and the upper stories contain, besides a large "parish room," a common room, library, with conversation room adjoining, principal's room, and twenty-six rooms for men, each room fitted and furnished for separate occupation. On the top of all is a large, convenient, and well-designed chapel, fitted with stalls for over fifty persons, and capable of holding a good many more. The house is heated throughout by a system of hot-water apparatus, thereby saving trouble and inconvenience from separate fireplaces. The rooms, as well as the passages and corridors, are lighted with gas, and great care has been taken to give good and manageable ventilation. No attempt has been made at architectural display.

New Schools, Gloucester-green.—A Gothic structure has been erected on Gloucester-green for day schools in connexion with the Independent Chapel, George-street, but in which an unsectarian education is given. There are large class-rooms on the ground-floor, with entrances from Gloucester-green and George-street. Mr. Codd was the architect, and Mr. J. Hall, of Walton-street, has carried the work out.

Chapel school, Hythe-Bridge-street.—At the corner of Hythe-Bridge-street, a Chapel-school for the boatmen and their children has been erected. The architect is Mr. Branton; and the builders are Messrs. Jones & Sons. The new structure will cost about 350*l.*

COMPRESSED AIR FOR PROPELLING VEHICLES.

We have often suggested the desirability of applying compressed air, or some such power, to the propulsion of street vehicles, whether coaches, omnibuses, cabs, or velocipedes. If what we now learn from America be correct, this desideratum has at length been realized.

Mr. Waylis, of New Orleans, has recently invented a locomotive car, which is said to have proved a complete success. In the car station there is an ordinary steam-engine, of about sixty-six horse-power, for compressing air into reservoirs, and two of these reservoirs are placed on the top of each car. On the car there is a small engine, operated by the air supplied from the reservoir in the same manner as by steam, and giving the exact amount of power that was required to compress the air. The engine is not difficult to run, and the cars can be stopped much more readily than when horses are used. Each car will have 300 pounds of compressed air to start with, which will be sufficient to run it nine or ten miles.

NEW TRAMWAY, RAILWAY, AND OTHER PROJECTS.

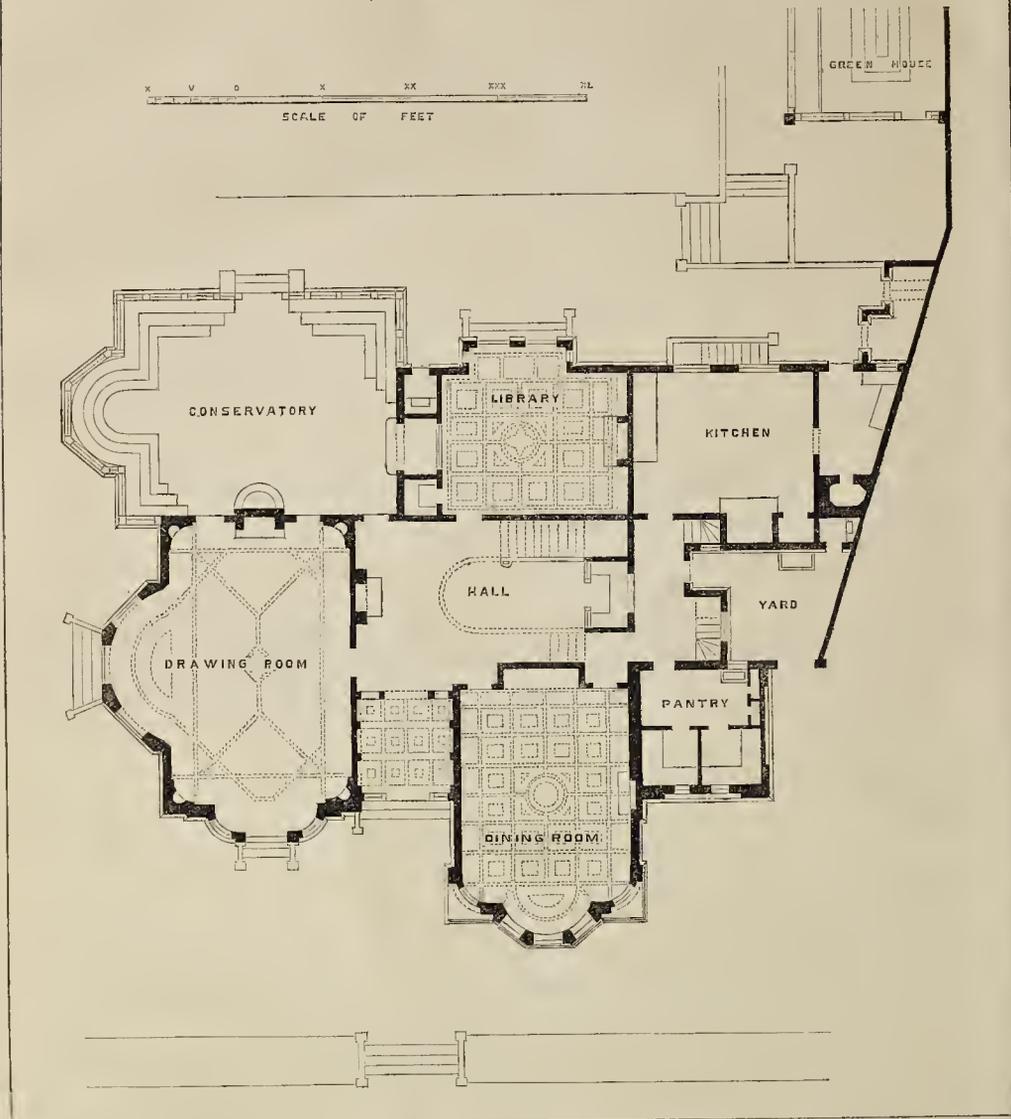
AMONG the notices of proposed applications to Parliament are the following:—

Incorporation of company for making tramways from Kensington to Hounslow, Hammersmith to Uxbridge, Paddington to Harrow and Edgware, Islington to Barnet, Newington to Charlton near Woolwich, Lambeth to Croydon and to Richmond.

Incorporation of company: construction of railway from near the west end of Oxford-street to Cheapside, in the City of London (to be called the Hyde Park and City Railway, and running as follows): commencing in the parish of St. George, Hanover-square, in the county of Middlesex, near the west end of Oxford-street, and thirty-three yards or thereabouts westward of the Marble Arch, and terminating in the parish of St. Michael at Bladun, otherwise St. Michael-Querne, in the City of London, near the western end of Cheapside, and at or near the junction of Foster-lane with Cheapside, to make and maintain the said railway, wholly or partly, as an underground railway, and to pass through and under the following, or some of the following, among other roads and streets, that is to say,—Uxbridge-road, Baywater-road, Oxford-street, Duke-street, Regent-street, New Oxford-street, High Holborn, Iloiborn, Holborn-hill, Holborn Viaduct, Victoria-street, Farringdon-street, Skinner-street, the Old Bailey, Giltspur-street, Newgate-street, St. Martin's-le-Grand, and Cheapside, or some of them.

Incorporation of a company to make and maintain a railway from Colchrooke-row, Islington, to New Union-street, in the City of London. Railways [Metropolitan (Southern District)

"THE LOGS," HAMPSTEAD.—Plan of Ground Floor.



Railway] from Elephant and Castle to Waterloo and Whitehall Railway, and from that railway to the Thames Embankment (north) and to Scotland-yard. Incorporation of company, powers as to Waterloo and Whitehall Railway, &c.

Kew and other bridges: to confer upon the Mayor, Aldermen, and Commons of the City of London, and the Metropolitan Board of Works, certain powers with respect to freeing from toll the bridges named in the 5th section of "The London Coal and Wine Duties Continuance Act, 1868," such bridges being Kew, Kingston-upon-Thames, Hampton Court, Walton-upon-Thames, and Staines, over the river Thames, and Chingford and Tottenham Mills, over the river Lee.

Landowners' Association, for the construction of branch railways and other works. Incorporation of company: powers to purchase and hold lands; to construct, work, and manage railways and other works; to levy tolls to raise capital; special provisions for acquisition of lands—powers to landowners and other persons having limited interests in lands to subscribe and hold shares, and to guarantee interest; and to charge

the inheritance with subscriptions and guarantees as a prior charge—provisions for compelling such persons to guarantee interest and to charge the inheritance with guarantee as a prior charge;—powers to persons guaranteeing to participate in profits of company, &c. This seems a very broad measure.

"THE LOGS," HAMPSTEAD.

The house we illustrate in our present number is faced with double-pressed Burham bricks (the stables and offices with wire-cut Burham bricks), and has Portland stone dressings. Red bricks are sparingly used in panels, under the eaves and strings. The eaves project considerably from the face of the wall, and have a panelled soffit of Portland stone, supported on carved cantilevers. Polished granite and red Mansfield stone are used externally, and serpentine and Plymouth rock internally, in decoration. The roofs are covered with the Broomhall

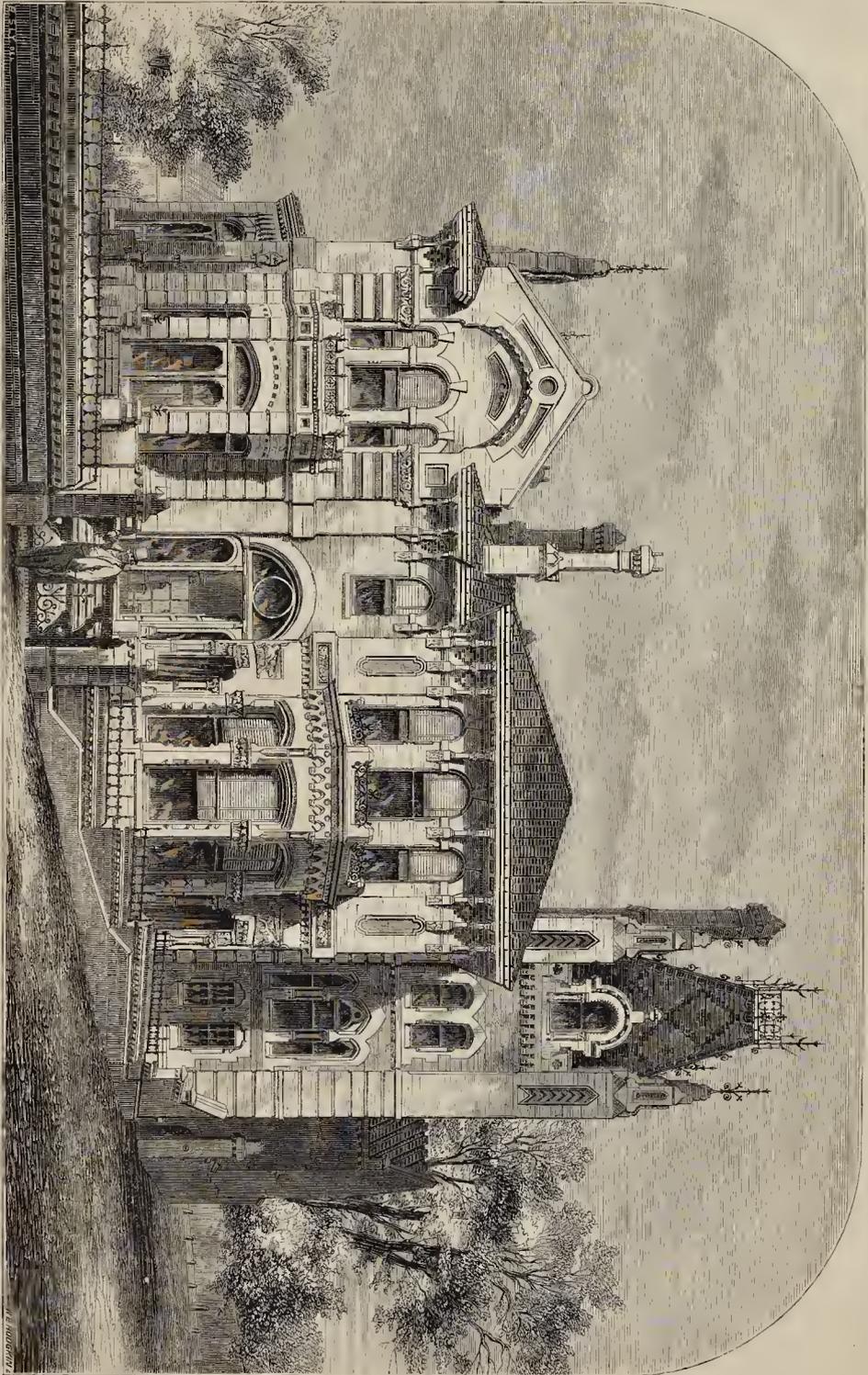
Company's patent tiles. Portland stone has been used internally for principal staircase, hall window, and screen between hall and vestibule. The hall, vestibule, and conservatory are paved with Minton's tiles.

There are open stained deal roofs over the hall and billiard-room. The joiner's work generally is of pitch pine, and carved work is introduced in the doors and other parts of ground floor. The drawing-room and dining-room ceilings have pitch pine ribs and cornices, and the library ceiling is wholly of pitch pine. Arrowsmith's parquet has been used for the floors of the principal rooms. The furniture was made from special designs. Parts of the house are heated by hot water.

Mr. J. S. Nightingale, of Westminster, was the architect.

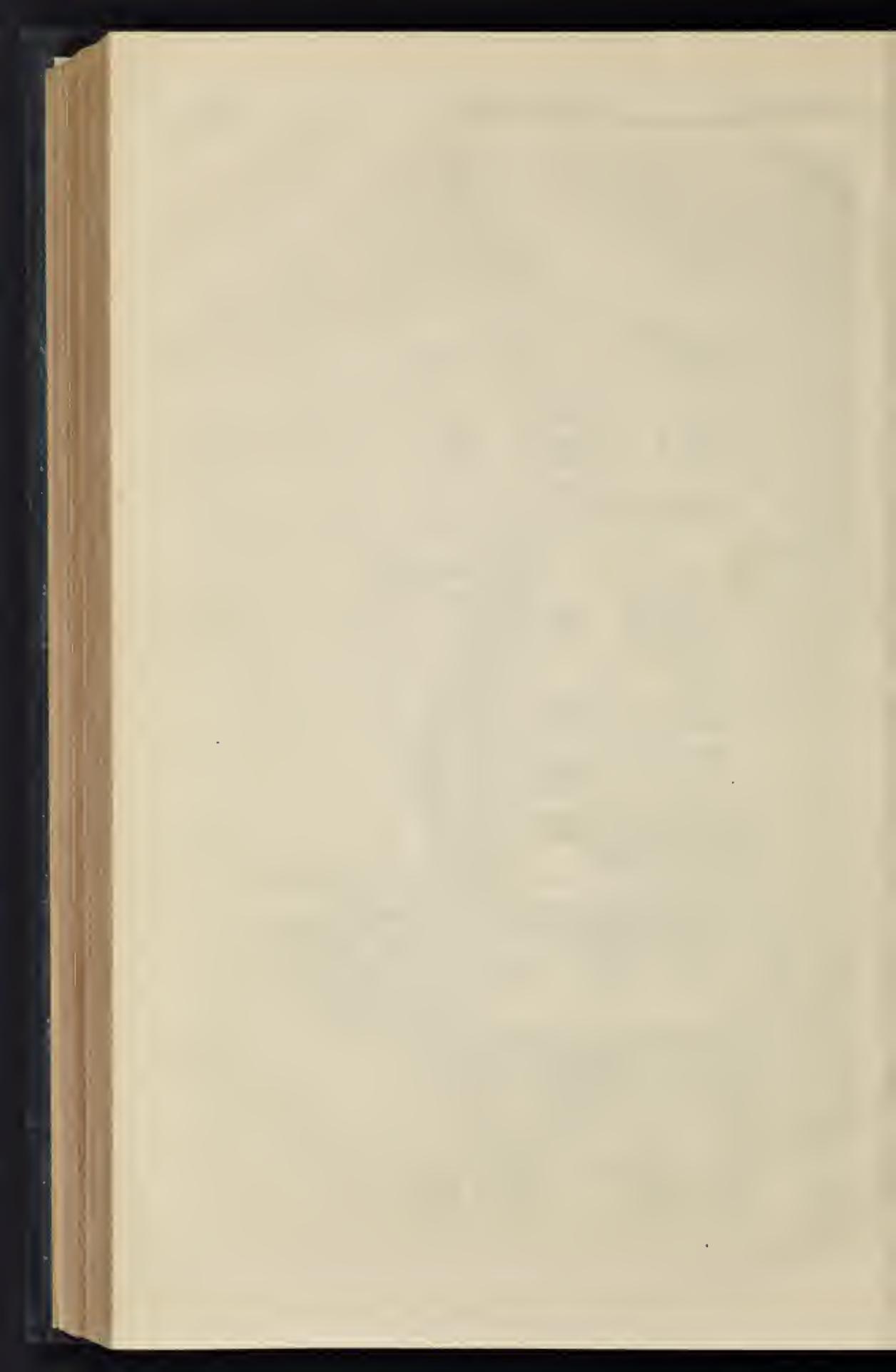
The chimney-pieces were made by Mr. Mitchell, of Brompton-road, from designs furnished. Mr. Shrivell supplied the ironwork; and the contractor for the general works was Mr. Charles Till, of Hampstead.

The cost of the house was about 9,000*l.*



“THE LOGS,” HAMSTEAD.—MR. J. S. NORMINGALE, ARCHITECT.

J. H. BURNETT



THE TRIANGULAR LODGE, RUSHTON HALL.

Long ago we illustrated this singular building, and we have since, at different times, given other particulars of it. Mr. Thomas Powell, who has been examining it, writes,—"I have also had an opportunity of examining those very interesting papers and documents which, some thirty years ago, were brought to light by the pulling down of a wall at the hall. I have not been able to do more than turn my attention to the 'building accounts,' which form a portion of those very curious manuscripts, but I have been able to ascertain from them a few distinct facts, of which the following are some:—

The beautiful fabric at Liveden was commenced, and nearly finished, before the 'Triangle,' and the parties who constructed it were two named 'Gronbolds.' The Triangle was not finished in 1595, as is sometimes conjectured, from these figures, with the letters T, T, which are placed on the outside. The work was in progress in 1596.

The general stone material was raised at the white stone and red stone 'pittes,' at 'Hawke fields.' The skunchions' (shields?) were from Pipwell.

Ordinary masons did the plain work, including the ashlar; but Freemasons executed all the symbolic matter. The names of both sets of workmen, together with those of the parties who did the windows, are given.

The Triangular Lodge has been mistaken for 'Wadener's Lodge;' they were entirely distinct fabrics, as appears from the building accounts; but of the latter there are, I believe, no remains.

During a great part of the time that both the fabric at Liveden and the Triangle were in course of construction, Thomas Tresame was in prison at Elis (Ely). To meet the cost of building, he sold, at intervals, lands at Clipston.

The 'spirit-rapping' did not occur in the Triangle. The building is simply the gratification of an exquisite taste in architecture, subverted by a deep religious trine enthusiasm.

The term 'triangle' is applied to the building by Tresame himself. I think an explanation of all the symbols might be found in the 'accounts.'

We should be glad to have the exact words in which the distinction between the ordinary masons and "freemasons" is made.

HARVESTING IN WET SEASONS.

THE prize essay on this subject, by Mr. W. A. Gibbs, of Gillwell Park, Essex, has been printed in the Journal of the Society of Arts, which Society awarded the prize. We have already given an account of Mr. Gibbs's method of drying wheat, hay, &c., by means of the hot-blast, &c., and his own account is so lengthy and diffuse that our limits do not allow us to give any intelligible quotation from the essay; but we may give an account of his wheat-drier as constructed for the Duke of Sutherland, after remarking generally that the essay first of all gives particulars as to various modes of harvesting crops in wet weather in different countries. As to a mode recommended in our column to be used at a pinch, and where elaborate and costly "wheat-driers" with their engines, fans, furnaces, wheat-hoses, hot blasts, elevators, &c., were not to be thought of or attained, even had they been then invented, Mr. Gibbs speaks of it as "an absurdity," although he acknowledges that it was "the old Roman plan," and that it has been "partially revived in Australia," and is "the last resource of a forlorn hope"—where, of course his "wheat-driers" are not even to be hoped for. To us it seems to be a still greater absurdity for Mr. Gibbs to present the country with such a system as his, by way of a solution of the problem how (short of at least half a century's progress amongst farmers in general) to harvest crops in wet seasons. The original suggestion in the *Builder*, by the way, was not the old Roman plan referred to by Mr. Gibbs, of beheading the corn "as it stands" in the fields, but after it has been cut and handed, and has stood waiting favorable weather which has never come. Then it is that the beheading process might perhaps best be done with sickle or with chopper, leaving the straw ready cut and standing as before, in the best possible position in the field for its preservation till drier weather should come. This original suggestion was certainly so far modified in our subsequent remarks

as to recommend, in very wet seasons—where it was desirable even to harvest the crop before the cutting of the straw—to save the heads at least, by at once reaping them where covered accommodation for drying straw and all was out of the question. Either of these modes, we will venture to say, will be adopted in nineteen out of every twenty cases, were one alone on Mr. Gibbs's system will; and for this plain and obvious reason, that out of every twenty farmers, either in this country, in Australia, or in any other country, for the next half-century, not more than that one is likely to be either able or willing to provide himself with Mr. Gibbs's "wheat-driers," on the chance of needing them for wet seasons. While describing his system, therefore, we venture to say that the grand problem of saving the crops of a country in wet seasons has not been solved by him, at least.

The "wheat-drier" referred to comprises a steam-engine, with cold and hot air flasks, a furnace, and a wheat-hose, covered and fitted with perforated cones on which the wheat is temporarily stacked, while the blast of hot air enters through the perforations and dries the bundles. The wheat is then taken to an elevator provided with a blast fan, also worked by the steam-engine, and which blast fan propels each bundle through a long and wide table or atmospheric hoist to the top of the stack where it is to be stored when thus dried.

By a modification of his process, rather confusedly and wordily described, Mr. Gibbs mentions that 45 lb. of "grass saturated with the heavy morning dew was dried into 9 lb. of bright green fragrant hay in fifteen minutes, by maintaining a steady temperature of 320° for the ingoing air. This [he adds] was my first experiment with steam-power in lieu of hand labour; but I have since, with my smallest model, succeeded several times in drying grass in a similar condition into perfect hay in six minutes, using a temperature of 380° and a velocity of 1,650 revolutions per minute."

In conclusion, the author says:—

"If it be remembered that this new adjunct of the steam-engine begins its work with the first crop of hay, can next be applied to wheat, oats, barley, and the whole range of cereals, is then at hand to finish the second crop of hay, and enables us to dry the artificial grasses at any season of the year, it would seem as if it were destined, perhaps at no very distant period, to complete that perfect circle of systematic husbandry which now begins with the steam-plough and ends with the threshing-machine.

When continuous employment can once be found for the 'iron horses,' we may hope to see them on every considerable farm in the kingdom, first breaking up and cultivating the soil, next mowing, reaping, and gathering the produce; and, finally, passing from field to field and from farm to farm, saving, drying, and bearing home the harvest."

Meantime, and till this good time has come (and no doubt it is coming), the world still wants some rough and ready means of harvesting crops in wet seasons.

THE INQUIRY AS TO THE FAIRFORD WINDOWS.

Sir,—In my former letter I alluded to certain specific differences that existed between the works of Albert Dürer and the Fairford windows. I shall now endeavour to show that the motives, the sentiment, and the principles under which both artists worked, were no less at variance. The artist of the windows was altogether an artist of the Middle Ages. He obeys the traditions, and confines himself entirely to the conventions of ecclesiastical art. His thoughts never stray out of their beaten path. His beauties and his defects are those of his school. The uncouth drawing that appears in the nude and lower extremities is not the result of youthful imperfection, but of the settled conviction of one who has not recognised scientific drawing as an artistic necessity. It is conventional, as is also his treatment of his subjects, and can be paralleled in abundant instances in the works of the Flemish school, in sculpture as well as in painting. The positive, quaint, almost melancholy air of the single figure of the prophet and apostles, pleasing as it is, is somewhat monotonous; no great distinction of character is attempted, by which the personality of the artist could be made known from amongst his contemporaries. Now in Albert Dürer we have quite a different man. He belongs to the *cinque-cento* school of art, rather than to that of the Middle Ages. Educated, as he must have been, with all the traditions of ecclesiastical art around him, he obeys them or neglects them at his pleasure. His ardent—nay his devoted—study of nature

appears in all his works, small or great. He is no conventional draughtsman, but one who has studied from the living model with a thorough knowledge of its anatomical construction. The splayed foot of the Flemish school, as in the Fairford windows, is impossible to Albert Dürer, and is not found in a single example known to be by his hand. It is equally impossible that so great a student of nature, animate and inanimate, could have drawn the ass and horses in the east window of the above-named church. His licence in the use of costume is like the freedom from restraint that marks him in every particular. He composes a costume for his Roman soldiers which is neither Medieval nor antique, nor of his own time, but made up of all sorts of elements; so also of other figures. Energy and power are his chief attributes: he shrinks from no difficulty, but grapples with it, where others have avoided the contingency. Let us examine, as an illustration, his treatment of the subject of the "Agony in the Garden," as expressed in the "Small Passion." And here let me observe that, in alluding to this series, I do so on account of its being favourable for such examination. If the Fairford windows cannot bear this test, they have but small chance with the larger and more important works. Most artists, in the treatment of this subject, have declined to represent the anguish of that terrible hour. The figure of our Lord is usually shown merely as praying with the sleeping disciples about him. But here, the almost convulsively-clasped hands and bowed head speak with bitter truthfulness of the mental agony of the moment, expressed in the words, "Father, if it be possible let this cup pass from me." The pathos of this little composition finds no parallel at Fairford, and in his larger composition of the same subject A. Dürer again differs from himself and the ordinary treatment, whilst the artist of the windows keeps to the old path trodden before him. The architectural background must also be contrasted with those of the two works on "The Passion," because the difference between them shows that the minds of the two artists ran in diverse directions. At Fairford all the backgrounds are Medieval; in A. Dürer's, Classic, or quasi-Classic. The distinction is important, as it shows that, whilst the one extended his thoughts beyond his own time, the other was content to represent his subject, in true Medieval conventionalism, as if the occurrences were of his own day.

Whilst upon this subject, I may allude to Mr. Taylor's inquiry of Mr. Clayton respecting identity of background at Fairford with Nuremberg details.* The towers, &c., in the window may easily be illustrated in old towns on even the Lower Rhine, as at Andernach, as well as in the old Belgic towns. But a glance at Braun's views published in the sixteenth century will show that it is not necessary to travel much beyond the German Ocean to illustrate the scenic backgrounds at Fairford. Of the style of the canopies, I stated at the meeting of the Architectural Institute on the 6th inst. that not a single example of Nuremberg detail was visible there,—indeed, I exhibited a tracing from German glass in my possession, showing the distinction. I also stated my opinion that the canopies were distinctly Flemish.

Having thus stated what, in my opinion, are distinctive differences fatal to the attribution of the windows to the hand of A. Dürer, with whose special style I find no agreement, it may be interesting to point out other works of the same age in our churches, having a close analogy with them. In the north transept of the Abbey Church of St. Alban is a representation of the "Incredulity of St. Thomas," in mode of treatment and character similar to that at Fairford. Among the very pretty examples at West Wickham, Kent, perhaps a few years earlier in date, we find details similar to some in the windows under consideration. Such, for instance, as the sword in the hand of St. Catherine, crown, &c., and the head of St. Christopher will certainly compare with the best of those at Fairford. But the very curious series of wall-paintings in the Lady Chapel at Winchester Cathedral, though almost effaced, of great merit as designs, contain many indications of being executed by one of the same school and period. The urban worn by some female figures in the windows, as also the executioner in the "Judgment of Solomon"—a remarkable and very distinct costume,—the ample skirts of the females generally, the broad-toed shoes, all ap-

* See p. 845, ante.

pear in the paintings. Now, these are valuable for comparison in one point at least,—viz., they furnish a date. The paintings were executed by Prior Silkeste in 1489. Now, I utterly throw from this inquiry all tradition. I place no trust in it. But working from independent sources, comparisons of costume and the like, I should certainly place the date of the Fairford windows in the fifteenth rather than in the sixteenth century. In fact, every bit of evidence, given out by themselves, points to that conclusion. There is another very interesting work for comparison that is Flemish, having close analogies with the costume in the Winchester and the Fairford works. I allude to that magnificent volume of the "Roman de la Rose," Harl. MSS. 425, in the British Museum. It is many years since I have examined it, but I have memoranda which certainly refer to it, with the above, to a common school of art. This work dates about 1480. I much regret that when at Fairford I neglected to note particularly the details of the kneeling figure in armour in the west window of the south aisle, because here we should certainly find data which would solve this interesting point to at least within a year or two. As it is, looking upon the subject in a purely archaeological point of view, the date of the windows must not trespass much beyond the boundary of the fifteenth century. The Dantesque picture, whose identity with the windows Mr. Taylor could perceive, yet singularly enough not how much it diverges from the style of A. Dürer, now takes its place as a witness for the attribution of them to the Flemish school (*vide Builder*, 7th instant), and also bears upon the question of date as the artist, Dierick Stuerhout, died in 1478, close upon the time in which the above referred to works were executed.

Supposing that we admit Mr. Holt's postulate that A. Dürer was engaged at one period of his life in designing for painted glass, which is probable enough, yet this is as far as ever from proof that the Fairford windows are by his hand. Many others were working in the same direction, and our task is to decide by the *only* certain means left us, viz., comparison of styles, whether they are by the hand of Dürer or from one of another school. No amount of personal history, short of direct proof, can stand in the way of this test. To sum up in brief, my objections are:—1. That the mind of the artist of the windows and that of A. Dürer, as shown in the treatment of the same subject, differs materially. 2. That he is inferior in artistic ability and knowledge. 3. That the details of his work, costume, architecture, &c. do not coincide with those shown in A. Dürer's compositions.

J. G. WALLER.

DANGER IN THE CEILING.

YOUR correspondent very properly calls attention to the accidents from the fall of plaster ceilings. I think, however, that these mishaps sometimes take place not through any scamping in the work, but owing to the plasterers fixing the laths so close that no proper key can be formed behind; hence, either vibration or a sudden jar will detach considerable portions. Sometimes, also, floors are constructed with a slight camber, and the plasterers in their endeavours to make the ceilings under them perfectly level increase the thickness towards the centre, so that the additional weight alone breaks the key and brings down the plaster.

While on the subject of ceilings, however, I have a caution to give. Possibly some of your readers may know a small covered way called Trinity-place, next to Stanford's, the publisher's, at Charing Cross, leading to official chambers in the court at the rear of Northumberland House. This passage is 6 ft. wide and 35 ft. long. The ceiling consists of eight iron joists, with Yorkshire rag stones bearing upon them. Passers-by supposed this to be mere fireproof construction. Not so, however; for it seems the party-walls between the houses facing Charing-cross rested on the centre of these cast-iron joists, which were put in about thirty-five years ago. On the night of Saturday, the 14th inst., loud reports were heard; and on Sunday morning, by a timely discovery, it was found that seven of the cast-iron joists had snapped in the centre, and it was a providential circumstance that a great catastrophe did not take place. Fortunately labourers were at hand; the front wall was shored up, and stout timbers wedged up under the cast-iron joists, sufficient to prevent further

mischiefs. A more striking instance could hardly be found to show the great danger of using cast-iron in such positions. It was suggested that the wires of the Electric Telegraph Company, which touched the iron, might have had some effect upon it; but being sheathed with india-rubber, they could have had no injurious influence upon the metal. B. F.

SIR,—The suggestion of your correspondent, of straining wires across bad ceilings to prevent their falling, is very good in its way, but will only apply in cases where the surface of plaster is sufficiently hard to resist the cutting of the wire; besides, the process of fixing will be attended with considerably difficulty. My remedy for old cracked or dangerous ceilings is papering. The strength and durability of paper in this respect is almost incredible, and very little known. Ceilings with a very threatening aspect, and appearing in a very bad way, have, to my knowledge, been sustained twenty years or more by two or three coats of paper. In extreme cases, brown paper, well lapped previously to the white or lining paper being laid on, is necessary.

I can say, after many years' experience in this branch of the building trade, I have never known it to fail, and can recommend it both as a remedy and a preventive.

THOMAS DAWSON.

THE SPIRE OF SALISBURY CATHEDRAL.

A CORRESPONDENT writes thus:—"Some weeks ago, being in Salisbury, I was assured by a gentleman who resides in the Close, and is connected with the cathedral, that the beautiful spire was not constructed of stone, but of some composition of lime or cement, resembling concrete. He said also that our forefathers had a knowledge of such mixtures, which has been lost. This was a new idea to me; but having read several of your recent articles and letters on the subject of cement or concrete structures, I see no reason to doubt the accuracy of my informant's statement. If you will be good enough to allow this to appear in the *Builder*, it may elicit interesting information as to the real material of which the Salisbury spire is made from any one who may have examined its nature."

This notion seems to be somewhat extensively entertained, for within three weeks we have received the inquiry from three different quarters. It may be as well, therefore, to set it at rest definitely, and this we are able to do with the authority of Mr. T. H. Wyatt, and Mr. Fisher, the clerk of the works at the cathedral. The latter gentleman, we may say, and his father before him, have had charge of it for about 100 years, and he knows every stone in it. The statement, then, is incorrect. The spire is built of Chilmark or Tishny freestone ashlering, solid. The tower is built of the same material, but is not solid, being filled in with a very hard material, similar to concrete of the present day: this filling has hitherto been found to be very firm, and some statement with regard to it has probably led to the misapprehension as to the material of the spire.

ROAD-MAKING.

THE paragraph of "X. Y. Z." on roads seems to have attracted attention, and my endeavour to enlighten his darkness by quoting from some of Telford's specimens has aroused a host of writers anxious to question the enlarged knowledge and experience of the great leviathan of road-makers.

I am not disposed, even if you would afford space, to nearnith the subject of Telford v. M'Adam roads, as that subject was thoroughly investigated and sifted by the last generation of engineers, and all the scientific men of that day acknowledged the superiority in every respect of the system of constructing roads as laid down by Telford over those constructed by M'Adam. It was scientific and more durable, and therefore cheaper; it lessened the tractive power of moving bodies as established by many experiments, and therefore lessened the labour of horses, and promoted economy of transit,—important points in these days, and don't so in those of inefficient communications. Your correspondent "Pro" takes exception to the laying on of 6 in. of metal at one time.

That was part of Telford's practice in making new roads: it has been found to answer in numerous cases, and I have known 12 in. put on in one coat in the iron districts of Staffordshire and South Wales without any great inconvenience, as the covering of fine cluders or "binding" soon formed a smooth surface for the feet of horses and the wheels of carriages.

And, if your correspondent has not tried the effect of the steam-roller on newly-laid metal 6 in. or more in thickness, with just sufficient "binding" to fill up the interstices of the stones in forming and consolidating a roadway, I would recommend him to try the experiment, and let us have the advantage of the result.

As to the assertion that M'Adam roads are cheaper in town than pavements, "Pro" cannot be aware of the numerous experiments that have been made and data derived from investigating this subject in London, Liverpool, and other places; and I dare say if he could procure the trustworthy reports of Messrs. Haywood, Newland, and others on this matter, he would rather modify his opinions.

If you take the first cost of a well-constructed pavement, and the annual wear and tear, and compare it with a macadamized road under similar circumstances, you will find the advantages are materially in favour of a pavement, which was candidly admitted by Sir James M'Adam in his evidence given before Parliament on this subject. There are other questions to be considered besides the mere comfort of horses travelling over roads; the best surfaces for them to travel swiftly over are not always the best for moving heavy weights. We have to consider the relative power required to move a given weight, and that surface that will economize the labour of draught to the utmost degree is the best adapted for the streets of towns.

Paved surfaces are not always slippery; there are millstone grits, syenites, some granites and other stones that are not slippery, and, if well laid on a good foundation, with open joints crammed with fine gravel or stone chips, they will make a fine foothold for horses.

Mr. Morgan appears to be also a disciple of M'Adam, and takes exception to a foundation for a roadway; while I consider, with Telford, that it is a *sine qua non*. We do not want an elastic surface that would obstruct heavy weights at every foot as they advance, but one that would carry and support weights unyieldingly as on our railways. I have travelled on railways with a yielding roadway, but it is not pleasant; it forcibly reminds me of being afloat in a small boat on a short and chopping sea, and must involve a great sacrifice of moving powers.

I think a solid foundation for a roadway, of concrete or otherwise, as essential as one for a house, a castle, or a bridge; it is the neglect of this that renders the streets of many of our towns so very unsatisfactory.

Again, he objects to the "binding" as applied in Telford's practices; but that serves to fill the interstices of the stones, and to cement them together, and forms a smooth surface for horses' feet and the wheels of carriages; but the system of applying scrapings or street sweepings, as adopted by the late Pigott Smith in Birmingham, made their streets more like ploughed fields when applied, very heavy for the traffic while consolidating, and an intolerable nuisance to the inhabitants. In reconstructing a roadway I should pursue the course I have indicated above, and as I have carried out on hundreds of miles of road in this country and abroad; but in ordinary and casual repairs I should pursue the system of coating and patching, of just sufficient thickness to maintain a good surface and a correct cross section. No precise or exact thickness of coat will apply in all cases.

I should "lift" if necessary, and the road was strong and would bear it, but "lifting" weakens the foundation of a road, and, I believe, has been carried sadly too far in this country, as road trustees and bondholders know to their cost.

The use of water to roads in the winter months is unnecessary and injurious, as we have frequent showers of rain quite sufficient to assist in the setting of the metal, if all the other matters are properly prepared and arranged, as it is only during the winter months (October to March) that the principal repair of roads and streets should take place.

As to the policy of laying on metal on dirty surfaces, such as are some of the metropolitan roads during the winter, ankle-deep in mud, without any previous preparation, this would be absurd; a thin coat, or sprinkling of stones, as

suggested, would be lost: they are obliged to apply a thick coat that would lead the traffic clear of the seaway of thick, liquid, floating mud.

The object of screening metal is to take out a part of the dirt that collects in the course of quarrying, carting, and breaking the metal, as the proportion is usually too great to fill up the interstices of the stones, and soon appears on the surface in the shape of mud: the application of binding on the surface of sufficient quantity to work in and fill up the interstices, is found in practice the better plan, as it works down the more readily, and sets more expeditiously. I think I have noticed the principal objections of your correspondents, which I did not originally intend, but the importance of the subject unwittingly drew me on. B. BAYLIS.

HYDE PARK.

MAY I be permitted to point out in your columns to the authority to whom we are indebted for the present beauty of Hyde Park, an improvement which may appear trivial until the result has been shown?

The Achilles statue, which would be seen to stand out with great effect on entering the gates at Hyde Park Corner, is now completely shrouded from view by the trees in front of it. If two or three of these were removed to the back of it, and a bed for flowers sunk in the slope leading up to it, this place, which is so much frequented during the season, would then possess all the beauty which can be given to it. A. P.

CONDITION OF FARNCOMB, SURREY.

LOCAL BOARDS OF HEALTH.

I LEARNT from your paper some time ago that a sanitary deputation waited upon the Duke of Marlborough to represent the defects of the present sanitary laws.

The organization of a central governing power has now become a necessity of the time. Members of local Boards of Health in many instances are quite incompetent, thereby saddling the ratepayers with unnecessary expenditure. It is not much to be surprised at. How can it be expected that the class of tradesmen and farmers who generally compose a country local Board of Health can have any idea as to the best plan of obtaining a water supply to a town, or the best means of sewerage and disposing of the sewage, and many other questions connected with sanitary engineering? And as they have their daily business to attend to, I consider it is hardly fair to expect more of them than they do at present. I consider the wholesome sanitary affairs of England ought to be in the hands of the Government, as towns or districts could then be grouped to advantage.

The present Boards of Health, I will admit, are adepts at contention, and waste much of their time thereby, and often create a party spirit in the district, which is much to be regretted, to say nothing of little jobbery affairs that the surveyor has generally to take upon his shoulders.

From recent statements as to the water supply to Guildford, it is seen that after laying out a great deal of money upon old waterworks the water is not fit to drink, thereby raising doubt in the minds of the inhabitants whether the bad quality of the water was not the cause of the outbreak of fever there this last summer.

I observed in the *Surrey Gazette* of the 7th of November that a letter was sent from the municipal department of the Privy Council to the authorities of the next town of Godalming respecting their water supply and drainage.

I have not heard of the fever reaching Godalming yet, but I hear it has got to the adjoining village of Farncomb, where, I am informed, the sanitary arrangements are miserably defective. The water from the sinks runs through a hole in the cottage walls to soak away in the ground. The privies in many cases are within a few feet of the wells. In thunder-storms, the cesspools sometimes overflow, and run down the streets of the village; and open ditches, full of black sewage, were covered in places with a green scum, when I was there in the summer.

What a wonder they should have fever come amongst them! Several gentlemen tried to bring about the draining of the village, but they

met with so much opposition and illwill from small freeholders owning cottage property, that the project fell through. Amongst other things, tenants occupying cottages at a rental of 2s. 6d. to 3s. per week, were told, if the draining of the village were carried out, the tenants would have their rents raised 6d. per week per cottage.

What course has been taken since the outbreak of fever in the village I do not know; but if remedial measures have not been taken, it is time something should be done.

LOOKER ON.

THE THAMES EMBANKMENT.

SIR,—This noble work stands some chance of becoming an eyesore very soon; and, as the remedy is at hand, no reason exists why every nook and corner should be considered an improvised "stopping-place." The stains are painfully visible, and certainly are becoming detrimental to the appearance of the place. The distance is great from end to end, and there is ample space within the hoarding for any amount of conveniences to be erected. The stairs leading to the embankment at Waterloo Bridge are also filthy; and, although lamps have recently been placed there, they alone will not abate the nuisance. The light of the *Builder* must shine on it. J. G.

AS TO GALVANIZED IRON FOR PRESERVING OR CONDUCTING WATER.

SIR,—A correspondent in your last week's journal inquires whether "galvanized iron" can be used for water-cisterns with safety.

In reply, I beg to state that I have turned my attention to the action of water on lead and zinc for a period of thirty years, and regret to say that "galvanized iron" (sincd iron) is nearly as injurious as lead for receiving or transmitting water intended for domestic purposes. If water is capable of acting upon lead, it will also act upon galvanized iron, and I would recommend your correspondent to substitute *slate* for the above metals,—*i.e.*, slate cisterns.

For transmitting water the pure tin pipes, or enamelled iron pipes, are preferable to any other with which I am acquainted; but the former are more expensive than the latter, though the enamelled iron are sometimes liable to impart a little ferruginous taste to the water.

HENRY OSBORN, M.R.O.P., Lon.

REPORTS ON THE PARIS EXHIBITION.

SIR,—Having unintentionally attributed, in a report I wrote on Class XVI. of the Paris Exhibition for our Government, the credit of having executed a very satisfactory reproduction of a picture of "Pride's" by Mr. Poynter to Mr. Powell, of Whitefriars, instead of to Messrs. Harland & Fisher, of Southampton-street, Strand, I desire to make any reparation I can to them for this slip of my pen.

I shall esteem it a personal favour if you will allow these few lines to appear in the next number of your Journal. M. DIGNY WYATT.

ROUNDBABOUT WAYS.

SIR,—I take the liberty of enclosing some advertisements which seem curious in their way.

The East-Indian Railway Company require tenders for 800 tons of coal and 200 tons of coke, to be made by one of three firms named. As the firms by whom the tenders are to be made are all named, what on earth is the use of advertising for them? Ordinary intellects would suppose that it would be sufficient to write to the three firms, and ask their price. There may be some wise purposes in this, but it is inscrutable.

From the other two advertisements we learn that the Admiralty wish to send six officers and 154 soldiers from Leith to Dover, and eight officers and 174 soldiers from Milford to Portsmouth. Common people might rashly suppose that with hundreds of steamers at the disposal of the Government, the way to get this service effected would be to put the soldiers, &c., in question on board one of them at one port and take them to the other; but no, tenders are required for the service, to be made on "printed forms," to be supplied by the Admiralty, and

"The bundle is in the pointing of the advertisement, which stands thus:—

"EAST INDIAN RAILWAY COMPANY. The East Indian Railway Company is prepared to receive TENDERS for the supply of, 800 Tons of best Sulphur Coal; also 200 Tons of the best Foundry Coke.

To be made by one of the following firms, viz., Messrs., &c., &c., and to be delivered at Calcutta," &c. It is not the "tenders" that are to be "made," one of the firms named, but the "coke" and the makers of coke would not necessarily tender for the transmission.—Ed.

sent in "in sealed envelopes," and no doubt, though this is not specified, to be tied with red tape. I am told there is a tradition current in Government offices that some important province or island was once given up uselessly by this country, because the "official personage" who conducted the negotiation had got the least idea where it was, and did not choose to confess his geographical ignorance. It is possible that Leith and Milford represented some far-off unknown localities, instead of places twenty-four hours apart by sea, or twelve by rail? or are these curious advertisements simply examples of the mighty power of routine? CENSOR.

RESPONSIBILITY FOR DEATH FROM DEFECTIVE PLANS.

IN the Court of Exchequer on Saturday last (Sittings in Banco, before the Lord Chief Baron and Barons Chanell, Pigott, and Cleasby), the case Moore v. Denton and Shipway was decided. This was an action under Lord Campbell's Act, by the widow of a bricklayer, in behalf of herself and children, to recover compensation in damages for the loss of her husband. It appeared that the defendant shipway, a publican, employed the other defendant, Denton, who was a builder, to construct a public-house in the neighbourhood of Finchley. Shipway also employed a man named Thomas to prepare the plans and superintend the works. In consequence of an admitted defect in the plans and the structure, a wall fell and killed the husband. It was sought to make both the defendants liable, on the ground that they must have known that Thomas was incompetent to prepare the plans and to superintend the building. The evidence went to show that he was a carpenter by trade, and had acted as foreman of carpenters and as general manager to a builder. The trial took place before Mr. Baron Pigott, in Middlesex, and resulted in a verdict for the plaintiff—damages, 600*l.* It transpired that the plaintiff was not likely to realise the fruits of her judgment against Denton. During the present term a rule was obtained on the part of Shipway to set aside the verdict for the plaintiff as regarded him, and enter a non-suit, or for new trial.

Mr. M. Chambers, Q.C. (with whom was Mr. J. Bridge), had the honour to address the Court. He contended that there was evidence to show that Thomas's incompetency must have been known to Shipway.

The Court (without calling upon counsel to support the rule) said the rule must be made absolute to set aside the verdict against Shipway, and enter a verdict in his favour. They did not think the evidence proved that Thomas's incompetency was known to Shipway. A foreman of carpenters and a manager to a builder might be perfectly competent to do the work which shipway employed Thomas to perform; and it was clearly Shipway's interest to entrust the work to a competent person, as he was laying out a large sum of money upon the building. Under these circumstances their judgment would be in favour of Shipway.

CASES UNDER METROPOLITAN BUILDING ACT.

ALTERATIONS.

At Marlborough-street, Mr. Edwin Bull, architect, Holes-street, was summoned before the magistrate by Mr. Jennings, district surveyor, South Marylebone, for certain fees alleged to be due for alterations to a house, No. 9, Duke-street, Portland-square.

It appeared that the house had been rebuilt, and a claim for district surveyor's fees made in due course, one fee being "for inspecting arches under public ways, &c.," which was objected to by the defendant, on the ground that the arches had not been touched. On this objection being made Mr. Jennings withdrew his claim, substituting a tender of 7*s.* 6*d.* for alterations made to buildings the roof had been covered in, such alteration having reference to the cellar in front of the house, and being explained by the surveyor to mean the taking down of a portion of the area wall on which the area railing stood. This alteration the surveyor contended entitled him to half the fee charged on a new building.

The defendant denied his liability, contending that what had been done was by way of necessary repair; and further, that vaults and cellars under public way could not be deemed "buildings" under the Act.

The magistrate was of opinion that a cellar was a building, and that taking down a portion of the area wall was the same as dealing with the external wall, entitling the surveyor to his fee, and made an order accordingly. He thought it, however, a hard case.

SANITARY MATTERS.

At the Clerkenwell Police Court, James Clark, of Union-square, Islington, was summoned before Mr. Cooke, at the instance of the authorities of the parish of St. Mary, Islington, for having a workshop so crowded, while work was carried on, as to be dangerous or prejudicial to the health of those employed therein. Mr. Robert Dunham, one of the sanitary inspectors, said he visited the premises in question on the 30th of October, and found in one room thirteen persons employed in the manufacture of artificial flowers. The length of the room was 18 ft., breadth, 13 ft., and height 10 ft.,—2,340 cubic feet, giving to each person employed 180 cubic feet. The superficial feet of flooring was 234, giving to each person 18 ft. Dr. Ballard said the cubic feet of air allowed to each person was not enough. There was a partition in the room which did not reach the ceiling by 4 ft., and, perhaps, if that were taken down, the room would be sufficient for the purposes of the parties employed. After a long discussion between the magistrate, Dr. Ballard, and Mr. Ricketts

for defendant, it was agreed to remove the partition; and, if that answered the purpose intended, all proceedings would be stopped.

A correspondence has taken place between the new Archbishop of Canterbury (Dr. Tait, late Bishop of London) and Mr. R. Arthur Arnold, respecting recreation-grounds for the poor in Lambeth, the latter suggesting that a portion of the lands attached to Lambeth Palace might be advantageously devoted to this purpose. In reply to a communication to this effect, a letter has been sent informing Mr. Arnold that "his letter shall receive full consideration," but that the new prelate "is not at present in a position to enter upon the subject of it." Mr. Arnold is also reminded that "the late archbishop allowed the use of the Lambeth Palace grounds to the cricket clubs at Lambeth."

There is typhoid fever in Keswick, where a man has just died of the disease, which, it is said, was solely occasioned by the exhalations of decomposing matter in a loathsome pit, over which it was his misfortune to lodge.

MANAGEMENT.

The part of the approach to the New Meat-market east of Farringdon-road was opened for carriages on Tuesday morning. One of the water companies took the opportunity of opening the roadway of the section west of Farringdon-street (leaving room for one line of vehicles to pass) on the same morning, having neglected availing themselves of the six weeks' time they had to effect their purposes.

SOCIETY OF PAINTERS IN WATER COLOURS.

The seventh winter exhibition of so-called Sketches and Studies (427 in number), by the members of this society, includes many charming works, but differs very little, as we have had occasion to say of their winter exhibition before, from the ordinary spring show. It seems to us it might be as well for the Society to recognise this fact, and to lessen the inducement that may thus be given for hasty and incomplete work, that they should to a certain extent limit the number of members, and limit to a certain extent the right to exhibit. We throw out this hint as one worth consideration, previously to March next, when Associates are to be elected. If the Society in return should desire us to select for ourselves six or eight pictures as a present out of the present collection, we should presently present a list with a strong presentiment, that in our presentment we were naming the artists to whom the exhibition is the most indebted, and it would run thus:—Mr. Gilbert's "City of Worcester" (92); Mr. Lundgren's "Spanish Gipsy" (98); Mr. Lamont's "Illustrations of Bonny Kilmory" (133); Mr. Burne Jones's "Head" (160); Mr. J. D. Watson's "Waiting for the Boats" (186); Mr. Birket Foster's "Sea" (191); Mr. G. H. Andrews's "Ebb Tide" (273); and Mr. F. Walker's "Lilies" (367). There are some others as good, but we are not avaricious.

METROPOLITAN BOARD OF WORKS.

At a meeting of the Board last week, the first business was to receive tenders for new sewers and filling up the open ditches in Wood-lane and Lawn-place, Shepherd's-bush. There were seventeen competitors, the highest tender being 12,200*l.* and the lowest (of Messrs. J. & S. Williams) 6,500*l.*, and the latter was, on the motion of Mr. Freeman, seconded by Mr. Layman, accepted.

Mr. Silas Taylor moved, "That the Board do limit the amount to be paid in one year for local improvements to a sum not exceeding one halfpenny in the pound upon the rateable value of property chargeable for that purpose." He did not consider it fair that the ratepayers living in remote districts should be called upon to pay for City improvements.

Mr. Healey seconded the resolution, believing it was necessary to limit the amount of expenditure.

A long discussion ensued, during which it was urged that the Government should aid the Board in making improvements such as the Thames Embankment, which was a national improve-

ment. It was suggested that a small tax in the shape of a halfpenny or a farthing stamp should be charged on metropolitan railway tickets, the revenue to be expended on metropolitan improvements. It was further argued that the great improvements benefited the community, for which all should contribute. Finally, it was agreed to refer the question to a committee.

FROM SCOTLAND.

Edinburgh.—The offer of an ornamental fountain for the adornment of the city having been received, says the *Scotsman*, with objection and opposition in almost every quarter, rather than with encouragement or thanks in any, is now likely to be withdrawn. The suspension of the Caledonian Railway Company's station works at the west end of Princess-street has indefinitely postponed the prospect of a site being found for the Ross fountain in that quarter; and the only place now open appears to be that originally proposed in the terrace of East Princess-street-gardens. If that site is generally considered to be eligible, no time should be lost by parties who desire to secure the gift of the fountain in taking action in the matter; for the intending donor is so wearied by delays that he is now resolved to bring the matter summarily to a close.

CHURCH-BUILDING NEWS.

Ewyas Harold.—The church here, which had been in a state of decay for many years past, has now been restored. The work of restoration has been to take down a portion of the tower, which was very much shattered, and rebuild the same, replacing stone for stone wherever possible, and adding new stonework of its original form. The white-washed ceilings have been removed in every instance, and have opened to view an oak-framed roof, which has been renovated and re-covered with local stone tiles and ornamental cresting; the timbers have been oiled. New one-light and two-light windows have been inserted alternately in the nave, and a new three-light window in the east end of the chancel. An archway has been opened out between the nave and the tower, giving increased accommodation for sittings. A new vestry has been erected on the north side of the chancel, and at the south doorway a new oak porch has been built. A heating apparatus of simple construction warms the edifice. The passages are paved with Godwin's tiles. The tower has been underpinned at the north-east corner, the sinking of which had caused a large rent, and the north wall of the nave, which bulged out badly and had recently been propped by modern buttresses, has been rebuilt. The windows throughout are filled with cathedral tinted quarry glazing. The pulpit, the open seating, and the stalls (the original worked in) are wholly of oak, and are made up principally of specimens of sixteenth-century carved panelling, the retables in particular. The doors, lectern, and altar-rail are of oak, the latter being supported on ornamental iron standards of a foliated design. The bells were originally five in number, but some of them were cracked. They have since been recast by Stainbank, of London, and one added. They were hung by Messrs. Alfred White & Sons, of Besselsleigh, Oxfordshire, bell-hangers for Mears & Stainbank, and who, with other members of the same family, constitute the set of Appleton chango-ringers. The bells, in addition to the name of the founder, bear the following inscriptions:—"Treble, 'S. Ethelbert—Blessing;" second, "S. Mary—Glory;" third, "S. Peter—Thanksgiving;" fourth, "S. David—Honour;" fifth, "S. Nicholas—Power;" tenor, "S. Michael—Be unto our God for ever and ever. Amen. W. Jones and T. D. Kedward, Wardens." In the chancelryard is a restored cross, a small part only of which belonged to the original. The whole work has been executed by local contractors, Messrs. Edwin and James Giles, of Ewyas Harold, from the design and under the direction of Mr. G. C. Haddon, of Hereford and Great Malvern, architect.

Folkstone.—The report of Mr. Christian, the architect appointed to make an estimate of the probable cost of thoroughly repairing the parish church, has been presented to a meeting of the committee, the Rev. M. Woodward in the chair.

The several items and the expense of each were as follows:—In south transept—rebuiding the wall, raising the gable, alteration of the windows, roofing, re-arrangement of tower-stairs, removing the south gallery, and preparing the floor for the reception of the organ, 237*l.*; in the south aisle of the chancel—rebuiding the wall, inserting new windows, and a new roof, 165*l.*; in the north aisle of the chancel—new windows, new doors, and thoroughly repairing 186*l.*; repairing and cleaning the stonework of the tower, 55*l.*; refitting the nave seats, 104*l.*; new choir-stalls and re-arrangement of corporation seats under the tower, 135*l.*; colouring the ceilings, &c., 90*l.*; heating the church with hot-water pipes, 250*l.*; making the gas-standards uniform throughout the church, 100*l.* Ten per cent. might be added for contingent expenses. It was announced that about 400*l.* had already been promised. After some little consideration, it was resolved to proceed at once with the south transept, the north aisle of the chancel, the cleaning of the stonework under the tower, the organ, and the new choir-stalls, as it was not thought possible to get the heating apparatus ready for this winter. It was also decided that a complete canvass of the town should be made.

Burwell.—The chancel of Burwell Church has been re-opened for divine worship. The chancel has been erected at a cost of upwards of 1,300*l.* All the ancient carved panel work, the decorated screen, and carved oak roof have been restored. The roof has been re-leaded, the plaster removed from the outer walls, the windows renewed, and filled with tinted glass,—the carved niches restored; oak stalls and seats erected in the place of the square pews, and the floor laid with encaustic tiles. The eastern wall is faced with plaster, and it is hoped a suitable retable will soon occupy the place of this unsightly wall.

Eltham.—The Bishop of Rochester has laid the first stone of the new church, to be called the Church of the Holy Trinity, at Eltham, and also opened the new national school-rooms. The church is being erected by public subscription, on a site granted by her Majesty. Mr. Street is the architect. The schools, with the master and mistress's houses, have been erected partly by means of funds belonging to the school, but principally by the subscriptions of the inhabitants. They are large enough to accommodate 400 children. Mr. Tasker is the architect. Mr. Naylor, of Rochester, is the builder of the church and schools.

Upton-on-Swern.—It has been resolved to take steps to promote the building of a chapel of ease capable of containing 150 persons, on a site in a central position, adjoining the Hook-road, offered by Major Martin. For this purpose a committee has been appointed, and Mr. G. Row Clarke chosen to be the architect.

DISSENTING CHURCH-BUILDING NEWS.

Keighley.—The United Methodist Free Church at Keighley has been opened for divine service. The foundation stones of the new buildings for chapel and school were laid a year ago last Shrove Tuesday. The buildings are in the Gothic style. The general plan consists of a parallelogram, 86 ft. long, and 48 ft. wide within the walls, exclusive of an apsidal projection 20 ft. deep at the rear for orchestra. The interior is divided into nave and aisles, by a series of ornamental iron columns, from which springs an arcade of seven arches on each side, which supports open hammer-beam trusses across the nave; these, and corresponding trusses over the aisles, have curved ribs or braces on the underside. A gallery runs round three sides of the chapel, three seats deep below the aisles on the side, and nine deep on the front end. All the seats are open and uniform. On the ground floor there is a clear width of about 3 ft. between the seat backs. A raised platform, in panelled compartments divided by buttresses, and with an ornamental iron balustrade on the top, occupies the place of the usual pulpit. A similar balustrade is carried round the communion. The exterior shows the triple arrangement of nave and aisles, with coupled doorways in the centre of end, opening into a corridor 8 ft. wide, laid with encaustic tiles, and extending between the gallery staircases, which are of stone, on each side. The staircases on the left of the entrance corridor is carried up in a square tower, surmounted by an octagonal lantern and spire, the height of tower and spire together being 125 ft.:

the space is used as a ventilator to the buildings. Over the coupled entrance doorways is a five-light window, filled with tracery in the head. The sides of the building are divided into seven bays, each by deeply projecting buttresses; each bay with two heights of two-light windows, with tracery heads. The upper lights are alternately circular and gabled, the latter running into and intersecting the aisle roofs, and terminated by iron finials. The large end window, the circular side windows, and the tracery of all the windows, are filled with stained glass, and the remainder have stained ornamental margins round, all executed by Edmundson & Son, of Manchester. The floor of the chapel is raised about 6 ft. above the street level, and in the basement under the chapel, and the same size as the chapel, is a school-room, lighted on the sides by a two-light window in each bay. The principal entrance to the schools is at the rear of the chapel, but communication is also provided by a staircase in the tower, under the gallery stairs, so that the scholars can pass from the school-room into the gallery of the chapel without going outside the building for the purpose. On the level of the schools are class-rooms, store-room, stoker for heating apparatus, arrangements for heating water for tea meetings, and other conveniences. At the rear of the chapel, on the ground level, are two large class-rooms, and vestry, lavatory, water-closet, &c. The chapel is lighted by star lights suspended from the arches of the arcades, with brackets under the galleries. The premises will be surrounded by a suitable iron railing, with iron gates and stone piers at the entrance, the piers surmounted by a couple of globe lamps. The whole of the wood-work is stained and varnished, and the iron-work painted in colours and part gilded, under the architect's direction. The different divisions of the building are warmed by the warm-air system of Messrs. Haden & Sons, of Trowbridge. The excavator, bricklayer, and stonemason's works have been executed by Mr. John Smith; the plumber and glazier's works by Mr. James Harrison; the plasterer's work by Messrs. Wilson & Ackroyd; and the painter's work by Mr. G. Lonsdale, all of Keighley; and the carpenter and joiner's works, by Mr. Thomas Smith, of Harden, near Keighley. The total outlay is about 5,000l. Mr. William Sugden, of Leek, Staffordshire, is the architect.

Walsley (Derbyshire).—A new Wesleyan chapel has been opened for divine service here. The edifice is built of the pressed bricks of the neighbourhood, with stone dressings from Woolley Moor, and consists of a chapel 54 ft. long, 23 ft. wide inside, with a porch at one end, and two entrances from the same to the aisles; also two school-rooms for girls and boys, attached to the chapel as transepts, shut off by sliding doors, which are opened during service, and obviate the confusion of bringing the children into the chapel. A vault is provided underneath the school-room to receive the warming apparatus, and for other general purposes. The style of architecture is Gothic, of the early part of the fourteenth century. It is fitted up with open benches of deal, slightly stained, as well as the main timbers of the roof. The windows are glazed with quarry plate-glass, with iron casements. The works have been erected by Mr. George Heath, of Chesterfield, builder, from the designs of Mr. S. Rollinson, architect, Chesterfield. The cost is 750l., exclusive of any cartage or fence walls.

Books Received.

Illustrated Books from Messrs. Routledge.

"Pictures from Nature," by Mary Howitt, is a charming little volume. To twelve illustrations of the Months, printed in colours, Mrs. Howitt has written with graphic truthfulness and feeling twelve descriptive papers, which bring the events and belongings of the various seasons forcibly and usefully to the mind. We transplant a couple of her paragraphs from the end of "October," relating to an application of science to the labours of the husbandman:—

"The thrashing-machine has given a new feature and a new voice to the country. Our fathers knew it not, and poets have as yet let it untraced in their descriptions of rural life. Listen! There it is humming and booming over stubble-field and wood, like a gigantic bee, or the hive of a whole district united in one great apian chorus. It is the great bee of science sipping at its work; tripping in its newly-created power of absorbing whole harvests, of separating straw, and grain, and chaff; by a speedy analysis of inessate energy, that laughs to scorn

the flail and the winnowing-fan of all the ages and nations of the past.

Wonder on, old Jonas, at what will come next. But of this be sure, that before many generations are past, the flail will be a piece of antiquity, known only as resounding through the pages of the old poets, chiming in with the ring of the blacksmith's hammer, through the dark winter mornings of their forefathers. The grim Frankenstein of science, the great humming-bee of innovating times, the strong, snorting mastodon of machinery, is, if not in the next lane, at least in the next season, and will henceforth be as much a feature of October as the stubble-field and the many-coloured woods."

Some of the illustrations are better than others, but the majority well fulfil their purpose. Examined with a glass, they show more expressive drawing than the after-printings have left visible.

To the illustrations in "The Language of Flowers, or Floral Emblems of Thoughts, Feelings, and Sentiments," by Robert Tyas, M.A., we will offer no objection. These also, twelve in number, are printed in colours. They consist of groups of flowers, and are presented with delicacy and skill. Take for examples the first two we open upon, the group of Honeysuckle, White Heath, and Scarlet Ipomoea, and that of Lilac, Spiderwort, and Marvel of Peru. A few years ago these alone would have been cheap at the cost of the book. The volume is handsomely bound, and will please the young ladies.

The same publishers have issued a fourth and prettily edition of Mrs. Jameson's "Memoirs of Celebrated Female Sovereigns," commencing with Semiramis, the first female sovereign upon record who ever held undivided empire, and ending with that fascinating tigress, Catherine II. of Russia.

VARIORUM.

Messrs. Moxon & Co. have published the last volume of a new edition of "The Poetical Works of H. Wadsworth Longfellow," and the last volume of "The Complete Correspondence and Works of Charles Lamb." The former is edited and prefaced by Mr. Robert Buchanan, himself a true poet, and will have the advantage over previous editions of containing the complete works, divided, for the first time, into two artistic portions, the impersonal and narrative, and the personal and lyrical. The volume of Lamb's delightful Correspondence commences with an Essay on his Life and Genius, by Mr. George Augustus Sala, displaying all the vivacity, skill, extent of reading, and knowledge of persons, that distinguish this most prolific and remarkable writer.—"Everybody's Year-Book" for 1869 is an improvement on its predecessor. It contains a large amount of useful and entertaining matter, and is certainly a good "sixpen'orth."

Miscellanea.

NEW TUBE WELL.—The New South Wales correspondent of the *Times*, dating from Sydney, speaks of a tube well, which he considers superior to the "Alyssinian." The tube to be sunk, instead of being shod with a steel point and pierced with holes, is quite open at the bottom, and possesses a free cutting circumference in contact with the ground. It may be sunk through the solid rock. When this is encountered a jumper is used inside the first tube, and this having pretty free motion within the tube makes a way of larger circumference. For quitting the rubbish a tubular jumper is used, which, when filled with material, is withdrawn and emptied.

POISONING BY GAS.—One life has been sacrificed and another imperilled by a new process recently introduced at the Gloucester Gas-works, in the manufacture of gas. The new process liberates sulphate of ammonia, and it is said that means can be adopted for preventing mischievous results; but in the instance referred to there can be no doubt about the cause and effect. It appears that two workmen, named William Hale and Henry Baker, were employed at the gasworks at Gloucester, and while at work at the blacksmith's shop, seeing steam (ammonia of gas) issuing from a valve of the boiler, they tried to prevent the escape by pressing down the valve. The ammonia, however, took such an effect upon them that they both staggered and fell. They were immediately conveyed in an insensible state to the Gloucester Infirmary, where Hale died in a few minutes. Baker has since recovered.

ARCHITECTURAL UNION COMPANY.—The annual meeting is fixed to take place on Wednesday next, at the House in Conduit-street. The directors are able again to report an increase from the rentals of the several rooms and galleries during the past year, and they recommend the payment of the usual dividend of 5 per cent., which will leave something handsome in hand to meet contingencies.

A FLOUGH FOR FEES.—Last Saturday night a prisoner, by a desperate leap, escaped from the custody of a police-officer at the Forest Hill station of the London and Brighton Railway. Bugden and Smith, two warrant-officers of the Lambeth Police Court, arrested James Quinn, of Bell Green, a master builder, under an order of the Court for non-payment of certain fees to a surveyor. While Smith was procuring tickets at the Forest Hill station the prisoner made a dash from the platform. Bugden seized him by the coat, which, however, gave way, and the prisoner leaped from the platform just as a train was coming in, and escaped. Bugden was caught by the huffer of the engine and thrown down, sustaining serious injuries.

FALL OF A ROOF.—At Liverpool a sad accident has occurred in connexion with the new works now in progress for the enlargement of the Adelphi Hotel, Ranelagh-place, which has resulted in very serious injuries to one man and the narrow escape of four other workmen and a boy. The only portion of the old hotel, standing between Brownlow-hill and Copperas-hill, is the hall-room, situated over what was formerly used as the hotel kitchen, and this the men were proceeding to take down when the accident happened. Five men and a boy were upon the roof, and were about to take out the principals, and for this purpose they had knocked the king-post away, when, without a moment's warning, the whole roof gave way and fell into the room below, carrying all the men and boy with it. The roof, which was 30 ft. in length by 20 ft. broad, fell in a mass.

DESTRUCTION OF MESSRS. GRIEVE & Co.'s SCENE-PAINTING ESTABLISHMENT.—A fire broke out on Monday morning last on the premises of Messrs. Grieve & Co., the well-known scene-painters, in Charles-street, Drury-lane. The building was at least 100 ft. deep, about 50 ft. wide, and three floors high, and ran as far back as the houses in what is termed the Coal-yard. The lower part of the premises was used as stables, and at the time of the disaster several horses were there. The whole of the upper floors were used as carpenters' shops, painting-rooms, and varnish stores. A number of elaborate scenes for the Christmas pantomimes were being prepared, all of which have been destroyed. We knew the place well, and had a sort of affection for it. It was here that many of the scenes for the Revivals of the late Mr. Charles Kean were executed, in connexion with which we spent many hours in those odd yet commodious painting-rooms.

THE LONDON HOUSE PAINTERS.—On the 18th instant a lecture was delivered by Mr. Dicky Wyatt, on "The History of Decoration by Means of Colour," to the members of the West London House Painters' and Decorators' Mutual Improvement Association, at the St. John's Schools, in Kirkman's-place, Tottenham-court-road. Suspended on the walls were numerous drawings of buildings in Italy, and details of decoration, as well as specimens of textile manufactures exemplifying Persian, Chinese, and other methods of ornamentation. The lecture, besides treating of the Eastern, Egyptian, Greek, Roman and later Italian, and the French styles, explained the principles of conventionalism and imitation in decoration, the latter of which was characterised as dangerous, albeit it embodied the perfection to be attained; whilst the former had the attribute of propriety, and, being more easy of attainment, had come first in the progress of art, and even now was in vogue in some countries. The value of attention to style was also shown. One characteristic of each style was the harmony that it had in itself, and this harmony should not be omitted as a feature when new productions were required. The audience were afterwards addressed by Mr. Grace and others, who urged the importance of establishing classes for instruction in drawing, and other requisites of the house-painter's craft, and who also adverted to the necessity for securing greater durability in painters' work, especially where costly decoration was attempted.

THE METROPOLITAN MEAT MARKET.—The new market in Smithfield was publicly opened on Tuesday last. Illustrations of the building will be found in our volumes for 1866 and 1867.*

THE INTERNATIONAL EXHIBITION.—Mr. Gladstone has accepted the presidency of the Workmen's International Exhibition, 1869. The requisition, we are told, was seventy yards in length, and was signed by workmen only.

BRONZE STATUE OF NAPOLEON III.—An equestrian statue of the present Emperor of the French has just been fixed over the new gateways that lead beneath the great gallery of the Louvre into the Place du Carrousel. It is executed in half relief, in bronze, and is of great size, measuring about 14 ft. each way, and weighing nearly a ton. It is being fixed to the stonework by means of bronze bolts, screwed into sockets in the marble.

CAMBRIDGE ANTIQUARIAN SOCIETY.—At a meeting on November 16th, the president exhibited a series of plans and other documents from the Treasury of St. John's College, relating to the building of the second court. Among these were the ground, first, and second floor plans of that court, the statement of moneys expended, deeds signed by the architects, &c.; also a proposed plan for the third court, according to suggestions by Sir Christopher Wren.

UNITED STATES PATENT OFFICE AND ENGLISH TRADE BOOKS.—The U. S. Patent Office is seeking to obtain for its library copies of all illustrated catalogues, price-lists, and circulars. In many cases, where no illustrations are given, such lists and catalogues are of great service in determining the meaning of words used in the arts, and for other purposes. It is sought to make the Library of the Patent Office a place of deposit for the unrecorded literature of the arts, which would otherwise, in a few years, be entirely lost. Three copies are asked for, one for permanent deposit in the library, and two or more for the use of the examiners. Messrs. Stevens, Brothers, of 17, Henrietta-street, Covent Garden, London, will take charge and forward any that may be sent to them.

ACTION OF WATER ON LEAD.—Professor Parkes, F.R.S., of Netley, calls attention to the fact that it has always been seen that the action or non-action of water on lead could not be entirely accounted for by the usual statements on the subject; and lately Dr. Frankland has made a curious observation, which may throw light on it. He found that water which acted on lead lost this power after passing through a filter of animal charcoal. He discovered this to be owing to a minute quantity of phosphate of lime passing into the water from the charcoal. On comparing two natural waters,—that of the river Kent, which acts violently on lead, and that of the river Tyrrwy, which, though very soft, has no action on lead,—he found that the latter water contained an appreciable amount of phosphate of lime, while none could be detected in the Kent water. This observation may probably explain much of the discrepancy of evidence in respect of the action of soft water on lead.

SANITARY COMMISSION.—The London Gazette announces that the Queen has been pleased to appoint Lord Northbrook, the Earl of Romney, Lord Elcho, the Right Hon. C. B. Adderley, the Right Hon. H. A. Bruce, Sir T. Watson, bart., M.D., Sir C. Lanyon, kt., Lieut. Colonel C. B. Ewart, R.E., Mr. J. R. McClean, C.E., Mr. G. Clive, Mr. F. S. Powell, Mr. A. S. Ayrton, Mr. R. S. Aytoun, Mr. B. Shaw, Mr. J. Lambert, Mr. J. P. Eslet, F.R.C.S., Mr. H. W. Ramsey, M.D., Mr. H. W. Acland, M.D., Mr. R. Christian, M.D., Mr. W. Stokes, M.D., and Mr. S. H. Clerk, M.D., to be her Majesty's commissioners to inquire into and report on the operations of the sanitary laws for towns, villages, and rural districts in Great Britain and Ireland, so far as these laws apply to sewerage, drainage, water-supply, removal of refuse, prevention of over-crowding, and other conditions conducive to the public health; also to report upon the operation of the laws for preventing the introduction and spreading of contagious and infectious diseases and of epidemics injurious to the public health; upon the local administration of the aforesaid sanitary laws; and upon the operation of that part of the registration system which relates to certificates of causes of death.

* Vol. xxix., pp. 955, 967; and vol. xxx., pp. 261, 263.

ROYSTON HALL ESTATE, KILBURN.—This freehold estate, having a frontage to the Edgware-road, and adjoining the station of the North London Railway, has been purchased by the United Land Company (Limited) co-operating with the Conservative Land Society.

RESERVOIR OF MONTROUGE, PARIS.—Another great reservoir for the supply of water to Paris, and similar to that at Ménilmontant, is being constructed to receive the waters of the Yvanne, which are being brought to Paris by means of aqueducts. The new reservoir is situated close to the new park of Montsouris, not far from the railway-station of the Seineux line. This reservoir will contain more than 67,000,000 gallons, for the supply of the left bank of the Seine, and such portions of the city on the other side as are not supplied from other sources. The object of the reservoir being built in two stories is to obtain a pressure sufficient to supply the houses in the highest parts of the town.

SOCIETY OF ARTS.—On Monday evening last, the first meeting of the 115th session of the Society for the Encouragement of Arts, Manufactures, and Commerce, was held in the Society's Rooms, John-street, Adelphi, when Lord Henry G. Lennox, M.P., as chairman of the council, delivered an address. Mr. W. A. Gibbs was then called forward, and received the gold medal of the Society, and fifty guineas for his excellent invention for harvesting corn in wet weather. Mr. Robert Cresser, Kingston, received a certificate and twenty-five guineas for having obtained the greatest number of first-class certificates at the examinations of the Society. Mr. Le Neve Foster then produced the Albert gold medal, which had been awarded to Mr. Whitworth, who was not present. Mr. Foster was directed to forward it to Mr. Whitworth.

DOES WATER EXPAND ON BEING CONVERTED INTO ICE?—Two or three correspondents write to us to deny, "as practical men," M. Barthélemy's assertion that vessels are broken in the act of the freezing of their contents, through gas being given off freely at that moment. Their mere assertion, however, is worth nothing. A correspondent of *Scientific Opinion*, dating from St. Thomas's Hospital, writes more to the purpose. He says:—"This assertion is not true, for I have used water from which the gas has been withdrawn by boiling and exhaustion under the air-pump, and even then an iron bottle, 1/2 in. thick, and having a bore of 1/2 in. diameter, was broken into pieces. If our worthy friend makes into consideration the fact that ice is lighter than water, he must admit that it expands; and this admission will disprove his argument." Even this, however, does not quite settle the question.

MODEL TENEMENT HOUSES FOR BROOKLYN, NEW YORK.—A block of model tenement houses has been built at Brooklyn, on a plan prepared by Mr. J. A. Wood, architect. The cost of the buildings will be about 100,000 dollars. They comprise three buildings, and are located in Stanton-street. One, of 130 ft. fronts in Stanton-street, and there are two in the rear, running at right angles with the front one, back 55 ft., and closing a court 65 ft. square, which is entered through a covered way. The front building is relieved by variety in outline, so as to obviate anything like barrack form. The tenements are divided into suites of rooms, with halls or lobbies, and each contains its own kitchen and other conveniences, complete in itself. Admittance is had from external corridors to which staircases lead. They are not intended for the poorest classes, but for persons of moderate income.

TENDERS.

For completion of Nos. 5 and 6, Collingwood-terrace, Plough-lane, Battersea. Mr. Octavius Symons, surveyor:—	
Whittick	£429 0 0
Leader	385 0 0
Shillito (accepted)	375 0 0
For constructing a sewer in Arthur-street, for the Vestry of St. Luke, Chelsea. Mr. Joseph Pattinson, surveyor:—	
Wignmore	£595 0 0
Fusell	593 0 0
Porter	578 0 0
Crockett	570 0 0
Hubbard	579 0 0
Bloomfield	519 0 0
Brass	511 0 0
Hollingback & Badley	510 0 0
Whittick	497 0 0
Nesve	485 0 0
Young (accepted)	451 10 0

For a dwelling-house and shop, to be erected on the Godstone-road, Caterham, Surrey. Mr. George Robson, architect:—	
Ellis	£379 10 0
Galt	678 0 0
Francis (accepted)	650 0 0
Elliff	643 0 0

For erection of cisterns and water-pipes at St. Marybone schools, Southall. Mr. H. Saxon Snell, architect:—	
Dennis & Scruby	£195 0 0
Penham & Sons	450 0 0
Jennings	143 0 0
Jeakes & Co.	398 7 0
Potter & Sons	375 0 0

For sewers and shading tank for the Wimbledon Local Board. Mr. Charles Bird, surveyor to the Board:—	
Kent	£1,699 0 0
Brewer & Steggle	1,474 0 0
Tyler	1,434 0 0
Pizzey	1,400 0 0
Marshall	1,394 0 0
Morton & Acomb	1,375 0 0
King	1,368 0 0
Wignmore	1,350 0 0
Dickenson & Oliver	1,340 0 0
Brown & Co.	1,339 0 0
Hollins	1,320 0 0
Harris	1,296 0 0
Pearson	1,269 0 0
Dover & Co.	1,258 0 0
Nicholson	1,250 0 0
Chapel & Holden	1,233 0 0
Killingback & Radley	1,230 0 0
Hayward	1,245 0 0
Chandler & Jarvis	1,235 0 0
Frayne	1,233 0 0
Kelly	1,213 0 0
Robinson, Brothers	1,207 0 0
Tosell	1,193 0 0
Young	1,185 0 0
Falkner & Cowley	1,185 0 0
Partridge	1,171 0 0
Gardner	1,152 0 0
Bloomfield	1,149 0 0
Carter	1,129 0 0
Reed	1,097 0 0
Moxon	1,055 0 0
Floyd	1,076 0 0
Tinsley (accepted)	1,060 0 0
Barnes, Hasel, & Co.	876 0 0

For rebuilding No. 23, Villiers-street, Strand, for Messrs. Stevens & Sons. Mr. W. H. Sanders, architect:—	
Quantities supplied by Messrs. Raik & Russell:—	
Carter & Son	£1,367 0 0
Baguley	1,211 0 0
Downs	1,127 0 0
Macey	1,098 0 0
Clemence	1,099 0 0
Read	854 0 0

For the erection of a villa residence on lots 5, 6, and 7, the Ellington Estate, Ramsgate, for Mr. Cooper. Mr. John R. Collett, architect:—	
Yade	£1,095 10 0
Forsyth	995 11 0
Osborne	988 0 0
Duckett	978 0 0
Ilgar	915 0 0
Kelson (accepted)	875 10 0

For alterations and additions to a lace warehouse, in Nottingham. Mr. S. Dutton Walker, architect:—	
Simpson & Lyman (accepted)	£290 0 0
Contract No. 2:—	
Simpson & Lyman (accepted)	£35 0 0

For a ware-room and sundry additions to a bronze factory, Nottingham. Mr. S. Dutton Walker, architect:—	
Fish (accepted)	£262 14 2

For alterations and additions to a chemical laboratory, Nottingham. Mr. S. Dutton Walker, architect:—	
Simpson & Lyman (accepted)	£255 0 0

For the erection of a villa residence, with honorary w.c., &c., complete, at Chislehurst, Kent, for Mr. D. Chatterl. Mr. Joseph S. Moyer, architect:—	
Grover (accepted)	£4,076 0 0

TO CORRESPONDENTS.

W. T. F. (last week) as it would be absurd to force a builder to be back his window-frames 4 in. from the face of the wall, and yet allow him to have a wooden roof 8 ft. long and 3 ft. 6 in. wide, projecting from it. The "tool-house" in question was undoubtedly a building.—Reader (we are not able to advise on special cases. There may be salt in the plaster).—Reminis (look to your dictionary).—J. W. F. (next week).—S. D. W. (this of tenders should give names of all the competitors).—J. T. H. W. F. W. S. J. B. B. O. J. W. F. B. B. F. J. G. J. F. M. T. D. C. R. T. J. N. C. —W. H. B. J. —Lord E. —W. B. —W. & Co. —H. W. —P. O. S. —J. F. —Colony A. P. —T. & B. —H. W. —J. H. —E. —L. —T. J. H. —We are compelled to decline printing on books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

Advertisements cannot be received for the current week's issue later than **THREE o'clock, p.m., on THURSDAY.**

The Publisher cannot be responsible for ORIGINAL TESTIMONIALS left at the Office in reply to Advertisements, and strongly recommends that COPIES only should be sent.

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The Builder.

VOL. XXVI.—No. 1348.

The Globe Theatre, London.



N part of the site of Lyon's Inn, between Holywell-street and Wych-street, with a narrow frontage in Newcastle-street, a Theatre has been built, and, under the title of The Globe, was opened for public performances on Saturday evening, the 28th ult. In Lyon's Inn (formerly a hostelry, with the sign of the Lion, purchased by professors of the law in the reign of Henry VIII., and made an inn of Chancery), the Architectural Association, as many of our readers know, had its first home. The site was then taken by the luckless Strand Hotel Company, part of whose ruins, at the end of Newcastle-street, still disfigure the Strand.

The site having been excavated very considerably for the proposed hotel, the floor of the pit has been made many feet below the street-level, and is approached by a steep flight of steps from Wych-street, the pay-place being at the bottom,—a very undesirable, not to say dangerous, arrangement. A sad disaster at the Haymarket Theatre, some years ago, where a similar, but now improved, arrangement exists, will long be remembered, though the warning, it would seem, has had little effect. In Wych-street, also, are the entrance to the gallery-stairs, and that to the royal box. The ordinary boxes are entered from Newcastle-street, and are on a level with the street, so that stairs are avoided; here, too, enter the occupants of the stalls. The box-circle has five rows of seats, part being regarded as the dress-circle (at 4s. each seat), and the remainder as ordinary box seats, at 2s. 6d. The admission-money to the pit is 1s. fid. Above the boxes is a large gallery, the front row of seats in it being treated as amphitheatre stalls. The front line of the boxes forms nearly a circle, cut off at about two-thirds of its extent by the proscenium. The ceiling is domical, with a sun-light in the centre. The seats are all fairly commodious, and there would seem to be very few places in the house where what is passing on the stage cannot be seen and heard. The draught is disagreeable in some of the back seats of the boxes, and the want of a centre passage through the pit seats is obvious. The draughts in many of our theatres keep away hundreds who would otherwise be visitors.

The Globe has been built from the instructions of Mr. Sefton Parry, the proprietor, by Mr. Samuel Simpson, of Tottenham-court-road, who built the Holborn Theatre, the Queen's, the Royal Alfred, and is now engaged on the Gaiety, in the Strand. It will seat 1,500 persons, exclusive of the eight private boxes. Mr. W. Brown was the clerk of the works.

The whole of the interior decorations in relief,

comprising the dome and perforated rib round it, the proscenium, and the gallery and box fronts, were designed and executed by Messrs. White & Co., of Great Marylebone-street, in their *papier mâché* and *carton pierre*. The view we give* shows the character of the ornaments, and we may say that they are well drawn, and produced with sharpness and precision. The material offers great facilities for rapid work: thus the ceiling here was executed in the shops, and screwed up in compartments complete.

White with gold is the prevailing colour, if colour it may be called, a little blue being introduced around the anthemion, along the bottom of the box-fronts. The crimson curtains of the private boxes, with gilded frames, are effective. The appearance of the whole, indeed, now the work is new, is bright and "smiling."

An act-drop representing Stratford-on-Avon, the birth-place of Shakspeare, was painted by the Messrs. Telbin, and is spoken of as having been one of the most successful results of their skill. Unfortunately, however, it was consumed by the fire that destroyed the painting-rooms in Charles-street, Drury-lane, mentioned in our last. Mr. Buckstone immediately offered Mr. Parry one that he had in store at the Haymarket, but Mr. Telbin and his son, with a numerous staff of assistants, went to work, and produced in time for the opening, an effective view of Ann Hathaway's Cottage, at Sbottery; with two figures, doubtless intended to suggest the poet and his future wife. The scene shows Telbin "hath a way" as well as a representation of Ann.

The stage appears to possess all the necessary appliances for rapid and effective representation, so far as we have yet gone in that direction, but we cannot speak well of the accommodation behind. The dressing-rooms are insufficient in number, and not what they ought to be in arrangement; and, strange to say, there is no green-room, with a view, as we have been told, to avoid "noise." The performers engaged are, therefore, driven to the dressing-rooms, or to holes and corners, when not on the stage. A more certain way to degrade the profession than by inattention to the dignity, comfort, and requirements of its professors behind the scenes, we do not know.

The play with which the house opened, "Cyril's Success," by Mr. Byron, is itself a great success. It is exceedingly well written and admirably acted. Slight though the plot may be, the interest is unflinchingly maintained, and, as a literary production, it is entitled to very high praise. The third act especially is a masterly piece of construction. It falls especially within our province to note that all the troubles of the hero, Cyril, very well played by a new man, Mr. Vernon, result from his attending a supper given to present a testimonial to one *Lincher*, who has submitted a design for baths and washhouses, and failed to convince the committee that his design ought to be accepted. "Why are you giving him a testimonial?" replies *Matthew Pincher*, a literary hack, capably presented by Mr. John Clarke; "why, because he has done nothing to deserve it." Mr. David Fisher, Mrs. Stephens, and Miss Henrade are other known performers who have parts, and contribute to the unmistakable success of the piece. Amongst those not known before is Miss Maggie Brennan, the representative of the *Hon. Fred. Titebo*y, a youngster of fashion, with more heart than head. The self-possession without impudence, the naturalness without mawkishness, and the humour without vulgarity displayed by this young lady won for her a reputation in a night. But why Maggie? The designations now assumed by our young actresses are one of the bad signs of the times. We have Miss Milly this, Miss Polly that, Miss Nolly one thing and Miss Patty the other. Those of them who wish to maintain the

dignity of their art and their own self-respect will give up this slang and endeavour to stand before the public like ladies.

As we are talking of things theatrical, we may add one or two notes which serve to show the movement just now going on in that direction. The Gaiety, on the site of the Strand Music Hall, is being proceeded with rapidly, and will be opened some time in the present month. Looking at the present bare walls, this would seem scarcely possible to those not used to theatre-building. The fact is, however, that the whole of the interior is in course of completion elsewhere, and will be at once put into its place when the shell is ready to receive it. This theatre will have the peculiarity of being Gothic in style! The St. James's Theatre, we understand, has been bought by Mrs. Wood, the American actress, and will be pulled down, together with some of the houses in the adjoining court, with a view to entire reconstruction and improvement. This, however, will not be done yet, a French lady having taken the theatre for the next eight months, intending to produce drama and extravaganza. Moreover, Brompton, rumour says, is to have a theatre. The story is, and we have reason to believe it correct, that a popular novelist, who has taught the public it is never too late to mend, has purchased two of the houses in Brompton-row, not far from Brompton-square, and on the site, which extends backwards considerably, intends to build a playhouse at the end of next year.

THE REGULATION OF RAILWAYS ACT, 1868.

AMID the din of that personal squabble which we call Parliamentary legislation, and encouraged by our contempt for the old maxim "*Notamus leges Angliæ mutari*," measures of great importance will at times elude the exigencies of faction, and the comments of the daily press, and to the surprise of every one, become law. It is probable that the most valuable of our legislative improvements are those which thus slip through Parliament, since any perceptible degree of homogeneity in a Bill is pretty certain to be destroyed by the process of lengthened debate. In fact, when a new statute issues from the senatorial mint, its value is, for the most part, altogether uncertain, until it has received the stamp of judicial exposition. Very frequently the ablest lawyers profess themselves unable to state what will be the effect of a new Act of Parliament, until a case arising under its provisions has been tried before a court of justice.

We have a striking instance of the manner in which laws may sneak into existence, in the Act of Parliament 31 & 32 Victoria, cap. cix., called "An Act to amend the Law relating to Railways," which commences by enacting that "This Act may be cited as the Regulation of Railways Act, 1868." It received the royal assent on the 31st of July last, but we are not aware that public attention has hitherto been at all adequately directed to its important provisions. It will be seen that they are well worthy of that attention.

Commencing with the preliminary establishment of the "short title" above quoted, by which the Act may be cited, the new enactment goes on to fix, on the broadest and most comprehensive scale, the interpretation of the terms "railway," "company," and "person." It does not seem possible that any of the difficulties, lately discovered to attend the use of the latter word, can crop up in legal proceedings under the Regulation of Railways Act.

The new law then confronts the important question of accounts. It does so in a fearless and determined spirit, and, it must be admitted, with the promise of working an important and much-needed reform. Fifteen blank forms of account, and two forms of certificate, are included in the first schedule annexed to the Act; and every incorporated company is enjoined to prepare and print a statement of accounts and balance-sheet, together with the other statements and certificates required by the schedule, in correspondence to these forms, every half-

* See p. 595.

year. A penalty not exceeding five pounds per day is declared in case of default.

The enforcement of a uniform method of stating capital and revenue accounts is, in itself, an important step in the right direction. It will be a boon of no slight value to the *bond fide* investor; and will, to an equal extent, be a blow and discouragement to the share gambler.

The form of the accounts, moreover, is to a certain extent clear and lucid; but the schedule appears to have been drawn up without consulting an engineer, or some much-needed improvements would have been made in it. Thus in Form No. 5, "Details of Capital Expenditure for Half-year ending —," the item of "Works" is omitted from what purports to be an exhaustive distribution of the expenditure of capital. The aim and intent of the form is clear, and the draughtsman no doubt thought that the expression "construction of way and stations" was calculated to elicit full information. If the accountants of the several companies desire to keep back any information which is not explicitly required, or even if they are officially exact, or nervously anxious to keep to the very letter of their newly-prescribed duty, this want of proper professional phraseology will give room for much regret. The miserable economy that saved a fee, which should have been given to some eminent engineer for revising the schedules, is likely to cost the country at least the expense of an amended or explanatory Act of Parliament, to say nothing of loss of time. The expenditure out of capital for the half-year is directed to be given, as showing, "under separate heads, amount paid for land (purchase and compensation); construction of way and stations, including rails, chairs, sleepers, &c.; engineering and surveying; law charges; Parliamentary expenses; interest, commission, &c." No such details are, however, insisted on in Form No. 4, "Receipts and Expenditure on Capital Account," so that the value of the detailed information demanded by the Act, even independently of the failure of the draughtsman to define properly what the framers of the schedule really wished to know, is reduced to a minimum.

To insure uniform, intelligible, and reliable accounts, that would be of real value at once to the profession and to the purchaser of railway stock, a very little enlightened care would have sufficed. An exactly similar demand for detailed account should have been inserted both in Form No. 4 and in Form No. 5. It should have been something to the following effect,— "Showing, under separate heads, the amounts actually paid for,—(1) parliamentary expenses; (2) purchase of land; (3) compensation to landowners and occupiers; (4) works, distinguishing earth-work, masonry, tunnels, and heavy viaducts; (5) permanent-way materials, distinguishing cost of (a) rails, (b) chairs, (c) bolts and fittings, (d) sleepers or timbers; (6) laying of permanent way; (7) stations, distinguishing passenger and goods; (8) law charges; (9) engineering and surveying; (10) finance charges; (11) any expenditure not included in the above."

Subject to that more matured consideration which should always precede, not follow, legislation, the adoption of some such form as that above sketched would have enabled any man familiar with railway construction to form a very accurate notion of the financial position of every company, on the face of each half-yearly account. Again, with regard to the working expenses. A little more precision would have had the same happy result. In the abstract of the cost of maintenance of way, there is a statement of "miles maintained, double—single." How much of this length is due to actual running distance, how much to sidings and station yards, is left out of sight. The actual running length of line should be clearly stated. If to this a table of gradients had been added, or at least a summary of such a table, and the tonnage of the coal and coke consumed had been stated, as well as the cost of those stores, the information would have been so complete as to be of extreme value. To know the sum spent in fuel, while remaining in ignorance either of the cost per ton, of the running lengths and gradients of the line, or of the mileage actually made by the trains, is to have the materials, indeed, for a partial and hasty comparison, but not those for a searching and useful criticism.

It is a matter much to be regretted that so well-intended an effort should have fallen so short of what might have been easily attained. Legislation has taken its course. Steps which we have ourselves pointed out as essential to the re-habilitation of railway property have been

boldly taken, and yet the full amount of satisfaction that might have been readily obtained has been missed, for the mere reason that competent professional advice has not been taken as to the engineering details of the forms now made imperative by law.

The Act goes on to enforce the signing of the accounts of the company by the chairman or deputy-chairman, and by the accountant; and to provide penalties for the falsification of accounts. It gives power to the Board of Trade to appoint inspectors, to examine into the affairs of any company under certain conditions, or auditors to examine the accounts. Then follows the clause as to which a public dispute arose between Lord Redesdale and Sir E. Watkin as to the issue of preferred and deferred stock, a clause as to the admissibility of which there is much to be said on both sides. The liability of companies (including canal companies) as carriers is then defined. A legible table of fares is ordered to be exposed at every station; and certain provisions are made with the intent of securing fair treatment for steamboat passengers, and for the consignees of goods.

A clause as to proceedings in case of non-consumption of smoke is worded in a curiously unsatisfactory manner. It is intended, apparently, as a mere supplement to the provisions on this subject in the Railways Clauses Consolidation Act of 1845; but a clear and distinct enactment would have been preferable to a patch on the former law. The clause is to the effect that, where proceedings are taken against a company for failing to consume the smoke of the locomotives, the justices before whom the complaint is heard are to decide whether "the engine is constructed on the principle of consuming its own smoke, but that it failed to consume its own smoke as far as practicable at the time charged in the complaint through the default of the company or of any servant in the employment of the company." The clause does not provide for any professional assistance to their worship, the justices, in case of any complaint involving so nice a mechanical question; and a finer sample of legal engineering, or of the failure of legal draughtsmanship in an attempt to grapple with a practical mechanical question, it would not be easy to find.

The provision of smoking compartments in every passenger train where there are more carriages than one of each class, is made imperative after the 1st day of October, 1868. But no penalty is provided for the infraction of the provision, any more than for the failure to post a legible table of fares, or to furnish, on demand, particulars of charges for goods. A penalty of from 250l. to 500l. is declared in case of any special accommodation being given for prize fights. The difference between the reality of the legislation on a point that so rarely can arise, by the declaration of a large penalty, and the vague uncertainty in which the clauses affecting the comfort of so many passengers in the matter of fares, of goods, and charges, are left by the omission of any fine for the neglect of the new law, is worthy of comment.

The long-versed question of a communication between passengers and the company's servants is set at rest, as far as enactment goes, by imposing a penalty of 10l. for each case of default in providing such a communication, after the 1st day of April, 1869. Five pounds fine is imposable on any passenger who makes use of such means of communication without reasonable and sufficient cause. There is not even an exception in favour of the day on which the new provision is to come into vigour—a very suggestive date.

Two very good clauses provide for punishment of trespassers, and for the removal of trees that may be in danger of obstructing the traffic.

The question of compensation for accidents is treated in a singularly inefficient manner. The Board of Trade is authorised to appoint an arbitrator to determine the amount of compensation, on a joint application from the company and the claimant. Where parties are so far agreed as to take such a step as this, it is easy to appoint an arbitrator without any further intervention. It is also provided that a judge may order examination of an injured claimant, by a medical man; but no such provision is made, as would have been consistent, in the case of the proposed arbitrator.

We have already spoken at such length on the subject of railway compensation, pointing out that the only satisfactory course is the adoption of a definite system of insurance by the companies, that we need merely now call attention to the inutility of the above-named clauses.

The fifth portion of the Act is, we cannot doubt, by far the most valuable and important. It provides, in three simple clauses, 27, 28, and 29, for the traffic of the future. On this point, also, our readers will be fully prepared for our opinion. The stats of the law, up to the passing of this Act, has acted as a direct bar to the due and legitimate extension of the railway system of this country, by rendering it imperative that branch lines, even to the remotest country districts, should be adequate to the full strain that is thrown on the main trunk.

In the clauses authorising light railways may be traced the workmanship of a far more skillful hand than that which has allowed such lamentable slips as to statement of accounts and enforcement of penalties. The one necessary step has, in this instance, been taken; and no more. The barrier has been knocked down; and that with so well-proportioned a blow, that no casual reader of the Act of Parliament would be aware of the revolution which it is calculated to effect. It is simply enacted that "the Board of Trade may by licence authorise a company applying for it to construct and work, or to work, as a light railway, the whole or any part of a railway which the company has power to construct or work." Notice of such application is to be given, and objections are to be inquired into by the Board of Trade. The conditions and regulations subject to which the "light railway" shall be worked, are remitted to the wisdom of the Board of Trade; the two cardinal provisions being alone insisted on,—first, that no greater weight than eight tons shall be brought on the rails by any one pair of wheels; and secondly, that the speed shall in no case exceed twenty-five miles an hour.

This simple enactment removes the obstruction which the—we can hardly give any other word than—stupidity of Parliament has hitherto opposed to the due extension of the railway system of this country. In a recent number* we made some remarks on this important subject. While the public highways of Great Britain, as is the case in every other part of the civilized world, have been fairly proportioned to the amount and character of the traffic which they were destined to serve, the railway engineer has hitherto been directly prevented by the Legislature from exercising the same wise economy. For city thoroughfares the roadway has required, and has received, a very different amount of care from that given in the case of a long line of mail-coach road. For the country lanes and by-ways, again, far less expenditure has been incurred than for the mail-coach lines. And thus has expenditure gradually been economised, down to the farmer's occupation road, or the grassy drive through the nobleman's park. But for railways, hitherto, the same outlay per mile has been legislatively imposed for the branch in a country district that may require a couple of trains per diem, and for the main trunk over which whirl the mail and express trains that connect London with the great centres of population at home and abroad. Single or double lines the Hobson's choice which we have hitherto had.

It is, happily, unnecessary now to argue as to the injurious stupidity of this legislation. But it is well to point out to all those interested in the industrial development of the country, or in the welfare of railway property, the great importance of the revolution which the Act of 1868 has so silently authorised. Our system of railways, costing, as we have before shown, nearly 35,000l. per mile for 14,000 miles which have been constructed in the United Kingdom, (the 9,634 miles in England alone having cost 42,000l. per mile), can now be completed by branches and feeders, constructed in accordance with the requirements of the districts, at a cost not exceeding a tenth part of the present extravagant outlay. That this low cost will in all cases be attained; that the reign of a wise economy will at once set in; that all idle waste will be benefited carefully eschewed; in fact, that human nature will be favourably modified by Act of Parliament,—we are not so sanguine as to expect. But it is much, that waste should no longer be enforced by statute or by standing orders. It is much, that the "wisdom of the Legislature" has at length permitted engineers to apply the principles of economy and of common sense to their work. And we cannot doubt that all the industrial classes will have reason, before long, to rejoice in the permission thus snatched from the House of Commons.

The remainder of the forty-seven numbered paragraphs of the Act provide for arbitration in

* See p. 640, ante.

certain cases of dispute, for information as to shareholders' addresses, and for some other special details of little general interest. With all its faults, especially those of want of courage in dealing with the great sore of Parliamentary outlay, and want of professional acumen and experience in the draughting of portions of the Act and schedules, as before mentioned, the Regulation of Railways Act, 1868, is a boon to the people of England.

THE PROPOSED PUBLIC OFFICES.

PUBLIC OFFICES CONCENTRATION.

THE most important of the plans deposited at the private bill-office of the House of Commons up to Monday last, the last day for receiving plans in connexion with bills to be dealt with in the next session of Parliament, was probably that which embraces the property in Westminster to be appropriated by Government for the new Public Offices. There may have been notices given of hills involving more important engineering works, but no other coming bill gives promise of equally imposing architectural results; and, although some of the other proposed bills may affect, more or less, a large number of valuable properties, no other comes with such a full swoop upon a large and definite area, proposed to be entirely cleared away. The plan referred to embraces the three blocks of building which have the common boundaries of Charles-street and Great George-street, and the outer boundaries of Parliament-street and St. James's Park, with King-street, Duke-street, and Delahay-street intersecting. The appropriation of this property seems to indicate that the public offices are designed to occupy two immense quadrangular blocks, extending from Parliament-street to the Park in one direction, and from Downing-street and the end of Whitehall to Great George-street in the other; Charles-street, running between Parliament-street and the Park, will be the inner boundary of each of the two quadrangles, and will exhibit the splendour of their side fronts. The partial breaking up of the head-quarters of the engineering profession in Great George-street, and the dispersion of the Parliamentary agents in Parliament-street may cause regret, but the clearance of such other buildings as occupy the ground, and the substitution of the palatial structures destined to rise upon the site, can only be cause for public satisfaction. The fragmentary portion of the northern quadrangle now in progress will include the Home and the Colonial Offices, in addition to the India and the Foreign Office, already occupied. The new quadrangle to the south will be required for the War Office, the Admiralty, and various other departments. It may be mentioned that the Bill authorising these great works is of a hybrid character; in so far as private property has to be appropriated, the Bill has to be dealt with as other private bills; but inasmuch as this bill is for State works, at the public cost, the Public Offices Concentration Bill will be dealt with as a public bill.

MOSAIC DECORATION.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the ordinary general meeting of the Institute held on Monday evening last, Mr. Charles Barry, V.P., in the chair, an interesting paper was read by Mr. A. H. Layard, M.P. (Honorary Fellow), "On Mosaic Decoration."

Mr. Layard said,—I desire to call your attention this evening to a subject of some interest both to the architect and the public—Mosaic Decoration. It has already been treated, and very ably treated, as everything he takes up is very certain to be, by my friend Mr. Digby Wyatt, in a paper read before this Institute on the 17th of March, 1862. He dealt with the subject as a member of the profession. I can only do so as an amateur without much practical experience; but since he read his paper, much has been done in mosaic, and in the direction which he then pointed out. I trust, therefore, I may add a little to the information furnished to the Institute by him.

I have long turned my attention to the subject of architectural decoration, external and internal. It has been connected in my mind with two great objects—public instruction and public enjoyment. In public instruction I would include all that is calculated to raise the character, cultivate the understanding, and refine

the taste, as well as to impart actual knowledge. By public enjoyment, I mean that exquisite sensation of delight and satisfaction which arises from the contemplation of the beautiful, and that pleasurable effect which, although difficult to define, and very often almost imperceptible, is produced by beauty of form, proportion, and colour upon most men.

With a desire, then, to ascertain how these two objects could be best promoted in this country, I have studied, as well as my opportunities would permit me, the architectural decoration, external and internal, as employed by the ancients and the moderns in different parts of the world, in the West and in the East, but especially in Italy, which now affords us the best school for the investigation of this subject; but to go into the general question at any length, would be to occupy your time far beyond the usual limits. I shall, therefore, confine myself to only one branch of it, viz., the decoration of public buildings, religious and secular, in this country, and the materials which may be best employed for such decoration.

It has always seemed to me that the numerous public buildings which have been erected during the last few years, and which are now in course of erection, or in contemplation, in England, and especially in the metropolis, would afford an unexampled opportunity for educating the public mind, and improving and elevating the public taste, through the means of mural decoration.

Mr. Ruskin, with his usual eloquence, and just appreciation of the real value of art, has observed that the Church of St. Mark, at Venice, was "to be regarded less as a temple wherein to pray, than as itself a Book of Common Prayers, a vast illuminated missal, written, within and without, in letters of enamel and gold. The common people were taught their Scripture history by means of the mosaics, more impressively perhaps, though far less fully than ours are now by Scripture reading. The walls of this church became the poor man's Bible, and a picture more easily read upon the walls than a chapter." "Never," he exclaims, "had a city a more glorious Bible!" and at every hour of the day, he might have added, the book is open. Our own churches might afford, and, perhaps, once did afford, public instruction of a similar kind, and at the same time become beautiful and solemn monuments like St. Mark's. Our public buildings might do for our history, political and intellectual, what our churches might do for our religion. There have hitherto been two difficulties in the way—English prejudice and English climate: the first chiefly affects our churches, the other both our churches and public buildings. As regards English prejudice, there is much yet to get over, although a great deal has been effected in the right direction. I do not intend to enter into the reasons for this prejudice, or to seek to combat it. Suffice it to say, that the strong reactionary feeling against the influence of the church of Rome, which set in at the time of the Reformation, and which received additional impetus during the Commonwealth, is yet powerful among us; and that church decoration is still connected, in the imagination of a vast number of people, with the tenets of the Roman Catholic faith. But I will presume that this prejudice has now greatly subsided, and that we are at liberty to decorate our churches to our heart's content, so long as we do not introduce into them any figures or symbols which may scare good Protestants, without our orthodoxy being called into question.

With respect to our public buildings, there is no such prejudice existing, although there is still floating about, even amongst educated people, who ought to know better, that strange notion that decoration is un-English, unsuited to our climate, and vulgar. A step in the right direction, though, unfortunately, owing to various circumstances, not a very auspicious one, has been made in the ornamentation of the Houses of Parliament. Had that attempt been more successful, the example would, I doubt not, have been more extensively followed in this country than it has been.

The climate difficulty is really the one which stands in our way, and which we must seek to get over. Owing to it, the attempt made on the Houses of Parliament has been unfortunately arrested, and a great work which might have added to our national glory, has been left unfinished. If the difficulty can be removed, I believe that, with the general improvement in public taste, and with the desire for educating the

people, which now prevails, we may see our churches and our national edifices covered with mural decoration, which would serve to cultivate, refine, and instruct the masses.

For some years I entertained a hope that wall-painting, either buon-fresco, fresco-secco, or water-glass, might be adopted in this country. I had carefully examined, and, indeed, partly traced, almost every wall-painting in Italy. I had convinced myself that, except, perhaps, at Venice, fresco would resist the effects of climate and of time, when only protected against them with moderate care. The frescoes of Giotto in the Arena chapel and at Assisi, in fresco-secco, be it remembered, are almost as fresh and transparent as when he painted them, except where exposed to wilful injury, or, as I regret to say they still are, to the grossest neglect. The frescoes of Ghirlandajo and the great masters of his time, are only blackened by the smoke of candles and incense, or by dust and dirt never removed. The beautiful decorations of the library of the Cathedral of Siena are as bright as the day on which Pinturicchio finished them. The frescoes of Perdoneuse in the church of St. Maria della Campagna at Piacenza have almost acquired the consistency of enamel, and would seem to be indestructible. In Venice only, owing, it is alleged, to the extreme moisture and saltness of the sea air, wall-painting seems to have partly failed. Of the great works of Giorgione, Titian, and other masters of the Venetian school, which once embellished the palaces of that city, and of those of Perdoneuse which adorned the cloisters of St. Stefano, only fragments now remain. But these frescoes, if must be observed, were on the exterior of buildings, and therefore completely exposed to the effect of the atmosphere. Tiopoli's frescoes, in the Lohbia Palace, and in some churches, do not appear to have yet withered; but still it would seem that the Venetians distrust the durability of fresco, and never employed it on a large scale, even for internal decoration, when it was being so used in almost every other city in Italy.

With the examples of fresco painting which I have mentioned, and with my desire that mural decoration on a large scale should be introduced into this country, I was rejoiced to see that which was being done under the direction of the Fine-Art Commission, of which the Prince Consort was president. I lost no opportunity of advocating, publicly and privately, fresco decoration. Amongst those who took the same view of the subject as myself was my distinguished friend, Mr. Watts; but he did more than I could ever hope to do in the cause; and with a devotion to his art and the public spirit, which are the best accompaniments of genius, he undertook to execute, without remuneration, a vast fresco on the walls of the hall of Lincoln's Inn. That work, criticise it as you like, is the greatest of its class on this side of the Alps; and I cannot believe that any man of feeling can be insensible to its grand and solemn character, or any man of taste to the additional value and majesty it gives to the architecture. Unfortunately, Mr. Watts has never completed the decoration of the hall; all the empty spaces in which should be treated in connexion with the fresco forming the principal feature in it. I do not think that we are yet sufficiently impressed with the fact, that in decoration completeness and general harmony are essential; and that, without these, the true and full effect of a great fresco, or any other similar work, can never be properly appreciated.

My hopes with regard to fresco were doomed to disappointment. I have no reason to believe that any serious deterioration is taking place in Mr. Watts's fresco at Lincoln's Inn; but in the Houses of Parliament, some of the frescoes had scarcely been painted before decay commenced, and many of them are even already almost gone. The same thing has taken place with the late Mr. Dyce's frescoes in All Souls' Church, in St. Margaret-street, which, I am informed, have required almost entire repainting. I was at one time inclined to assign this rapid decay to some defects in the materials employed, either in the pigments or in the intonaco, or lime, especially as the same deterioration had occurred in some of the frescoes at Munich, though by no means in all; it will appear where, at least, the fault could not be laid upon the English climate. The Germans, however, attributed it to the effects of the atmosphere acting upon the exterior surface of the painting, and to prevent this they adopted the method of covering the fresco with a solution of silicate called water-glass, which was supposed

to be impervious to the air. The great frescoes of Kanlbach at Berlin have been painted in this material; and Mr. Maclise and Mr. Herberth have adopted the process in their most recent works in the Houses of Parliament. It is, perhaps, too early to pronounce decidedly upon the durability of the waterglass, but there are grounds for fearing that it will not resist the insidious attacks of our London smoke. Dr. Percy, after a very careful scientific examination and analysis, carried on under official instruction, has come to the conclusion that no such painting, whether executed in buon-fresco or fresco-secco, can resist the atmosphere impregnated as that of London is with the chemical substances evolved from the consumption of coal. He doubts even the efficacy of waterglass, and gives it as his opinion that Mr. Herberth's well-known fresco will not be safe except under glass. The scientific investigations of Dr. Percy have, unfortunately, been confirmed by the practical experience of Mr. Digby Wyatt.

I confess to great disappointment at this unexpected result of the attempt to introduce fresco painting into England. It is a noble art, the one declared by Michelangelo to be best fitted to show the genius of a man; the one which gives the really great painter the widest influence over, and can bring him into the closest communion with, the great mass of his fellow men. It can raise the great painter to the level of the great poet. Think one moment of the fame which Leonardo da Vinci, Michelangelo, and Raffaelle have achieved through their wall paintings. Leonardo's "Last Supper" is more widely known than any poem that was ever written, not excepting the "Iliad." Throughout the whole civilised world some kind of copy of this immortal wall painting may be found in the palace and the cottage. But after what has occurred I am afraid that we must give up the hope of seeing fresco painting introduced on any considerable scale into England.

Thus disappointed, I turned my attention to mosaic as a means of supplying the place of fresco. With this object in view, I have carefully studied most of the finest examples of mosaic decoration in Italy. It is unnecessary for me to enter into the history of mosaic: that has been done already by Mr. Digby Wyatt in his paper to which I have already referred. It is sufficient now to say that the art of putting together small cubes or tesserae, as they are technically called, of different substances, so as to form patterns and figures either in monochrome or in various colours, is one of very ancient date, and was known even to the earliest civilized nations,—such as the Egyptians, Assyrians, and Babylonians. Mosaic was applied to the decoration of walls and pavements, and was extensively used, especially for the latter purpose, by the Greeks and Romans in their public and private buildings. Owing to the durability of the materials generally employed,—such as hard marbles and porphyries, enamels, or glass and terra-cotta,—mosaic has defied the ravages of time probably more effectively than any other architectural decoration. To this day the remains of mosaic pavements are the most usual indications of Roman sites in England and in many countries of Europe, as well as in parts of Asia and Africa. But pictorial mosaic on a really large scale was first used for the decoration of public buildings during the later days of the Roman empire, and during the supremacy of Byzantium, and in those countries which derived their civilization and arts from Rome and her Eastern successor. It took its chief development after the spread of Christianity, and in the decoration of Christian edifices, so that we may call it essentially a Christian art. The most magnificent examples of ancient times were to be found in the churches of Christian Rome, Constantinople, and Ravenna. It is to this Christian mosaic that I wish now to draw your attention.

The chief features, then, of this Christian mosaic are the vast extent of wall-surface to which it was applied; its most frequent use on domes, apses, and curved surfaces; and the representation of figures and ornaments on a gold ground, although a gold ground was not always used, as in the early mosaics in St. Prudenzianna and St. Prassedo, and in the baptistery of St. Giovanni Laterano, in Rome. In Italy to this mosaic the epithet Byzantine is indiscriminately though wrongly applied. It is true that the art flourished in the East when it had almost died away in the West, and that Italy owes to a great extent to Byzantine artists its revival; but a direct Roman influence, as

Mr. Digby Wyatt has well pointed out, may be traced in Italian mosaics up to the eighth and even ninth century. The art, however, flourished contemporaneously in the eastern and the western parts of the empire.

The extreme richness of their mode of decoration and, at the same time, its grand and solemn character when used in large masses, made it especially applicable to religious purposes; and it appears to have been generally used for the embellishment of churches, although there are several recorded instances of royal palaces having been very profusely adorned with it. A vast mass of ancient mosaic work has perished: no small amount in the East is still covered with whitewash and plaster. There scarcely seems to have been a church or baptistery of any importance built within the precincts of the Byzantine empire that had not more or less mosaic decoration. The fashion spread across the Alps, and we find Charlemagne decorating his basilicas and palaces with mosaic.

This general use of mosaic led to improvements in the materials employed. Marbles and porphyries could no longer be exclusively used, and earthenware did not promise the required durability. Enamels or vitreous substances, which the Italians call "smalti," and which had not been unknown in earlier times, were mixed with them. The art, too, of enclosing gold-leaf within layers of glass, a very difficult one, was also discovered (there is no evidence, I believe, that it was known in Classic times); and thus the gold ground, one of the peculiar features of this mosaic, could be effectively executed. Of these early mosaics, the most remarkable now preserved are those of St. Sophia, a church at Salonica, the baptistery of Constantine, or St. Costanza, at Rome, which show a curious mixture of Pagan and Christian figures and symbols, and the style of which almost approaches that of the painted ornaments in the Baths of Titus; of the apse of St. Prudenzianna, also of the fourth century; of the monumental chapel of Galla Placidia, and of the baptistery of Ravenna, and of St. Maria Maggiore at Rome, of the fifth century; and those of St. Vitale, of St. Apollonaris in Clesse, and of St. Apollon Novvo in Navarre, of the sixth century. Unfortunately few of the early mosaics at Rome and even Ravenna are free from considerable restoration, and their original character is in many instances much destroyed: frequently these restorations are even made with coloured plaster.

I will now direct your attention to those edifices which furnish the best examples of mosaic decoration and are most deserving of study, with a view to the use of mosaic in this country. I exclude St. Sophia because the mosaics on its walls are for the most part concealed by plaster. In its original state it must have been, as far as the interior is concerned, one of the most glorious buildings that the world ever saw. In no other, probably, were such vast spaces covered with the richest mosaic decoration; and every part that was not so covered seems to have been panelled with the rarest and most beautiful marbles. I had the good fortune to see St. Sophia when under repair, and when the plaster had been removed, under the direction of an Italian architect, Sig. Fossati. The effect of this partial revival was truly magnificent. Some idea of the vastness and richness of the details may be obtained from Salzenberg's work, which is in your library. I would particularly dwell upon the extraordinary preservation of these mosaics. They had been covered since the Turkish conquest, and probably had not undergone much restoration in previous times. The examples, therefore, of mosaic, which I would most particularly point out for imitation, if the time should ever come, as I hope it will, when people in this country will be only impressed with the value of internal decoration, are St. Mark's, Venice; Monreale and the Capella Reale, at Palermo; and the basilicas of Ravenna. I do not place these buildings in order of date, but according to importance as illustrating mosaic decoration.

St. Mark's, taken as a whole, is the most perfect example of internal decoration in the world. In other edifices you probably find instances of details and detached mosaics more beautiful than any in St. Mark's; but you will nowhere find an example of one grand and noble conception so thoroughly and completely carried out. It furnishes, too, the richest and most valuable chapter in the history of mosaic, for in this one building we have specimens of mosaics extending over a period between the

eleventh, or certainly the beginning of the twelfth, and the end of the thirteenth century, and, consequently, comprising a variety of styles and showing many different modes of employing mosaic. Every square foot of the church, the baptistery and the vestibule, domes, apses, sides, and pavement, is covered with mosaic work, except where the richest marbles panel the lower parts of the walls. There is no uncovered or naked space. The eye, I may say the mind, is completely satisfied. Nothing looks as if it were unfinished, or as if there yet remained anything to be done. I cannot imagine any one to enter this glorious edifice without being deeply impressed with the solemnity and majesty, and, at the same time, with the exquisite beauty and harmony of all around him; without feeling that, if we are to have decorations in our sacred edifices on a large scale, and so as to add to their religious character, and at the same time to produce a sense of enjoyment of the purest description, mosaic is the most appropriate of all decoration.

The lustrous surface of the enamels, the large masses of gold ground, the richness of the colour, produce an infinite variety of the most beautiful effects, ever changing as the sun changes its place. St. Mark's is never the same. Enter at any hour of the day, in summer or in winter, and whether the sky be clear or overcast, and you will ever be surprised and delighted by some new unexpected effect. In the morning, the recesses of the nave-end, the grand solitary figures of Christ, the Virgin, and the Evangelists, will be revealed to you. At midday, when the full light of a southern sky is equally diffused over the interior, the many domes and vaults are so illuminated that every detail in that vast maze of figures and ornament can be plainly detected. And when the rays of the setting sun stream through the western window upon the grand apse above the high altar the majestic form of the enthroned Saviour seems to float in a sea of burnished gold. Even when the shades of night are fast gathering over the lower parts of the building a mysterious and solemn light lingers for a time on the golden domes and vaults of the upper, like the bright clouds which float in the sky after a Venetian sunset.

The singular harmony, notwithstanding the abundant richness of the gold grounds, which prevails throughout the decoration of St. Mark's, is owing to its completeness. Any whitewash or plaster, or blank unredeemed space, such as one sees in our churches, would have been an eyesore, and would have marred the marvellous beauty of the whole. Decoration, when thus complete, whatever may be the wealth of gold and colour lavished upon it, is never vulgar or tawdry; but, on the contrary, when a just balance is preserved in them, it is sober and harmonious, and can be made eminently subservient to religious purposes. It is only when decoration is introduced as if it were something not forming an essential part of the building itself, but only put there for show, and as if too precious except to be doled out with a niggard hand, that it does become vulgar and tawdry, and appear inconsistent with the objects of a sacred edifice.

St. Mark's teaches us that it is especially necessary to avoid white spaces, and particularly plaster, where materials so rich as mosaics are employed. We see this well established in the sacristy. Its vaulted ceiling, lunettes, and spandrels furnish one of the most exquisite examples of cinque-cento mosaic work with which I am acquainted; but the effect of the whole chamber is greatly impaired, and an appearance of weakness and want of finish is given to it by a panelling of white marble, which runs completely round it, between the mosaic decoration and a skirting and benches of dark walnut wood below.

In St. Mark's we can study and satisfy ourselves as to the best mode of employing mosaics, and the style best suited to our churches, should mosaics be introduced into England. We have in this very museum of mosaic decoration specimens of all styles and manner of work. The most ancient are simple figures on a gold ground, probably the work of Greek artists; or if not, certainly copied from them, and properly termed Byzantine—such as the colossal figure of Christ seated on a throne, in the apse over the high altar; the figures of patriarchs, saints, and apostles in the domes, or the side walls of the nave, and on the pendentives; and the group of Christ, the Virgin, and St. John over the principal entrance. So, also, are some of the figures, arranged in processional order in various parts of the church, a tradition of the Classic period

of mosaic, as seen in the basilicas of St. Vitale and St. Apollinaire Nuovo at Ravenna. In the baptistry and vestibule, and in the semi-domed recess over the most northern entrance in the exterior, we have examples of the work and design of the thirteenth and fourteenth centuries. A more complete grouping of figures is attempted, and more variety in the tints. The tesserae in some instances are very minute. The general design and arrangement of the figures are all strictly architectural. In the chapel of the Mascoli, one of the most beautiful portions of the church, in the wagon-shaped ceiling, decorated by Gianhono, towards the end of the fifteenth century, we see how the growing feeling for Classic ornament had modified the old manner, and had produced a style very appropriate to architectural decoration in mosaic. In the sacristy, in the works of Rizzo and Guccati, we have the graceful and flowing ornamentation, and the broad treatment of the draperies which mark the cinque-cento period; still, however, made subservient to the architecture, and forming part of it. Lastly, in the upper part of the walls to the left of the high altar, in the vaulting over the western end of the nave, and in the lunettes over the exterior entrances, and over the central entrance in the vestibule, the mosaics, having been executed from cartoons by Titian, Tintoretto, Salviati, and other great masters of the sixteenth and seventeenth centuries, we see how the mosaicist vied with the painter in producing pictures not only without reference to the architecture, but altogether independent of it. I will point out hereafter which of these different modes of treatment I consider best adapted to our modern buildings, and most consistent with the legitimate use of mosaic.

Perhaps the most perfect specimen of mosaic decoration after St. Mark's with which I am acquainted is that of the Capella Reale, or, as it is frequently called, the Capella Palatina, in Palermo. The chapel was built in 1132, and the mosaics were finished in 1143, or soon after. Consequently, they are all of the same period, although the original character of many of them has been somewhat altered by modern restorations. I place this interior next in order after St. Mark's, because, although much inferior in size to other buildings similarly decorated, the decoration is complete, leaving nothing to be desired. It forms one beautiful and harmonious whole, without a spot upon which the eye can dwell with regret. It also possesses that solemn, religious character, and shows that infinite variety of effects which form the glory of the Venetian temple. The cupola, the sanctuary, the walls, and the aisles and nave are covered with mosaics, in which the figures of Christ and the apostles, and scenes from the lives of St. Peter and St. Paul, form the principal subjects. Beneath the mosaics is a skirting of rare marble. The pavement is of mosaic work (*opus Alexandrinum*) of serpentine porphyry and hard marbles.*

HISTORICAL NOTES ON THE CULTIVATION AND TENURE OF LAND.

THE INSTITUTION OF SURVEYORS.

At the ordinary general meeting held on Monday, the 23rd ult., the president, Mr. John Clifton, in the chair, several new members were proposed for ballot. Various donations of books and subscriptions to the library fund, amounting to about 115*l.*, were announced.

An interesting paper, entitled "Historical Notes," was read by Mr. Edmund James Smith, member, in which he noticed many of the scattered details relative to agriculture and transactions with property which present themselves in ancient history and in England prior to the commencement of the era of modern cultivation. He said the characteristic of the present system is the cultivation of the land by freeholders or by tenant farmers with free labourers, while that of the period prior to Henry VII. was that field work was the task of slaves or serfs. The oldest form of civilization was in Egypt, and its characteristic was repose. Corn was grown in Egypt as far back as history or tradition can carry us. The fecundity of the land was renewed yearly by inundations of the Nile, and the land was irrigated much in the same way as our water meadows. The art of mensuration must have been one of the earliest arts, as the boundaries were sometimes washed away, and required

annual resettlement. He described the ancient mode of cultivation in Egypt, which was carried on with little valuation to the present day. The cultivation of corn in India more resembled that of the open field land system of England. In Egypt no manure was wanted; in India none was available, as all animal excrement was required for fuel. The later Greeks never cared for farming, but their pastures were excellent and their honey famous, and they were great bee-masters. The Romans in early days were fond of agricultural pursuits, but, as their power increased, they depended on Sicily, Egypt, and Africa for their corn, and there was always a large quantity stored at home to provide against the contingency of unfavourable winds stopping the importation. Three Greek and three Roman agriculturists have left precise accounts of farming. The alternate fallow, the insufficient working of the land, the few cattle kept, and the practice of burning the straw, show that the produce of a given area must have been insignificant, and demonstrate the great inferiority of ancient farming.

The notices of the value of property throughout this period are rare. The transfer of one parcel of land 4,000 years since proves that some land was then private property. He referred to the purchase by Abraham of the field and cave of Macpelah; and it was worth while to note the manner in which this ancient purchase was effected. The purchaser desired to buy a cave: the vendor begs he will accept it as a gift, but intimates that a price may be named. The vendor names the price (about 50*l.*), and the offer is accepted by Abraham like a price without discussion. The plot was probably about an acre of land, with olive trees some half a mile from Hebron; but we have no measure of the relative value of silver at that date. He knew of no other detail of the value of land in Judea until the grandsons of St. Jude were charged with treason before the Roman Pretor. They appeal to their horny hands, hardened with the cultivation of 24 acres of freehold on which they lived, and this is valued in the Roman census at 300*l.* of our money. Crassus, the wealthiest Roman, derived his riches from land immediately around the old city, the value of which will be apparent to surveyors from the fact that the emperors repeatedly enacted that no private house should be erected more than 70 ft. in height; and that when Rome reached its maximum it contained only 50,000 houses, but a population of 1,000,000, or twenty to each house, there being in our own most densely populated parishes only twelve persons to each house.

The residence of Crassus sold, after his death, for 30,000*l.*; another house sold for 130,000*l.*; and another, with its furniture and ornaments, being burnt, the loss was estimated at 800,000*l.* Marius gave 2,500*l.* for the site on which he built his villa at Misenum; and it was sold, after his death, for 80,000*l.*, his villa being built, probably, meanwhile.

The Roman census was much more complete than ours, and gave detailed particulars of all the property, as well as the names of all persons in the family. It was the duty of the College of Agrimensores (or Institution of Roman Surveyors) to measure and value every estate, so that it might be fairly charged with the public impost. Their mode of surveying was primitive; they ran a line due south from a given point, and then ran another east and west perpendicular to it, and by a system of squares ascertained the relative position of fences and the area.

The College of Agrimensores no doubt originated in the same necessity which has induced us to form the Institution—the necessity for a more systematic practice on our part, and for some security to the State on its part, that business of the magnitude and of the confidential character entrusted to the Agrimensores should be properly transacted. We find corn was cultivated in this island before Caesar's first invasion; and when Caesar landed on the 25th of August, the corn was just beginning to be cut; but before he sailed away, on the 12th of September, the harvest was secured and the ships re-victualled. And at a subsequent period 600 Roman or Gallic ships, carried from England some 126,000 quarters of corn, at a time of dearth in Gaul: this quantity could hardly have been raised from less than 60,000 acres.

In the succeeding 450 years the Roman modes of agricultural cultivation, as well as Roman

civilisation, overspread the whole country; for the Romans followed here their general practice of imposing on the natives of each district an annual tribute of corn to be paid in kind. This tribute in kind at once provided for the food of their soldiers, and gave some security for the natives' good behaviour: the first sign of an impending insurrection was that the natives neglected to prepare the land for the next year's corn.

The withdrawal of the Romans 450 years after the landing of Caesar, was the commencement of a period of relapse into barbarism, so complete, that the light of Christianity was totally extinguished south of the Humber, and only rekindled from Rome after a period of 200 years. The laws of the Anglo-Saxons regulate the prices of all kinds of cattle, and are nearly silent with respect to arable cultivation. The lord's mansion and demesne were under the care of the hallif and domestic slaves, and the rest was held by bondsmen at rents fixed by law, but burdened with oppressive services to the lord.

There must have been some approximation to a survey of the Saxon kingdom about the year 1,000, nearly 100 years before "Doomsday Book" for the Danegeld, a tax of 1*s.* on each hide of land, was then imposed, and the "Doomsday Book" throughout compares the valuation and number of hides charged in the time of Edward the Confessor with the valuation and number then accounted for, and with the rents then actually paid for them.

The Anglo-Saxon transactions furnish us also with glimpses of prices. Thus, a hen was 1*l.*, a sheep (of which the value of the fleece was two-fifths) was worth 1*s.*, a cow was worth four sheep, and an ox worth six sheep; a horse worth about five oxen, and a mare about three oxen. One hide of land was sold, the price of which is recorded at 11*s.* It is impossible to avoid perceiving that the gradual restoration of peace in England was mainly due to the monks and churchmen, whose monasteries and churches contained the only civilized men in the whole kingdom. Neither security nor knowledge was to be found elsewhere. The monks reclaimed the wastes, tilled the land, preserved libraries, taught the people, and inculcated Christianity.

The exertions of the monks were repaid by grants of land; and, as the boundaries of the townships and parishes had been by that time settled, there is little difficulty in identifying these several donations, except where they became lay property at the Reformation. The possessions of the ecclesiastical corporations and of the universities being the most ancient in the kingdom, and having been held uninterruptedly for eight centuries, afford the best chance of tracing the gradual increase of rents and change in the value of money consecutively through the whole period. It is remarkable that there is no notice of tithes in Doomsday Book, while the landed possessions of the bishops and abbots are carefully enumerated.

Doomsday Book was formed after the Norman Conquest, from evidence given to five justices in each county.

The county reports give the names of the landowners, and the extent, with more or less detail, of their lands. The landowners' names are frequently arranged in the order of their rank, but in some cases the return is arranged in the order of the parishes.

It would be supposed that from such a survey, so well preserved to us, a tolerably accurate account of the state of the country might be prepared; but to the present time no one has been able to deduce from it any practical results, except as regards population. The leading feature is the enumeration in each manor of the number of hides in some counties, of carucates in all counties; but what is a hide and what is a carucate is not settled.

Admirable facsimiles of the Doomsday Book of each county have recently been photozincographed and published at a nominal cost, but the letterpress prefixed to them is very unsatisfactory.

The hide has been variously estimated as 120 acres, as 24 carucates, as 14½ carucates, as 12 carucates, and as 6 carucates. In Herefordshire each possession is stated in hides and virgates. The latter has been variously estimated at 30, 24, and 15 acres. The carucate appears in nearly all the surveys, as does occasionally the organ as a portion of the carucate.

Remembering that different justices took the evidence in each county, that the evidence was that of the grieve and tenants, and that these men spoke according to their local usage, no com-

* To be continued.

parison between different counties seems to be possible. We are all aware that to this day the Irish acre, the Cheshire acre, the Lancashire acre, and the forest acre perplex our minds; and it is only reasonable to suppose that different standards of measure obtained in different counties; but within each county it might be possible to arrive at some nearly approximate standard, and he recommended the subject to the notice of the members. With respect to value, the same want of uniformity between the several parts appears; as, for instance, taking three estates following each other consecutively. In one 20l., in King Edward's time, had decreased to 14l. at the time of the survey; in another the value was unaltered; and in the third 16s. had decreased to 5s., about the time of the Conquest, and again risen to 10s. The one thing in which the Domesday Book is probably to be depended upon, is in the number of men in each manor. The king would care more for this part of the account than even for increased taxation; and there would be more danger and difficulty in giving false information on this point than in diminishing the extent and the value of the lands in the manor.

The Domesday Book did not extend to the county of Durlam; but about 100 years later, an account of the lands within that county palace was taken, but excluding the estates of the free tenants of the county. It relates the state of each parish, and is much more precise than Domesday Book. Taking Bolton parish for an example, there were 22 villans, holding one with another 2 oxgangs of 15 acres each, or 650 acres together, each villan paying a rent of 2s. 6d. yearly, and 16d. in another form, and half a husband of oats, and 5 cartloads of wood, and 2 fowls, and 10 eggs; and they gave 3 days' work in each week to the lord, all the year round, except Easter and Whitsun week, and for two weeks at Christmas, besides other heavy duties. And the 12 cottagers, each of whom held 12 acres, or 164 acres together, gave 2 days in the week work to the lord, all the year round, except at the festival weeks, and paid 12 fowls and 60 eggs each.

About 200 years after this survey another was made, including the estates omitted in the Boldon Book, and this giving a complete view at that date. The free tenants had 266 acres, and were 27 in number; one who received the bishop's rents in Weremouth, and was in fact his local agent, and had 36 acres without charge, and 26 who paid 3s. 8d. for each 10 acres, or about 3s. 6d. an acre. The 32 bond tenants now paid for 22 houses, and 46 oxgangs, with the mill and common rights, 44l. The day work appears to have closed, and the rent gone up to about 20s. an oxgang of 15 acres. It is not unlikely that the survey marks the time of the substitution of rent for servile work, which first took place on church lands.

In these two hundred years a considerable proportion of the demesne lands, and probably of the other lands, were gradually converted into arable land; and there is every reason to believe that the numbers of the population had largely increased. From the accession of Edward I., in 1272, to the death of Henry V., in 1422, a period of one hundred and fifty years, there had been continued internal peace and security; and he believed that a close investigation would prove that the cultivation was as far advanced and the population at least as large, if not larger, at that date than it was at the accession of Henry VII., more than sixty years later; for, in the meantime, the wars of the Roses destroyed nearly all the ancient nobility, and the peace and security of nearly every laided estate in the kingdom. The landholders having led their followers into the field, the numbers that returned were so diminished that the demesne lands were for the most part laid down in pasturage,—and, probably, much of the other land,—and, as the surrounding lands were arable, pasturage now involved the inclosure of the pasture closes. From the reign of Henry VII., the commencement of free labour generally, any connected account of English agriculture should begin. To that date the accounts of the operations of husbandry, and even the farming accounts, were written in Latin; but, from the beginning of the reign of Henry VIII., there are a series of regular treatises, written for the most part by persons actually experienced in the subject they describe.

It would appear that, from Cassar's first expedition to the present time, a period of 1,900 years, one-fourth passed in comparative peace under the Roman dominion; one-fourth, reaching nearly to the Conquest, was marked by

constant internal war and rapine; one-fourth, after the Conquest, was freed from external attack, but was frequently disturbed by internal strife; and that the last fourth alone is a continual and uninterrupted progress in civilization. No taxation can possibly bear comparison with the cost of internal disturbance, as regards agriculture,—to say nothing of trade, manufactures, and commerce.

At the reign of Henry VII., therefore, where modern history begins, he concluded, hoping that his curiosity would induce others to continue the subject, and occupy the attention of members with papers of a more practical character.

A discussion ensued, in which Messrs. Haskinson, Clark, Vigers, Woolley, Buckland, and others, took part, and it was thought that the line of inquiry opened up by Mr. Smith was of great interest and usefulness, especially at the present time, when the tenure of land both by owners and occupiers, and the adjustment of their respective rights had become an important question in Ireland, and in England some modification of existing law and custom would doubtless be necessary; and it was suggested that by discussion among surveyors, who were so well acquainted with the several usages and varieties of tenure, and their effect on the value and disposition of property, some plan might be sketched out for assimilating custom and more strictly defining the interests of owners and occupiers, and so he of great assistance to the Legislature in maturing any scheme which it might be thought desirable to bring forward for that purpose.

Mr. F. J. Clark, who had visited Egypt, pointed out several peculiarities in the cultivation of that country which had struck him, and promised, if possible, to relate his experiences more at large in a paper on a future occasion.

The president mentioned several curious customs which had come within his own experience,—among others, that which obtains to the present day in the Isle of Portland of taking a conveyance of land by paying over the money at the church-door, and of keeping the account of the Queen's Manor rents there on a stick with a series of notches. All custom was antiquated, and should be abolished. Every agreement should be expressed in writing; and he hoped the country members would take up the subject and bring it before the Institution for regular discussion.

A vote of thanks was given to Mr. Smith, and the meeting then adjourned to Monday, December 7th, when a paper will be read, entitled, "The Education of the Surveyor," by Mr. William Sturge.

OF SOME WELL-BUILT MONUMENTS.

The *Builder* often treats of monuments, either because of some going to decay before the fame of the things we mean them to commemorate, or of others puzzling us by surviving all memory of what on earth they meant,—for architects have not exactly hit the mark of making both monument and meaning endure as long as they are wanted.

Now the last year or two has uncovered a marvellous monument, so contrived by a consummate architect as to defy probable human power to destroy, deface, or make illegible, for as long as he meant the memory of what it celebrates to endure.

Most have heard of, and many (luckier than the present writer) saw the "meteor-stream" of the 14th of November, 1866; and that an American professor, Newton, predicted it, by deducing from numerous records, Chinese, Arab, and monkish, of star-showers in the last 900 years, that after every 33 years, two or three may be expected at intervals of 365 days 6½ hours (that is, a sidereal year and 21 minutes, or a tropical year and 41 minutes), or when we pass a certain point of the earth's path, but a point shifting onward so as to be reached nearly 24 hours later in each 33 years. Some may have tuned a globe to see how the visibility of the shower in any land depends on its arrival between that country's midnight and sunrise; for we and they meet almost directly, as opposite trains, and before midnight we are always on our planet's sheltered back. Only from midnight to noon are we on her front, where their impact is possible, and most so at sunrise; near which hour only can a place meet them (as some in America did in 1833) like a rain, slanting but moderately from the south, owing to the perspective radiant point,—which keeps

its place among the stars of Leo,—being only then on the meridian.

Now as to their orbit, each meteor might either to the place or "node" of our encounter come 67 times in the 33 years period, or 65, or 34, or 32 times, or only once: these were the five possible theories. In the two small orbits that would bring them round every 180 or 186 days, we should meet them at their farthest from the sun, therefore lowest speed, which, though added to our own (of 18 miles per second the opposite way) would scarce account for half the observed rate of meeting between our air and them. They would also be as frequently met in the 17th year as in the year or two after the 33rd. The two nearly circular orbits (of a 33rd less and a 33rd more than a year) would give them only our speed, for we should meet only at about 35 miles a second, instead of nearly 50, as we do. And our great discoverer of Neptune has found, by immense labour, that the action of the planets would not shift the node, in any of these four orbits, by the minutes that give the delay of three days per century. This can only be in the immense orbit that carries them out on a 33 years' journey, or beyond far-wandering dim Uranus; and only in this, which brings them to us at their nearest to the sun, and swiftest, is our enormous rate of encounter explained.

This rate is 100 times that of the best rifle-shot. Were it only 10 times, they would be a murderous hail; but because it is 100 times, they fail to reach us! None, seemingly, have mass enough to stand the air's friction three seconds, but are dissipated into flame and vapour. Each pebble cleaves the thin fluid, from 70 miles down to 40 miles above us, dragging after it a vacuous globe, as big perhaps as a house, filmed over with intense fire; but into this and the smoke-train, the whole solid, if he sail or adamant, has been resolved ere it can, in the slant direction they commonly arrive, be retarded enough to drop perceptibly from the straight line!

Now the last-found marvellous property of light came just in time to reveal something of their materials. With the spectroscopic, Mr. Browning caught the rays of some in the 1863 display, and found diversely proportioned mixtures of light from solid and from gaseous matter, but in all a dominant yellow, as of a soda-salt vaporized, except in two that gave green rays, apparently maguesian.

Next came Schiaparelli's discovery, from the table of comets, that this and the other known meteor-streams are following in the exact wake of every little comet known to have crossed our annual path in space. For the orbits of many,—though only telescopic ones,—do actually cut or touch that of our earth. The small comet which heads this November train had been only observed by Europeans within the same year. In January, 1866, this Tempel's comet passed, with the very direction and speed of the meteors, the point that we pass on November the 14th. Ten months after him, we arrived there, and found his retinue still passing, in thousands per minute; and after another year, and even another, up to this third November, their procession has not entirely passed!

It is not in the power of observers, from the mere ellipticity of so much of a comet's orbit as it traverses in one appearance, to approximate more than vaguely the period of its revolution. The calculator of this one's elements, however, Dr. Oppolzer, actually fixed as the likeliest period, a fraction over 33 years. His finding thus any length between 30 and 40 would have been remarkable. The comet has since been identified with one observed by the Chinese, passing its descending node, in August, 1366 (but two months before one of the chief recorded meteor showers), and whose Chinese observations had been reduced to elements twenty years ago. There is no manner of doubt that between the Chinese date and the visit in 1866, this cometic made 15 exact nodal revolutions. Thus, then, by most rare coincidence, we are supplied, at this "nick of time," with an accurate mean period for the comet and his suite, 33.292 years, instead of the 33 and a quarter, the nearest guess that could be made from the meteor-showers. I will presently show how exactly every one of those on record followed on one or other of the comet's unseen passages thus reckoned, and the most noted displays within the fewest months after him. We have, then, no experience or record (unless one presently to be added) of what might happen did the comet's body

ever pass the node (say, but a day or less before the earth. But this we know, that should there, even then, he no meteors heavy enough to penetrate to the ground unaccommodated, at the slant angles nearly all places met them, yet if any could reach the ground, it would be in the district (perhaps very small), that met them most perpendicularly, or with the "radiant" in its zenith. And this, we have seen, could only happen to a place having sunrise at the time; but, further, of all the places then having sunrise, it must be that one whose latitude corresponds to the radiant's declination. (Remember that celestial latitude and longitude are not, like terrestrial, measured from and along the equator, but the ecliptic; and distance from the equator is called declination.) If we are in latitude 51°, no stars can pass overhead but those whose declination is 51°.

Now, it has been guessed, because all other known meteor-streams are rather annual than periodic,—that is, met nearly alike every time we cross their line, as if distributed round their comet's whole path, while this one is met but at two or three crossings of 33,—that this might be a new comet, not yet travelled round enough among us to get so distributed. Hence Le Verrier's great calculation that, taking the meteor's period at 33 2/5 years, they may have almost touched Uranus (the only planet besides ours that their present orbit could) in A.D. 126, and so got turned from an unknowable orbit into this one. But any correction of the above-assumed period, even to 33 2/9, changes all that; and neither the Italian, English, nor American astronomers admit this approach to have happened. Moreover, as there were anniversary displays three years apart, even in 931—934, the train was hardly shorter then than now; and, if a fresh arrival in our system, it must yet, you see, have been introduced far more than twice these nine centuries back.

Now, take 93 times this 33-2/9 from 1366, and you find there was a node passage in B.C. 1897 (remember, that from B.C. 1 to A.D. 1 is but a year, and from B.C. 100 to A.D. 100 only 199). Next find the declination of the "radiant" at that time. Sir J. Herschel makes its present latitude 9° N. and longitude 142°. This longitude is counted along the ecliptic, eastward, from that circle's intersection with the equator, a point that is always shifting westward (by the earth's top-like movement, called precession) a degree in about seventy-two years, at which rate, therefore, every fixed point's celestial longitude goes on increasing. Making this allowance, then, for thirty-seven centuries, you find what was then the longitude of a point that is now in 142°. The figure will happen to be the only one that saves you all trouble with its declination. Knowing the ecliptic's ninetieth degree to be always its northernmost, or in its declination above 23°, the "radiant," if in its present latitude of 9°, was simply 9° north of that, or in declination 32° N. So our meteors could only impinge vertically on a place in the parallel of 32° N.; and of all such places, that only which was then on the sunrise line.

Well, now let me transcribe from a record professedly of occurrences in the latitude 32° N., and the year B.C. 1897,—“And Abraham was ninety-nine years old.* . . . [Gen. xvii. 24]. And the Lord appeared unto him in the plains of Mamre; and he sat in the tent door in the heat of the day [xviii. 1]. . . . And the men turned their faces from thence, and went toward Sodom [22]. . . . And there came two angels to Sodom at even [xix. 1]. . . . And when the morning arose, then the angels hastened Lot [15]. . . . The sun was risen upon the earth when Lot entered into Zoar. Then the Lord rained upon Sodom and upon Gomorrah burning stone and fire from the Lord, out of the heavens. [Heb.] And he overthrew those cities, and all the plain, and all the inhabitants of the cities, and that which grew upon the ground. But his wife looked back from behind him, and she was made [Heb.] a pillar of salt” (23-26).

Of these meteors, then (following a node passage of the same little comet as ours, in the same direction, and from the same radiant), the only one particularised, because it hurried a person, made her (or was) a pillar of salt. And pillars of salt—of soda salts and magnesian salts—(the same chief and the same second ingredient that seem, according to Mr. Browning, to characterise the November meteors) are the matters that, dissolved in the lake, or

heaped in forms unknown to geology on its borders, are found to blight and mark off that locality from the whole globe. Another thing indeed it has unaccountable, and contrary to all other earthly phenomena; its depression to furlongs below the sea-level, and this by downward bending of the whole strata. It is now, in no sense, “the plain” that Genesis calls its former state; but is the only district on earth like nothing but a bruise of her plump skin, a contusion or indent, as by direct impact of a foreign body. And agreeably with this, we find volcanic outbreaks on the extreme verge of the depressed area; but none within that area. The non-biblical accounts, too, of the event either called it simply a great earthquake, or made that its chief element.

Tradition has poetically but ignorantly derived the country's asphalt and sulphur from the catastrophe, though Genesis distinctly says the former distinguished it before (xiv. 10), and the sulphur veins have lately proved to be part of its deluge-drift or older strata. But neither of these minerals would make the soil barren. The only things that do this are the salts, that geology finds unaccountable intruders.

I must now apologize for one omission made to simplify the above reckoning, and which may seem to have made it look a little stronger than it is. We supposed the “radiant” at its present place among the stars of Leo, but the permanence of the phenomenon shows it to move eastward about equally with the node; and a Chinese account, nine centuries old, confirms this by placing it then in Cancer. In Abraham's time it was in Gemini, and instead of longitude 90°, was as far west of 90° as it is now east thereof. If in its present latitude, its declination was the same as now, or about 23°; but its latitude is certainly decreasing, and may, for aught we know, have been then several degrees higher, and S° would give it the declination we assumed above. The exact fact then is this:—That it was within a very few degrees of the zenith of Sodom, or the fall as vertical as any rain, is certain; and mathematically exact verities (which is nowise required) was quite possible, but is not, as the above made it seem, ascertainable.

Now observe that none of these calculations would be easy, or perhaps possible, had the comet's elements been slightly different, the stream not encountering us so directly at our sunrise line, or not having its perihelion and node within a few degrees of being identical; had it, in short, resembled the August meteors' orbit, or any other known, these would have made the problem one for astronomers, if not almost as insoluble as had the Chinese account of the comet in 1366 not existed. But as surely as the spectroscope came just in time (this comet the very first to be examined by it), so are these numerical data just such as would be chosen if one wanted to make the calculations and argument plain, yes, ridiculously easy, to a school-boy. This applies even to the comet's period, so near a third of a century, that we may reckon 24 in 799 years. Thus, then, I find an event singularly well monumented. Lot's wife's pillar served in its day; but a far more durable, and how carefully and consummately contrived a monument is this flying through the sky! that non-travellers can examine, and so arranged as to be visible in general once every generation from any single spot on earth,—from some occasionally twice.

I will now tabulate the list of its recorded visits, as the American professor traces them, but connected with the notable one twenty-eight centuries before his first. The times of the comet's passage, except the two in 1366 and 1866, must be taken as what they would have been undisturbed. The period found from fifteen revolutions will apply better in calculating many revolutions than a few; for you must observe that planetary perturbations may have lengthened or shortened any single revolution by as much as a year, and even accumulated similar effects for two or three revolutions together. Therefore, we know not whether the showers of A.D. 931, 1399, or 1698 preceded the comet, for it may have been many months earlier than the dates here set down for 933, 1399, and 1699. But we do know from the slight display in 1855, which certainly preceded the comet's passage two months, that he has some vanguard of meteors, though the mass of the procession follows him.

TEMPEL'S COMET (1. 1866) AND ITS ATTENDANT METEOR STREAM.

No. of Visit.	COMET.		METEORS.		Place and Remarks.	By whom observed.
	Time of Node-passage undisturbed.	Old Style.	Morning of each recorded Shower.			
			Old Style.	New Style.		
0	B.C. 1898 or 7	B.C. 1398 or 7		July 30 (probably)	Sodom, &c., destroyed at sunrise	Abraham
21	1099 or 8		193 to 129		China, — “Great agitation of stars in these years”	
48	300 or 299				Do. — “Stars falling in all westward”	
53	131 or 3				Constantinople, — Dust shower	Procopius and Marcellinus Monks
65	A.D. 268 or 9	A.D. 268 about Sept.			France, — “Fiery lances flying westward”	
71	468 or 9		690 (no mo. stated)	October 17	Europe, — Cairo [10X]	
84	650 or 1		A.D. 902, October 12	October 17	China, — “More than Spain, Bagdad, &c.”	Arabs, &c.
85	933, November		931, “ 12	“ 17	Very not-d shower	Arabs and Monks
			933, “ 13	“ 18		
86	967, February		934, “ 13	“ 18	China, — “Many shooting stars at once”	
87	1000, June		1002, “ 11	“ 20	China, — Radiant observed in Cancer	
88	1063, September		1001, “ 16	“ 23	France, — “Rain of stars”	Monks
89	1067, January					
90	1183, April					
91	1183, August					
92	1166, November					
93	1220, March		1202, “ 19	“ 26	Bagdad, &c. — “Stars flying from E. to W.”	Arabs
94	1223, June					
95	1266, October					
96	1309, January					
97	1333, May					
98	*1366, August 26		1366, “ 22	“ 30	[Fragme.—Very noted Portugal, France, Italy, Italy]	Monks Monks
99	1390, December 11		1390, “			
100	1434, March 27					
101	1496, July 12					
102	1496, October 26					
103	1533, February 10		1533, “ 25	November 4	China, — Europe, — Very noted	
104	1566, May 27				China, — “Many hundred stars dispersing and reconverging”	
105	1598, September 11		1602, “ 27	“ 6	France, — Stone rain	Morinus
106	1632, December 26		1631, “ 27	“ 6		
107	1666, April 11					
108	1699, July 27		1698, “ 30	“ 9	Europe	
109	1732, November 11					
110	1763, February 25					
111	1799, June 11		1766, October 1	or November 1	Quito, — Cumana	Natives Humboldt
			1799, November 1	“ 12	Cumana	
			1832, “ 1	“ 13	Europe, — Greatest sh.	
112	1832, September 26		1833, “ 1	“ 13	Americas, — less	Olmsted
			1834, “ 1	“ 14	North America, — slight	H. A. New.
			1835, “ 2	“ 14	North America, — small	
			1836, “ 2	“ 14	All Europe, — moderate	
113	*1866, January 11		1867, “ 2	“ 14	America, — slight	
			1868, “ 2	“ 14	Europe, — small	Phillips

* This year was 1867, even according to the popular margin, if you compare it with that given for Abraham's journey out of Haran (Gen. xii. 4).

ORNAMENTAL ART WITH RELATION TO ETHNOLOGY.

At the Associated Arts Institute Mr. R. H. Soden Smith, M.A., read a paper on "Some Phases of Ornamental Art, considered in Relation to Ethnology."

In introducing his subject, Mr. Soden Smith alluded to a paper read during the last session of the Arts Institute, in which he had stated the theory respecting the classification of art that he had been led to adopt,—namely, the division of all Fine Art into Instinctive, Intellectual, and Moral or Spiritual Art. He then proposed to take one of these classes or divisions,—viz., Instinctive Art,—as his present theme, and proceeded to point out, 1st, its nature and limits, its excellences and defects; 2nd, its development among certain nations.

Some exception may be taken, he said, to the term "instinctive," which cannot with exactness be applied to any operation of the human mind resulting in artistic effort, however humble; but, on the whole, it most nearly expressed the thought he desired to convey. The aim of instinctive art is not high. It occupies itself with surface decoration, and with this, not as subordinate to architecture, &c., but as the only art known, and therefore, primary, instead of, as it should be, secondary. It also, in objects surrounding daily life, shows its influence on form, and, among certain races, with excellent results. In its own sphere it approaches perfection,—a perfection more easily attainable than that of intellectual or moral art, as it seems to be free from the hesitation that belongs to reflection. It is not symbolic, nor truly æsthetic, but makes its appeal to man's sensuous nature. It is limited, therefore, to conventional ornament and forms, whether in the round or the flat, the ornament and forms employed being the result of general rather than particular impressions. When it strives after direct imitation it passes its limits, and fails; thus the efforts to represent the human form that occasionally intrude themselves into works of instinctive art are hopeless failures.

The development of instinctive art among certain races of mankind was then alluded to. First among certain oceanic groups of the Malayan type and amongst Papuans. The objects of daily use, the dresses, and weapons of these races were quoted as admirable examples of instinctive art. Reference was made to a collection of tissues brought from the South Sea Islands in one of Capt. Cook's voyages, and which now belong to the South Kensington Museum. These are decorated by means of the simplest forms and few colors, and are examples of the complete attainment of the object in view. The art of the Mongolian race was next spoken of, Chinese surface-decoration being dwelt upon, and their skilful treatment of colour pointed out. The probability was suggested that the forms which they occasionally use, and often mar in the use, originally were derived from a race of another ethnological type. Vases, for example, of excellent outline have their forms strangely altered by handles or projecting monsters of shapes out of harmony with the rest of the work. Yet the instinct of the Chinese artist enables him at times to redress the balance wonderfully, and for this reason,—the carved wooden stands should not be removed from the vases, incense-burners, &c., to which they belong. They are necessary to complete the conceptions of form, often *bizarre*, which was in the mind of the artist.

Lastly, the instinctive art of races belonging to the Caucasian race, using that title in its wide sense, was treated of, and the surface-decoration of the Celtic nations, especially the British Keltic, was dwelt upon, their skill in the ornament in metal-work being mentioned at some length, and examples of cast, of chased, and of filigree ornament being quoted, and its characteristics pointed out, the peculiarity of certain curves, and especially of the spirals and their distinction from other allied phases of decoration, being indicated. The MSS. illumination of the British and Irish Keltic people was next mentioned for its extraordinary excellence as an example of surface-decoration, its complexity of design and faultless accuracy of execution being illustrated by reference to the "Book of Kells," which dates from the seventh century, and to other examples of nearly contemporary work.

The speaker concluded by observing that, although he might seem to invite attention to a very humble field of art, yet that the subject

was not without importance; for if we could aid in any degree in surrounding the daily life of the millions of our countrymen with objects enriched by such art as that on which he had commented, so fit in design, so subtle in conception, so rich in colour, sometimes so marvellous in execution, we might be conscious that we were assisting to raise those around us in the scale of intellectual civilization, and to enable them at length to appreciate the efforts of those nobler arts which shed an immortal light on the fortunate lands where they take root and flourish.

THE SOCIETY OF ARTS.

An able and interesting review of the past history of this society, with suggestions for its future expansion, has been given by Mr. S. T. Davenport, financial officer of the society, in a paper titled "A Glance at the Past and Present of the Society of Arts, with some Suggestions as to the Future." The past was divided into two periods, one extending from the foundation of the society in 1754, by William Shipley, landscape-painter, to what may be called its winding-up, about a quarter of a century ago, and the other extending from that time till now. Mr. Davenport has been connected with the society during the whole of this last period. For the future, he said,—

"I would venture to suggest, in the first instance, some such division as the following, each group being placed under the special care of an expert:—

Chemistry in its relation to manufactures and the arts.

Manufacturing machines and tools.

Trade and commerce, especially including colonial produce.

Education, domestic, social, and economic appliances.

Under some such divisions (he continued) an expansion of our present action might be begun; an expansion which could be elaborated from time to time as additional funds were provided; and under these divisions I believe members would naturally group themselves, and papers might be read periodically in each section.

With industry, according to a list formerly prepared for the society, applied to nearly 1,000 trades, and the discoveries of science daily brought to bear more and more upon them, how is it possible, under our present system, to watch and record progress in this country alone?

I think, also, that it would be a good and profitable investment of money to appoint gentlemen to watch and report on the progress of science and industry abroad, and to translate the records of the published discoveries made in foreign countries for the society's *Journal* and the information of its members."

"The society should watch for and record the wants of industry and art, and offer such honorary rewards for them as their importance demands. Are there no wants in the present day not yet supplied? Do we know all there is to know about metals? Can we puddle iron without a large amount of manual labour? Have we succeeded in constructing a locomotive fit to be worked, and capable of being used in underground railways without creating a nuisance or injury to health? Have we yet ascertained how to bring the surplus food supply of other countries to our own shores? Have chemists exhausted all the sources from which motive power may be supplied, without nuisance, and in so safe and portable a form that horses might be dispensed with on our streets and roads, thereby adding an enormous food-producing area for the benefit of the people of this country? Have manufacturers combined with electricians to apply electricity as it is capable of being applied to increase and extend the artistic powers of the loom? Are there no new oils, gums, fibres, and splices, &c., in India, Africa, and throughout Australia? Do we know how to use petrolæum as it is capable of being used? Surely with experts in charge of sections, wants such as these and many others I could name might be recorded and put forward for solution; and though we may not live to see them all realised, still when our successors shall come before the members of the Society of Arts 115 years hence, they may then have to record of them as we do now, that the reaping-machine asked for 100 years ago has been obtained and is regularly at

work, and that the hay and the corn that used to be spoiled in wet seasons are now capable of being preserved and harvested for the use of man."

"We started our present society twenty-five years ago, with 300 members. We had to borrow money to pay debts, and members subscribed funds for special purposes. We did work which was appreciated by the public; the public supported us; and we are now a body of 3,000. Let us still endeavour to extend our influence; and I have no doubt that, as, in times past, the seed which was sown in good ground took root, and has brought forth tenfold, those who are spared, if they work vigorously, will, in years to come, be able to say it has brought forth an hundred-fold."

In the discussion which followed the reading of Mr. Davenport's paper, very high encomiums were passed on both the review and the suggestions, and the thanks of the Society were unanimously accorded to him at the close.

THE TRADES MOVEMENT.

Manchester Court of Arbitration.—A meeting of the representatives of employers and employed interested in the formation of this Court has been held at the Manchester Chamber of Commerce, and, as their first business, proceeded to the election of a president. It was found that the representatives on both sides had independently selected Mr. Edwd. Owens, judge of the County Court, as a gentleman specially qualified for the appointment. It was therefore arranged that the presidents of the Chamber of Commerce and Trades Council should wait upon Mr. Owens to ask his acceptance of the office. Mr. Owens has accepted the invitation, and at a court held when he was present, he was duly appointed president. Those present at the meeting first mentioned were Mr. Edwd. Owens (chairman), Mr. J. M. Bennett, Mr. Fereday Smith, Mr. Richard Johnson, Mr. J. Slagg, jun., Mr. H. J. Leppoc, and (representing the Trades Council) Mr. W. H. Wood, Mr. George Jones, Mr. P. Clark, Mr. P. Shorrocks, Mr. G. Townley, Mr. C. Swain, and Mr. A. Ridge. The reconsideration of a code of by-laws and standing orders occupied nearly the entire sitting of the court. These rules will shortly be completed and made public. Mr. Browning, secretary of the Chamber of Commerce, volunteered to undertake the duties of secretary in an honorary capacity for the next six months.

ST. PATRICK'S (R.C.) CATHEDRAL, MELBOURNE.

This important edifice was commenced in the year 1858. The plan of the cathedral comprises nave, transepts, and choir, with aisles to each on both sides. The choir has an apsidal end, and five chapels open out from the aisle which surrounds it. There are two towers with spires, each 220 ft. in height, at the south-west end of the nave, and a lantern tower and spire 330 ft. high at the intersection of the nave and transepts. The extreme length of the church interior is 345 ft. The width inside the nave and aisles is 76 ft. The interior length of transepts is 160 ft.; and the height to the ridge of the roof is 92 ft.

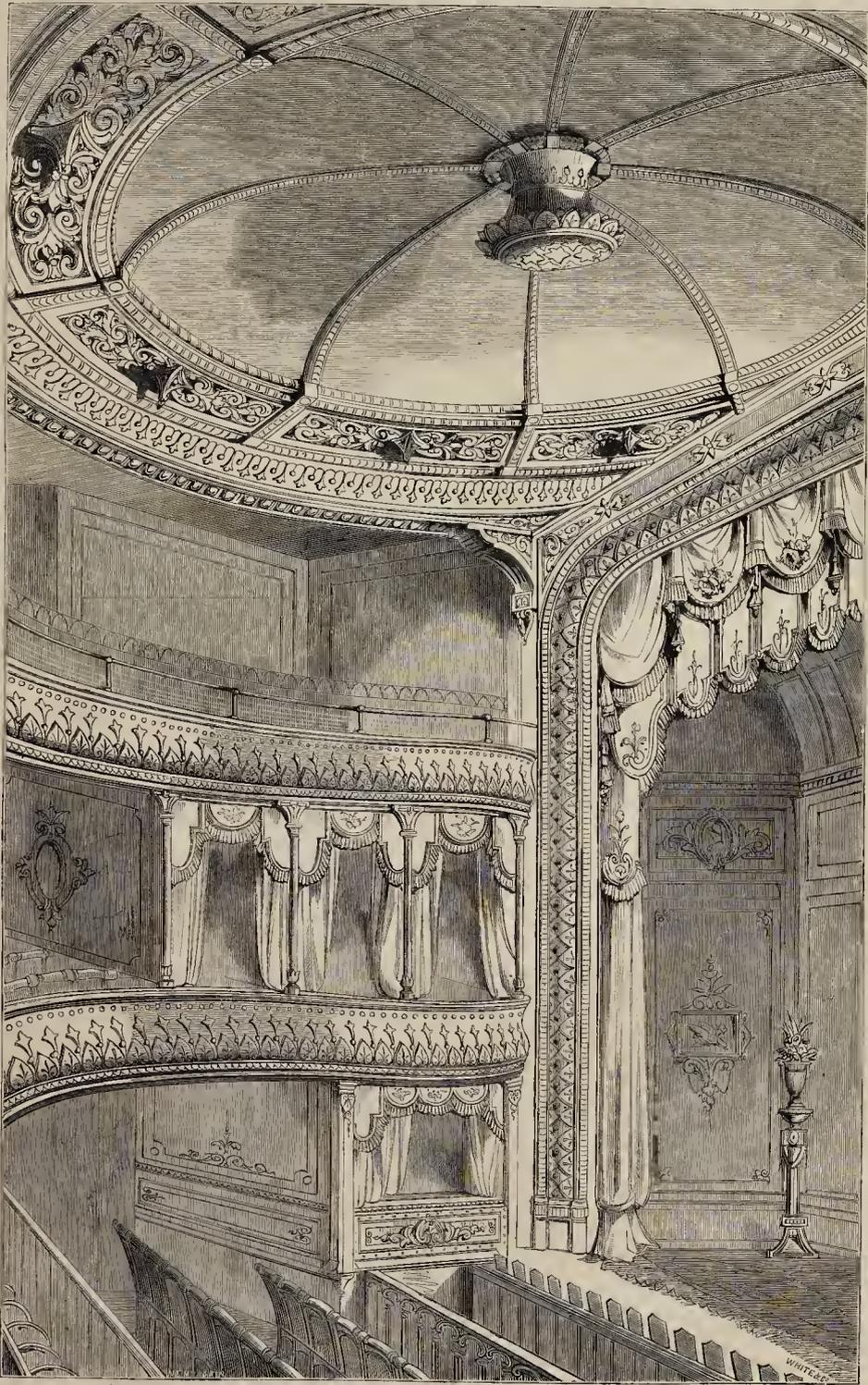
The nave and aisles and two western towers have been commenced; the nave and one aisle are roofed in and nearly completed, and the stone vaulting of the second aisle is making rapid progress. The fittings are at present all temporary. One of the towers is up, ready to receive the spire; the other being complete to the floor of the upper belfry, a portion of the bells have been hung in the western tower. They were cast by Mr. Sheridan, of Dublin. The stained glass is by Hardman, of Birmingham. The principal window in the nave, having for subject the Ascension of our Lord, is well spoken of.

The works are being carried out under the superintendence of Mr. Denny, by Mr. Young, the contractor. Messrs. Wardell & Co. are the architects.

It is proposed to remodel the present house for the bishop, to form part of the grammar school buildings, and the proposition includes a plan for a new house for the bishop, with chapter-house, sacristies, cloisters, &c.



ST. PATRICK'S (R. C.) CATHEDRAL, MELBOURNE.—MESSRS. WARDELL & CO., ARCHITECTS.



THE GLOBE THEATRE, NEWCASTLE STREET, STRAND.

[See page 535, ante.

IRON AND STEEL SHIPS.*

No one who reads his newspaper can be ignorant of the name and note of Mr. Reed, our navy constructor. This work of his is so replete with practical and detailed instructions to qualify it for its destiny as the base of future examinations in practical iron shipbuilding in the national dockyards, that it is not a hook well suited, and especially on such a subject as ship-building, to be used freely as a gleaner's field for our columns; defective, as it is acknowledged to be, in what relates to the history and theory of ship-building. We shall endeavour, however, to give an idea of the author's manner of treating his subject as regards armour-plates and steel in ship-building, premising that the hook is divided into chapters on the strength of iron ships; on keels, keelsons, and garboard strakes; on stems; on stern-posts; systems of framing, in various chapters; deck stringers and plating; bulk-heads; topsides; rudders; iron-masts; steel-plates for ship-building; rivets; testing iron and steel; Lloyd's and rules for ship-building; armour-plates, &c.

Steel is now regarded by the shipbuilder as a material which may with care be made to possess greater ductility, both hot and cold, than the best wrought iron, in combination with a tensile strength 50 per cent. greater than that of iron. It has on this account come to be largely used by shipbuilders, instead of iron, for plates and angles, and to a great extent for rivets also. There is but little room for doubt that it is destined to a far more extended use than it now has for these purposes; and it is possible that it may ultimately displace iron for such uses. But, in the present state of the manufacture, steel ship-plates, our author thinks, possess some very dangerous peculiarities. There is ample experience, he says, to prove that ships built of steel may be weaker, both structurally and locally, than ships built of iron of the same scantlings, and with precisely similar arrangements of framing and fastenings. It may be said, indeed, with truth, he remarks, that if steel supplied by first-class makers is treated in the same manner as iron in working it into a ship, it will require to be of the same thickness as the best iron, in order to obtain the same strength; and that, as the practice has been to reduce the thickness in nearly inverse proportion to the tensile strength of the perfect plate, steel ships so built are by so much inferior in this respect to ships built of iron of unreddened thickness.

Several kinds of steel have been used in ship-building in the form of plates and angles, but there are only two which have had any extensive use, viz., Puddled and Bessemer steels. These two materials differ widely from each other, not only in the mode of manufacture, but in their qualities. Puddled steel plates and bars, like iron, are made from a pile of small pieces, welded together under the hammer, and between the rolls, and are subject to those well-known and troublesome defects produced in these processes, to a greater extent even than iron. Each Bessemer steel plate or bar is, on the contrary, made from a single ingot, and is therefore free from these defects.

Large plates can thus be made by the latter process with the same precision, and almost with the same ease as small ones, but in puddled steel this is not so. It also appears to be more difficult to obtain uniformity of temper in a batch of puddled steel plates than in Bessemer steel, probably because of the extreme care required in selecting the puddled bars of which each pile is made, as these bars differ greatly from each other in temper, and the selection is made from observation of the nature of the fracture when they are broken. In the manufacture of Bessemer steel, the selection which requires to be made is dependent on precise chemical analysis, which is part of the daily operation of the mills, and is altogether independent of the workmen. Puddled steel is not necessarily inferior in strength to Bessemer steel, but that made in England is generally of lower tensile strength, as well as less uniform in strength.

An important metallurgical discovery, we may here observe, has been recently made, which will have great influence on the manufacture of steel, and how far that may affect the use of it for ships remains to be seen. Bessemer's process is ingenious, and successful with the best kinds of iron, although it is inapplicable to the inferior kinds produced in North-east Yorkshire and in Northamptonshire. Even Bessemer, however, is now beaten by Heaton, a manufacturer in the Erwash valley, for he can take common "pig," and turn it into steel, and by a very simple process. He covers the bottom of a cupola with

nitre, pours thereon the molten metal which he

desires to convert, and chemistry does the rest. At the end of two or three minutes, a fierce flame bursts from the top of the cupola. Presently all is quiet; the nitre, by the action of the intense heat, is converted into phosphate of soda, and the iron into steel. That is the whole process; and, on opening the cupola, there is a solid mass of steel, weighing from 12 cwt. to a ton, ready for the hammer, and to be wrought into any of the forms in which steel is sent into the market.

As if to be ready for this new steel, too, a "deadstroke hammer" has been recently invented by Messrs. Shaw & Justice, of Philadelphia, which is to excel the ordinary steam hammer of Nasmyth by simplicity and ease of working, as well as economy of steam. Three of these hammers, it is said, can be kept going with the steam required for one ordinary steam hammer, and "any boy in a smithy" may manage one.

In armour-plating iron ships, the practice of Government service is to make a set of moulds representing sections of the outside of the ship, and to fix them in their proper relative positions, so as to obtain an accurate representation of the ship's side in wako of the plating to be taken account of. The slight expense of materials and workmanship thus involved is found to be more than compensated in the accuracy with which the plates can be specified for. Drawings of the various plates are prepared, showing their forms and having the figured dimensions, thickness, and estimated weighing marked on them, together with the distinguishing letter and number by which each plate is known. These drawings are forwarded to the manufacturers, and accompanied by printed forms, on which are given the numbers and particulars of the plates ordered. In preparing the specification for armour-plates at the extremities of a ship it is usual to allow a margin of about 2 in. on each edge and butt above the net dimensions; but for the plates amidships the allowance made is not so great, as they have only a moderate amount of curvature and twist. The ordinary dimensions of the plates used are a length of from 15 ft. to 16 ft., and a breadth of from 3 ft. to 4 ft., but the dimensions of many of the plates necessarily vary greatly from these.

A ship's side has to resist both shot and shell; and one of the most important things to guard against is, the explosion of a shell within the wako hacking.

"When the *Warrior* was designed [says Mr. Reed] it was very probable that any shell would pass completely through the 4-in. armour and explode there, and therefore a great depth of wako hacking was unobjectionable on this ground; but as Mr. Whitworth, Sir William Armstrong, and others improved their shells, this contingency became probable, and hence it appeared to me most important so to adjust the thicknesses of the backing and armour, that a shell, which was large and powerful enough to pass through the armour, should be too large to bury itself within the backing, and explode there. If it were not regarded, it is obvious that a single shell might strip several armour plates from a ship's side, and expose her to speedy destruction. In the *Hellfire* target this was carefully regarded, as it is not to be expected that a shell large enough to break through a 6-in. armour-plate would be less in length than the thickness of the backing, viz., 10 in.; and the importance of the precaution was signally illustrated, for the shell that did penetrate the plate was stopped by the stout iron skin before it got within the armour, and consequently exploded harmlessly backward through the hole which it had made. By placing the extra iron plate of the *Lord Warden* upon the frames of the ship, the same object is accomplished there also, so that a shell piercing the 4-in. plate may encounter the 11-in. plate before it has space to bury itself.

In the *Hercules* target the same principle of construction has been carried out. In the *Hercules* herself, provision has been made for 9-in. armour at the water-line, and for wako backing, varying from 10 in. to 12 in. It was considered that in this case, also, it was out of the question to suppose that a shell which could penetrate a 9-in. plate would be less than 12 in. in length, and consequently, in this case also, it was presumed that the armour-plate, the backing, and the skin of the ship must all three be pierced, before a shell could do any serious injury to the structure."

We learn, by the way, that Messrs. Napier, of Glasgow, have received orders from the Admiralty to construct the *Hotspar*, a steam ram which bears no resemblance to anything in our navy at present. She is neither a broad-side ship nor a monitor. Like the *Beller*, this vessel is intended to fight end-on. The armour belt at the water-line consists of two strakes of plating, the upper one being 11 in. thick, and the lower one 8 in. She has a formidable ram. On the main-deck is an armour-plated breastwork extending about one-third the length of the ship, similar to that which has been adopted in the new monitors. From the bow aft to the breastwork the main-deck is plated with 3-in. armour; and at the forepart of this breastwork a pear-shaped battery, covered with 8-in. armour, is brought above the upper deck. This battery is

pierced with several ports, and contains a turntable carrying an 18-ton gun, the whole being trained, &c., by suitable machinery situated on the main-deck. The only other gun to be carried by the *Hotspar* is a 40-pound Armstrong; this will be placed aft.

The book is valuable.

SCHOOLS OF ART.

The York School.—The annual meeting of the friends and supporters of this school has been held in the school, but there was only a thin attendance. The report stated that the condition of the school was satisfactory in respect to the number of pupils as well as their works. The number of pupils in attendance on the various classes during the past year had been 67, that of the preceding year being 51; their attendance had been more regular; they had displayed a greater amount of diligence, and their success had consequently been greater, a statement corroborated by the number who had passed the Government examination and had obtained prizes. Eleven in the second grade, and five in the third grade, had obtained prizes; while thirty-eight had passed in the second grade, four with full certificates; one had been made a free student, and one a pupil teacher with 15l.

The Cambridge School.—The annual meeting in connexion with this school for the distribution of prizes, &c., has been held in the large assembly room, Guildhall, the Rev. the Master of St. John's College presiding. A large number of ladies were present, and on the platform to support the chairman were Professor Kingsley (who read a paper on the "Morality of Art"), Mr. Hattersley, the master of the school of art, and others.

The chairman congratulated those present on the success of the school, its progress during the past year being of an encouraging character. He regretted the severe loss the school had sustained in the death of Mr. Beaumont. The committee reported an increase in the total number attending the school, but they regretted that there was a diminution in the attendance at the gentlemen's advanced class. The number of prizes and rewards obtained by the students from the Government, either in the local examinations or for works done during the year, was much greater than last year. Thirteen were this year selected for national competition at South Kensington, against six of last year.

THE TECHNICAL INSTRUCTION MOVEMENT.

Newcastle-upon-Tyne.—Mr. J. C. Buckmaster has delivered a lecture, in the lecture-room of the Literary and Philosophical Society, on "The Facilities and Grants of Money now offered by Government for Scientific Education." The lecture was well attended. After Mr. Buckmaster's address, practical observations were made by various speakers, and it was resolved "That a committee [named] be appointed to assist the two gentlemen sent down here to promote the formation of classes, for the purpose of making representations of the defects in the present arrangements, and to lay before the Government those little difficulties which fall in the way of the inauguration of these classes."

Blyth.—A public meeting has been held in the lecture-room of the Mechanics' Institution, Blyth, for the purpose of increasing the interest in evening classes for instruction in geometrical drawing, machine drawing, building, construction, &c. The Rev. W. Greenwell, vicar of Horton, presided. Mr. W. T. Rowden, associate of the Royal School of Mines, London, was in attendance, and explained the advantages and objects of such classes, and showed how they could be wrought in connexion with the Government Department of Science and Art. The meeting was also addressed by the Rev. W. Dromgoole (Roman Catholic), the Rev. T. Clifton (Congregational), and Mr. G. B. Forster. The committee of the Blyth Mechanics' Institution inaugurated two successful classes last winter—one on marine architecture, the other on geometrical, free-hand, and perspective drawing, conducted by Mr. Wallace, National School teacher. Several pupils obtained certificates at the last March examination.

Banbury.—The annual meeting of the Committee of Management for the Banbury Science

* Ship-building in Iron and Steel; a Practical Treatise. By E. J. Reed, C.B., Chief Constructor of the Navy, &c. London: Murray, 1869.

School has been held in the Council Chamber, Town-hall. Mr. B. Samuelson, M.P., the president, occupied the chair. The annual report was adopted. It was reported that efforts had been made in the neighbourhood to establish classes for science instruction, and that in one case (Deddington), these efforts were likely to receive encouragement, as classes were now being conducted in Elementary Mathematics and Physical Geography. Classes for Banbury were arranged for the next session, on Animal Physiology, by Mr. J. H. Beale; Elementary Mathematics and Physical Geography, by Mr. A. Owen. The chairman was requested to obtain the assistance of Sir H. Verney, M.P., in the formation of classes at Buckingham. Mr. Samuelson expressed a hope that as the Banbury Science School was one of the first established in connexion with the Government Department of Science and Art, every effort would be made to secure permanent successful working for the various classes in the town and neighbourhood. He called attention to the efforts that were being made in the North of England; where through the agency of schoolmasters' classes, science instruction was being pushed with marked success. He especially called the attention of the committee to the minute of the department which allows grants for building purposes to committees of science classes, and expressed a hope that advantage may be taken of the same. The minute is as follows:—

"A grant in aid of a new building, or for the adaptation of an existing building for a School of Science, may be made at a rate not exceeding 2s. 6d. per square foot of internal area, up to a maximum of 500l. for any one school, provided that the school

(a) be built under the Public Libraries Act, or

(b) be built in connexion with a School of Art aided by a department building grant.

And provided that there is a population in the neighbourhood which requires a school of science; that it is likely to be maintained in a state of efficiency; and that the site, plans, estimates, specifications, title and trust deeds are satisfactory."

COMPETITIONS.

New Church, Brownswood Park, South Hornsey.
In a private competition for this new church, four designs were sent in, by Messrs. Wallen, Joseph James, Theodore Green, and Bacon & Bell. The design of the first-named gentlemen has been selected for erection.

THE NORTHERN ARCHITECTURAL ASSOCIATION.

The quarterly meeting of this body was held on the 26th ult. in the Old Castle, Newcastle-on-Tyne; Mr. J. Watson in the chair. The secretary announced that he had been in communication with the Architects' Benevolent Society; and they had advanced 10l. to the widow of one of the late members of this Association. The Association (added the secretary) subscribed annually; and this was the third time that help had been received. It was resolved, on the motion of Mr. R. J. Johnson, seconded by Mr. Frank Charlton, that a letter of condolence be sent to Mrs. Green, on the death of her husband, Mr. John Green, the late president of the Association. The report of the Architectural Alliance was read; and Mr. R. J. Johnson announced that he had attended the annual meeting in London, on behalf of this Association. The secretary called attention to a very important matter in the last paragraph of the report, referring to the facilities for architectural education in the neighbourhood; and also read a letter from the Alliance on the subject. Mr. Fowler moved, and Mr. Oliver seconded, that the report and letter be referred to a special meeting. The secretary received instructions to write to the secretary of the Glasgow Architectural Association to inquire what steps had been taken by that society for the purpose of registration, and under what Act of Parliament. The Society then proceeded to elect the officers for the year, as follows:—President, Mr. J. Watson; vice-president, Mr. R. J. Johnson; hon. treasurer, Mr. F. Charlton; hon. secretary, Mr. Thomas Oliver; hon. solicitor, Mr. G. W. Hodge; committee, Mr. Hogg, Mr. Fowler, Mr. Thompson, Mr. Parnell, and Mr. John Johnstone. The president returned thanks for the honour they had done him. He felt the honour the more from his being the successor of his late lamented friend, Mr. Green.

SANITARY MATTERS.

Typhoid at North Shields.—Last week, says the *Lancet*, we informed our readers that fifty-six deaths have lately occurred from fever in North Shields; and, from the various accounts we have published of the disease, it is very moderate to compute that 1,000 people have been ill, out of a population of about 35,000. There has been no coroner's inquest over any one of the fifty-six deaths, and the illness of a thousand does not seem to have occasioned much anxiety. It would take an alderman's death, or town clerk's, to startle the authorities into an inquiry worthy of the occasion. There has been no investigation by the Privy Council, so far as we know, though the outbreak is far more serious than the one at Guildford. We have no reason to doubt that Mr. Simon would find the North Shields outbreak as "instructive" as the Guildford one, and (as valuable an illustration of "excremental poisoning." It is high time the Sanitary Commission which has just been appointed should begin its inquiries. It cannot have a better subject to start with than this outbreak of typhoid at North Shields, and the slight attention excited by it.

On the Use of Sewage at Parsloes (Barking).—We have the summer's history before us in a report on certain half-acre beds of land near Barking; and it throws considerable light upon the sewage question. A nine-acre field, of a fair loamy soil, lying a mile beyond the utmost point to which the Metropolis Sewage Company then sent their North London sewage, was during the month of May, ploughed and reploughed and thrown up into ridges 18 yards wide and nearly a yard high. Meanwhile, a line of troughing which should command this field was erected on posts some 12 ft. high at the sewage end—landing their contents, however, in a stream just above the level of the furrows along the ridge-lines of these beds. Mangold plants, says the report, were transplanted into the blanks from a seed-bed, sown so late as June 9th; and by-and-by the sewage was available, and the appearance of everything soon changed, almost as by magic. And now the straw of the Indian corn, the crop having been long since gathered, is standing 6 ft. or 7 ft. high; the mangold ridges, not altogether evenly covered, for some of them had been transplants and others had been seedlings, are covered with a heavy crop, probably nearly 40 tons per acre, many of them heavy, handsome roots; the cabbages have been sold after the rate of 30l. per acre; the kohl rabi, not so good a crop as the others, yet promises a very fair return; and some of the remaining ridges are covered with a very vigorous and bushy crop of late-sown turnips. The detailed history of the field is one of the most surprising testimonies to the fertilising power of London sewage that has yet been borne.

Sanitary State of the Army in India.—The report of the sanitary commissioner for 1866-7 shows that the death-rate of the European army was 30.95 per 1,000 men. This was more than half as high again as in the previous year, much higher than any year since 1861, when it was 45.93 per 1,000. The rate of 1861 was the highest on record, and of 1866 the lowest. 1,071 deaths from all causes occurred, and of these 471 arose from cholera. The per-centage of deaths from cholera per 1,000 was 13.81. Next to cholera, the largest number of deaths was due to fever.

THE SANITARY STATE OF SHOREDITCH, AND THE DWELLINGS IMPROVEMENT ACT.

The vestry of Shoreditch are considering several important matters relating to the sanitary condition of the parish. A meeting was recently convened by requisition, for the special purpose of considering a report from Mr. Sutton, the medical officer of health, suggesting the expediency of carrying out the provisions of the Act 31st and 32nd Victoria, cap. 120, entitled "An Act for providing better Dwellings for Artisans and Labourers."

The report stated that during the two weeks ending with the month of October last, there had been nineteen deaths from contagious diseases registered in the parish; that there had been an outbreak of typhus fever in the Holywell district; that eleven persons had suffered from typhus in Bath-place, Curtain-road, all of whom had been removed to the Fever Hos-

pital; and that isolated cases had occurred in Willow-gardens, Garden-row, Eleanor-place, Chapel-street, Royal Oak-walk, Pitfield-street, and the neighbourhood of Hoxton Market. Notices had been served on the owners of the houses in which these cases had occurred to cleanse and disinfect the same, and the beds and clothes were ordered to be destroyed. In several instances notices had been served on owners to close the houses, as being unfit for human habitation, and the medical officer recommended that the vestry surveyor be requested to report upon certain houses in Charlotte-court, Charlotte-street, Curtain-road, as to whether they can be rendered fit for human habitation by alteration, or it is necessary that they should be rebuilt. The medical officer strongly urged the vestry to carry out these recommendations, on the ground that the house property around Garden-walk, Ingram's-buildings, Charlotte-court, Dennis-place, and that district, is in a very bad state, the houses being in such bad structural condition that it is almost impossible to keep them in a good sanitary condition. The result, he states, is, that these houses are frequently the dens of fever, and if fever break out in one house, it generally spreads to several others. More- over, he continues, now that the owners of this property are beginning to recognise the necessity for pulling down such houses, it is very important for the health of the artisans and the labouring classes of the parish that the owners of such bad property should know that the vestry have the power to compel them either to greatly improve or to rebuild these houses. It is not intended, he observes, that a number of these houses should be closed at once, but that measures should be taken to compel the owners to improve and reconstruct such houses by degrees.

A discussion followed the reading of the report, when very different opinions of the propriety of interfering were expressed, and ultimately the meeting was adjourned till the second Tuesday in January, the clerk meantime to furnish each vestryman with a copy of the Act.

RAILWAY MATTERS.

City Railways.—A new method of applying steam for locomotive purposes on street railways, so as to avoid the use of fire in the engine while running on the streets, has been exhibited at Philadelphia on a temporary track. In this engine the necessity for a fire-box, smoke-stack, &c., is done away with by substituting a tank or reservoir for holding water previously heated to a high temperature in a stationary boiler. The water is forced into the locomotive tank, and is said to be capable of giving off an amount of working steam for a considerable length of time sufficient to drive the engine and draw one or more carriages. The new locomotive weighs about five tons when fully supplied with the requisite storage of heated water. At the trial it ran forty-five minutes, making 125 stoppages and reducing the steam pressure from 80 lb. at starting to 20 lb. when the trial ceased. The temperature of the water is kept up by a non-conducting jacket 3 in. thick around the tank.

Communication between Guards and Passengers.—A series of experiments have been made on the North-Eastern Railway system, with a view of testing various methods of communication between passengers, guards, and drivers, which have been devised in April next, when a provision of the kind becomes compulsory on railway companies. Four experimental trains were run, and the general managers and other officials of the Great Northern, South-Eastern, Manchester, Sheffield, and Lincolnshire, Midland, London and North-Western, North-Eastern, and other companies were present, and travelled in the trains. The results will lead to a conference with the different managers, and form the basis of a suggestion to the Board of Trade for a uniform system of signalling in passenger trains.

A Railway Train Smashed by Indians.—A freight train on the Union Pacific Railroad has been captured by Indians, about a mile west of Alkali Station. The Indians effected the capture of the train by cutting the ties in the centre, and thus spreading the rails, so that when the train came along, about two o'clock in the morning of the day stated, it was piled up together, and made a wreck. In the smash the fire-

man was killed. All the men of the train fled when the disaster occurred, to escape from the Indians, except the engineer, who remained with his dying freman. The Indians burned the railway-bridge near by, for the apparent purpose of destroying a passenger train that was soon to follow the freight train already destroyed; but the division superintendent immediately telegraphed west to the coming passenger train, and stopped it. He also telegraphed to Fort Sedgwick for troops; but when they arrived the hostile Indians were all gone. When he arrived at the scene of the disaster there were about 100 Indians congregated on an adjacent hill around a bonfire. Very quickly after he saw similar bonfires lighted successively, as signal lights, on the distant hills, around each of which he could see bands of Indians. He calculates that their whole force amounted to 1,000 warriors. These Indians were Sioux and Cheyennes. Railway travelling in the Far West must be rather exciting.

THE RESTORATION OF ST. NICHOLAS'S STEEPLE, NEWCASTLE-UPON-TYNE.

At a meeting of St. Nicholas's Steeple Restoration Committee, the Secretary read a report, which said,—

"In obedience with the resolution passed at the last meeting of the Committee of Management, application was made to the town council to levy a voluntary rate of 3s. in the pound upon the rated inhabitants of the borough, for the purpose of raising the necessary funds to complete the restoration of St. Nicholas's steeple, in conformity with the plans and specifications of Mr. Gilbert Scott. The town council have the satisfaction to report that the said committee very promptly acceded to their request. It is estimated that it will require about 7,000*l.* to perfect the restoration, against which 2,922*l.* 13s. 7d. have been paid, and some of the largest subscribers to the fund, or promised. Some of the largest subscribers to the fund, before contributing, stipulated that there should be no partial measure, but that the work be thoroughly and effectually done. The committee having secured from a first-class builder a contract undertaking to do the whole of the restoration as recommended by Mr. Gilbert Scott, at 1,223*l.* below the average of other eight tenders which were sent in to the committee, it is extremely desirable that so favourable a contract should not be lost; they have therefore to express the earnest hope that the public will liberally respond to the voluntary rate, and thus enable them to reap the full advantage of the tender made by Mr. Walter Scott, and also keep faith with those contributors who only subscribed upon the understanding that the work should be carried out in its entirety."

It was resolved that the report be received and printed.

The Secretary gave the following financial statement:—Subscriptions promised, 2,943*l.* 13s. 7d.; unpaid, 292*l.* 2s.; total received, 2,650*l.* 11s. 7d. Disbursements—Contractor, on account, 2,100*l.*; architect, 100*l.*; clerk of works, 303*l.* 9s. 11d.; advertising, &c., 38*l.* 6s. 6d.; total, 2,886*l.* 14s. 10d., leaving an available balance of 63*l.* 16s. 9d. The amount for which they were now liable to the contractor was 1,400*l.* on the second division of the contract. The secretary added that Messrs. Robert Stephenson & Co., although they gave 100*l.* had now paid the voluntary rate amounting to nearly 30*l.*; and Mr. Budden, their chief manager, had gone over the work, and expressed the greatest satisfaction with it.

It was resolved that notice be given to the contractor to proceed with the third division of the work.

MIRFIELD TOWN-HALL.

MIRFIELD, near Huddersfield, has provided itself with a town-hall, and it was opened on the 25th ult. The building has been erected from the designs of Messrs. John Kirk & Sons, architects, of Huddersfield and Dewsbury, and is situate in Easthorse, abutting on the turnpike-road. The structure comprises, on the ground-floor, a hall, 90 ft. long by 40 ft. wide, having seating accommodation for 900 persons, with an orchestra of 600 performers, also side and end galleries of extent sufficient to accommodate 300 persons, making the total sitting accommodation of the hall for 1,000 persons. There are five entrances to the hall and three to the galleries, the principal one being from the main road, and two others from the side street, all of which have vestibules, and contain ticket offices, and staircases to the galleries. Under the orchestra in the hall are two private entrances, and ante-rooms suitable for the use of committees, &c., and beneath these, on the basement floor, are the cooking kitchen and warming apparatus for warming the building. In front, and abutting on the main road, are four look-out shops with cellaring. Above these, and ap-

proached from the main road by the gallery staircase are suites of offices and a reading-room, 95 ft. by 20 ft., with lavatories. The roof of the great hall is formed with nine principals, composed of rafters and collar-beams, the principal portion of the lateral pressure being sustained by a moulded circular fitch rib in three thicknesses, bolted together; the spandrels are filled in with ornamental cast-iron work, which serves to bolt the whole together as well as to enhance the general appearance. These principals are dressed and partially exposed, and divide the roof into ten compartments; they are stained and varnished, and supported at the walls upon projecting moulded corbels. The ceiling is 40 ft. from the floor, and the hall is lighted by means of skylights in the roof. Externally the principal features of the building are the south front, consisting of a central projecting clock-tower, and containing the principal entrance, flanked on each side by the shops. The style of the architecture is Italian, freely treated. The stone has been obtained from the local quarries, and the cost of the entire building has been about 4,000*l.*

LIGHTHOUSE BUILDING.

THE INSTITUTION OF CIVIL ENGINEERS.

On November 24th, the paper read was on the "Roman Rock Lighthouse, Simon's Bay, Cape of Good Hope," by Mr. John Frederick Bourne.

The object of this communication was to point out the causes of failure of the original structure, and to give an account of the mode of securing the tower against further injury.

The late Mr. Alexander Gordon was intrusted with the design, and with the superintendence of the construction of the iron-work and lantern in England. The design was for a circular tower, 15 ft. in diameter and 48 ft. in height, of cast-iron plates, with a central column, 16 in. in diameter, as a well for the weight of the revolving machinery. There were eight plates in the circumference of the tower, and six plates, each 8 ft. long, in the height. But to admit of the horizontal joints of each vertical set of plates breaking joint with those of the contiguous vertical sets, there were four plates of 4 ft. high each and four of 8 ft. each in the first and last sets of plates. The door- sill and level of the first floor were 24 ft. from the foundation; the whole interior up to that level being intended to be filled in with concrete. If the building, as designed, had been skillfully and carefully erected, and filled in with good material, there was no reason to doubt that it would have answered the required purpose, and have stood well. But it failed, and was condemned as being dangerous.

The first cause of trouble, and which led to immense additional expenditure of time and money, arose from the lowest portion of the rock being chosen for the site, on account of its being more level. The next error was cutting the foundation pits too deep into the rock. For the purpose of getting as much solid rock as possible for the inside of the tower. In order to give a core of 6 in. at the lowest spot, it was necessary to leave it 2 ft. 9 in. high at the highest point; and as the groove was formed by blasting, for the sake of saving labour and time, the rock was much injured. Every sea of course filled the annular foundation pit, rendering it difficult to work. Two channels were therefore made, by blasting, one on each side, to allow the water to run off; and these channels were very annoying at a later period. It was found impossible to cut the foundation pit true and level, or so difficult that the attempt was abandoned; and the holding-down bolts were so imperfectly secured that some of them drew when screwed up. Nor was the circle true in plan. Not only had the bottom flanges of the plates to rest upon uneven bearings, being wedged up in some places with blocks of oak, but they were forced, when screwed together, to take a form to which they were not cast. When the plates were tightly bolted together, and the concrete was filled in to its full height of 24 ft., the plates began to crack vertically in six different places, one crack extending 28 ft. high; so that it became necessary to hoop the tower with wrought-iron hoops. In this condition the lighthouse was completed, and was used for some time. The erection occupied five years, and the cost was stated to have been about 17,000*l.* The lighthouse was built by the Imperial Government, and the arrangement was that when completed to the satisfaction of the Colo-

nial Government, it was to be maintained and lighted by the colony. Owing to its patched-up state the colony refused to undertake its maintenance, and consequently a long correspondence ensued, when a proposal, made by the author, was eventually adopted by the Board of Trade, that the tower, as it stood, should be surrounded to the level of the first floor, a height of 24 ft., by a concentric ring-wall of granite, 4 ft. thick, with a backing between the wall and the iron plates of about 8 in. of cement concrete.

The arrangements for conveying the stones to the rock, for landing them there, and for setting them by means of a traveller running on a circle of fished railway bars fixed round the tower, were described. Copious extracts from the resident engineer's journal of operations were also given, from which it appeared that the foundation pit was cut by drilling holes, 1½ in. in diameter, in concentric and radial lines, to the required depth, and breaking the pieces out with ping and feather. The bed was then dressed until it was perfectly true. The whole foundation was put out in two levels, the lower one not being so deep as the old foundation pit, or as the channels previously referred to. The journal shows that in 269 days after the work was commenced, in 1864, there were 102 days on which it was possible to do something on the rock, in 356½ working hours, whilst in the same number of days in the year 1865, there were only 42 days when the work could be proceeded with, for 126½ working hours. But the year 1865 was exceptionally bad. The number of hands employed, all told, was generally nineteen. The four masons and two smiths received 6s. 6d. a day each, and the labourers who were employed in drilling, quarrying, and rough-dressing, and in pulling out, and back from, and working on, the rock, received 4s. 6d. a day each. It was satisfactory to be able to record that the whole work was completed without any serious accident to the men. No difficulty was experienced in filling in the old pit and gullies in favourable weather, with Portland cement mixed with very little sea-water and chips of granite from the quarry. A temporary protection for each short length of pit, as it was about to be filled, was made with gunny bags, filled some with sand and some with clay. As the still cement and flakes of granite were laid, they were covered with tarpanin and bags. Some time elapsed, owing to adverse weather, before the courses of stones could be laid. The work was commenced on the lee side of the tower, and carried round to windward on both sides for the first three courses, after which each course was commenced to windward, as, being 6 ft. high, it was not so much exposed to the force of the sea, and it was more convenient in bringing round the stones. By the end of 1866 the work was at its proper height for putting on the coping. This was completed early in the following year, when the lighthouse was taken over by the Colonial Government.

BUILDERS' BENEVOLENT INSTITUTION.

The twenty-first anniversary festival of this Institution was celebrated on Thursday evening (26th ult.), at the Freemasons' Tavern, Great Queen-street, Lincoln's-inn-fields, Mr. George F. Trollope (president) in the chair. The entire number of friends and subscribers who attended amounted to 250.

On the removal of the cloth, the usual loyal toasts were given, and duly honoured.

The Chairman next proposed "The Army, Navy, and Volunteers," to which Lieut.-Colonel Thorpe briefly but very suitably responded.

The Chairman, in proposing the toast of the evening, "The Builders' Benevolent Institution," referred to the foundation of so valuable an Institution, which for twenty years had been pushing onward in the work of doing good. He contrasted it with the Society of Painters, to which he had the honour to belong, and showed the advanced growth of the Builders' Benevolent Institution, as to its giving relief to decayed members of every branch of the building trade, as also to their widows; the male pensioners receiving 2*l.*, and the women 20*l.* per annum. This might not appear much, but to the poor it was a great deal. In some cases the recipients lived with their friends in the country; and when the time came round for the payment of their money, it was received with joy and gratitude. In other cases, it materially assisted in keeping them out of the workhouse. Under all circumstances, the Institution was progressing,

and very deservedly so; and be hoped that all the friends and subscribers would continue and further their support and interest, as there was yet much to be done to meet the requirements of the Builders' Benevolent Institution.

Mr. W. B. Rogers, in support of the toast, strongly showed the necessity for builders aiding the Institution, which had now attained its majority. He said that with builders, in the undertakings they had frequently in hand, there was no doubt a vast degree of talent and assiduity required to carry on the works successfully. But notwithstanding that talent and assiduity, they all knew that obstinate adversity had appeared, and the heretofore wealthy man had irrevocably fallen. It might be said that he had done that which he ought not to have done; that he had entered into speculations which he ought not to have entered into. But enterprise and speculation were one; for without the combination enterprise would be constrained. Enterprise, in fact, was speculation. The small sum of 24l. per annum had been alluded to, but as a charitable grant, he was of opinion that it was very acceptable in old age. In August last, the number of pensioners on the funds was forty-eight, and he thought they ought not to scruple at having one hundred on the books. There were numbers of gentlemen who were all in some way connected with the building trade, and to these he would suggest that they should give a hearty and continuous support to this very praiseworthy undertaking.

The toast was drunk with great enthusiasm.

Mr. Geo. Plucknett proposed "The health of the Chairman and President." He was fully aware, in introducing that toast, it would be satisfactory and cordially received. That gentleman (the chairman) being largely connected as he was with a great business, had the opportunity of giving up a portion of his time to works of charity. In that spirit of philanthropy he felt that in bestowing his attention on the Builders' Benevolent Institution he would thus promote good objects.

The Chairman briefly returned thanks. He said he was fearful that his efforts to promote the interests of the Institution would not be adequate to his wishes. He, however, trusted to extended assistance, for there were many anxiously waiting to become recipients of the funds.

Mr. R. Crockett proposed "The Patrons, Vice-Presidents, and Trustees," and associated with that toast the name of Mr. Thomas Cozens, the founder of the Institution, through whose zeal and untiring energy the Institute had breathed difficulties until it had attained its present strength. He much regretted that Mr. Cozens was prevented from being then present among them as he was suffering from illness. There was, however, another gentleman among them who had also been a hard-working promoter of the interests of the charity. He meant Mr. John Thorn, who had devoted much time to the Institution's well doing. He repeated the toast with the above names conjointly added.

Mr. J. Thom, in reply, also regretted the absence of his friend and colleague, Mr. Cozens, with whom he had worked hand-in-hand both as committeeman and otherwise for many years. For his own part, and also on that of Mr. Cozens, he could say, that as long as they had the power and ability they should devote themselves to the welfare of the Institution, with a hope and trust that the ultimate wish of the founder may be realised.

The Chairman then proposed "The Health of the Treasurer," whose name it was not necessary to mention.

Mr. George Plucknett sincerely thanked the meeting for the kindly manner in which they had drunk his health, and congratulated the committee on the result of their more than night usual, making altogether nearly 500l., and he hoped that each succeeding year they might realise as much. It would not all be spent, but carefully watched and appropriated as deemed most advisable. The funded stock now amounted to about 15,000l., and he trusted, therefore, that in a few years the pension would be increased from 24l. to 30l. per annum.

The "Architects and Surveyors" was the next toast, on which the Chairman referred to the feeling of respect and hearty co-operation which existed between them and the builders.

Mr. Franklin responded. The Chairman then gave the last toast, "The Directors and Stewards."

Mr. Wilfred Nicholson (a director) returned thanks, and spoke of the anxious desire he and his brother directors had to support creditably and permanently the establishment in which they all had so great an interest. At the fall of the present year they had not their usual election, simply because it was deemed prudent not to throw another pensioner on the list. They would wish to take in all, but at present they were unable to do so. The builders were a class different from others, and when a brother met with vicissitudes, little or no sympathy was obtained. How necessary was it, then, to extend as much as possible the usefulness of the Builders' Institution, so that by and by they might show a very large success and a very worthy treasury. A few friends might do a very large amount of work. They might enter the whole metropolitan area, and by the obtaining of new subscribers greatly enhance and the income. Referring to the vicissitudes by which men of their class were stricken down, he said many who had held high positions, — not by any fault of their own, had fallen: one, a former member of the board of management of that Institution, at that time was a grateful recipient on the funds. They required a large amount to help all who were in need, and, therefore, the more benefactors they had the better. The trade did not consist alone of those connected with bricks and mortar.

Mr. J. Bird said there were 16,000 persons associated with the building trade, and he had no doubt that a great number who had not before subscribed could be prevailed upon to do so, and then, instead of only electing one or two of their poor brethren, they might be enabled to elect all and support them ultimately without touching the material funds of the Institution.

DRINKING FOUNTAIN, SHEPTON MALLET.

A DRINKING-FOUNTAIN has been erected and opened at Shepton Mallet. The base stone is of Cornish silver-grey granite, furnished by the Messrs. Clemens, of Truro. Partly in relief, and partly sunk in the stone, are two dog's troughs. Around the base stone is placed a step of Pennant stone. The spur stones are of Cornish silver-grey granite. After a block of freestone laid on the granite base stone, there is a block of polished mountain limestone, each face having pattern carved in high relief. The stone was obtained from Waterlip quarry. The bowl is of highly polished red and green Cornish serpentine, furnished by the Lizard Serpentine Company. Fern-leaves are carved on it in relief. The carving was done at the company's works at Caerleon Cove. It is made always to contain water, to prevent the splashing that would otherwise arise if the steam of water fell directly on the stone. The stream is incessant, and flows from a brass spout. From the level of the bottom of the bowl springs at each angle of the structure a polished serpentine shaft (blood red and black, black and green, &c.; also furnished by the Lizard Serpentine Company), which sustains the angles of the canopied arch that terminates the structure. The bowl is set in diaper work. The capitals, instead of acanthus, are roses, wheat, and geraniums. The under faces of the canopy are carved in strong relief, each side different, passion flowers, roses, German ivy, common ivy, convolvulus, bramble, &c., are severally introduced; the apex finished with a finial, each of different pattern. From the valleys of the roof spring at each angle a crocketed pinnacle, carried on a short shaft. The roof is carved with a fish-tail tile pattern. The centre of the roof carries a lamp-pillar, cast by Messrs. Turner & Allen, of Loddon. The lamp, which was also furnished by them, is one of Forrest & Co.'s patent cylinder lamps. The lamp and pillar are painted maroon, relieved with gold, by Mr. Smith, of the Market-place, who also fixed and provided all the pipes, &c., required throughout the structure free of charge. The carving was done by Mr. William Halliday, of Wells. The builder was Mr. Emery, of Town-lane, who not only carried out the work without profit, but subscribed towards it. The entire work was carried out under the personal superintendence of the architect, Mr. T. J. Hicks. The freestones is from Doulting. The cup is of silver-plated nickel, and was the gift of Mr. Cuzner. The whole work has been treated with a solution of soap and alum as a preventive against decay and parasitical growth.

SOCIETY OF ENGINEERS.

SIR,—I trust you will allow me, through the medium of your paper, to call the attention of the members of the Society of Engineers to the halloing list of proposed new members of council for the ensuing year.

There are seventeen candidates, and twelve only can be elected. The outgoing council have as usual nominated themselves with one or two exceptions, and will, no doubt, vote for each other and get their friends to help them to get returned.

I beg to suggest that, following up the Conservative tactics, the members should plump for eight candidates, including the five new candidates not in the outgoing council's list. This will ensure the return of the new candidates, and infuse new blood into the council, which, I need hardly say, is much required.

A MEMBER OF MANY YEARS' STANDING.

THE NUMBERING OF STREETS.

SIR,—I noticed in your paper recently a suggestion as to the "numbering of streets," and no doubt improvement is required there. The proposition, however, would not meet all the difficulties. The principle of numbering streets by putting all the even numbers on one side, and the odd numbers on the other, answers remarkably well. The difficulty now to be got over is, how to see the numbers at night, or with gas-light. As a step in the direction of overcoming this question, I would advance, that on two sides of every gaslamp in the public streets the number

of the house immediately opposite it be printed on transparent paper, gummed or pasted on the inside of the glass. This plan would confine the search for a number to be betwixt the lamps; and these catch numbers would be illuminated free of cost, and be discernible so long as the street lamps were lighted; and when these lamps were put out, parties at a loss for their house numbers could just take the hint, that the public authorities did not intend to encourage late walkings. But in addition to this, I would have the "name of the street" put on each lamp in the same manner. I have seen the names of streets done in this way; the light is imperceptibly affected, and the advantage, especially to strangers, is very great. In fact, in any large town the introduction of the above would prove of great public convenience.

Dundee. THE TOWN SURVEYOR.

VENTILATION OF SOIL PIPES.

SIR,—Perhaps you will allow a mechanic a word or two on "sewer ventilation." I quite agree with your correspondent "F." in stating "that the pressure of the gas in sewers often exceeds the hydrostatic pressure of the water in the traps;" but I will go further, and state that the handle of most water-closets cannot be raised without a certain amount of foul air passing into the apartment. And why? Because while the water is rushing through the closet the water in the trap fluctuates and allows the compressed gas to pass. My suggestion would be to have an earthenware trap at the bottom of each stack of soil-pipe, thereby taking the pressure from off the top one, and a 1½ in. or 1 in. pipe attached to the top part of the column, and carried to the highest part of the building, with a return head to prevent it from being choked up; and, further, this escape-pipe would prevent the lead soil-pipe from so readily decaying.

Bell-traps are not only a nuisance, but an imposition on the public, and inspectors of nuisances would do well to condemn such sanitary holes in the improving laws of health. II.

Windsor.

THE CITY MEAT MARKET.

SIR,—I am much amazed that the new Meat Market should be called by the repulsive name of "Dead Meat Market." Surely there cannot be any reason for the word "dead." It appears to me there would be as much propriety in saying "a dead corpse" as "dead meat." T. H.

* * * We urged the objections to this unpleasant pleasure some time ago, and, to a certain extent, with good result; but stupidity is always hard to conquer.

BRICK ARCHES ON CIRCULAR FACE.

SIR,—Would some of your subscribers kindly inform me how they would construct a 14-in. brick covering arch on 18-in. walls over windows in semicircular end of a room? The question is, bond; and how the thrust (horizontal) is to be counteracted. Any information on this unusual form of arch in light walls will oblige.

A CONSTANT SUBSCRIBER.

CHANGE OF COLOUR.

SIR,—Can any of your readers inform me of the cause of green marble paper, after being hung and varnished, turning red or fusty? J. F. S.

REMOVAL OF SNOW.

SIR,—Can any of your readers inform me if anything has yet been done in reference to the award of premiums offered by the City Commissioners of Sewers for suggestions for the removal of snow from the streets? COMPETITOR.

RATING OF PUMPING STATION, OUTFALL SEWER, &c., TO GREENWICH PARISH.

In the Court of Queen's Bench (sittings in Banco, before Justices Lush and Hayes), Mr. Justice Lush, in the case of The Queen v. The Metropolitan Board of Works, read the judgment of the court, which raised a question as to the liability of the Metropolitan Board of Works to be rated for certain portions of their outfall sewer, pumping station, and other works in the parish of Greenwich. He said there was nothing in the statutes under which the defendants were constituted, or the public sewers constructed or maintained, to exempt them from liability in respect of any rateable property they occupied, nor was there anything which prohibited the application of money in their hands to the payment of parochial rates. The only question, then, was whether the property referred to was rateable. As regarded the sewers, they were o

opinion that they were not rateable, on the simple ground that they were not the subject of beneficial occupation. No profit was derived from them by the Board. With respect, however, to the other property, they were of opinion that the rates were properly imposed. The water, engine-houses, pumping station, tramways, and appurtenances had an occupation value. The Board must have rented such property if they had not possessed it, and the Board wished to let it if they could easily have found a tenant. The order of sessions would be confirmed as to this property, and quashed as to the sewers.

CASES UNDER METROPOLITAN BUILDING ACT.

HAD BUILDING: A WARNING.

At Marlborough-street, Mr. John Ashley, builder, of Grafton-street, Fitzroy-square, appeared to answer two summonses taken out against him by Mr. Baker, district surveyor; first, for neglecting to give notice of works; and, secondly, for constructing the front wall with broken bricks and rubbish, put together with inferior mortar, and not properly bonded.

Mr. Baker stated that, on receiving information that a new room was being built in rear of defendant's house, he immediately went there, and found the wall in question already raised 3 ft. or 4 ft., built entirely of brick-bats and what he should call mud, not mortar or cement. He desired the bricklayer to stop the work, and the next morning he served the usual notice to amend. Instead of complying with this the defendant hurried on the work, and at the expiration of forty-eight hours, when the surveyor went again, he found the wall not only completed, but, wet and unset as it must be, it was plastered inside and out, so that no one could then see the materials of which it was composed.

Mr. Venn appeared on behalf of the defendant, and admitted the neglect of notice, but pleaded that it was accidental. With regard to the work, he produced a sample brick of the finest quality, and then called Mr. Potter, a surveyor, who stated that he had seen the wall, and that it was a very good one, fit to carry another story if required; but, upon cross-examination, he admitted that he had only seen it since it was plastered, and knew nothing of the materials with which it was built.

After some further evidence, the magistrate, Mr. D'Eyncourt, suggested that another surveyor should be appointed, with power to strip the plastering and give an independent opinion, to which both parties agreed, and Mr. Caiger, surveyor to the police, was nominated. That gentleman attended the adjourned summons, and was sworn, when he fully corroborated the evidence of the district surveyor; and added that, in case of a frost, he thought the wall might burst and become unsafe.

Mr. D'Eyncourt thereupon ordered the defendant to pull down and amend the work within fourteen days; and in consideration of his heavy expenses of solicitor, two surveyors, and witnesses, he was fined in the nominal penalty of 1s. only, in addition to the other costs, namely, Mr. Caiger, 2l. 2s.; Mr. Baker, 2l. 2s.; summonses, 4s.; total, 4l. 9s.

Defendant paid the money; and the magistrate congratulated him that the district surveyor had not employed a solicitor.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

Cloyne.—The corner-stone of St. Colman's new Catholic cathedral, diocese of Cloyne, was laid at Queenstown on the 30th of September, by Dr. Keane, bishop of the diocese. Messrs. Pugin & Ashlin are the architects. The style is Gothic, of a Continental type. The plan includes a nave, with north and south aisles, and transepts; baptistery, side chapels, chancel, pews, towers and sacristies. The length is 80 ft. in the clear, and the width across the transepts 106 ft. in the clear. The nave is 34 ft. wide, and the aisles 15 ft. each, including the thickness of the nave walls. The main tower and spire will be erected at the north-west corner, and will reach a height of 100 ft. There will be six turrets, 120 ft. high, each, containing stairs to the triforium and organ-gallery. The architects are putting in the foundations, as the depths to which excavations had to be made were so variable as to form an impediment in letting to a contractor. Mr. G. Doran is the clerk of works.

Uxbridge.—Dr. Manning has laid the founda-

tion-stone of a new church at West Drayton. The dimensions of the intended building are 77 ft. by 44 ft.: its design is English Gothic of the fourteenth century. When completed it will be fitted to accommodate 500 persons. The architects are Messrs. Wilson & Nicholl, of Marylebone; and the builders, Messrs. Fassnidge, of Uxbridge. The site of the building adjoins the residence of the local priest, the Rev. Michael Wren.

Ongar.—The chief stone of a new church has been laid here by Canon Last, of Ingatstone. In the course of his address he said the church would be dedicated under the invocation of St. Helen, an Essex saint, born at or near Colchester. She was the daughter of Coel, and mother of Constantine the Great, the first Christian emperor. The church is from the designs of Mr. Cabitt Nicholl, architect to Lord Petre, and will be built of brick with Bath stone dressings. It will be in the Early English style, and so formed as to constitute the chancel of a future church, should its enlargement become necessary. The builder is Mr. Joseph Bostock, of Brentwood.

CHURCH-BUILDING NEWS.

Tilley, Herefordshire.—The first stone of the new church was laid on the 30th ult. It will replace an edifice erected 100 years ago, and consist of nave, north aisle, south porch, chancel, organ chamber, and vestry. It is intended to retain the present tower. The fittings are to be of oak, and the church will accommodate 220 persons in open seats. Penrhos stone is being used for the walling, blue Pennant for the arcade shafts, and Bath for the dressings. The walls will not be plastered internally. The style of the church is Early Decorated, and the cost is estimated at 1,600l. The work is being carried out by Messrs. Lewis & Day, of Hereford, under the direction of the architect, Mr. E. Haycock, jun., of Shrewsbury.

Books Received.

Haydn's Book of Dates, relating to all Ages and Nations: for Universal Reference. Thirtieth edition—corrected to June, 1868. By BENJN. VINCENT. London: Edward Moxon & Co. 1868.

HAYDN'S "Book of Dates" has become a standard work of reference, and nothing more is needed on the appearance of a new edition than to let intending purchasers know that it can be had. Mr. Vincent became connected with the work in the preparation of the seventh edition, and from that time to this, when he issues the thirteenth edition, has gone on gathering, and condensing, and wedging in fresh facts. Haydn's original design was to give the greatest body of compressed information that had ever appeared in a single volume, and we are much disposed to say that this intention has been fulfilled. The number of facts and dates in the twelfth edition was certified by actuaries to be 34,563, and this number is now increased. The new edition must be regarded as a writing-table necessity.

Mr. Haydn left amongst his papers a plan for a Dictionary of Biography, as a companion to his Dictionary of Dates. This has been carried out under the care of Mr. J. Bernard Payne, and will be published shortly by Messrs. Moxon & Co.

The Art of Garntishing Churches at Christmas and other Festivals. By EDWARD YOUNG COX. London: Cox & Son, Southampton-street, Strand.

THIS book comes opportunely, and will be welcomed in many parishes, notwithstanding that other books on the same subject are available. Mr. E. Y. Cox, the author of this "Art of Garntishing Churches," is a member of a firm of church furniture manufacturers and ecclesiastical decorators, and it has been his aim to make his volume thoroughly practical, in which he has very well succeeded. Descriptions are given of the ornaments suitable for the different parts of the church and the necessary directions for making devices, banners, and inscriptions. Numerous lithographs and engravings, illustrating the designs of various architects, accompany the work, and also three or four photographs, representing the style of decoration recommended. The festoons across arches shown are a mistake.

The firm have since published an Illustrated Catalogue of shapes, cut to serve as groundwork for devices and other decorations, so that the whole affair is now brought down to the compass of the meanest capacity.

Miscellanea.

THEATRES IN RUSSIA.—The *St. Petersburg Gazette* reports that the erection of no fewer than ten theatres for the people, all to be situated in the workmen's quarters of the city, are to be begun forthwith, the plans having been approved of by the Minister of the Interior, under whose supervision they are to be placed.

BIG BLOCKS.—The Luxulyan Granite Company have just shipped at Charlestown, for the Hampton Waterworks, near London, some huge blocks of dressed granite, weighing from 8 tons to 11 tons and upwards. Two stones in particular, which have been prepared for cylinder beds, measure 10 ft. by 10 ft. 6 in., by 2 ft. deep, containing 210 cubic feet, and weighing over 14 tons each.

EXTENSION OF THE GENERAL POST-OFFICE.—The long line of houses opposite to the General Post-office, in St. Martin's-le-Grand, will shortly be removed, the whole of the property having been purchased for the Government. On the site occupied by the houses, buildings will be erected for post-office purposes, the increase of business having rendered more extended accommodation absolutely necessary.

NEW INFIRMARY FOR OLDHAM.—The Mansion-house Committee, out of the surplus fund, subscribed some years ago for the relief of the operatives during the cotton famine, have apportioned to Oldham, under an order of Chancery, 1,000l. towards the erection of a new infirmary, to cost 10,000l., at that place, which hitherto has possessed no medical institution of its own, though its inhabitants number 90,000.

CHESTER CATHEDRAL.—The chief stone of the restoration works at this cathedral has been laid at the base of the north-east buttress of the Lady Chapel. In the evening the workmen engaged in the work of restoration, to the number of fifty, dined at the Blossoms Hotel, where, through the kindness of the Dean and Chapter, an excellent repast was provided. The Dean was present for a short time, and offered a few remarks upon the occasion on which they had met, and afterwards, Mr. Frater, taking the chair, the proceedings were of a thoroughly convivial character.

OIL PAINTING UPON ZINC.—Every painter is aware of the difficulty experienced in making oil colours adhere to articles of sheet zinc. Professor Beutger, however, has recently published a process by which, it is stated, that the desired result can be accomplished, this process consisting in the previous application, by means of a hard brush, of a mordant, composed of one part of chloride of copper, one part of nitrate of copper, one part of sal ammoniac, and sixty-four parts of water, to which is afterwards added one part of hydrochloric acid. The zinc turns of a deep black immediately after the application, changing after drying (twelve to twenty-four hours) to a dirty black, greyish-white shade, upon which any oil colour, once applied, will adhere with the greatest tenacity.

CLEVELAND INSTITUTE OF ENGINEERS.—From the annual report of this institution, read at the last general meeting, it appears that the most satisfactory progress has been made during the past year. In respect alike of funds and members, the society stands well; and the greatest interest was felt in, and impetus given to, the meetings of last year, in connexion with the valuable discussions which took place on the subject of the manufacture of steel from Cleveland iron. It is intended, if found practicable, to renew the discussion of this subject during the present session; and there can be little doubt but that it will be found productive of valuable results to the cause of Cleveland industry. The annual meeting of the institute was recently held, when the office-bearers for the ensuing year were elected. Mr. David Joy was appointed president, and Messrs. T. Wrightson and G. Whitwell hon. secs. A paper was, at the same time, read by Mr. Theodore West, of Darlington, on the "Wearside and Sildon Waterworks," which elicited a lively discussion.

"EXECUTED IN TERRA-COTTA."—Talking of the education question, a traveller observed that as he was walking on one occasion under the arcade of the horticultural garden, looking at the works of art displayed there, he came upon two well-dressed ladies examining a statuette of Andromeda, labelled "Executed in terra-cotta." "Executed in terra-cotta," says one; "where is that?" "I am sure I don't know," returned the other; "but I pity the poor girl, wherever it was."

THE DRAINAGE OF THE PROPOSED ASYLUMS.—We are told that it is definitely decided that Moul's dry-earth closets shall be introduced into the new asylums for lunatic paupers which are to be built, under Mr. Gathorne Hardy's Act, in the neighbourhood of London. If this be so, we are disposed to fear that a great mistake has been made. We trust that, at all events, the necessary arrangements for water-closets, drains, soil-pipes, and so on, will be made during the building of the asylums, or the result will probably be that costly alteration will be required hereafter.

INVENTORS' INSTITUTE.—The first meeting of the eighth annual session of this association was held at the offices, St. Martin's-place, on Monday evening, when Lord Richard Grosvenor, M.P., the president (elected in the place of the late Sir David Brewster), took the chair for the first time. Mr. Home Williams delivered the inaugural address. A discussion followed, in which Mr. Savage; Mr. Paterson, of the Working Men's Club and Inmate Union; Captain Selwyn, R.N.; Mr. C. W. Siemens, F.R.S.; Mr. Thomas Webster, Q.C.; Mr. F. W. Campin; and the president took part.

THE "TIDY BOX."—So Messrs. Jenner & Knowlton call a despatch-box they have patented, and so it is, for it enables the owner to put by letters, or bills, or other papers, under alphabetical arrangement. The box, of which the front as well as the top opens, contains a tray, in which are twenty-four upright movable divisions, lettered at the top, and which run on a wire at each side, and between these papers may be put away under the different letterings. The patentees consider with Pope, that "Order is Heaven's first law," and, doubtless, think the best sort of order an order for their despatch-box.

INCREASE OF FEVER IN LONDON.—Dr. Buchanan, medical officer of health for St. Giles's district, in consequence of the great increase of fever in the metropolis, has urged upon the local board of works the necessity of establishing a public disinfecting chamber for the purpose of purifying infected clothing, bedding, &c., pursuant to the Sanitary Act, 1866, sec. 23; and as a preliminary step the Board have invited the local boards of adjoining parishes to join with them in providing such an establishment. This is a measure which the medical officers of the metropolis have long urged upon their respective Boards, but without success in even a single instance.

THE LATE MR. G. R. HARTSHORNE.—We spare a corner of our paper to record the early death, from consumption, of Mr. G. R. Hartshorne, for twelve years one of the designers employed by Messrs. Hart & Son, the metal workers. He was first engaged by this firm in 1856, and placed under the instruction of Mr. W. G. Smith. He was a clever draughtsman and designer, and several times exhibited designs for iron and brass work at the Architectural Exhibition. Only a few days previously, another young but very clever draughtsman and designer, Mr. Fitch, originally apprenticed to the same firm as a pattern-maker, but of late employed as designer by Messrs. Benham, died at an early age of brain-fever.

FALL OF A MALT MILL IN STOCKPORT.—About three o'clock on Friday, the 27th ult., the newly-erected malt-mill of Messrs. Yates & Son, High-street, Stockport, fell in, from the roof down to the ground-floor, nearly burying alive two of the malsters—William Evans and William Pugh—who were engaged in the second and third rooms. The accident happened through an imperfection in one of the cross-beams in the upper rooms, which beam had given way under the weight of the malt upon it. For some time Evans could not be extricated from the debris, which had driven him against the wall; but fortunately he was dug out in time to save his life. No bones were broken. The damage to the property is estimated at about 200l.

ENGLISH CHURCH, CEYLON.—The foundation stone of a new English Protestant church was laid at Point de Galle, Ceylon, on the 30th of October, by the Lord Bishop of Colombo. Mr. James G. Smith is the architect.

BOLTON FINE ARTS AND INDUSTRIAL EXHIBITION.—An exhibition of paintings and other works of art, machinery in motion, and models, is to be opened in the New Mechanics' Institution, Bolton, by Mr. Anthony Trollope, on Monday next.

THE TELEGRAPHS AND THE GENERAL POST-OFFICE.—The arrangements for the purchase of the telegraphs by the Government are being actively carried on, and a commission appointed by the Accountant-general has nearly concluded the inquiry into what the net profits of the companies really are.

SHEFFIELD ARCHITECTURAL AND ARCHAEOLOGICAL SOCIETY.—The annual general meeting of this society was held on Thursday last week, at the School of Art. Mr. E. S. Howard occupied the chair. Mr. Fawcett, one of the secretaries, read the annual report, and Mr. J. D. Leader, the treasurer, presented a statement of accounts which showed that the year's income had just balanced the year's expenditure.

THE ROYAL SOCIETY.—The annual meeting of the members of the Royal Society took place on Monday, the festival of St. Andrew. Lieutenant-General Sabine, the president, delivered the address, in which he reviewed the principal scientific events of the past year. He was re-elected president. Dr. W. A. Miller, of King's College, was elected treasurer; and Mr. G. G. Stokes, M.A., of Pembroke College, Leonaasia Professor of Mathematics in the University of Cambridge, and Dr. W. Sharpey, secretaries. Mr. W. H. Miller was elected foreign secretary. The following gentlemen were placed on the council:—Mr. John Hawkshaw, Lieut.-Colonel Alexander Strange, Sir William Ferguson, bart., Mr. F. A. Abel, Captain G. H. Richards, Captain Douglas Galton, Mr. John Marshall, Mr. Archibald Smith, Sir Benjamin Brodie, bart., Dr. W. B. Carpenter, Mr. J. Lockhart Clarke, Mr. Frederick Currey, Mr. W. H. Flower, Mr. Warren de la Rue, Mr. J. P. Gassiot, and Mr. Joseph Prestwich.

PROTECTION OF LARGE BUILDINGS FROM LIGHTNING.—This subject was laid before the Paris Academy of Sciences, and M. Pouillet, since deceased, was entrusted to report fully upon it. This report was the other day laid before the Academy, and approved by that body. The Engineer gives a lengthened account of it. The first thing to be done is to establish a conductor, formed of square iron measuring 4.5ths in, on the side, which shall pass without interruption over every portion of the building to be protected: when the line is broken by towers, pavilions, or other erections, the conductor must pass up and down each, so as not to interrupt its course. This main conductor, of course, is modelled, as it were, to the form of the building, and often consists of several branches, particularly in the case of edifices, like the Louvre, where there are several blocks of buildings perpendicular and parallel to each other: it will also have many minor branches, for it must be placed in good communication with all the gutters, leads, and other large metallic surfaces on the roof. This great conductor or circuit must be placed in direct communication with a body of water which is never wanting. Ten or a dozen wells might be dug to receive each a conductor leading from the main circuit. Each lightning-rod must be placed in perfect communication with the main circuit.

TENDERS.

For new workhouse buildings, and out-offices, &c. in Valley, for the Holyhead Union. Mr. R. G. Thomas, architect:—

Williams	£3,595 0 0
Fryce & Son	3,670 0 0
W. Williams	2,963 0 0
Chester	2,943 0 0
W. Jones	2,885 0 0
Griffiths	2,468 0 0
R. Jones (accepted)	2,160 0 0

For additions and alterations to the Wolverhampton Union Workhouse. Mr. Veal, architect:—

Crutchley	£1,023 0 0
Lovatt	979 7 10
Thompson (accepted)	863 0 0
Bowater	550 0 0

For the conversion of a house into a lace warehouse, Nottingham. Mr. S. Dutton Walker, architect:—

Acton (accepted)	£262 15 0
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For model building in Fitzroy Market, Tottenham-court-road. Mr. H. S. Legg, architect. Quantities supplied:—

Harrison & Edwards	£19,085 0 0
Williamson	17,349 0 0
Hochley	15,866 0 0
Rudd	15,277 0 0
Turner	15,969 0 0
Foale	15,800 0 0
Wilson	15,800 0 0
Bayes	15,818 0 0
Kings	15,277 0 0
Nightingale	15,693 0 0
Bull	15,000 0 0
Crockett	15,000 0 0
Till	14,900 0 0
Webb & Sons	14,820 0 0
Waship	14,655 0 0
Manley & Rogers	14,641 0 0
Hughesdon	14,450 0 0
Piper & Co.	14,370 0 0
Nutt & Co.	14,220 0 0
Scrivenor & White	14,160 0 0
Cooper & Cullum	13,800 0 0
Baker & Constable	13,580 0 0
Johnson	13,439 0 0

For repairs, &c., to houses at Brompton. Mr. J. Coe, architect:—

Reid Hall	£410 0 0
King & Sons	418 0 0
Johnson	383 0 0
Ourdon	350 0 0
Stapley	330 0 0

For erecting four houses for Mr. J. Foster, at Slough. Drawings furnished by Mr. Pierce Arthur:—

Frans	£800 0 0
Jones	750 0 0
Shaw	730 0 0
Johnston	710 0 0

For chapel, West Ham-lands, Mr. T. Chatefield Clarke, architect:—

Brine	£735 0 0
Saunders	733 0 0
Wirt	696 0 0
Scrivenor & White	691 0 0
Hocking	662 0 0
North	656 0 0
Clough	633 0 0

For the erection of schools in connection with the King's-road chapel. Reading, Messrs. Win. & J. T. Brown, architects. Quantities supplied:—

Simonds	£879 0 0
Sheppard	868 0 0
Wright	867 0 0
Barnicot	856 0 0
Matthews	848 10 0

For the construction of the Poultry Arcade, Nottingham. Mr. S. Dutton Walker, architect:—

Simpson & Lyman (accepted)	£720 0 0
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For the erection of a stamping-room to factory, The Meadows, Nottingham. Mr. S. Dutton Walker, architect:—

Fish (accepted)	£111 2 0
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For re-building the White Hart Hotel, Upper Norwood. Mr. Sextus Dyball, architect:—

Total amount of Estimate.		Allow for Old Materials.
Bowyer & Sons	£4,529 2 11	£150 12 2
Tarrant	4,369 0 0	209 0 0
Nixon	4,240 0 0	112 0 0
Thompson	4,195 0 0	49 0 0
Macey	4,195 0 0	49 0 0
Kilby	4,196 0 0	137 0 0
King & Sons	4,060 0 0	100 0 0
Parry (accepted)	3,897 0 0	123 0 0
Sayer	3,853 0 0	...

For erection of dwelling-house on the Lime Grove Estate, Putney for Mr. J. E. Rabbitt:—

Sutton (accepted)	£1,375 0 0
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For rebuilding warehouse Houndsditch, for Messrs. Lazarus Rosenfelds. Mr. H. H. Collins, architect:—

Stuart & Bennett	£1,558 0 0
Cohen	1,650 0 0
Ball & Russell	987 0 0

For house at Reigate. Mr. J. F. Mathews, architect. Quantities supplied:—

Barnes	£993 0 0
Nightingale, Brothers	935 0 0
Nightingale, B.E.	823 0 0
Gage	825 0 0
Cook	813 0 0
Reed	805 0 0
Holdsforth & Co.	875 0 0

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We are compelled to decline printing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily published.

Advertisements cannot be received for the current week's issue later than THREE O'CLOCK P.M. on THURSDAY.

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On the 10th inst. will be published. THE BRITISH ALMANAC FOR 1869. Bound in Wrapper, price 1s. THE COMPANION TO THE ALMANAC. Sewed in Wrapper, price 6d.

On the Total Eclipse of the Sun of August 17th, 1868. By Edwin Smith, Esq. of the Royal Observatory. One volume. Free Public Libraries of Great Britain, by William B. Ekin, Esq. Paternoster, Parson, and Nitro, by James Thompson, Esq. Paternoster. The Schools Library General List, by the Committee of the Schools Library General List, by Arthur Locker, Esq. With the other usual Art Lists on the Legislation Statistics, &c. 1868.

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THE ENGINEER, December 4—6d. This No. 77, contains Working Drawings, No. 9; Feathering of the Main Gears of a 120 Horse-power Steam Engine on the Main Gears Halfway; West's Dynamo's Compound Pump and Compound Reciprocating Water Pump; the Hydraulic Press; the Hydraulic Colliery Engine; the Hydraulic Colliery Engine; and the Hydraulic Press. Price 6d. New Agents.

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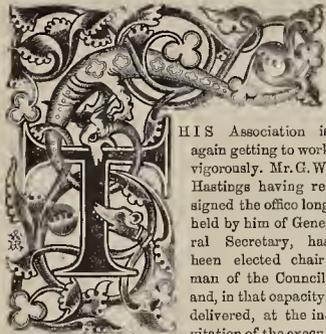
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VOL. XXVI.—No. 1349.

The Social Science Association.



THIS Association is again getting to work vigorously. Mr. G. W. Hastings having resigned the office long held by him of General Secretary, has been elected chairman of the Council, and, in that capacity, delivered, at the invitation of the executive committee, the opening address of the new session, in which he referred not to one section specially, but to all; carrying out the idea on which the Association was founded, that Social Science is a unit; that, while its component branches may be separately treated (and with advantage) as to details, they cannot be discovered in principle. Nor is it only that the several sciences concerning the well-being of a community form a common philosophy which must be dealt with as a whole; it is also that the practical work which the study of these sciences evokes requires a reciprocity of labour. The workers in these various fields are in want of each other. The lawyer needs the economist, and has often grievously erred for lack of him. The political economist needs the sanitarian to teach him how much of the productive energy of a nation depends upon a due observance of the laws of life. The sanitarian on his part has need of the jurist that he may learn into what mould the new energies of hygienic government can best be cast. All have sore need of the educationist, to warn them how futile is every effort for national improvement which does not carry with it the assent and purpose of an understanding people. Nothing, then, said the speaker, can be amiss which impresses on our members the unity of our science and the reciprocity of the objects which we pursue. We cannot work at everything; some of us can spare time, and that with difficulty, for no more than a single section; but we all can and ought to be interested in the whole, and be ready to exchange advice and help with each other.

Speaking of the subject which underlies all the problems of Social Science, national education, he maintained that without the solution of this question none other can be followed up to a good result. It is true much has been done during the last thirty years; but after all the efforts made, after all that has been effected by private exertion and by the application of the Privy Council system, there remains in the country a large residuum,—to use a word which has been brought politically into vogue during the last two years,—who have not been as yet subjected to the civilising and refining influences of any education whatever. When the Association held its meeting in Manchester, the fact was brought out by the Manchester Education Society that there are 50,000 children there attending no school. Some months before the London Diocesan Board of Education had pub-

lished a statement that, in London alone, there were about 150,000 children so situated; so that, if these figures are to be taken as accurate, there are in London and Manchester together about 200,000 children who have not been touched by all the educational efforts made by the Government and by private individuals. This residuum, it was his belief, as it is ours, never can be dealt with unless some obligatory system of education be established. In a rural parish in Worcestershire, the children of every single family in the parish except one had been gathered into a school. The half-dozen children of that family were running about ragged, dirty, uncare for, perfectly ignorant, and growing up, no doubt, to be in the end, vagrants or criminals. Any one would naturally suppose that the parents were too poor to pay the 2d. per week which was required for each child, or that they had some religious objection. So far from that being the case, they were a great deal more able to pay than a large number of those who regularly sent their children to school. They had no objection to allege against the school or the teaching; they simply ignored the benefits of education, and steadily refused, in spite of all that could be said, to avail themselves of the advantages placed within their reach. How is a case of this sort to be dealt with except by some obligatory system? Surely, it cannot be alleged that parents have any right to deprive their children of education. What right have they as against the children? What right have they as against the community? For the children, ignorance means mental incapacity, moral degradation, future disadvantage for competition in the labour market, deprivation, poverty, and wretchedness. For the community it means an enlargement of our prisons and workhouses, with the consequent burdens on the rates. For out of this residuum of neglected children is hatched the spawn of our criminal, vagrant, and pauper classes. It may be said,—apply the Industrial Schools Act to cure the evil. But to do so is to ignore the principle on which the Act was passed. That principle was the sound idea of prevention, so fruitful of good in many branches of social science. Within all our memories it was the custom to send criminal children to prison, to be made worse instead of better. A few wise persons, persevering through countless defeats, at length persuaded the Legislature to sanction the establishment of reformatory schools, where young criminals might be taught habits of morality, and thus be prevented from becoming the inmates of prisons. Some time after it was found advisable to establish industrial schools by another Act, thus creating a cheaper machinery to deal with still younger children, beggars and vagrants, and prevent them from growing into the subjects for reformatories. Surely, it is only logical and politic to push the principle one step further, to make your net still closer to catch the smaller fishes, and to provide that obligatory education which shall prevent the children whose parents neglect their best interests from idling into vagrancy and vice.

We have a right to compel every child to be vaccinated, because if unvaccinated it may give small-pox to others; we have a right to compel every householder to drain, lest he breed fever among his neighbours; and *pari ratione* we have a right to require that no child shall be left in the darkness of ignorance, to grow up a pest and burden to the community.

This is the great educational question of the hour, the one which most demands attention, because it is the one most urgently requiring help. The speaker was more hopeful that the well-to-do artisans will obtain as much technical education as they care to have, and in the way they want it, than we are. Something must be done to lead them to care more for it than the majority do. Still we fully agree with him, as our readers may know, that primary education for all

is the great requirement. Unfortunately, the most potent of all obstructions, sectarian differences and religious prejudices, stand in the way of their salvation. Mr. Hastings quoted a remarkable utterance by Lord Brougham, many years ago, on this subject. When speaking of the sectarian opposition to national education he exclaimed, that the contempt cast by history on that Council of Constantinople which disputed on a text while the Turkoman, the enemy of all their texts, was thundering at the gate, would be but as a murmur of dissent compared with the loud shout of universal scorn which all mankind in all ages would send up against us if, on the flimsy pretext of theological differences, we left to destruction the helpless children of our poor. Surely it is time that those who appreciate the importance of this question, who know the facts, and who believe that national retribution waits on national neglect, should make one vigorous effort more to ensure the elements of education to every child in the community.

Coming then to the section of health, the speaker urged the importance of the great science of State medicine. State medicine means simply the care of State health, as opposed to that of private health. A physician in private practice looks after the health of individuals; a physician in what may be termed public practice looks after the health of the community. Physicians, no doubt, so long addicted themselves solely to the cure of maladies, that they neglected the still nobler art of preventing disease; but the medical profession has now, for some time past, understood its wider destinies, and yearly sends forth a large number of highly-educated men impressed with the supreme importance of sanitary functions, and qualified for their discharge. What is now needed above all is a better organization. In the first place, the statute law on the subject is chaotic and contradictory. The different Acts still conflict in their provisions, and in many cases it is hard to know to whom recourse is to be had for the removal of nuisances, or the improvement of sanitary arrangements. The real remedy is the thorough revision of the whole law relating to public health, and its condensation into a single statute. In the next place, we must have a better sanitary administration. We want not only a consolidated Act, but a trained and organized staff in town and country to carry out its provisions. Every considerable town should have its own medical officer of health. Many already possess that advantage. The City of London long ago set an excellent example; Liverpool and Glasgow have followed in its steps; Manchester, influenced by the representations made when the Association met there, has recently had the wisdom to adopt the same course; and it is to be hoped that Birmingham will not long be behind. Small towns may be joined by rural districts around, or several towns may unite in paying the necessary salary. We trust with Mr. Hastings that the joint committee now sitting will continue to press, both upon Parliament and upon the Ministers of the Crown, the necessity of an improved organization of State medicine. Let them also keep a vigilant eye on the commission, and take care that it is fully supplied with information, and that its inquiries are directed to the proper points.

In the department of Economy two subjects were particularly observed on: the Poor Law and trade unions. As to the latter, he did not believe it to be true that trade unions had always, or nearly always, done mischief. So far from unions having, on the whole, encouraged strikes, he was convinced that, on the whole, they had tended to diminish those calamities, though there was no question that when they have organised a strike they have naturally made it much more formidable than it would otherwise have been. It was certain that the outrages which have disgraced

some trade unions were condemned by the largest proportion of the working men who belonged to societies of that kind throughout the country. But, on the other hand, he was astonished at the views expressed, and the strength of the language used, at the meeting held by the Association when Mr. Gisdstone presided; not so much, indeed, if at all, by the working men, as by some of their zealous friends. There seemed to be a lunatic idea that some malice against working men was involved in any criticism of trade unions. Now, if it be the case, as he believed it to be, that trade unions are capable, when wisely managed, of doing a considerable amount of good (though no one can suppose them to be more than stepping-stones to higher things, a necessary defence against other evils, temporary alleviations of mischief in the body politic, and which, therefore, will gradually pass as our civilization expands into higher organizations of social life)—if trade unions have good in them, surely it follows that the more you eradicate anything that may be evil in them the more you will confer a benefit on those bodies, and the class who support them. The man who points out any errors in trade unions, or helps to expose any abuses that may have been perpetrated in their name, is surely the best friend they have; and the working-men can surely follow no course better adapted to their interests, than that of joining in the most vigorous exertions to put down any mischiefs that may have arisen anywhere out of these societies, and to bring to justice all who have abused, for their own criminal purposes, the lawful power of combination. He did not conceal his opinion that by far the most useful function of the Association would be to spread a knowledge of the principles and mechanism of those industrial partnerships which, by identifying the interests of employers and employed, absolutely preclude their quarrelling. Only second to that is the task of diffusing information, as was done the other day by the discussion in Birmingham, as to those means of conciliation which have been so successfully adopted in some trades and districts, so that when the conflicting claims of capital and labour do unhappily produce differences, those differences may be prevented from assuming the calamitous form of a lockout or strike.

The speaker then approached the subject of Jurisprudence, on which he spoke at some length, but we may not follow him further in his comprehensive address than to say he rightly dwelt on the necessity that exists for the revision and condensation of the whole body of our English law. Such a work would not only be an immense boon to the public in itself, but it would also be productive of great advantages indirectly, through the improvements which it would compel the Legislature to make in the actual substance of the law. It lies at the root of the amendment of the law, precisely as national primary education, and as the organization of State medicine, lie at the root, respectively, of educational and sanitary improvements.

At a seasonal meeting after the opening night, a paper "On the Fundamental Reform of the English Poor-law," by Dr. W. B. Richardson, was read, and provoked a lively discussion. It will be seen, from what we have said, that the Association has commenced the session with spirit, and some of our readers learning it is not alone when the Social Science Association goes out of town that its labours, may be led to find their way to Adam-street, Adelphi, and lead their aid in a good and pressing work.

Advertisements have been recently issued, announcing the intention of the Association to elect a secretary: a barrister, or gentleman studying for the bar, it was stated, would be preferred. Some twenty-five candidates sent in testimonials. In the course of two lengthened sittings, the executive committee reduced this number to six, whom they afterwards saw personally. The list was then reduced to two, Mr. Alsager Hay Hill, and Mr. Edwin Pears, of whom the latter was ultimately elected to the office, subject to the approval of the council.

THE HILLFIELD ESTATE, GLOUCESTER.—The first portion of a terrace, consisting of seven houses (ultimately to be increased to twenty-six), has been commenced on this estate. It is in contemplation to continue the terrace early in the spring, and also to erect a number of semi-detached villas. The architect is Mr. Maberly, of Gloucester, and the builder is Mr. Arthur Parker, of London.

MR. LAYARD ON MOSAIC DECORATION.*

The basilica of Monreale, near Palermo, magnificent as it undoubtedly is, and superabundantly rich in mosaics, which cover, according to the Duke of Serra di Falco, no less than 97,973 Sicilian palms (rather less than a foot each) of enamel mosaic (*opus Aleandrinum*) and 13,041 of pietra dura mosaic, and which required for their execution the continuous labour of 150 mosaicists for three years, does not produce the same impression as St. Mark's. This arises from the roof being in timber, from the absence of those numberless curved surfaces which distinguish the Venetian church and which are especially suited to mosaic, and from the greater diffusion of light. The effects are less solemn and religious than those of St. Mark's. Still, however, it is a glorious building, and furnishes to the architect an invaluable collection of beautiful ornaments of a particular period and style, the church having been entirely built and decorated towards the end of the twelfth century. It affords, too, an important example of the use of mosaics for pictorial purposes on side walls, which at Monreale are covered with stories from the Old and New Testaments. The colossal form of the Saviour on a gold ground, in the semi-dome over the central apse, has also a grand and imposing effect, and is a fine example of the manner in which this architectural feature in a church can be appropriately decorated with a single figure. The lower parts of the interior walls are panelled with marble slabs, divided by bands of mosaic in endless variety of designs. Unfortunately, the ancient basilicas of Ravenna have either been allowed to fall into decay, or have been so much changed by modern restorations and alterations, that we can no longer judge of the effect which the mosaics they contain must have produced when the whole ornamentation of the interior was in complete harmony with them. What is called the Jesuit architecture of Italy,—that vulgar renaissance which is so offensive to good taste, and so utterly opposed to all solemnity and true religious feeling,—introduced the fashion of breaking up the interiors of ancient churches by the introduction of side chapels, and of vast altars composed of columns, cornices, and pediments of marbles of every hue, piled up without any reference whatever to the surrounding architecture, or without any pity for the frescoes and ornament which may have adorned the walls.

The original simplicity and symmetry of almost every sacred building of any antiquity in Italy has thus been destroyed. Most fortunately St. Mark's, for various reasons,—amongst them, perhaps, the jealousy with which the clergy has preserved its antique church ritual,—has been spared, and remains, both in form and ornamentation, nearly as it was intended to be by its builders.

In the basilicas of Ravenna we can only judge of each mosaic as an individual example with reference to the actual work and the capabilities of the material: we can form no adequate conception of the general effect which it was calculated to produce as a portion of the general decoration. The richness and harmony of colour are neutralized by the vast spaces of plaster and naked walls by which in most instances these mosaics are surrounded, with the exception, however, of the tomb of the Empress Galla Placidia, which still maintains as a whole much of its ancient character and beauty. But in themselves they are deserving of the most careful study as belonging to the best period of early Christian mosaic art. They are especially valuable to the architect as affording some of the finest examples of the treatment of pictorial mosaic, and of the technical qualities of the material. For beauty and purity of design, which nearly approaches that of the Classic times, and for exquisite harmony of colour, the mosaic of the "Good Shepherd," in the tomb of Galla Placidia, is one of the most perfect specimens of the art that can be found. For the processional treatment of subjects, and for ancient costume and architecture, the basilicas of Ravenna furnish most excellent examples, especially the Church of St. Apollinare Nuovo. Indeed, at no period were the use and capabilities of mosaic so thoroughly well understood as in the fourth and fifth and early part of the sixth centuries.

* See p. 897, ante. In the previous notice, the Church of St. Apollinare in Classe and that of St. Apollinare Nuovo are stated in one part to be in Navarre. They are in Ravenna.

Before concluding this branch of the subject, I would mention, as an example of exterior decoration in mosaic, the cathedral of Orvieto. To judge of the full effect of the mosaic pictures which adorn its richly-decorated facade, it must be seen from a distance. Its position, standing majestically on a platform supported by precipitous cliffs rising out of a wide valley, is admirably suited to the display of its richly-ornamented facade. The mosaics, which are modern, are not of the best style, and are too pictorial for the architecture, unless seen from afar; but the effect is undoubtedly very gorgeous, especially on a bright day, when the facade glows in the sunlight with all the hues of the rainbow. I should hesitate, however, to recommend similar decoration for imitation in this country.

No one acquainted with the magnificent examples of mosaic decoration which I have described, will probably be inclined to doubt its great value, at least for the ornamentation of sacred edifices; and I think that those who have no prejudices and preconceptions on the subject, will be equally disposed to agree with me that, if mosaic can be used effectively and advantageously in sacred edifices, there is no reason why it should not, with equal propriety, be employed in secular buildings. All that is required for this purpose is a knowledge of the principles which regulate its proper application, and of the capability of the material.

In many respects mosaic is undoubtedly preferable to fresco for decoration, especially in our climate, even without reference to the atmospheric influences upon wall-painting. It is more durable; it is more lustrous; it is more effective when employed at a considerable distance from the eye; it is far richer and more brilliant, especially when gold grounds are extensively used, in this shaded and frequently insufficient light of our climate; and, lastly, in case of injury or deterioration from dirt, or other causes, it can be restored and cleaned without any detriment or loss of character to the original work. However, when making the observation, I would add that fresco painting and mosaic have distinct and separate attributes and capabilities, and that, when both can be employed under equally favourable conditions, as in Italy, they need not interfere with one another; and this reflection leads me to endeavour to point out what the proper attributes and capabilities of mosaic decoration really are.

Let me remind you, in the first instance, that I am not dealing with that minute and elaborate mosaic work chiefly practised at Rome, which is intended rather for the reproduction of easel pictures and altar-pieces than for architectural decoration. These are things to be avoided,—not to be imitated,—and with which the architect has nothing to do.

Legitimate mosaic decoration, like all true architectural decoration, should, in the very first place, be made subservient to the architecture, or, rather, it should be made essentially part and parcel of the architecture. The truly great architect will devise and superintend the decoration of his own building, even, if possible, to the minutest details; for there is nothing which adds more to the effect of an architectural monument, and to its grandeur and nobility of character, than the feeling that one clear, well-defined, and lofty conception pervades the whole of it. When this identity of conception is apparent in a building, however inferior it may be in certain details to another edifice in which this homogeneity is wanting, it will always be far superior to it in the general effect that it will produce. In order, then, to make mosaic decoration harmonize with architectural line and forms, all the best designers for mosaic have sought to give their cartoons a certain conventional and architectural character, and have avoided any attempt to make the mosaic look like pictures in oil. As, from the nature of mosaic, tesserae placed together with more or less precision, it is best seen at a distance; it should be used, especially when pictorial, at a certain height from the spectator. There are no mosaics in St. Mark's less, I should think, than 10 ft. from the pavement, and the greater number are at a very considerable elevation. Consequently, distinctness of outline, not only in the figures themselves, but in their extremities and parts, so that they be not lost in the mass, is required. When grouped, each figure should stand out boldly, and not interfere with any other figure. For this reason, the mosaicists of the best periods of the art generally preferred the processional treatment of their figures. Any

attempt to produce different planes of distance which require, to be properly defined, all the subtle tints of the painter's palette, should be avoided. The outlines should be distinct, well-defined, and marked, somewhat heavily; their darkness and thickness being regulated according to the elevation of the mosaic. This rule applies to both pictorial and purely decorative work. Reference should be specially had to the style of architecture of the building; always, however, bearing in mind, that although the general arrangement of lines and treatment of the subject may be varied to suit it, yet that, whether mosaic be introduced into a Classic, Gothic, or Renaissance edifice, the general laws which regulate its use are the same.

I may cite as an example in illustration of what I have said, the semi-dome over the most northern, and the lunette over the adjoining exterior entrance to St. Mark's Church. In the first instance, the original mosaic of the thirteenth or fourteenth century (its precise date is doubtful), represents a procession of figures bearing the body of St. Mark to the church, a view of which, as it appeared when the work was executed, is seen in the background. The subject, simply and somewhat rudely treated, harmonises perfectly with the surrounding architecture. The mosaic of the adjoining lunette represents the Doge and Venetian magistrates venerating the body of St. Mark. It was executed from a cartoon by Rizzi, and is probably one of the finest known examples of enamel mosaic, both as regards execution and the wonderful beauty and richness of the colours, especially the blues, purples, and golds. But this mosaic, however admirable in design and in execution, does not combine or harmonise with the architecture. It looks like a fine picture suspended on the façade, and which might have been hung anywhere else; consequently its effect is infinitely less pleasing than that of the earlier, simpler, and ruder mosaic. What the effect must have been before the original mosaics were removed to recede, the later, may to some extent be judged of by Gentil Bellini's great picture in the Accademia, in which the façade of St. Mark's is represented with almost photographic minuteness, as it appeared in the fifteenth century. No one will doubt that it was superior to that produced by the modern imitators. I may add that, in order to increase its effect, almost all good pictorial mosaic with which I am acquainted is surrounded by a band of appropriate ornament, the width of which depends upon the elevation and position of the mosaic picture.

It may be said that these considerations as to the designs for mosaics should be addressed to the painter rather than to the architect; but I contend that the design for mosaic, whether pictorial or simply decorative, is essentially the business of the architect, and that unless he attends to it and makes it himself, or causes it to be executed under his own immediate direction, he will never produce a really great architectural monument, if mosaic decoration is to be a prominent feature in it. As I have ventured to remind you on a previous occasion, architecture is the noblest of all arts; for when rightly understood, sculpture and painting become her handmaidens. When they were so, the most beautiful and perfect edifices were produced, whether in Greece or Rome, in Italy or more northern climes. It is the architect who, taking this lofty view of his profession, and educating himself to carry it out, will erect the greatest monuments and earn the highest fame.

Although the chief merit of the mosaic must depend upon the designer of the cartoon, much is left to the skill and judgment of the mosaicist who executes it. It is surprising how much effect may be produced by a judicious selection of tesserae of different sizes for different parts, by the mixture of tints in large masses of one colour, such as a gold ground, so as to avoid monotony of tone, and by the dexterity with which the arrangement of the tesserae is made to follow leading lines and the undulations of flesh or drapery. The interval between the tesserae must be regulated according to the distance, and can also be made to contribute to the general effect. These things and the proper selection and matching of the tints form the duty of the mosaicist.

Having thus endeavoured to place before you the nature and capabilities of mosaic, I would invite your attention to the main objects of this paper, which are two. First, to ascertain whether this mode of decoration can be advantageously introduced into this country; and secondly, if

so, whether there be the means of employing it on an adequate scale.

With regard to the first point, I have already expressed my opinion on the subject of the decoration of our public monuments, as well as our churches. Not only am I convinced that pictorial decoration might be introduced into such edifices much more extensively than it has hitherto been, but that it could be so introduced very much to the public advantage, both as regards public enjoyment and public instruction. But, unfortunately, the apparent failure of fresco and other such painting has discouraged the public, the architect, and those who have the superintendence of our national monuments. It is a matter for regret that mosaic was not more generally known, and had not been introduced into England when the decoration of the Houses of Parliament was commenced. I hope that it is not yet too late to introduce it into a building which is eminently calculated, especially in its halls and passages, dimly lighted through stained glass, for this mode of decoration. It was truly a noble idea to make the walls of the great palace of the representatives of the nation the record of her history, and we must deplore that it has not been fully carried out, principally owing to the failure of the materials employed. It will be a national loss if the fine wall pictures of Mr. Macleise should perish, whether we regard them as monuments of the genius of the painter or as most careful representations, in every detail of costume, of great events which have occurred almost within his time. Had they been executed in mosaic, we should no doubt have missed the skillful touch of the master, but we should have preserved designs worthy of him, and he would have been enabled to employ the years that have been consumed in the actual manual labour required to execute such vast works in preparing other cartoons for the completion of the decoration of the wall, in two panels alone of which the battles of Trafalgar and Waterloo are now represented.

The works of some of the principal painters of our time, executed at no small cost to the nation, will perish in all probability within a few years, and our only chance of preserving any memorial of them is by reproducing a portion of them at least in mosaic.

Besides the Houses of Parliament, we have rising up around us museums, picture galleries, public offices, courts of law, town-halls, railway stations, and other edifices. Each of such buildings might, like the Houses of Parliament, be made to contribute something towards the instruction of the public and towards the elevation of the public taste by appropriate pictorial decoration in mosaic. They have blank spaces which need to be filled up, and which the architect would, perhaps, gladly fill up; but he hesitates to do so now with wall-painting, because he cannot satisfy himself that it will resist the effects of our climate, and the smoke and dirt of our principal cities. If a suitable and durable material were at hand, in which such pictorial decoration could be executed at a reasonable cost, he would probably avail himself of it. Judging from the manner in which mosaic in Italy and in the East, when used externally, as well as internally, has defied the ravages of time and weather, we may infer that mosaic, if of good quality, is precisely the material which would suit our climate and atmosphere. I cannot conceive anything more instructing and interesting to the great masses of the people than pictorial decoration carried out in a comprehensive and intelligent manner in our great public buildings. Millions have yearly to while away some spare minutes in railway stations, town-halls, and courts of law. We might make such places, as the Greeks and Romans did their public edifices, a means of teaching and amusing the people, and, at the same time, add much to their beauty and interest by representing on their walls great national events, or recording important scientific discoveries which have increased the prosperity and power of the country, or have contributed to our civilization and our intellectual development. As a familiar illustration of what I mean, I may mention that I learnt more of the different forms and employments of locomotive-engines than I had ever known before, when spending a quarter of an hour a few weeks ago in the railway-station of a small Italian town, round the principal hall of which were very artistically painted in lunettes every variety of engines for railways and the mode of their use.

In our museums and picture-galleries, with

the exception of the South Kensington Museum, where a most praiseworthy and, on the whole, successful attempt has been made to introduce ornamentation on a large and complete scale, we have hitherto been sadly deficient in rich and appropriate decoration; and yet the value of a work of art, and the impression it is calculated to convey, are very much enhanced, as far as the general public are concerned, by the beauty or magnificence of the building which contains it, like a panel which gains by a rich and appropriate setting. Our National Gallery, for instance, is a disgrace to a great and civilised people. Its dirty floor of common boards, its coarsely-papered walls, its undecorated ceilings, its mean internal approach, have unquestionably a tendency to depreciate in public estimation the value of the treasures which it contains. Our pictures, crowded on the walls of such apartments, look as if they were hung there for an approaching sale in an auction-room. Thousands who visit the National Gallery, and for whose instruction and elevation its contents are partly intended, leave it without any adequate notion of the worth and beauty of what they have seen, more because they cannot believe that things of real value can be so poorly cared for. There is something elevating and refining in rich and beautiful ornament when introduced into a public building, and depend upon it the working classes feel the influence of it.

Mosaic decoration is particularly fitted for our churches on account of the grand and solemn effect which, when employed in large masses, it is calculated to produce. It is especially suited to curved surfaces, such as domes, vaults, and apses, because, when thus applied, it produces an infinite variety of effects of light and shade, especially when gold ground is extensively used. These effects are constantly changing throughout all hours of the day. We may imagine what the dome of St. Paul's would have been had Wren's original idea of covering it with mosaics been carried out. Even the gloom of the dull and murky atmosphere of the City would have been conquered by the bright and luminous enamel, and those who have seen St. Mark's at night can picture to themselves the effect of an evening surface at St. Paul's when the golden ground of the overhanging dome would reflect the thousand lights beneath.

In connexion with exterior decoration, which has of late years become better understood and valued in this country, I would point out the use of gold mosaic as a ground to bas-reliefs, whether figures or ornament, in white marble and other materials. The Byzantines and Venetians were well aware of its worth for this purpose, and of the singular beauty and delicacy of its effect. There are some charming examples in the façade of St. Mark's.

In the best period of Italian art the sculptor was well aware of the beautiful effect of sculpture in white marble relieved by a gold ground, and the niches which received the statues on the exterior of the church of San Michele at Florence were for the most part lined with gold mosaic. An important consideration in the use of mosaics in England, and especially in London, is the facility with which dirt and the discoloration produced by smoke and soot can be removed from its surface either by simple washing or by the employment of an acid without the least detriment to its brilliancy. I understand that recently some of the most ancient mosaics at Ravenna, dating from the fifth century, have been cleaned, and that they are as bright in colour as when first executed.

Let me now, in conclusion, ask your attention for a few minutes to my second point, viz.—Have we the means of using mosaics for decorative purposes in this country?

In England we have never had a school of mosaicists. The few specimens of ancient mosaics that we possess, such as those in Westminster Abbey, were executed by Italians. An attempt was made four or five years ago by Mr. Cole, with his usual zeal for the promotion of applied art in this country, to found a school of workers in mosaic who were to employ tesserae of terra-cotta, or, as they are technically called, "ceramic tesserae," instead of enamel, for figures and ornaments. Some very creditable specimens were produced, principally by Messrs. Dinton & Co. and Messrs. Simpson & Co., but the attempt does not appear to have been altogether successful. For certain purposes these terra-cotta or ceramic tesserae are sufficiently effective, but they lack the richness, brilliancy, and luminous quality of enamel, and certain colours such as reds and purples cannot be pro-

done, and they can never equal the effect of the gold of the Byzantine mosaics. Moreover, the gold being applied externally, and not protected by a film of glass, is liable to tarnish and to injury. As regards the durability of ceramic mosaics, I hesitate to give an opinion after the solemn warning of our president in his opening address of the session, against the indiscriminate use of terra-cotta, at least for external decoration. I will only mention this fact, that in repairing the mosaics of St. Mark's, it has been found that whilst the ancient tesserae in enamel are perfectly preserved, those in terra-cotta and other materials (for such were mixed with the enamel) have either perished or have greatly suffered. But mosaics in enamel have been executed with considerable success by several eminent firms in this country. I may particularly mention some of the full-length figures in the principal hall of the museum at South Kensington, by Messrs. Rust & Co. and by Messrs. Harlow, Fisher, & Co. Some of the enamels used were, I am informed, produced in England, by Messrs. Powell, of Whitefriars; but the greater part were, I believe, obtained from abroad, mostly from St. Petersburg, where, as is well known, a manufactory of mosaic, which has produced some remarkable works, was founded by the Imperial Government, under the direction of Sig. Bonafede, a distinguished Roman mosaicist, who is only recently dead.

In Italy the traditions of the workers in mosaics have been handed down through centuries, and, although at times the art has been very low, and indeed was scarcely practised at all, yet it has never altogether died out in the Peninsula. At Monreale certain families of mosaicists have been employed from generation to generation in keeping up and repairing the mosaics of the cathedral. At Rome, owing to the demand for elaborate mosaic in the reproduction of pictures, and for furniture and personal ornaments, the skill of the mosaicist was almost exclusively directed to those objects; but still the ancient traditions were not lost, and workmen were without difficulty found to execute the series of mosaics which adorn the walls of the new basilica of St. Paola. At Venice the old secrets were still preserved in the island of Murano, which had been celebrated since the twelfth and thirteenth centuries for the beauty of its manufactures in glass and for its enamels; but the sad condition to which the mosaic art had been reduced may be judged of by the restorations and renovations which during the last century and the early part of the present were executed in St. Mark's. A few years ago a poor glass-blower of Murano, named Lorenzo Radi, applied himself with that singular intelligence and perseverance which are not uncommon among Italian artists, to the improvement of the manufacture of enamel mosaics, and to the application of some of those secrets which were traditionally preserved in the island. He particularly turned his attention to the manufacture of gold mosaic. The success which attended his experiments attracted the attention of Dr. Salviati, a lawyer of Venice, and a gentleman of much ability and ingenuity, who perceived the value of his discoveries, and foresaw that they might be applied to the revival of mosaic decoration. He accordingly entered into an arrangement with Radi, and opened an establishment at Venice for mosaic work, and obtaining artists from Rome to instruct Venetian youths in this art. In former times mosaic work, having to be executed on the walls, required considerable time and labour, and was consequently very expensive. The mosaicist had to copy the cartoon on the wall itself, fixing the tesserae one by one in the cement prepared to receive them. Dr. Salviati succeeded in avoiding the necessity of working on the spot by an ingenious process, which, however, is only applicable to decorative mosaic, and cannot be used where much delicacy of work and extreme nicety in the gradation of tints are required. He taught the workmen to execute the cartoon on the reverse side, the face of the mosaic being downwards. The tesserae are fastened with common paste to sheets of coarse brown paper, on which the cartoon is traced. When the work is finished, it has only to be fixed with cement upon the wall destined to receive it, and the brown paper is then removed from the face of it. This process requires considerable skill and practice, especially when figures have to be executed, but is perfectly successful. Thus the decoration of many hundred square feet of surface can be forwarded from Venice to any part of the world—to America or

to India, with safety and at little cost. Having thus found the means of executing mosaics in the establishment at Venice, and having trained a number of young Venetians to the art, and much improved the quality of his enamels, he endeavoured to introduce this mode of decoration into foreign countries. It was chiefly in England that he met with success. The increased feeling for colour and decoration, and the gradual improvement in the public taste which had taken place in this country, chiefly through the enlightened influence of the Prince Consort, were very favourable to his attempt. It was principally through the knowledge of art and the well-known taste of the Queen that Dr. Salviati obtained his first important commission,—the decoration of the Wolsey Chapel at Windsor, and that of the Albert Memorial in Hyde-park. The mosaics of the latter monument are now complete, and cover above 1,000 square feet. In the Wolsey Chapel very little now remains to be done. The general designs for the reproduction of mosaic decoration in both these monuments were by our distinguished fellow, Mr. Gilbert Scott, and were carried out under his directions from the cartoons of Mr. Clayton, of the firm of Clayton & Bell.

The Albert Memorial and Wolsey Chapel furnish excellent examples of mosaic used both for external and internal decoration. In the Albert Memorial mosaics adorn a pediment and two spandrels on each face, and the vaulting above the statue of the Prince. The four pediments are occupied by allegorical female figures on a gold ground, representing poetry, architecture, sculpture, and painting. Beneath each pediment, on two spandrels, are figures also on a gold ground, illustrating the application of the art typified in the figure above. The vaulting is blue, set with gold stars, and adorned with emblazoned coats of arms. The general effect of the mosaics, as far as one can judge, in the present unfinished state of the monument, is rich and harmonious. Mr. Clayton has designed his cartoon with a thorough knowledge of the capabilities of mosaic, and of the requirements of architectural decoration. The figures are distinctly and clearly defined on gold ground, and can consequently be seen from a considerable distance. Except on the cathedral at Orvieto, there is no similar instance of the employment of mosaic on so large a scale for external decoration. The mosaics of the Albert Memorial, exposed to the full influence of our climate and atmosphere, and facing the four quarters of the heavens, will furnish the best test of the durability of the material when used in this country on the exterior of monuments.

If I am not much mistaken, the Wolsey Chapel, when completed, will prove the most gorgeous and perfect specimen of modern decoration in Europe. The intervals between the ribs of the groined roof, including an area of about 2,100 superficial feet, are adorned with angels, heraldic devices, and various ornaments in mosaic on a gold ground. The soffits of the twelve side windows are similarly ornamented, and the twenty-eight panels of the great blank west window are occupied by full-length figures of historic persons who have been connected with the erection of Windsor Castle, also in mosaic on a gold ground. The windows are filled with the richest stained glass by Messrs. Clayton & Bell. The walls of the chapel are panelled with a series of Scripture subjects in marble tarsi, each framed in bands of ornament formed by white marble reliefs inlaid in marbles of various colours, the whole executed by the Baron de Triqueti. The tarsi of coloured marbles and engraved outlines and shading filled with mastic is a revival and improvement by the Baron de Triqueti of an art practised during the Italian cinque-cento, and carried to its highest perfection at that time on the pavement of the *duomo* of Siena. Above each panel are introduced medallion busts of the Queen and members of the Royal Family by Miss Durant, a pupil of the Baron de Triqueti. As the decoration of this chapel is not yet finished, the time is perhaps not come to pronounce a fixed opinion upon it; but I cannot refrain from saying how much impressed I have been with the exquisite and refined beauty, and at the same time with the exceeding richness of the general effect. I especially rejoice to see an example of interior decoration thoroughly carried out, and I cannot but believe that it will lead to still greater works of the same nature.

Besides the decoration of those monuments which I have described, Dr. Salviati has obtained

other commissions for public buildings in England. In the Museum of South Kensington, he has executed several full-length figures of celebrated painters, sculptors, and other artists after cartoons by some of our most eminent painters. I may particularly mention the figures of Nicolas Pisano, by Mr. Leighton, and of Apelles, by Mr. Poynter. In Westminster Abbey, "The Last Supper," over the communion-table, is by him, after a design by Mr. Clayton. For St. Paul's he has executed the mosaics of two pendentives of the dome, one from a cartoon by Mr. Watts, the other from a cartoon by Mr. Rivers; and he has a contract for the decoration of the remaining pendentives. I trust that the day may come when the whole of the dome may be similarly decorated as the dome of St. Peter's at Rome is. The architect of the noble edifice, Mr. Penrose, has not, I hope, relinquished the idea of carrying out Sir Christopher Wren's original design. In addition to these great commissions, Dr. Salviati has executed several restorations for churches in England, into which they have been introduced with excellent effect.

Above the principal commission obtained by Dr. Salviati is that for the complete restoration of the mosaics on the walls and in the pavement of St. Mark's at Venice, for which a contract has been entered into extending over fifteen years. Many of the cartoons of such designs as have fallen away from the cracking of the walls, owing to the subsidence of the foundations, have been preserved, and I trust that the restorations will be executed with such care,—indeed, with such reverential feeling,—that this grand and unique monument may in no wise lose its original character.

From what I have said there cannot, I think, be a doubt that mosaic, both pictorial and simply decorative, not only can be, but ought to be, employed in this country. I have shown that when protected from the effects of the atmosphere in the interior of buildings its durability can scarcely be questioned. With regard to exterior use, it may yet have to be tested; although I see no reason why it should not be proof against our climate, if proper precautions are taken in fixing it. These precautions consist mainly in the selection of the cement which binds the tesserae together and fixes the mosaic to the wall. That used by Dr. Salviati has been subjected, I believe, to adequate tests by Mr. Gilbert Scott and other eminent architects who have employed mosaic, and has been found of excellent quality. The architects of St. Mark's appear at one time to have used as an additional precaution in fixing mosaics, especially on walls and ceilings, large nails with heads in the form of a star, and, as it were, split at the end, in which a wedge was inserted which opened up the nail as it was driven into the wall; but such precautions appear to be scarcely necessary when perforated bricks are employed for the reception of mosaic, and they do not appear to have been used by the most ancient mosaicists.

There is still another point of a practical nature upon which the architect and the public also will naturally require some information: I mean the question of cost. Upon this subject Mr. Digby Wyatt made some statements in his paper; but since then, owing to the greater facility of execution, and of producing certain enamels, the scale of prices has somewhat altered. The cost of mosaic depends principally upon the following considerations,—the quality of the work, the distance from the eye at which it is to be placed, the predominance of figures, ornament, or simple ground, and the prevalence of certain tints.

On the walls and on the table are various specimens of Venetian mosaic, which will afford some idea of the relative quality of work used for architectural decoration.*

The most elaborate, well-executed mosaic, for decoration in England, are the figures at South Kensington Museum. It would be difficult to find finer specimens of this branch of the art, but they are, of course, the most expensive, requiring very skilful artists, who receive very high pay. I doubt whether mosaic of this nature can ever be introduced very largely for purely decorative purposes. The great monuments of Italy and of the East contain no work so elaborate and highly finished.

* The illustrations referred to consisted of a mosaic picture representing a full-length figure of our Lord, from designs by Mr. Gambier Parry, exhibited at the Bathin Exhibition; a mosaic picture representing Henry III., duplicate of one of the twenty-eight figures in the east window of the Wolsey Chapel at Windsor, by Salviati; a ditto of Henry VII.; and a mosaic picture representing Our Saviour at Supper with the Disciples at Emmaus.

The pictorial mosaics of the Albert Memorial and of the Wolsey Chapel are purely decorative, and are meant to be seen from a distance. In order to be effective, they are not too fine in the workmanship or too elaborate in the gradations of tints. These figures are excellent examples of what mosaic for internal decoration should be; but they are more elaborate in execution and in gradation of colour than most of the decorative mosaics of the early Italian and Byzantine churches; although there are specimens in St. Mark's, as in the semi-dome over the exterior northern entrance in the Mascoli Chapel and in the sacristy, which exceed it in the fineness of the work and the smoothness and exact fitting of the tesserae. The figure of Christ in the act of blessing, from a cartoon by my friend Mr. Gambier Parry, an eminent amateur artist, is a good example of the two qualities of work united. The head having been executed by a skilful artist, according to the usual process, that is to say, not on the reverse; the drapery, by less skilful hands, on the reverse. Still coarser work even than my specimen exhibited here is well suited for simple architectural decoration and even for figures, producing an excellent effect when far removed from the eye,—a better effect, indeed, than more finely-executed work.

Of course, figures require, under all circumstances, more careful execution and more skilful workmen than mere ornament. As regards the relative cost of tints, the reds and purples are the most expensive, on account of the materials used in them, and of the difficulty of producing them. The gold mosaic, but especially the silver, which is more difficult to obtain than the gold, is more costly than common tints. To show the requirements of a mosaic establishment, I may mention, that in order to execute in a satisfactory manner the cartoons which have hitherto been confided to Dr. Salvati, a stock of nearly 1,500 tints has been brought together, for the most part produced on the company's premises at Murano. I may point out that any quality or tint of gold may be obtained by darkening or lightening the colour of the glass upon which the gold-leaf is laid, or by using a film of coloured instead of transparent glass over it; or the brightness of the gold may be denuded by roughing the surface of the outer film of glass with the wheel. The architect or painter can consequently choose the quality of gold which best suits his work or his taste.

Taking, the various qualities of mosaic which may be fitly used for decorative purposes, the price would vary from about 30s. the square foot to 4l. or, at the utmost, 6l. for the finest. This includes the fixing, but not, of course, the price of the cartoon. When these prices are compared with what an artist of eminence, and fully employed, would receive for the execution of a great fresco, or any elaborate mural decoration; in fact, with what the artists engaged on the wall-paintings in the Houses of Parliament have received, they will be found, I think, very moderate. Of course, we must take the cost of a cartoon into consideration; but even if this be added to the cost of the mosaic, supposing the cartoon to be executed by an artist of high reputation, the whole expense of the mosaic would be far less than that needed for the execution of an elaborate fresco by the same artist. It must be borne in mind that all great fresco-painters have, before commencing their work on the wall, executed most careful cartoons for it,—cartoons, indeed, which would be more than sufficient for the skilful mosaicist.

As regards simple decoration,—when the durability of the material, the facility with which it is cleaned and restored, and the admirable effect that it is calculated to produce, are taken into consideration, the price of mosaic is certainly not an obstacle in the way of its use on a large scale in our great public and even private buildings. In conclusion, I would venture to express a hope that the subject which I have brought before you this evening is one not unworthy of the attention of English architects, and that by the aid of mosaic we shall see erected public buildings which, in their internal decoration, as well as in their exterior architectural features, may be worthy of the wealth and greatness of the country.

LONDON OVER THE WATER.—There is scarcely a street in the district of St. Olave's, Southwark, where fever, in some form or other, is not raging, according to the *South London Press*.

ON THE DRYING PROPERTIES OF VARIOUS KINDS OF HOUSE PAINT.*

The question we have to consider is, "Why does paint dry?"

The difficulties of this question presented themselves to me on the occasion of some house-painting during the last summer. "Capital weather for drying, sir," was the remark of the painter. "Why does paint dry?" was the question of a child.

I have great love and respect for children. I love them because they think what they say, and say what they think. I respect them because they are good observers, and continue to be so until they go to school and learn how not to observe. Philosophers are children whose powers of observation have been cultivated. Children left to themselves are philosophers: what a pity they should cease to be so.

But why does paint dry? When a shower of rain wets the pavement and the sun shines out and the wet disappears, we know that a certain amount of heat-force has converted the water into invisible vapour, and we call this process of drying evaporation. So, also, when we boil a kettle of water, there is a change of state, of water into steam, and a process of evaporation is going on, only in this case it is more rapid than in the other; and evaporation is not superficial merely, but from every part of the liquid, more or less. Continue the process, and the water dries up by this rapid evaporation. Again, if we apply heat to oil of turpentine contained in a retort, it will boil a little over 300° Fahr., and the vapour may be collected and condensed in a cooled receiver; but, if we try to boil linseed oil, for example, it will not only not distil over, but it will blacken and decompose instead of boil. If we moderate the heat so as not to carbonise it, then it will lose about one-sixth of its weight and become thick, tenacious, and viscid; forming what is called printer's varnish. Raise the temperature above 600°, and if air be present the oil will take fire and burn quietly without further external heating, until nothing but tar or charcoal is left. If, however, the burning be interrupted by closing the vessel, a brown viscid substance will be left, known as bird-lime.

There must be something, then, very different in the constitution of these two oils, turpentine and linseed, since they behave so differently under the influence of heat. Such is the case. Turpentine belongs to a class of oils known as *volatile*; that is, they can be raised into vapour by means of heat, and under certain conditions, will evaporate or dry up in the sense that the wet on the pavement dries up after a shower of rain. Linseed oil, on the other hand, which cannot be boiled or distilled, belongs to a class of oils called *fixed*.

Some one now steps in with an objection. Painters not only boil their linseed oil, but the very process gives the name of *boiled oil* to the product.

What painters really do is this: they gradually raise the oil to about 600°, when it begins to give off acrid vapours and a little above 600° the oil itself begins to decompose with the escape of gaseous hydro-carbons, which, swelling up in bubbles, give the oil the appearance of boiling. Continue the process out of the reach of air, and the oil would be entirely broken up, past recall, into a mixture of solid and liquid hydro-carbons, and various fatty acids, with a very irritating body, known as *acrolein*, from its distressing action on the mucous membrane of the eyes and organs of respiration. It is quite clear, then, that the linseed or nut oil used as the liquid vehicle of paint does not dry by the ordinary process of evaporation. I put the question, "Why does paint dry?" to an intelligent painter, and the answer was, "Because we mix *dryers* with the paint." These dryers, as they are called, consist of litharge, oxide of manganese, and sugar of lead. Linseed oil is heated with about one-twentieth of its weight of litharge, which the oil completely dissolves, and is then used as a dryer. A similar heating with manganese or sugar of lead also improves the so-called drying properties of the oil.

But what would be the effect of omitting the dryers altogether in the composition of the paint? I have no doubt most painters would say that the paint would never dry. Let us see the result of a careful experiment performed by

Chevrel some years ago. Of course, you are aware that house paint, omitting the colouring matters or stainers, consists of three ingredients: 1st, white lead or white zinc; 2nd, a fixed oil, such as linseed, or nut, used for the purpose of reducing the white to a soft paste, to which is afterwards added variable proportions of linseed or other oil for thinning the paint; 3rd, the drying material or dryer which we now propose to omit.

Four oak strips were painted, each on one side, with a paint composed of white lead and linseed oil, and the other side with a paint composed of white zinc and linseed oil. The strip No. 1 was exposed to the air to dry; No. 2 was put into a hottle of the capacity of two litres (3-52 pints) and closed; No. 3 was put into a similar hottle, containing dry oxygen gas; No. 4 was put into a similar hottle, containing dry carbonic acid gas. The results as to drying were examined after twenty-four hours, and again after seventy-two hours:—

After twenty-four hours.

No. 1. The lead paint was almost dry; the zinc paint had set, but was not dry. No. 2. The lead paint was almost dry; the zinc paint had set, but was not dry. No. 3. Both the lead and the zinc paints were perfectly dry. No. 4. Both paints were still wet and fresh, and had undergone no change.

After seventy-two hours.

Nos. 1 and 2. Both paints were perfectly dry. No. 4. The lead paint had almost set, but it had no adhesion to the wood, and could be easily removed by friction; the zinc paint had undergone no change, but stuck to the finger like fresh paint.

Now, how remarkable are these results. Paint, containing no so-called dryer, dries rapidly and completely in oxygen gas, within twenty-four hours, and does not dry at all in dry carbonic acid gas. It dries more slowly in the air, whether exposed or confined, and in another experiment it was shown that in drying in a confined volume of atmospheric air, the paint had absorbed all the oxygen, and left nothing but pure nitrogen in the hottle.

We can now answer the question, "Why does paint dry?" in a scientific, that is, in a satisfactory manner. Paint dries, not because it loses anything, as in the case of ordinary drying by evaporation, but because it absorbs oxygen from the air, and solidifies in combining with it. The drying of paint is not, therefore, a physical effect, as in the case of evaporation, but a chemical one, in which there is a change of properties attending a change of state from liquid or viscid to solid.

In the above experiments we omitted the dryers; what would be the effect if we left out the white lead or the white zinc, and exposed pure linseed oil to the air?

Linseed oil exposed to the air in thin layers dries up into the form of a resinous, transparent, moderately elastic mass resembling caoutchouc. This property of absorbing oxygen and gradually becoming solid, also applies to walnut, hemp, poppy, rapeseed, safflower, and some other oils, and hence such oils are termed drying oils. In undergoing this change these oils undergo slow combustion, and give off carbonic acid. Under certain conditions the drying oils absorb oxygen so quickly as to take fire, as when the cotton-wool, tow, &c., used in cleaning machinery is thrown aside, and has thus led to conflagrations.

The non-drying oils, as those that do not absorb oxygen, are rape, colza, olive, almond, and many animal oils. By exposure to air they become gradually changed, but in a different manner as compared with drying oils. They become rancid from the fermentation of the cellular substances of the plant or animal from which the oil was obtained. They lose their colour, and, to a certain extent, their fluidity, and acquire an acrid, disagreeable taste. Such oils are, of course, quite unfit for the purposes of the painter, although there is ground for suspicion that linseed oil is sometimes adulterated with a cheap fish oil, the result of which in the paint is to produce a disagreeable kind of stickiness which is all but permanent. While studying the cohesion figures of liquids some years ago I was anxious to procure a specimen of pure linseed oil. The specimens procured from oil warehouses gave different figures; but in the International Exhibition of 1862 there was a linseed-oil press at work. Here, I thought, is a splendid opportunity for getting a

* By Charles Tomlinson, F.R.S., read at the Society of Arts on Wednesday, December 9th.

specimen of pure linseed oil. "It must be pure," said the man, "for we make it before your face." He gave me a bottle of oil, and generously volunteered to give also a sample of the seed. To my surprise, on examining the linseed, I found it mixed with various other seeds to the extent of at least one-sixth. What hope, then, is there of obtaining pure linseed oil, and, consequently, good drying paint, if not only the oil is liable to adulteration, but the source of the oil itself is impure?

The distinguished chemist who does us the honour of taking the chair to-night, has been good enough to place at my disposal some recent results obtained by the Dutch chemist, Mulder, who drew some of the oil experimented on from good fresh seed in his own laboratory. According to Mulder, the difference between non-drying and drying oils arises from the presence of oleic acid in the latter. He compares drying oils to blood; they absorb oxygen and give off carbonic anhydride. To prove this in the case of linseed oil, fragments of pumice-stone were ignited, left to cool, and then put into a bottle, and the pumice was moistened with boiled linseed oil, the effect of boiling being to raise the oil into a state of greater activity. Air, previously deprived of carbonic anhydride, was next passed over the pumice, and then into a vessel containing baryta water, which, in a few minutes became turbid from the presence of carbonic acid, due to the slow combustion of the oil.

A pure linseed oil, drawn in the laboratory, was represented by the formula C 768 H 112 O 12. When made colourless by being passed through animal charcoal, its composition was not altered. Poppy oil, nut and hemp seed oil, were found to be similar in composition. The chief component of these oils, and probably of all drying oils, is a neutral fat known as linoleine. Linseed oil also contains the fatty bodies known as elaine, palmitine, and myristine. Poppy oil contains elaine, myristine, and laurine. Walnut the same, but rather less laurine. The mucilaginous matter said to exist in these oils, and to act as a ferment, was not found.

The ash of good linseed oil contained only one per cent. by weight.

In the so-called dry distillation of linseed oil, when carefully conducted, decomposition begins at 250° C (482° Fabr.); it yields acroleine, which, by partial oxidation, forms a certain quantity of acrylic acid, sebacylic acid, palmitic acid, and myristic acid, while the great bulk of the oil left in the retort is the anhydride of linoleic acid not unlike birdlime, or fused india-rubber. It is insoluble in ether. It is dark-coloured in the mass, but of a straw-yellow in thin layers, and very elastic. This is the basis of our printing inks. In preparing it, in practice, there is usually a great loss, from the application of too strong a heat, so that volatile hydro-carbons and even oil-gas are produced.

Linseed oil, by saponification, yields glycerine, linoleic acid, elaine acid, palmitic acid, and myristic acid.

100 parts, by weight, of several drying oils, yielded by saponification from 87.7° to 95.4° of fatty acids, dried at 100° C. Fresh linseed oil 95.4°, old walnut oils 87.7°.

Linoleine is readily saponified by means of a solution of basic acetate of lead, the effect being the same as boiling the oil with litharge, or red lead.

Pure linoleine is not disposed to become rancid. The drying oils become slowly rancid by changes produced in the other fatty bodies present, especially in the elaine.

Poppy and nut oils become much sooner rancid than linseed-oil, but in general, the drying oils become less rapidly rancid than the non-drying.

The acid compound of linoleine is linoleic acid. This is a colourless compound when pure, and it is very fluid at 14° C., and is not solidified at 18° C. Its specific gravity is 0.9206. It reddens litmus, and is soluble in alcohol and ether. When exposed to air in thin layers linoleic acid absorbs oxygen and turns red. This change is greatly promoted by the presence of bases. The lime and baryta salts of linoleic acid are soluble in boiling alcohol. The lime, zinc, copper, and lead salts are soluble in ether. The acid readily oxidises, yielding iodic acid, a substance something like Venice turpentine; it is colourless, but becomes blood red by being exposed to the heat of boiling water, as also by contact with strong caustic alkalis and acids. The alkaline carbonates do not affect this acid in the same way. The change in colour is not accompanied by change in composition.

In the change produced by the exposure of linoleic acid to the air, a body known as linoxine is first formed, and some months elapse before the peculiar stickiness of the Venice turpentine-like body is formed. With raw linseed oil, however, the change takes place in about two weeks, with boiled oil in a few days. Linoxine is formed by the loss of one equivalent of the elements of water from linoleic acid. Linoxine is an important body, it being the chief compound resulting from the application of oil colours and paints. It is amorphous and somewhat elastic, like leather or gutta-percha. It is not hygroscopic. It is heavier than water, and is not soluble in water, alcohol, ether; it swells up in chloroform and bisulphide of carbon. It is not affected by acetic acid or by dilute mineral acids. Caustic alkalis dissolve it and turn it red, and it is precipitated from those solutions without change. The best solvent for linoxine is a mixture of chloroform and strong spirits of wine, aided by a moderate heat. Oil of turpentine renders it gelatinous, but does not dissolve it. It is not affected by being raised to 100° C., only it gets a little darker. It cannot be fused without decomposition. Such are Mulder's results, very briefly stated. They ought to have a marked effect not only on the practice of the house-painter, but also on that of the printers' ink maker. Chevreul's details also are full of practical instruction, and we now proceed to lay them before you.

Roughly speaking, the setting of paint is due to the absorption of oxygen; hence we can understand why the painters, in order to prevent their brushes from getting hard, put them into water when they leave off work; and also cover a painted surface with water when they want to keep the paint from setting.

We have spoken of white lead, or white zinc, as the basis of paint; white antimony has also been proposed. In order to determine the relative merits of the three, M. Chevreul instituted an experiment, in which 10 grammes (154 grains) of pure linseed oil were mixed up with sufficient quantities of the three solids without the addition of any dryer. It was found that the zinc paint covered a less surface than the lead, but more than the antimony paint. The drying of the different coats of the three paints required very different times, as will be seen in the following table:—

Coats.	Lead	Zinc	Antimony
	Paint.	Paint.	Paint.
	Days.	Days.	Days.
First	4	18	50
Second	3½	15	28
Third	3	5	27
Total	10½	38	105

Hence it appears that lead paint dries much more quickly than zinc or antimony paint. Indeed, unless it were possible to hasten the drying of zinc paint by the addition of a dryer, zinc paint would be of very little use in industry, since the practice of house painting requires that not more than two or three days shall elapse between the application of the first coat and that of the second.

Antimony paint is also too slow in drying to be used. A tin paint was also tried, but the oxide of tin was found to delay the drying of the oil. Pure linseed oil dries more quickly on glass than when mixed with oxide of antimony, so that this oxide is actually anti-siccative relatively to glass.*

THE VALUE OF ASPHALTE.

THE newspapers have quoted very extensively—and as if an entirely new thought—a recommendation by Professor Rolleston, of Oxford, to the effect that the entire area occupied by a house should be covered with "the same layer of impervious material which is put into the walls as the so-called 'damp course.'" Such a superficial stratum may be cheaply made," the writer continued, "by a mixture of gravel and gas tar. It would effectually prevent that rising of watery vapour out of the soil which the 'aspiring' effect of a warm house does much to intensify over the area it covers." The suggestion, as many of our readers must know, is by no means new. Such a precaution, especially on clayey and otherwise damp soils, we have ourselves often adopted. For years past, in damp situations, all the areas of gunpowder magazines

* The conclusion in our next.

have been covered with Pyramont asphalt, for the suppression of moisture. As long ago as 1853, Mr. William Rutson, of Newby Wiske, erected infant schools upon his estate, the entire site of which, with a view to sanitary benefits, was covered in the same manner; and over which the wooden floor was placed. In 1856, the whole of the foundations of the Enfield small arms factory and engine-houses, situated alongside the River Lea, had all their foundations encased with asphalt, by which means this portion of the building, though surrounded at all times by 3 ft. of water, has been ever since proof from damp; so, also, the superintendent's house and offices at Pyramont-wharf, Cubitt Town, by the recommendation of Messrs. Tilott & Chamberlain, architects, was thus prepared for. At Dr. Swabey's mansion, at Langley Marsh, near Slough, the area was thus covered under the direction of Mr. Hardwick. Again, in 1867, from 4 ft. to 5 ft. of water were kept out in the cellars and basement of Mr. Angell's, Lubenham, near Market Harborough, by the application of this same asphalt, under the direction of Messrs. Cubitt & Co. This same firm, during the erection of the new tobacco stores, in Victoria Docks, situated some 15 ft. or more below the basin of it, encased the dock front of the building with asphalt to the extent of 12,000 ft., continued it through the walls (7 ft. at ground line), and over the entire area of the floor to the further extent of 82,000 ft. Still it is so important that the worth of an impervious layer over the site of a building should be kept in view, that we are thankful to the professor for giving increased publicity to it. He was led to do so, it seems, by the assertion by Professor L. Pfeiffer, "that the interposition of a layer of impervious substance, of whatever kind so that it be impervious, between the level of the ground-water in the soil and the floor of a house built upon it, confers upon such house an immunity in cholera epidemics. Barracks and hospitals lying low, and on superficially plain strata of clay, have been remarked to remain free from attacks of this disease, whilst houses placed on elevated and sandy soils, and more favourably conditioned thus, probably, as to bronchitis and rheumatism, have enjoyed no such freedom."

The Seyssel asphalt is a much better material for the purpose than gas-tar. It is a bituminous limestone from the Lower Jura, brought by beat and an addition of its own tar, to a state of mastic, in which condition it can be applied from ½ in. to ½ in. in thickness, to the area of the site selected for building upon. It is perfectly inodorous and indestructible in such a situation. On the contrary, a mastic composed of gas-tar would, for a considerable time, throw off an offensive odour, and when this odour ceases to be noticed, then the material becomes soft and brittle, and cracks.

Several applications of this valuable material have lately come under our special notice. Thus, at Warrnam, near Horsham, the residence of Mr. Charles Innes, the well-known builder, where a very complete rafter-cone has been formed, the floor is laid with it. And in the New Meat Market, Smithfield, Pyramont Seyssel asphalt forms the wide margins to all the shops, and immediately beneath what are technically called the "butchers' hangings." It is uniform and neat in appearance, and seems to answer its purpose well.

THE CHAUCER WINDOW, WESTMINSTER ABBEY.

A MEMORIAL of Chaucer has been set up in Poets' Corner, immediately over his tomb. The design is intended to embody his intellectual labours and his position amongst his contemporaries. At the base are the Canterbury Pilgrims, showing the setting out from London and the arrival at Canterbury. The medallions above represent Chaucer receiving a commission, with others, in 1372, from King Edward III. to the Pope of Cenoa, and his reception by the latter. At the top the subjects are taken from the poem entitled "The Flour and the Leaf." On the dexter side, dressed in white, are the Lady of the Leaf, and attendants; on the sinister side is the Lady of the Flour, dressed in green. In the tracery above, the portrait of Chaucer occupies the centre, between that of Edward III. and Philippa his wife; below them, Gower and John of Gaunt; and above are Wickliffe and Strode, his contemporaries. In the borders are disposed arms. At the base of the window is

the name Geoffrey Chaucer, died A.D. 1400, and four lines selected from the poem entitled "Balade of Gede Counsaile" :—

"Rise from the pees, and dwell with soft-fastness,
Suffice unto thy good though it be small,"
"That thee is sent reeve in buxomness;
The wrestling for this world asketh a fall."

This window was designed by Mr. J. G. Waller, and executed by Messrs. Thomas Baillie and George Mayer. It is a brilliant piece of colour, and an interesting addition to the attractions of the Abbey. This and the Brunel window deserve the attention of students of modern stained glass. Chaucer's tomb should now be cleared of some of the disfigurements around it.

THE LATE MR. JOHN BURLISON.

ON Tuesday last were interred, in Hampstead Churchyard, the remains of Mr. John Burlison, who has for the last quarter of a century been the confidential and highly-valued practical assistant of Mr. Geo. Gilbert Scott, R.A.

Mr. Burlison was a man of very remarkable talents, and of extensive practical and scientific acquirements, uniting in an eminent degree the classes of skill and knowledge which belong more especially to the practical builder and surveyor, with the constructive science of the engineer, and the antiquarian knowledge and acumen which are so necessary to the investigation of the architectural history of ancient structures, and to a sound judgment in their restoration. His knowledge of our own architectural antiquities, and those of Germany, where he frequently travelled, was very extensive.

He was a mathematician of a high and thoroughly practical order, and was well versed in scientific and antiquarian works in French and German, as well as in our own language. Mr. Burlison's sound judgment and unflinching integrity acquired for him the confidence and respect not only of clients, but of those whose work he had to superintend, and whose charges it was his duty to scrutinize. Among his many important qualifications may be mentioned a remarkable perception, while dealing with ancient structures,—of the means of saving them from ruin, and preserving their identity even under circumstances apparently hopeless; and he may fairly lay claim, like the well-known antiquary, John Carter, who lies buried in the same churchyard, to having given substantial aid in saving many ancient monuments from destruction.

Mr. Burlison died, after only four days' illness, in the fifty-eighth year of his age. He was for some time of the city of Durham, where he was for some time in the office of Mr. Bonomi. His loss will be felt by Mr. Scott, not only as having been a most able and valued coadjutor, but as one for whom he entertained the highest esteem and respect; and the same feelings will be largely and extensively shared by those who knew his talents and his personal worth.

URBAN AND SUBURBAN RAILWAYS AND STREET TRAFFIC.

New remedies of various kinds are again proposed, by private Bills to be petitioned for in next session, for the greivling, in the metropolis especially, of a street traffic in excess of the capabilities of the channels in which it has to be conducted. The remedies are of two classes.

One class of remedy applies to the regulation of the traffic, and to expedients for getting more work more quickly and safely out of the existing means of communication between one locality and another, by guiding the streams of traffic in accordance with understood municipal regulations enforced by law. Much has been well done by the police authorities in this respect, of which no better illustration can be given, perhaps, than the enormously-increased capabilities of London Bridge by the simple expedient of enforcing a quick and a slow stream of vehicular traffic in each direction,—a regulation that almost entirely obliterated the numerous distressing and costly "blocks" that were of daily occurrence.

Another proposed remedy belonging to this class is the adoption of street tramways, by which a larger number of passengers could be carried at greater speed and in a

smaller number of vehicles than by the ordinary street carriages in use. For tramways in the heart of London the public are not prepared as yet, and no projector is held enough to propose their adoption for the City proper, the Strand, Oxford-street, or others of the main traffic arteries; but their use as suburban means of communication would, it may reasonably be expected, prove of public advantage in various respects,—in the increased celerity, smoothness, and comfort of this mode of locomotion as compared with the ordinary street omnibus, and especially in their operation as a check upon the railway companies in their dealings with suburban season ticket-holders. Aots for tramway systems have already been passed by Parliament for Liverpool and Dublin, the Liverpool ways to be carried into the very heart of the town and its best streets. The promoters of the Liverpool and Dublin Tramways Bills have petitioned for several sessions for the conversion of their "Metropolitan Tramways" Bill into an Act, but hitherto they have petitioned without success. This year they come forward again, with a somewhat smaller scheme than those of former years. They ask for less aggregate mileage, and propose to commence at points further from the more crowded thoroughfares or in near the heart of the City. Their proposed lines are to the north, two lines by leading thoroughfares; and to Stratford and Bow in the east, by White-chapel and Mile-end. Other two Bills are to be brought forward for very large tramway schemes in various suburban localities.

The other class of remedies for the overgrown and ever-growing street traffic is by attempting its depletion or diversion into additional and new channels. To this end underground and overground railways are proposed, which often, in the first instance by breaking up the streets and interrupting existing traffic, aggravate to an almost intolerable extent the evils they are intended ultimately to abate. Some of the new schemes proposed for railways in London are but little obnoxious to this objection. One of these is a tunnel line, nearly four miles in length, proposed to be constructed between London Bridge and Clapham-common. This line, it is proposed, shall be under the highway between one terminus and the other, and will be strictly underground all the way. It can be made, it is alleged, without tearing up the road, or disturbing the ordinary traffic, excepting at the points where the shafts necessary for ventilation will be placed. The line will be practically straight and level nearly throughout. Whether with one aboveground line from London Bridge to Clapham, and another between the Borough-road and the Elephant and Castle and Clapham, a third and underground line will pay, is a question for speculators and investors to consider. Another line, under covered way, is proposed, which seems calculated to relieve the pressure upon the streets in a quarter—Billingsgate—which greatly needs relief. This is a line projected from Tower Hill, and along the north bank of the river to Blackfriars Bridge. An extension to Smithfield is also included in the plan, which embraces, moreover, the widening of Lower Thames-street, and the construction of a new road between London Bridge and Billingsgate Market. It is suggested that this line may be a good substitute for this portion of the Metropolitan District Railway, part of the inner circle, between Tower Hill and Blackfriars, and it is further suggested that the low-level main sewer may be carried along in the proposed embankment at a saving of 100,000*l.* as compared with the more inland course. The adoption of this suggestion would also avoid the necessity for breaking up the streets. Another very important underground line,—the Mid-London,—involving enormous cost, is proposed again,—its course to be from the Marble Arch under Oxford-street and Holborn to Newgate-street and Cheapside. Two lines are proposed to Islington,—the one an underground line from the Metropolitan line near Granville-square, Clerkenwell; the other an overground line, on viaduct all the way, as already mentioned by us, from Finsbury to the Agricultural Hall. The viaduct line, it is proposed, shall be on a 3-ft. gauge. Amongst the other lines affecting London and its suburbs is the Metropolitan Southern District, from the Elephant and Castle to Scotland-yard. This project, if the Bill passes, will absorb the Waterloo and Whitehall, and in the communication between the banks of the Thames the works of that company, in so far as they are available, will be taken advantage of.

FREE LIBRARIES.*

The chief librarian of the Manchester Free Libraries, Dr. Crestadoro, has prepared his annual report for the library committee, who have presented it to the City Council. From this report it appears that the aggregate issues have been 807,664, against 673,432 in the preceding year, being an increase of 136,232. Out of this number, 262,446 volumes were issued in the reading-room of the Reference Library; 94,602 volumes in the reading-rooms attached to the branch libraries; and the remaining 452,616 volumes were lent to borrowers. The number of borrowers has amounted to 32,106. The number of books lost or damaged has fallen from 87 to 81, all replaced or paid for principally by borrowers, the guarantor's responsibility having been taxed in but few cases. The new regulation allows books to be taken out on the signature of one guarantor only. With reference to the borrowers' occupations and descriptions, 117 are clergymen, ministers, and missionaries; 1,066 represent literary men, architects, surgeons, solicitors, sculptors, artists, civil engineers, and other liberal professions; 462 are schoolmasters and schoolmistresses; 3,575 school boys and school girls; 3,443 merchants, traders, and agents; 229 employers of manufacturing, agricultural, and other industrial labour; 10,850 artisans, mechanics, working men, and laborers; 5,245 engaged in various public and private situations; and 3,250 ladies.

The Bobington Free Library was established on January 1st, 1866, by Mr. Joseph Mayer, of Liverpool. The number of books issued from it in 1866 was 12,199, to 700 readers. The number of books issued in 1867 was 25,993 to 1,350 readers. From January to April, 1868, the number of books issued was 7,032 to 1,473 readers. The number of volumes in the library was 11,703.

HER MAJESTY'S THEATRE, LONDON.

WITH the assistance of the architect, Mr. Lee, we publish the plan of the new Opera House, and by the side of it a plan of the old one, showing, amongst other things, that a considerable addition has been made to the stage and its surroundings. The following references show the appropriation of the various parts:—

THE LATE THEATRE.

- A. Dressing-rooms.
- B. Gallery entrance, &c., stairs to amphitheatre, &c., amphitheatre stalls.
- C. Stage entrance.
- D. Housekeeper.
- E. Treasury.
- F. Manager's room.
- G. Box office.
- H. Royal entrance.
- I. Committee-room.
- J. Entrance to stage.
- K. Omnibus boxes.
- L. Stairs to flies.

THE NEW THEATRE.

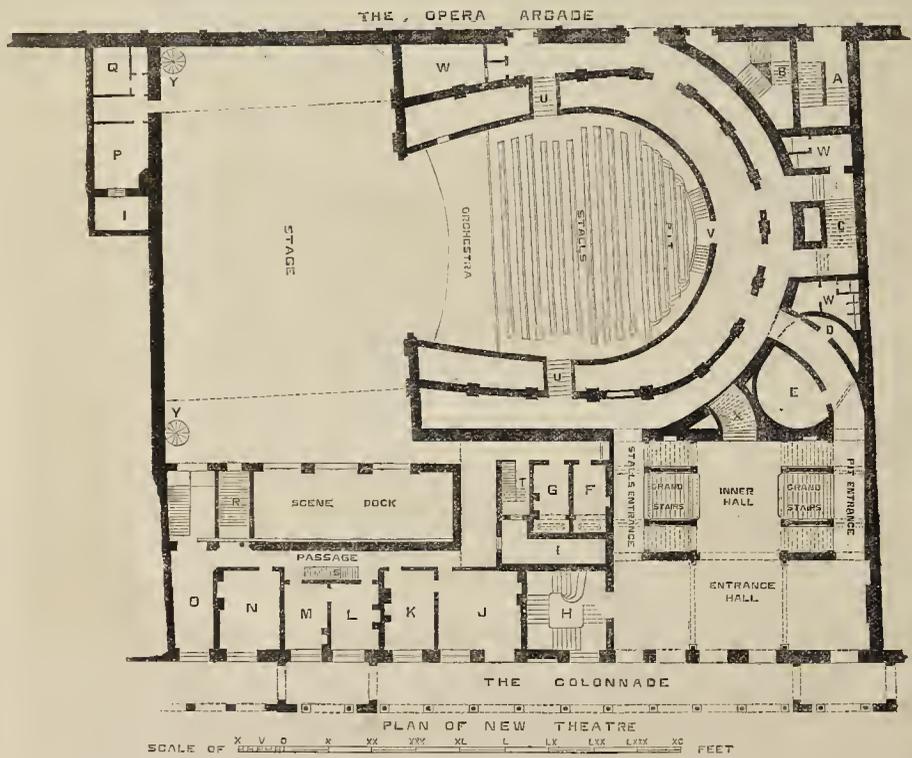
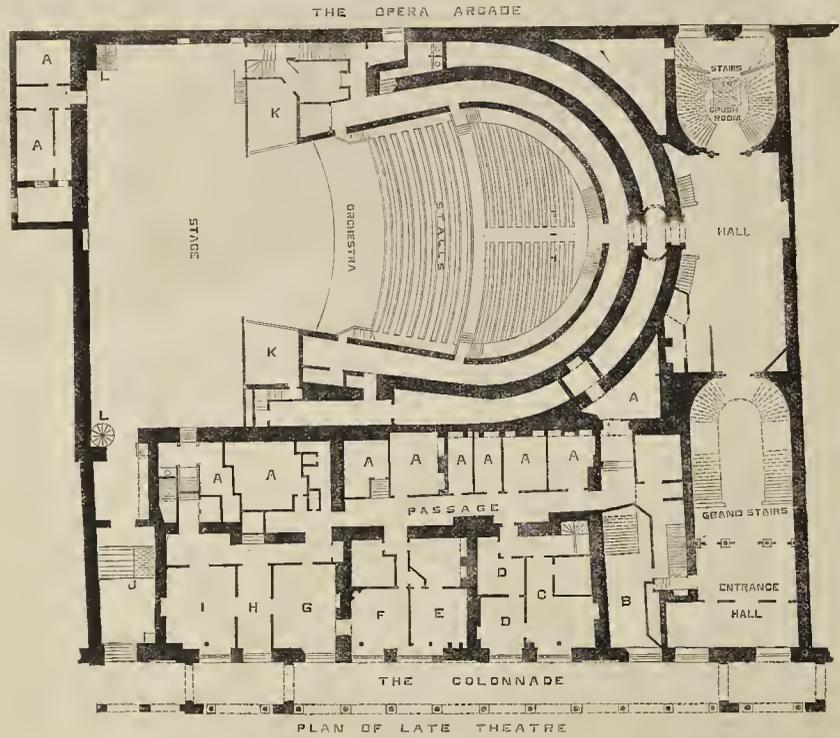
- A. Stairs to amphitheatre.
- B. Stairs to amphitheatre stalls.
- C. Stairs of communication between tiers of boxes.
- D. Cheque-taker.
- E. Soldiers' room.
- F. Acting manager's room.
- G. Conductor's room.
- H. Royal entrance and stairs.
- I. Open areas.
- J. Box office.
- K. Manager's room.
- L. Treasury.
- M. Waiting-room.
- N. Stage entrance.
- O. Scenery entrance.
- P. Green-room.
- Q. Dressing-room.
- R. Stairs to stage.
- S. Stairs to dressing-rooms and carpenter's shop.
- T. Ditto.
- U. Stairs to stalls.
- V. Stairs to pit.
- W. Waterclosets, &c.
- X. Stairs to pit tier of boxes.
- Y. Stairs to flies.

The dimensions of the new house run thus:—

	ft. in.
Height from pit-floor to the ceiling in the centre.....	63 0
Height from the stage to the roof over it.....	70 0
Height of basement under the stage.....	21 0
Length from back of stage to curtain.....	52 3
Length from curtain to the front of the boxes in centre.....	70 0
Diameter of curve of boxes on pit tier.....	43 0

The proscenium when finished will be 40 ft. in width, by 36 ft. in height.

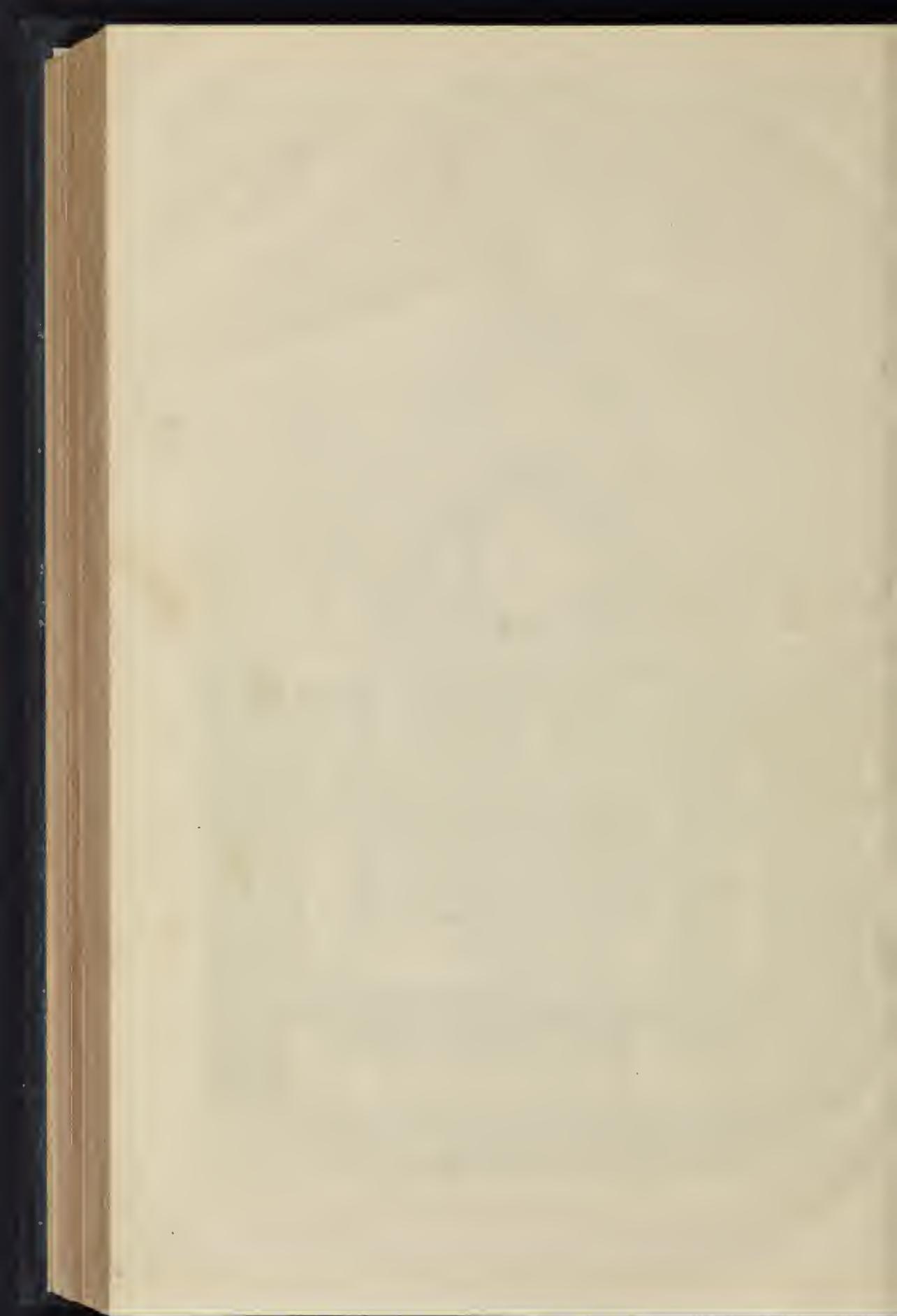
* Sixteenth Annual Report to the Council of the City of Manchester on the Working of the Public Free Libraries, 1867-68, Bobington Free Library.



HER MAJESTY'S THEATRE, LONDON.



MONUMENT TO THE LATE EARL OF ELGIN, CALCUTTA.
PROFESSOR G. G. SCOTT, ARCHITECT. MR. J. BIRNIE PHILLIP, SCULPTOR.



MONUMENT TO THE LATE LORD ELGIN.

The monument of which we here give an illustration is destined for the cathedral of Calcutta, and has been executed at the expense of the Government, in memory of the services of the Earl of Elgin and Kincardine. The design is by Professor G. G. Scott, R.A., and the monument has been executed by Mr. J. Birnie Philip, of Hans-place, in a manner quite worthy of that gentleman's distinguished reputation. To describe the work somewhat in detail: it is a mural monument, Italian Gothic in style, raised upon a table, or rather semi-table. The general form or body is a pedimented parallelogram. On each side is a panelled buttress with crocketed pinnacle, the pediment being richly crocketed also, and terminating with a finial. The centre of the whole is divided into four by broad bands, the upper two divisions being trefoiled. Above these panels is a circular frame in dark marble, in which is an alto-relievo portrait of Lord Elgin, in pure white marble. The four panels each contain a subject in bronze, depicting some prominent event in the diplomatic career of the late earl in the four countries where he had served. The bands which divide these panels are dove-coloured Derbyshire marble, enriched with incised gilded scroll-work, and at intervals studded with jewels, as they are termed. Eight bosses of rich-coloured marble occur at the intersections of the bands and tops of the arches. Over the panels and within the pediment is a trefoiled pointed arch, sculptured with small figures, portraying the virtues of a good governor, and springing from a marble column on each side. The spandrels formed by the trefoil, and which enclose the portrait, are filled with highly-wrought foliage; indeed, the whole is worked as if in ivory rather than stone. A dark serpentine slah covers the table, and the same material forms the base. The front of the table contains the inscription, and has two panels decorated with foliage somewhat too purely Italian in design. The body of the monument is of Mansfield Woodhouse stone. The columns on each side are of greenish-coloured marble. As a whole the monument may be said to harmonise well in tint, with the exception of the marble portrait relieve, which is at present over-white.

The inscription runs thus:—
 "In Memory of the Right Honble. JAMES BARRON, Earl of Elgin and Kincardine, K.T., G.M.S.I., G.C.B., Viceroy and Governor-General of India, who Died, in the execution of his office, at Dharmasala, in Northern India, there lies Buried, This Monument erected by the Government of Her Majesty Great Britain.
 In recognition of the many eminent Services rendered by him to his Country in Jamaica, Canada, China, and India. Born July 26th, 1811. Died November 20th, 1863."

This inscription is in incised lettering, gilded. The cost of the monument, we understand, will be about 800*l*.

CAMBRIDGE ARCHITECTURAL SOCIETY.

At the second meeting of the Society for the Michaelmas Term, held on the 19th of November, the Rev. G. Williams gave an account of "Certain Churches in Egypt and Syria," with the ground plans of which he had been furnished by the Hon. Arthur Gordon, Trinity College, and Governor of Trinidad, by whom they had been carefully measured and plotted when on a tour in the East some years ago. He first spoke of the church of St. Barbara, near Old Cairo, where they say the head of the saint is preserved with some other relics. Most of the churches have more ancient ones below them, and in this case the lower one was dedicated to St. Sergius, and the Holy Family are supposed to have rested on the spot during their sojourn in Egypt. The church, which is 66 ft. long and 48 ft. wide, consists of nave and two aisles, with galleries over the aisles supported by pillars, and adorned with columns in front, which support the roof. The nave terminates at the east end in an apse separated from the church by a screen, but the aisles have square terminations.

He next spoke of St. John's Church near Antinoe, on the Nile. It is higher up the Nile than Antinoe, a town built by the Emperor Adrian in honour of Antinous, who was drowned there. The church, which is 72 ft. long and 34 ft. wide, has a curiously-formed apse, much elongated, so as almost to form a chancel. The prothesis on the south side is ruined, and the nave is curiously divided in the middle. The

narthex, also, is peculiar, in being more open to the church than is usual.

The Great White Monastery near Souhaj (Egypt), to the east of the Nile, was described. Mr. Williams quoted at length from Curzon's "Monasteries of the Levant," with reference to this church. It consists of a long and spacious nave with north and south aisles, divided from the nave by colonnades; the apse is peculiar in being formed in three recesses, one to the east, one north, and another south, and around each are niches formed on a trefoiled plan. Another peculiarity about this church is the long chamber parallel to the south aisle. This chamber is supposed to have formed by a main portion of the monastery. Pocock mentions that he noticed the eagle with a cross and also with crown carved, and conjectured that St. Helena must have been connected with the building of it, which conjecture is strengthened by an ancient tradition mentioned by Curzon that such was the case.

REPORT ON STEAM CULTIVATION.

The following summary of the Report of the Judges on Steam Cultivation at the Leicester meeting of the Royal Agricultural Society has been furnished us:—

"The society offered at Leicester a first prize of 100*l*., and a second of 50*l*., for 'the best application of steam-power for the cultivation of the soil' and in adjudicating upon the same 'Class I,' the judges lay down a most important principle.
 'The prizes in this class,' they say, 'being offered for the best application of steam-power to the cultivation of the soil, without regard to the extent of the occupation, we had no hesitation in restricting the entries to such systems as worked on the direct principle, believing that on large areas steam could be more economically and efficiently employed in this way than on the roundabout system. Having come to this conclusion, it was apparent that Fowler & Co. were alone in the field; and the only point to determine was, which of their systems was most meritorious. The absence of Messrs. Howard's double engine was a source of much regret to those who visited the trial-field, anticipating a keen struggle between the celebrated firms of Fowler and Howard.'

Unfortunately the public thus had no opportunity of seeing the Bedford direct tackle compete with the Leeds direct tackle in any quality of performance, in cost of work, and in other points of comparison; but we have here an official and authoritative adoption of direct-acting in preference to stationary engine apparatus, as the most economical and efficient, excepting in special cases provided for in 'Class II.' Is this decision of the judges borne out by the experiments made?

No roundabout or stationary-engine machinery was tried against the single and double engine direct-acting sets in Class I. But in that class the first prize went to a double-engine apparatus, and the second prize to a single-engine apparatus, direct-acting, and in both this was also another direct-acting tackle was tried in Class II, against the roundabout sets.

The trial [in Class I.] completely proved that for economy and speed of performance the roundabout is decidedly inferior to the direct-acting machinery, and could have stood no chance whatever if it had entered into competition in Class I.

In Class II, the society offered a 1st prize of 50*l*., and a 2nd prize of 25*l*., for the best application of steam-power (we suppose for cultivation) adapted for occupations of a moderate size. If either Fowler's direct-acting sets did more and cheaper work, and lost less time and engaged less labour in travelling between one field and another, how was it that Howard's roundabout tackle, nevertheless, won the 1st prize in this class, and that Fowler's sets were considered ineligible altogether? It was simply a question of the prime-cost of the machinery.

There was not (say the judges) exhibited at Leicester any direct system made up of a travelling anchor and a travelling winch, driven by an ordinary portable or traction engine. In the absence of any such arrangement, and considering all the points we have above alluded to, we are driven to the conclusion that the roundabout system, which can be worked by an ordinary portable engine, is the only one exhibited at Leicester which fulfils the conditions under which the prizes in Class II. are offered by the society. . . . Bearing in mind the conditions as to the cost of the apparatus, which, in our reading, exceeds Nos. 4 and 6 (Fowler's direct-acting sets) from being fit for 'occupations of moderate size,' we were unanimous in awarding the 1st prize of 50*l*., to No. 2, Messrs. J. & F. Howard, of Bedford."

CHURCH OF ST. JOHN THE BAPTIST, LEYTONSTONE.

This church was built by the magnificence of Mr. Cotton in the Early English style of thirty years ago, and has been transformed from looking cold and dingy to warmth and brightness. The old organ, one of the kind which emitted melody by a skillful player turning a handle, has been removed from the gallery, and a new organ has been erected by Gray & Davison on the south side of the chancel. The choir seats have been rearranged.

The floor of the chancel has been laid with Minton's tiles; the stone font altered and inscribed with "Suffer little children to come unto me." The pulpit has been placed on the gospel side; the desk and fittings, the kneeling-

rail, and gas standards are of Hardman's manufacture. The altar-cloth, the offering of one of the congregation, and the kneeling-cushion, the work of the ladies, are richly embroidered.

The flat bays of the ceiling and the shelving sides of the roof are coloured light, with red and black ornaments running next the mouldings; a broad border is painted over the cornice in brown and grey, with a blue seaxill and gold fleur-de-lis in the centre of each length.

The principals, girders, and supports of the roof, with the queen-posts, are painted light grey, alternately ornamented with green, maroon, and brown, slightly relieved with black and gold; the corbel brackets supporting the roof are white, brown, and gold. The upper part of the walls are a warm tint of grey, the lower part maroon; the window mullions and linings are white, with ornaments and lines in a dark red.

The roof of the chancel is light blue, sprinkled with stars, the groins have a warm tint, relieved with maroon; the walls a deep grey, with a wide border on a gold ground, in green and brown, under cornice mouldings. The Decalogue, Lord's Prayer, and Creed are painted on the north and south walls, and the sides are powdered with grey and red. The lower part of the walls, about 5 ft. high, is light olive, with horizontal borders, in rich colours and gold, except the recess for the altar-table, which is arched, with gold panels, upon which are painted, in encaustic colours, the sacred monogram and symbols. The wall-spaces between the three lancet windows are diapered with a rich flowing pattern to harmonize with the stained glass.

The arch mouldings are powdered with black and gold; and on the label is written, "Lord, I have loved the habitation of Thy House," over the side arch, "Let Thy priests be clothed with righteousness," on the organ, the opening sentence of the "Te Deum" over the gallery, "All Thy works shall praise Thee, O God," in the porch, "Be ye all of one mind, having compassion one of another." The designs are by Mr. W. Pitman, and the decoration by Messrs. Hayward & Pitman, of Newgate-street. The building, having been closed a few weeks for general repairs by Mr. Cairns, builder, Leytonstone, and for the execution of the above works, was opened on Sunday, the 29th ult.

STATE OF ST. MARGARET'S CHURCH, LOWESTOFT.

The churchwardens and committee appointed to assist them in carrying out the repairs of the parish church have reported—that, in pursuance of the resolution of the vestry meeting of the 23rd June last, they proceeded to obtain the required assent of the diocesan and the archdeacon to the plan proposed for rebuilding the south aisle, and then entered into a contract with Mr. C. Godbolt, of Harleston, and his associates for the proper carrying out of the same. These preliminary steps being effected, the contractor immediately commenced pulling down the south aisle; and the outer wall had been nearly removed, when it was discovered that the south arcade wall of the nave had for some time partaken of the outward inclination of the aisle wall, an inclination that threatened to increase with a rapidity which might have suddenly put a stop to all further proceedings, had not prompt measures been instantly resorted to to retain the wall in its then position. Mr. Clemence, the architect, having pointed out the serious consequences likely to arise from the dangerous state of things, he was directed to examine the entire fabric, and to make a report on its present state.

Mr. Clemence, having given the result of his examination, said there was no immediate danger, it being well shored up, but his deliberate opinion was that the sooner the wall be taken down and rebuilt the better. The north wall of the nave was secure; the south-east angle of the tower above the leads of the nave roof requires rebuilding. Estimated cost, with new lead gutter to the nave, 650*l*.

On the receipt of this report, the committee consulted with Mr. Clemence. The committee expressed its confidence in Mr. Clemence, but in view of the diversity of opinion prevailing out of doors it was considered desirable, both by the committee and Mr. Clemence, that the opinion of another architect from a distance should be taken, and it was determined to request Mr. Tenlon to visit the church, and report to the committee. Mr. Tenlon accordingly re-

ported upon the subject. The report contained various suggestions, and Mr. Teulon stated that he did not feel able to certify the church perfectly safe in its present state. At the request of the committee, Mr. Clemence gave a more detailed report upon the plan he had proposed for rebuilding the south arcade wall, and he estimates the cost of the works and putting in new gutter boards and bearers to the nave roof at 700*l*. A vestry meeting has been called to consider this subject.

EUSTON SQUARE AND STATION.

Few, if any, architectural works worthy of notice are promised by any of the private bills which are to be brought forward in the next session of Parliament; but it is satisfactory to observe, in the very lengthy *Gazette* notice of a bill to be brought in by the London and North Western Railway Company, a short paragraph that gives promise of an important neo-architectural effort from an existing building—the dropping of the canvas, the presentation to the public in an æsthetic sense, “after all these years,” of the propyleum which furnishes the grand entrance to the Euston Station. The Company give notice, in their New Works and Additional Powers Bill, that they will apply *inter alia* for power, which it is to be hoped will be granted, to make and maintain, in the parish of St. Pancras, an approach-road to their Euston Station, commencing from and out of the Euston-road, at a point nearly equidistant from “the eastern and western ends of Euston-square, thence proceeding in a direct line to, and terminating at, the principal entrance to the Euston Station in Drummond-street; and to provide for the removal of the gates, bare, or railings now erected and standing on or across the site of the proposed approach-road, and for the extinction of any rights or privileges that may interfere with those objects.” The directors may be congratulated on their having arrived at the resolution to carry out, although somewhat tardily, what must have been the intentions of the architect, and of their predecessors in office, in the inception and execution of this design. It may seem paradoxical to say that a structure which dwarfs everything in its vicinity has not hitherto been seen; but this is in a sense true, and it is satisfactory to have the expectation that a point of sight worthy of the work is at last to be provided.

A SHAKY WALL.

Sir,—A passage leading to King-street, St. James's-square, until recently enjoying no very delicate fame, and now known as “Pall Mall-place,” consists, on the west side, of a most unsightly structure, which bulges out at the centre with a truly despicable and dangerous aspect. The other side is a row of shops of the first class, and how the shopkeepers and their customers are affected by the menacing indications over the way, I know not; but assuredly, until the state of things is pronounced, on authority, to be safe, I shall pass another way. Would you have the goodness to take a momentary “survey” of the place, and let the public know whether so unusual a curve in a rather long line of building, is compatible with stability. M.A.

** The appearance of the wall in question is certainly not quite satisfactory, especially at the northern end.

A SCALE FOR DRAWINGS IN PERSPECTIVE.

Sir,—In the “Life of Sonnia,” an architect, who flourished in Northern Germany from the middle to the end of the last century, I find a passage which I should be glad to have explained. Sonnia was commissioned to make a perspective drawing of a garden belonging to a certain Count von Ahlefeldt; he did so, but “die Zeichnung bat das Besondere, dass man vermittelst einer am Rande angebrachten Scala der Längen und Breiten die Grösse eines jeden Gegenstandes auf der Zeichnung anmessen kann.” This I would English thus:—“There is this peculiarity about the drawing, that the size,—in height or in length,—of every object may be measured off from a scale attached to the margin of the picture.”

Can any of your readers oblige me with

information as to this “scale?” If a scale can be attached to the side of any perspective, whereby dimensions, not only of height, but of width, can be measured, this would be of the greatest possible use in the case of photographs taken from nature. ALFRED STRONG.

THE DUTY OF MEMBERS OF A BOARD OF WORKS.

Sir,—Knowing your valuable paper stands pre-eminent as an authority, will you favour me by stating in your next impression whether you deem it a dereliction of duty, and altogether inconsistent or otherwise, with the position of a member of a Board of Works, to undertake to do and make out the accounts of a contractor, who is executing works under the Board, with which (the member) has been and is still connected? A CONSTANT READER.

** A member of a Board so acting professionally for a contractor, would incapacitate himself for rightly discharging his duty to the ratepayers, whom he is supposed to represent.

CEILING AND PARTITIONS.

Sir,—I am glad to find attention drawn to the material of which ordinary ceilings are composed, as it seems strange that materials so opposite in their natures as timber and plaster should so long have been used in such close connexion and with such numerous failures.

I quite agree with your correspondent “B. F.” that it is often attributable to the laths being fixed too close together to allow of a good key, but believe it more often arises from the sagging and shrinkage of the joists where there is no counter ceiling, which is, of course, increased when furniture is placed in the room above, and the constant vibration, caused by motion, is confined to a portion of the room chiefly near the centre. While the timber yields, the plaster, being a rigid material, must crack, and it is only a question whether the whole falls or only the floating and finishing coats, which is often the case on account of the defective key formed by the pricking up coat.

It appears to me that a material is required something of the nature of felt, which may be nailed to the underside of the joists, with a surface similar to drawing paper to allow of distemper; the edge may be luted and bidden by a small moulding, or by stiles to form panels. The material must be unflammable, as there is probably no better fire-resister in houses than the plaster; the cost must also be considered, as it is in smaller buildings that its use would be of more value than in larger ones.

If some such material could be invented also for quarter partitions, instead of lath and plaster, it might prevent the annoyance of ugly cracks occasioned by the before-mentioned causes, and which few architects have been free from during the last trying summer. J. D. M.

Sir,—I have no doubt there will be many persons act on the recommendation in your pages, and paper their cracked and dangerous-looking ceilings.

They will very much strengthen them by twice or thrice without the paint depart, till the zinc breaks. So far as I know this paint resists heat and cold, air and moisture. I beg to enclose a small piece of zinc, painted, as sample. With the same results of firmly adhering, this paint may be used for iron, wood, stone, terra-cotta, &c., in every color, without light and temperature altering the same, and better protecting the painted object than usual linseed paint. The paint alluded to can be applied easier and quicker than linseed paint.

I do not know if it is known in England; in any case, it is not generally known. If this communication be of some utility to you, I will be glad to consider this as a small tribute of gratitude which I feel indebted to your excellent paper, the *Builder*, which has procured me for several years many an agreeable and useful hour, and of much assistance in the beginning of my career. With much regard, I remain, D. JEAN DEW DIXIE.

Rotterdam.

** The specimens sent are entirely satisfactory. We shall be glad to know the nature of the paint or process.

CHIMNEYS.

Sir,—In reply to your correspondent “Stat Veritas,” in your publication of November 21st, I beg to say that circular or oval flues or chimneys will do equally well for conveying smoke; but the determining points which secure an upward draught or a down blast of smoke may be had with either; and if he had the most correct information as to what would make a good draught, he might still be defeated in getting it carried out by the workmen, who, to secure a good regular outside appearance, often make the inside work, especially in chimneys, to suit their own convenience instead of the conveyance of smoke. The only sure way I can find to meet such difficulties is to get flue linings made at the pottery from tested models, the exact form and dimensions to suit the different sizes of chimneys. I quite agree with your correspondent as to the almost total want of practical knowledge to be found everywhere on this subject. It is much to be lamented that in matters so deeply affecting the health and comfort of all, as good draughts in chimneys, good ventilation in dwellings and in the streets and sewers of towns and cities, there should be so much ignorance in those having the management, and so much thwarting of such improvements through the avarice or indifference of those having the control. Were those connected with house-building to study more accurately the laws by which the elements are governed and their power bounded, both separately and in their compounds, and employ these natural laws in their construction, to aid them in carrying out their plans for health and comfort in the dwellings they build, there would be a very remarkable improvement. N.

LINE OF FRONT: METROPOLITAN DISTRICTS.

THE WANDSWORTH BOARD OF WORKS (APPELLANTS) v. HALL (RESPONDENT).

The respondent in this case (Court of Common Pleas) had been summoned by the Board of Works on the ground that he had built in front of Fairlow Cottage, Wandsworth-road, beyond the general line of building frontage. It happened that, at the time the respondent built, the architect of the Board had not actually laid down any building line at the spot in question; and the magistrate held that under these circumstances he had no power to interfere and order the demolition of the respondent's building, and he dismissed the complaint. The question for the court was, whether the magistrate had power to make the order for demolition.

Mr. Francis appeared for the appellants, and Mr. Wharton for the respondent. The court held that if a man built beyond the proper building line, and the line was afterwards fixed by the architect of the Board, the magistrate had power, notwithstanding the line was not laid down until after the building was erected, to order the demolition of the building. Judgment for the appellants.

A WATER SUPPLY REGULATOR.

MR. CHARLES GEOGHEGAN, architect (of Dublin), has just perfected a very useful invention. The pressure at which the Varty water will be delivered in the houses of Dublin will not be strictly constant, and may be expected to cause occasional accidents by the bursting of weak or otherwise defective pipes. To obviate this inconvenience, various contrivances have been devised; but Mr. Geoghegan's possesses, as far as we can judge, important advantages over those of his competitors. It is self-acting; it costs but 2*l*. or 2*s*. 10*s*., according to size; and, being of very simple construction, it is not likely, when once set up, to get out of order.

The principle of the invention, so far as we understand it, is as follows:—The supply-pipe from the main leads into a closed cistern. When the water in this cistern rises to the maximum height which is compatible with the perfect safety of the house-pipes, the air which occupies the upper part of the closed cistern is pressed through a connecting-pipe into a rectangular vessel, called the regulator, one compartment of which is divided by a vertical partition into two compartments, each of which is half filled with water, and which communicate with each other at the bottom. The air which enters at the top of one of the compartments depresses the water therein, and by doing so raises the level of the water in the other. This water in the other compartment contains a float, which, of course, rises with the water, and, by means of a projecting stem, turns a cock in the supply-pipe, and thereby cuts off all further supply and pressure. On the other hand, when the level of the water in the cistern sinks, the compressed air above it expands, and losing a portion of its elastic force, permits the air which is in the upper part of the first compartment of the regulator, and which is in free communication with it by means of the connecting-pipe, to yield to the hydrostatic pressure produced by the head of water in the second compartment. The level of the water in the latter sinks, therefore, and by doing so brings down with it the float, and thereby opens the cock in the supply-pipe. Thus the required supply, and no more than the required supply of water, is maintained without

the necessity of any interference by the proprietor or his servants. The apparatus has been exhibited in action in the Corporation-yard, Wine-tavern-street. The manufacturers of the instrument are Messrs. Ross & Murray, of Middle Abbey-street, Dublin.

SCHOOLS OF ART.

The Gloucester School.—The Tolsey was crowded by the School of Art pupils and their friends, at the annual distribution of prizes. The mayor presided, and many of the leading supporters of the school were present.

Mr. J. D. T. Niblett, secretary of the school, read the report of the committee. It said:—

"We have the pleasure to report that the Gloucester School of Art has gained this year a greater number of successes in the various examinations established by the Department of Science and Art than in any previous year of its existence. In the National Competition it has gained three successes, viz. two national bronze medals, and one Queen's prize of books. The works of eleven of its students were chosen to enter into this competition. Three students have been nominated by the department to prize studentships, by which they are entitled to gratuitous instruction at the School of Art."

Mr. Gambier Parry, the president of the school, addressed the meeting and distributed the prizes.

The Carlisle School.—The annual meeting of the friends of this school has been held, in the school-room, Finkle-street. The mayor (Mr. A. Davidson) presided. In opening the proceedings, the chairman said he was glad to be able to congratulate the friends of the school on its healthy and prosperous condition. There was not much to boast of, because it unfortunately happened that few students came forward to take advantage of the opportunities given to them, than might be expected in a large population like that of Carlisle. However, the school was making progress. It had been in existence for fourteen years, and during the greater part of that period it had had to undergo many vicissitudes. Happily, three years ago, it had got quit of the debt which had been pressing it down, and he believed it was now in a better condition than it had ever been before. The number of students who had passed their examination had increased over the number of last year, and a corresponding increase had taken place in the number of certificates. Another very pleasing circumstance was, that the treasurer had a balance in hand.

CHURCH-BUILDING NEWS.

Rockingham.—The church here has been reopened, after the restoration of the chancel. In the spring of the present year, the roof of the chancel was found to be in such a dilapidated condition, that it was determined to replace it by a new one, of high pitch, and of a better character than the existing one. At the same time it was thought a good opportunity by the patron, Mr. G. L. Watson, to add a chapel, on the south side of the chancel, to receive the greater portion of the monuments belonging to his family, which had previously been in the chancel, and prevented its being rendered available for the choral services of the church. By the removal of a large monument on the north side, the aisle was opened out by the insertion of two arches and piers, the mouldings of which were taken from the fragments already alluded to. At the same time the east window was removed to the new chapel, together with a memorial window, erected in 1853, to the memory of the late Hon. Richard Watson. The subject is "The Ascension." This window has been replaced by one of larger dimensions, and of an earlier date, which is filled with stained glass, executed by Messrs. Heaton, Butler, & Bayne, under the superintendence of the Rev. P. H. Sutton, the gift of Mr. Thomas Watson. The subject in the centre is "The Crucifixion," and on either side are, "The Agony," and "The Resurrection." Beneath are smaller subjects, "The Nativity," "The Baptism," and "The first Miracle of our Lord." The reredos is the work of Mrs. Bigge. The chancel has been restored by the rector. A memorial stained glass window, by O'Connor, has been placed in the west wall, just over the door, by Mrs. Gunning Sutton, and north of this another window is about to be placed by the rector, who has not yet decided on the subject of the illustration. The wall decorations were done by Mr. Hobbs. The restoration has been carried out by Messrs.

Law & Son, of Lutterworth, from plans designed by Mr. E. Browning, of Stamford, architect. The interior is not quite complete, the chancel seats, pavement, &c., having still to be put in. An effect has been produced in the colour of the chancel walls, by the addition of some Indian red in the last coat of plaster. This contrasts with the white marble of the monuments. The family vault is under the north side of the chancel, and is now approached from the outside, the entrance from the chancel having been closed.

West Somerton.—At a meeting of the Norfolk Archaeological Society in this town and neighbourhood last year, the fresco paintings on the walls of St. Mary's Church were examined with interest, and it was resolved to have them illustrated in the society's publications. These paintings had then been recently uncovered, through the exertions of Mr. J. T. Botle, architect; and this gentleman has now been instructed to prepare designs for a complete restoration of the fabric. It is believed, from various indications, that further paintings exist on other portions of the walls under the incrustations of whitewash, &c., and every exertion will be made to discover these, and preserve them. An appeal will probably be made for funds to carry out the proposed works of restoration.

Nottingham.—St. Stephen's Church has been consecrated. The building was the late Trinity Free Church, used as a Chapel-of-Ease. The church is situated on Bunker's-hill, off Lower Parliament-street, in the midst of the class whom it was originally intended to benefit. It contained 550 sittings, but owing to the success which had attended the efforts put forth, the accommodation had become inadequate to the increasing requirements of the parishioners, and it was resolved to enlarge the chapel. This has now been effected by a partial rebuilding of the old edifice, and the new district of St. Stephen's is assigned to it. The main front of the building has been brought forward several feet towards Bunker's-hill, and the space intervening between the chapel and the boys' school at the sides has been covered over. This arrangement gives to the new church an area of 102 ft. in length by 42 ft. in width. To avoid losing the advantage of the school windows, a roof in the form of a lean-to has been thrown over the space, supported by columns occupying the place of the former side-wall. These columns, in conjunction with the support given to the curved ribs of the main roof, without causing any serious obstruction to the view, tend to conceal what would otherwise be the irregular appearance which the room presented. The whole of the walls have been strengthened in accordance with the requirements of the Ecclesiastical Commissioners in regard to all similar enlargements of churches, and they are lined with a red brick facing, varied by blue brick courses in the form of panels. A space has been set apart for a larger chancel, and also for a porch. The architect was Mr. T. C. Hine, and the builder Mr. J. White.

East Barnet, Herts.—The church of St. Mary the Virgin was re-opened on Saturday, the 28th of November, having been closed during the summer months for restoration and enlargement. The church is one of some interest, having been erected in the early part of the twelfth century, by an Abbot of St. Alban's, for the spiritual benefit of the poor inhabitants of that locality engaged in the wood-cutting in the then surrounding forest, and a considerable portion of the ancient fabric still remains. The additions consist of a new south aisle, built in the Early English style of architecture, with walls faced with Kentish rag stone, and windows and dressings of Bath stone. The roof, framed with open timbers, is covered with Staffordshire tiles. The arcade opening from the ancient nave is of two arches, supported by a polished marble shaft, with richly carved capital. The church throughout is fitted with open seats of deal, stained and varnished, and capable of accommodating 420. The passages and communion space are paved with Minton's tiles, that in the latter being of rich encaustic patterns. The east wall of the chancel has been enriched by the artistic writing of the Commandments, executed by Mr. West. The whole of the works have been carried out under the superintendence of Mr. A. R. Barker, the contractors being Messrs. Dove, Brothers.

Whitby.—The ancient church of St. Hilda, at Epton, near Whitby, has fallen into a state of decay and complete dilapidation. During 700 years it has been uninterruptedly used for divine worship, but its condition is now so unsafe that

at any moment it may fall into a mere ruin. The Roman Catholics have recently erected a large chapel, and great exertions are being made to extend Roman Catholic interests among the people. The newly-appointed vicar (the Rev. I. Fish, many years the chaplain and superintendent of the Castle Howard Reformatory) is anxious to set up schools and rebuild the church. The parishioners are nearly all poor persons, and the peculiar circumstances under which the land is held, most of it being in Chancery, and the remainder in the hands of Roman Catholic owners, make it impossible to hope for aid from the proprietors. A subscription list has, therefore, been opened.

DISSENTING CHURCH-BUILDING NEWS.

Bristol.—Clifton-down Congregational Church, just erected at the foot of Clifton-down, from the designs of Messrs. Hansom & Son, of this city, architects, for the congregation formerly worshipping in Bridge-street chapel, has been opened for divine worship. The church consists of nave, chancel, north and south transepts, with vestries and lecture-room beyond. The principal front faces the Down. The centre portion will be occupied by a tower. At the west end is an open porch of three arches, moulded and carved in stone, and groined. On the right side of the tower it is intended to erect a house for the minister. The sides of the building are ornamented with a parapet and pinnacles surmounting a range of traceroed windows; and at each end of the transept is a rose window. The building, as at present, with the land, has cost about 10,000*l.*, and all but 400*l.* or 500*l.* of that amount has been raised. The tower and minister's house are for the present deferred.

Redcar.—The foundation stone of a new Wesleyan Chapel, Sunday school, and classrooms, has been laid here. The cost will be about 1,650*l.* The chapel is in the Early Decorated style of Gothic architecture. The front elevation will be faced with red pressed bricks, Castleton stone dressings, and ornamental bands in white bricks. The building has been let to the contractors for 1,381*l.* 9*s.* Bricklayer, Mr. Scott, Middlesbrough; mason, Mr. Lord, Middlesbrough; joiner, Mr. T. Watson, Redcar; painter, Mr. T. D. Guy, Redcar; plumber and glazier, Mr. Kershaw. The heating apparatus was supplied by Messrs. Cunningham & Wain, Middlesbrough.

Books Received.

"The Ecclesiologist." Masters: London. 1868.

THE December number of *The Ecclesiologist* contains the announcement that this periodical will not again appear. The first number was published in November, 1841. According to the editor's address to his readers its continuance has been a struggle from the first. "The stress and obligation," he writes, "of other—though not alien—occupations, have overmastered our bark." The number includes an article on the Fairford Windows adverse to the ascription of them to Albert Durer.

The Spectator: a new edition. With Introduction, Notes, and Index, by HENRY MORLEY. London: George Routledge & Sons.

WE have here the *Spectator* complete, reproducing the original text, in one compact volume, a charming edition of a work that will be prized so long as the English language is studied. Professor Morley's Introduction is sound and sensible, and the same may be said of his notes.

Cassell's Technical Manuals: Linear Drawing. By ELLIS A. DAVIDSON. Cassell, Petter, & Galpin, London and New York.

THIS little work is intended as a text-book for teachers in schools of art and science, training colleges, national and other schools; and also as a manual for self-instruction for artisans and the public generally. It shows the application of practical geometry to trade and manufactures. The author is a lecturer on science and art in the City of London Middle-class Schools. In addition to illustrations connected with the lessons, six pages of the application of geometrical drawing to iron and wood work, masonry, mechanism, and design, are appended.

The Mechanic and Student's Guide in the Designing and Construction of general Machine Gearing. Edited by F. H. JOYNSON. Edinburgh: Nimmo.

This is a practical treatise on the designing and construction of eccentrics, screws, toothed wheels, &c., and the drawing of rectilinear and curved surfaces, with practical rules and details. Mr. Joynton is the author of a work on "The Metals used in Construction," and the work under notice seems well adapted for the practical instruction of mechanics and students.

Address to the Members of the Historic Society of Lancashire and Cheshire. By JOSEPH MAYER, F.S.A., &c., President. Liverpool: Printed by Thomas Brakell, Cook-street.

On the Preparations of the County of Kent to Resist the Spanish Armada. By JOSEPH MAYER. Printed by Brakell, Liverpool.

The first of these was read on November 5th, 1868. In course of it Mr. Mayer makes interesting remarks on American archaeology. He speaks of Mr. Blackmore, of Liverpool, purchase of the celebrated museum of American antiquities collected by Messrs. Squier & Davis from the western "mounds." That purchase now forms the nucleus of a collection from "all the four continents," and which Mr. Mayer characterizes as not only the most perfect in the world, as illustrating the age of stone, but the only collection in which it has been hitherto attempted to grasp the whole subject in that detail which the student must require. "At the close of the address, Mr. Mayer says, as to museum rooms,—

"With singular care the documents are preserved which relate to the mere events of to-day, the profit of the family; but for those dim parchment and ancient volumes, which are the title-deeds of its rank in honour, the record of its worth or its usefulness for that high station which England gave, and has often snatched away, what place is devoted for them? Too often a distant and dismal chamber, where rats grow, rain beats in, mice and worms burrow and build. I am not speaking without feeling; and it would even be well if the culpable carelessness of owners stopped at this point; for in too many instances the museum-room is abandoned without thought to the tender mercies of children and housemaids. Every day manuscripts of the deepest importance to the nation are torn up for nursery toys, are cut to pieces for silk-winders, are absolutely burnt in grates and garden-furnaces. One feels a positive thrill of indignation in recalling some stories of this sort which rest upon authority incontrovertible. Such irreparable waste of the national property, for national it is, cannot be allowed longer to continue. I should suggest that the heads of the South Kensington Museum, or other officers of departments where there is room to spare, should issue an invitation to all persons having such documents in their possession, should by that means collect these treasures together, and there and then examine and report upon them. Some such course must be followed. It would be preferable that the owners should solicit the attendance of some skilful person from the British Museum to examine their muniments,—and such requests are rarely refused, I may add,—but even if this be done, as in a very recent instance, the confusion is often found to be so utter and complete that half a lifetime might almost be spent in restoring order, and in properly examining the deeds. I take it this is one of the foremost questions now demanding the attention of archaeologists. It must be solved. One-half the controversies which occupy the time and study of leading men in our science might, I feel sure, be very speedily set at rest if all the private collections of England were thrown open."

The second paper by Mr. Mayer was read on April 2nd, 1868. It contains many curious and interesting quotations from the MS. papers of Roger Twisden, J.P., and Captain of the Light Horse of the Laths of Aylesford, A.D. 1585-1596.

DIARIES.

THE No. 8 "Diary" published by Letts & Co. gives a whole page to each day, and is well suited both for business and literary users. This firm have sent us a packet of their various diaries and pocket-books of last year, which have been duly committed to the waste-paper basket.

The "City Diary," issued from the City Press Office (seven days on each page), contains a considerable amount of information chiefly respecting the Corporation and the City generally.—Blackwood's "Desk Diary, No. 4," contains seven days on each page, and includes postal maps. The "Shilling Scribbling Diary," issued by the same firm, gives more room for each day's entry, and is interleaved with blotting-paper; altogether a useful book.

VARIORUM.

As if in response to our desired geological chart for architects and builders, as well as for geological students generally, a new edition of Professor Morris of University College's Geological Chart has been issued by Reynolds, 174, Strand. This

chart contains a considerable amount of information as to building stones, slates, flags, limes, &c., to be found in the various strata, collected in a separate column under the title of "Uses in the Arts, &c."—Transactions of the Institution of Engineers in Scotland, with which is incorporated the Scottish Shipbuilders' Association: Twelfth Session, 1868-9. This issue contains an Introductory address by Mr. James M. Gale, the president, read October 28th, 1868; a paper on "ships' lights," by Mr. James R. Napier, F.R.S., read October 28th, 1868; experiments on the delivery of domestic cranes, by Mr. Thomas Hoey; report of the council, &c. The president in his address speaks of the Glasgow Sewage Irrigation scheme recently proposed by Mr. Bateman and Mr. Bazalgette. The scheme is estimated by them to cost, including cost of works and pumping, 4d. per ton of sewage distributed, and if only 3d. per ton is realized from it, there will be an annual profit of 58,000l. after paying all expenses. The proposed outfall on the Ayrshire coast is at a considerable distance from any habitation, and is surrounded by a dreary waste of sand; but is separated from Glasgow by sixteen miles of country of an average height of 120 ft. above the sea, and the cost of pumping the whole or any considerable part of the sewage of Glasgow over this elevation was a serious obstacle to the adoption of this outfall, till it was suggested that the whole distance might be tunneled.

"This," said the president, "at once placed the Ayrshire outfall in the same position as the river outfall, as regards the annual expense of pumping and the height to which it would be necessary to raise the sewage of the low-lying parts of the town, or at least to reduce the whole difference between them to the difference in the length of conduit, which cannot be put at more than four or five miles. This small extra outlay for an unobjectionable outfall, and a tract of sandy land to take up surplus sewage, is Messrs. Bateman and Bazalgette to adopt the Ayrshire outfall."

Messrs. Bateman and Bazalgette propose three lines of intercepting sewers on the north side of the river, and two on the south, with one pumping station at the Saltmarket, and another at Pollokshields, at the commencement of the main conduit to Ayrshire, the average height of lift for the whole sewage being 32 ft. The sewage when so lifted will command for irrigation about 8,000 acres of very suitable land, lying between Paisley and Bischopton, by gravitation, but an additional lift will be necessary for that part proposed to be utilized on the Ayrshire coast. The estimate for the whole work is about 1,250,000l., but it does not include the branch conduits over the large areas of ground proposed to be irrigated, the pumping in Ayrshire, nor the cost of preparing the land to receive the sewage water; neither do they in their estimate of the assessment necessary to carry out the works take credit for the very large return which must in time accrue from the use of the sewage-water. Mr. Gale is of opinion that this is the only project that can be devised for the thorough purification of the River Clyde, and he hoped that the next ten years will see it accomplished.

"A Synopsis of the Patent Laws of various Countries." By A. Tolhausen, Ph.D. London: Trübner. Dr. Tolhausen is a translator at the Patent Museum. This synopsis is a second edition, revised, and enlarged. The first edition was published in 1857, and is out of print. The present abstract of patent laws relates to thirty-three different countries, and is very comprehensive and methodical, and must be very useful to inventors and manufacturers, as well as to legislators on any question in Parliament relating to the patent laws.—"Essay on Indian Agriculture." By Lalal Luchmi Narain, Banker and Municipal Commissioner, of Bareilly. Calcutta: printed by Hay & Co. This very interesting pamphlet contains an English translation, by the author himself, of a paper in Hindi, read by him to natives of India at the Rohildund Exhibition, Bareilly, in December, 1866. The English, though not quite according to rule, is better than that of many a translator, and the substance is excellent. The author urges more attention to agriculture, on the part both of the Government and the people of India; points out the hindrances, and expatiates on the advantages. It is an able essay, and, but for a few very slight defects in the English, might have been written by one of our own agricultural writers. We give a specimen:—

"It is worthy of consideration that the productive power of land in India is in no way inferior to that of America, and India is governed for 110 years by the same race of men. Why should the cultivation in this country have been carried on according to the old methods, while America has made such rapid advances in that way? The answer is simple. No endeavour has been made in this country towards instructing natives in this branch of

knowledge, while in America agriculture is carried on according to scientific principles best adapted for that purpose.

The assertion, if made, that the people of India are not capable of receiving such instruction, it cannot be supported, inasmuch as no trial has ever been made, nor can it fairly be made, by the Government, having taken no steps on this behalf. Experience shows that we have made, and are making, great improvements in other branches of knowledge which Government has been pleased to teach us. The science of mathematics is the most difficult and dry science; and if we have improved in it why should we not be able to advance in agriculture, which is not so difficult? The development of the resources of the country depends on the instruction of the people in agriculture. It is essential that the Government should take the subject into favourable consideration. A number of students and cultivators should be selected for the purpose of acquiring such knowledge, and this can be done in no better way than by establishing agricultural schools, such as are established in France, England, and other countries of Europe. Should the Government be pleased to make agriculture a branch of education in its public schools, for the maintenance of which it expends thousands of rupees, the measure will lead to manifold good results. Hundreds and thousands of beggars of land, covered with forest and lakes, would be brought under the plough.

This system may be introduced experimentally, as it was done in France, in 1810, or in the village schools were first established by the late Mr. Thomson in eight districts of the north-western provinces, as a probationary measure. If the experiment realizes the expectations, which certainly must, the system may then be extended to all districts. Exhibitions have been set up by order of Government in the several districts, with a view to the advancement of the agricultural products of the country, and improvement of the breed of cattle; but I am of opinion that the subject in view will not be gained unless agricultural instruction is first of all introduced in our schools; for until the people are trained in the principles of agriculture, both as an art and science, they cannot reasonably be expected to make any improvement in the quality of the produce which their lands yield. They can bring forth only such products as can be raised on the old principles."

—*Fraser's Magazine* for December contains an interesting paper by the Rev. B. Girdlestone, vicar of Halberton, and canon of Bristol, on Landowners, Land, and those who till it. This reverend gentleman is well known for the interest he takes in the physical and moral improvement of the agricultural labourer. He has been the means of increasing the wages, and ameliorating the treatment of these poor serfs in his own district, by obtaining the removal of no less than 100 of them, many with wives and families, to other localities where their wages have been often doubled, as well they might be, from the miserable pittance of 7s. or 8s. a week, which till lately were the regular wages; and even still they are only 9s. Mr. Girdlestone has, of course, been annoyed and insulted by the farmer class of his district in consequence of his kindly exertions on behalf of their labourers. Church-rates have been refused, and he has been dragged into law courts; but for all this petty spite he seems to have been quite prepared, and he still pursues his philanthropic course, for which, we feel assured, he has the heartfelt thanks and the high respect of the public. Here are specimens of the gentry he has to deal with, although there are, be any, exceptions of a very different character. He speaks from his own knowledge:—

"A shepherd, an old and faithful servant of a man who farmed upwards of 800 acres, had several of his ribs broken by one of his master's horses. He was confined to his bed for several days. Not only did he require no wages or any other sort of assistance from his master during the whole of the time he was disabled, but the rent of his house, which as a shepherd he had free, was deducted from his son's wages as long as he was unable to look after the sheep. Another man, a carter, also in the service of a well-to-do farmer, saved a valuable team of horses and a wagon from being dashed to pieces, but in doing so was severely injured. In this case great interest was made with the farmer, but in vain, to give if only a little milk for the wife and family. This description of the condition of agricultural labourers in North Devon is not based upon information obtained from interested parties or at second or third rate, or upon a hasty personal visit. It is the result of the experience of a six years' residence in a parish of 7,000 acres and 1,400 people, in every farmhouse and cottage of which the author has been many times a year at almost every hour of the day, and with the habits and circumstances of whose inmates he is as fully acquainted as those of his own household, and which it is notorious that this is a fair average of the whole district. Can any one in such a condition be said to live?"

The bones of their oppressors deserve to be broken.—*The Journal of the Franklin Institute, Philadelphia*, vol. 56, No. 514: third series, vol. 56, October, 1868. No. 4, Philadelphia: published by the Franklin Institute at their Hall. The issue under notice contains various interesting papers;—on the influence of artificial illumination on the quality of the air in dwelling-houses, translated from the German of a paper by Dr. Gorp-Besanez, and read before the Polytechnic Association of New York, December, 1867, by Dr. Adolph Ott; on proposed method of sinking the piers for the St. Louis Bridge, by James B. Eades, C.E.; on the economical construction of beam trusses, by G. S. Morison, C.E.; editorial items and novelties, and corre-

spondence on fire-proof buildings; lecture notes on physics by Professor A. M. Mayer, Ph. D.; and other matter connected with science and the mechanical arts.—Amongst cheap issues may be mentioned an edition of "The Percy Anecdotes" in sixpenny volumes, published by Berger. The first volume includes "Humanity" and "Beneficence."

Miscellaneous.

TERRA COTTA AT SOUTH KENSINGTON.—With reference to the discussion on the subject of terra cotta, reported in our number for November 21st, when one of the speakers was described as the manufacturer of terra cotta used at the South Kensington Museum, Messrs. Alexander Wilson & Son ask us to say that they have completed two contracts, and have three others now in hand for that building.

PENZANCE WATER SUPPLY.—At a recent meeting of the Town Council, the Sanitary Committee reported that they had given the subject of a larger reservoir their best consideration, and were of opinion that the plans of Mr. Matthews were sufficiently comprehensive. Mr. Matthews said the reservoir would drain a watershed of 300 acres. Two-fifths of the estimated rain-fall, calculated on 300 acres, would give 17,424,000 cubic feet annually. This would give 10,000 inhabitants 4 cubic feet, or 25 gallons of water, a day. The reservoir would cover 11 acres, and be 25 ft. deep at the lower end, or have an average depth of 12 ft. It would hold 5,749,920 cubic feet of water, or 40,000 cubic feet a day for 143 days. The present storage was 1,183,000 gallons, or 40 gallons a day for 23 days, so that 172 days' supply would be provided for without any reliance upon any other source. This he considered ample for many a year. But some additions to the same reservoir would cause it hereafter, if occasion arose, to hold 10,820,480 cubic feet. Simply by raising the embankment 2 ft. or 3 ft., one-third more water would be stored. Looking to these facts, he thought the size of the reservoir ample. Mr. Downing said he still thought the larger scheme would be the best and the most economical in the long run. The available watershed was 600 or 700 acres for a weirhead constructed further down towards the first pond at Treagwaiton. This might cost something more.

MONUMENTAL SCULPTURE BY MR. JOHN STEELL, R.S.A.E.—Mr. Steell is just completing two pieces of monumental sculpture, which the *Scottsman* describes. One is designed to commemorate the officers and men of the 42nd or Royal Highland Regiment who fell during the Crimean war, or in the suppression of the Indian mutiny, and is being got up at the expense of the surviving members of the regiment. The monument is to be a mural one in the Gothic style, and will be placed in Dunkeld Cathedral. The chief feature of the monument will be a large pointed panel, surrounded by a richly-moulded and lofty framework, and filled with an alto-relievo in white marble. It is with the latter that Mr. Steell is engaged. The subject is taken from the lines in "The Black Mosquetaire," in the "Ingoldby Legends," beginning with,—

"But a sombre sight is a battlefield,
To the sad survivor's sorrowing eye."

The central position is occupied by the supposed survivor, who has gone to the battlefield in search of a missing comrade. This is a life-size figure of a soldier of the 42nd Regiment. A slab underneath the sculpture will bear a suitable inscription. The second monument is a mural tablet, which is to be fixed on one of the walls of the ruins of the old church at Blair Athole, to mark the burial-place of the late Duke of Athole. The tablet will occupy a position immediately over the vault which contains the remains of the duke, and also those of C. Claverhouse. It is 7 ft. in height, and bears an allegorical design in high relief, representing one of the duke's Highlanders, standing in a sorrowful mood, with his cheek resting on the butt of his reversed musket, beside the stump of an oak-tree, which, while yet green and flourishing, had been broken by a tempest. One branch of the oak-tree remains attached to the stump, and on that the mantle of the deceased duke hangs. Mr. Steell has been commissioned to execute a monument of the late Earl of Shrewsbury. The monument is to be in the form of an effigy tomb.

THE PEABODY FUND INCREASED.—Mr. Peabody, not satisfied, it appears, with what he has already done in the establishment of this fund, but entirely satisfied with the way in which it is managed, has just given notice of an addition of 100,000*l.*, thus making a total of 350,000*l.*

DESICCATION AS APPLIED TO THE INDUSTRIAL ARTS.—A business pamphlet on this subject, with reference to the use of "Davison's Patent Thermation, or Hot-air Fan System" has been printed at Edinburgh, by E. Ravenscroft. It treats at some length on the seasoning and preservation of timber, the drying of corn, malt, hops, paper, silk, yarns, &c., and on the warming and ventilation of buildings and ships. It is a useful pamphlet irrespective of the merits of Davison's hot-air fan apparatus, which seems to be an efficient desiccator, as well as a ventilator of large buildings and ships. The use of it in drying corn, &c., takes anything like novelty out of Mr. Gibbs's scheme. The chapters on ventilation, and on the desiccation of timber and of corn, are interesting.

THE NEW FONT IN DUDLEY CHURCH.—The font given by the Earl of Dudley has just been formally used for the first time. It was designed by Mr. Forsyth, sculptor, who designed the Dudley Fountain, of which we gave a view in March last. The font is in all 11 ft. high, and of Caen stone. The style is that of the fifteenth century. The plan is an irregular octagon, and the Scriptural subjects used to illustrate the work, are "The Baptism of our Lord," "The Baptism of the Eunuch," "Suffer Little Children to Come unto Me," and "The Presentation in the Temple." These are sculptured on the four larger sides of the font, the smaller sides forming canopies to the statues of the four evangelists underneath, who, with four figures of angels in groined arches, appear to form and support the base of the font. The cover is of oak, carved. It rises tapering, pinnace above pinnace, until the whole culminates in the figure of an angel, and is suspended by two ornamental wrought-iron brackets, with compensatory weights. Mr. Bellamy, a townsman, executed this font from designs by Mr. Forsyth.

RESTORATION OF GLOUCESTER CATHEDRAL.—The restoration of the south porch has now been taken in hand. This effected, there will remain only the restoration of the buttresses on the south side to complete the external work of the chief portion of the fabric. At a recent meeting of the Dean and Chapter, Mr. Scott produced his design for the restoration of the choir. His plans received the unanimous approval of the dean and canons, and instructions were given that the work should be taken in hand without delay. The restoration of the choir will of necessity occupy at least two years, and during that time service will be held in the nave. The work is intended to be composed of stone and mosaic work; it will extend nearly the whole width of the screen; it will be surmounted with tabernacle work, and canopied; the centre panel will contain a carved representation of the crucifixion of our Lord; and other appropriate subjects will be represented in the side panels. Mr. Scott's original estimate for all the work required was 45,000*l.* Already about 10,000*l.* have been spent. The restoration of the choir will involve an outlay of at least 13,000*l.*

THE ISLINGTON AND CITY RAILWAY.—The line of railway already noticed by us as one of the projects before Parliament is to be a light railway of narrower gauge than the country railways. The gauge will be 3 ft., and the line will form a continuous bridge or viaduct. The average gradient is under 1 in 255, and the greatest is 1 in 86, extending over a distance of 270 yards. The average height of the line above the ground is 18 ft. "The perfect safety and economy of a gauge less than that ordinarily adopted," says the prospectus, "have been already proved by the experience of years both at home and abroad. The Festiniog Railway (gauge only 2 ft.) has, during the year, carried 120,000 passengers and 125,000 tons of goods, and there has not been a single accident during the four years since locomotive power has been placed on the line. It has been most favourably reported on by Captain Tyler, R.E., the Government inspector." The proposed line will run from the Angel pretty nearly in the route of the projected new road to the city. It will end at the Moorgate-street station of the Metropolitan. The engineers are Messrs. Robert Richardson, C.E., and John Inrany, C.E. An immense traffic is anticipated.

WATER CISTERNS.—With reference to the recent recommendation of slate cisterns, a manufacturer wishes us to mention that cisterns made of glazed "terra-cotta" are equally as good and much cheaper than slate, and are rapidly coming into use.

THE MARKET HALL, KIDDERMINSTER.—A meeting of the building committee was held at the Guildhall last week, in reference to the rebuilding of the Market Hall. The mayor (Mr. W. Cowen) presided. Plans were produced by Mr. Baker, the borough architect, and approved of, and tenders will shortly be advertised for.

ROBERT HOOKE.—Sir: From the interesting enumeration of the achievements of this great philosopher, furnished by your correspondent "H." in a recent number, is omitted the most important of them all, viz., the origin of the undulatory theory of light. Dr. Whewell considered that he had anticipated, also, the principle of interference. (See "Hist. of Inductive Phil.," vol. ii., p. 391.)—M.

A STEAM-ROLLER.—The Liverpool corporation recently purchased a steam-roller for levelling and smoothing newly-made and mended roads. In that capacity the monster, locally known as "The demon crusher," has been a great success; but it has, unfortunately, so injured the network of gas and water pipes in the streets in which it has been used, that the corporate authorities find that they must either greatly decrease its weight or cease using it altogether in certain parts of the town.

LIVERPOOL ARCHITECTURAL SOCIETY.—Mr. Francis Horner presided over the fifth meeting of this society, for the twenty-first session, held last week. Mr. Wm. Esch, photographer, of Hardman-street, exhibited a number of permanent fac-similes of the drawings in the Louvre Museum, reproduced by M. Braun, of Dornach, the copies of the engravings having been made by the process invented by the Autotype Printing and Publishing Company. The paper for the evening was read by Mr. H. H. Vale, the subject being "A Trip to Staffa and Iona."

OXFORD ARCHITECTURAL SOCIETY.—A meeting was held on the 2nd inst., at which the secretary of the society, Mr. James Parker, gave an account of the Roman occupation of Dorchester in this county. He described the march of Aulus Plautina, and the difficulties which had to be met with in reconciling the short record preserved by Dion Cassius, with existing remains and the general aspect of the country. He considered that the Roman general passed along the south side of the Thames, and formed a camp at Cirencester, and that he then returned along the north side till, arriving at Dorchester, he had to pass across the river. In order to effect this *Sinodum Hill*, the British fortress, had to be taken, and here was the chief battle of the campaign. He also made some remarks upon the numerous discoveries of Roman remains in Dorchester, which city had sprung up in consequence of the neighbouring camp. The Rev. W. Jackson made some remarks upon the question of the Isæ, the origin of the Isis; and after a paper on "Apsidal Churches," by Mr. E. C. Bruton, the meeting separated.

CONCRETE BUILDING.—A patent has been granted to C. Drake, Kemington, for "Construction of concrete buildings." The patentee claims, first, the construction and use of, in erecting concrete buildings, apparatus consisting of flanged iron plates, supported by iron uprights secured against the face of the wall, such plates being capable of being shifted upwards step by step upon the uprights, and of being locked to them in the several positions by bolts or pins passing through holes in the uprights, and in the flanges of the plates. He also claims the construction and use of angled plates to form the angles or corners of walls, as described. He also claims the use to connect the front and back plates and uprights, of metal straps with pinholes in them at various distances, so that the length may be adjusted to the thickness of the wall required, such straps passing through holes prepared for them in the uprights and plates, as described. He also claims the combining scaffold brackets with the uprights, as described. He also claims the construction and use, in erecting concrete buildings, of apparatus consisting of frames connected or bolted directly the one to the other, and tied together by straps passing through the wall, such frames being capable of being shifted upwards step by step upon the straps which are built into the wall.

VELOCIPEDS.—Several correspondents wish to know where good velocipedes can be bought. We must leave advertisers to answer this inquiry.

THE NATIONAL COTTAGE HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST.—Owing to the liberal response of the benevolent public to the appeals made by the general committee on behalf of this charity, the erection of the first pair of buildings is already far advanced, in Ventnor, in the Isle of Wight. Upwards of 2,000 shrubs for the grounds of the hospital have been presented.

MEDICAL OFFICER, ST. PANCRAS.—The vestry of St. Pancras, being about to appoint a medical officer of health, in the place of the late Dr. Hillier, has resolved to increase the salary from 250l. to 300l. a year, and to require that the officer shall reside in the parish on entering upon his duties. It was stated by several vestrymen that a number of medical men of the highest attainments and position had canvassed for their support.

INAUGURATION OF BELLRINGERS AT TIVERTON. The inaugural festival of the St. Peter's Society of Change Ringers has been held. They procured the services of the St. Stephen's Society of Change Ringers, Bristol, who enlivened the town for two days by their well-known skill in bell-ringing. The Rev. H. T. Ellacombe also delivered a lecture on bells on the occasion. The Tiverton Society have advertised their charges for ringing: a full peal for a day costs 3l.; for half a day, 2l.; for an hour, 1l.; a muffled peal for an hour, 3l.

ACCIDENTS.—At Hastings a bricklayer met with an accident while at work at a house which is being erected near Warrior-square. He was ascending a ladder, and a fellow-workman who was above him accidentally dropped a coil of rope, which knocked him off the ladder to the ground, a distance of about 30 ft. Fortunately no bones were broken, but he sustained a severe sprain of the ankle.—As a labourer was employed at a house in course of erection in Richmond-terrace, Edinburgh, a portion of the scaffolding gave way and precipitated him to the ground, a distance of nearly 25 ft. His wrist was fractured, and his head and body were much cut and bruised.—The new tower of the parish church of Moirans (Isère) has fallen to the ground, doing considerable damage to the roof and nave. The cause of the disaster was the elevation of the structure without means being taken to strengthen the base, which at last gave way beneath the additional weight. Only a few hours before, the church was filled with people.

THE LATE MR. THOMAS DUNCAN, C.E.—Mr. Duncan, the water engineer to the Liverpool corporation, has recently died. He belonged to Perth, and was selected by Mr. James Walker, civil engineer, to execute his plans for the construction of the lighthouse on Fern Island. This lighthouse was the first step made by Mr. Duncan towards that eminence which he subsequently attained as an engineer. His reputation in carrying out submarine works was confirmed by the skill with which he executed other commissions entrusted to him by Mr. Walker. His introduction to Liverpool was as early as the year 1843, when he accepted the position, under Mr. James Simpson, C.E., of assistant engineer to the Liverpool and Harrington Waterworks Company, before the corporation had taken the waterworks into their own hands. Mr. Duncan soon after coming to Liverpool, was appointed assistant to Mr. Newlands, the borough engineer, and he had continued in the service of the corporation from that time down to the day of his death. When the waterworks were purchased by the corporation Mr. Duncan was placed in sole charge of them, and he had become recognised as the Liverpool water engineer when the Rivington Pkcs scheme of Mr. Thomas Hawksley, C.E., of Nottingham, was broached. In addition to the five lakes or reservoirs designed by Mr. Hawksley,—the Upper and Lower Rivington, the Anglezark, the Rakebrook, and the Lower Roddlesworth,—two subsidiary reservoirs, one at Roddlesworth and one at Prescott, had been since designed and completed by Mr. Duncan, besides improvements which he has made in the other works at Rivington, and the preparation and execution of the plans and designs for the various receiving reservoirs at Liverpool. He has left a widow in adverse circumstances, arising from heavy losses, which had swept away the investments of years.

TENDERS.

For the erection of premises, 46, Strand, Mr. T. C. Clarke, architect. Quantities supplied by Mr. Mark W. King:—

Table with 2 columns: Name and Amount. Includes Henshaw, Wheeler & Co., Clements, Kelley, Bro., Kelly, Brass, King & Sons, Scrivener & White, Abraham.

For completion of villa residence, No. 5, Brokes, Reigate, for Mr. G. E. Morrison. Mr. J. F. Matthews, architect:—

Table with 2 columns: Name and Amount. Includes Barnes, Nightingale Brothers, B. E. Nightingale, Gage, Cook, Bacon, Holdsworth.

For new infirmary, &c., Godstone Union, Mr. A. R. Stearns, architect:—

Table with 2 columns: Name and Amount. Includes Knight, Morris, Worsell, Cooper, Galyer & Moore, Sherwood, Cook, Grover, Barnes, Kesterton & Head, Smart, Webb & Sons, Dannel, Henshaw, TIL, Macey, Colls & Sons, Byles, Nightingale, Knight, Regis, Johnson (too late), Woodward (accepted), Constable & Baley, Gage.

For sewage utilization works for the Romford Local Board of Health. Amended plan. Messrs. Russ & Minns, engineers:—

Table with 2 columns: Name and Amount. Includes Contract No. 1. Sewer and Buildings, F. & J. Wood, Mercant, King, Crane, Neave & Fry, Bloomfield, Hubbard, Young, Porter.

Contract No. 2. Engines, &c.

Table with 2 columns: Name and Amount. Includes Campbell, Johnstone, & Co., Barrows & Stewart, Kirrihan, E. & J. Wood, Bower, Bells, Goodman, & Co., Whieldon, Lecky, & Lucas, Wilkins, Williams, E. R. & F. Turner, Burton, Sons, & Walker, Laidlaw & Co., Prothero & Bastin, Perkins, Brothers, Farnell, Chigley & Co., Whitmore & Benyon, Rogers, Bevington, Courland, & Baker, Davey, Gimson & Co.

For erecting a warehouse in Ropemaker-street, Finsbury, for Messrs. G. Bartholomew & Co. Mr. F. G. Widdows, architect:—

Table with 2 columns: Name and Amount. Includes Webb & Sons, Ennor, Chestum, Colls & Son, Newman & Mann, Pritchard, Bishop, Brass, Henshaw, Browne & Robinson, Killy, Hill, Keddell, & Waldram.

For erecting forty-four almshouses, chapel, and lodge, with boundary walls, drains, &c. for the Worshipful Company of Drapers, at Elmale, Tottenham, Middlesex. Mr. Herbert Williams, architect. Quantities supplied by Mr. Charles Reilly:—

Table with 2 columns: Name and Amount. Includes Trollope & Sons, Brass, Piper & Co., Conder, Barclay & Sons, Ashby & Sons.

For repairs, pulling down, rebuilding, and building new workshops in the rear of five houses in James-street, Goswell-street, for Mr. D. Donovan. Mr. Hammond, of Finsbury-square, surveyor:—

Table with 2 columns: Name and Amount. Includes Lewis, Follett, Starkey, Peely, Stockwell, Wilson.

For six houses at Lewisham. Mr. Banks, architect:—

Table with 2 columns: Name and Amount. Includes Belham, Smith, Staines & Son, Bennett, Jackson, Hanks, Wevell, Reilly, Turner, Harrison & Edwards, Dixon, King & Sons, J. & W. Hobern, Walker, Blackmore & Morley, Leild, Williams, Wise, Felchick, Huphedon, Bridel, Heyrman.

For alterations to the Berley Mow Tavern, Smithfield. Messrs. Haywood, Blashill, architects:—

Table with 2 columns: Name and Amount. Includes Mather & Read, Lagmead & Way, Tully, Nind.

For house, Cheyne-row, Chelsea. Mr. P. Webb, architect:—

Table with 2 columns: Name and Amount. Includes Thorne & Co., Howard & Son, Lathley, Brothers, Ashby & Sons, Brass, Adamson & Sons, Foster, Cherrington & Cole.

For pier, &c. at Mousehole Harbour, near Penzance. Quantities supplied by Mr. Joseph Simmons. Mr. Douglas, engineer, Trinity Works, Penzance:—

Table with 2 columns: Name and Amount. Includes Robbins, Flavin, Freeman & Son, Sharpe, Brothers, Hubbard & Long, Moore, Keswick.

For restoration of Kelshall Church. Messrs. Nash & Son, Royston, architects:—

Table with 2 columns: Name and Amount. Includes Memel roof, Pitch pine, Fittings, Gibbin, Gibbons, Brown, Richards, King & Sons.

For sewers at Kensington Park, for Mr. Stephen Marten. Mr. R. Whitechurch, surveyor:—

Table with 2 columns: Name and Amount. Includes Wigmore, Hollins, Bercham, Parker, Killingback & Bradley, Williams, Nicholson, Crockett, Hubbard, Young, Potter, Bloomfield, Osenton & Carter, Tossell (accepted).

TO CORRESPONDENTS.

C. F. (happy to receive particulars).—Penzance Quæritio (consult the schedule of charges issued by the Institute of Architects).—J. S. (recovery would be very doubtful).—R. E. N. J. N. J. M. L. T. W. F. H. W. G. G. S. J. H. E. H. B. A. F. F. G. A. G. C. S. B. J. O. W. C. R. W. H. F. G. W. W. S. F. H. K. G. H. H. S. M. N. M. U. R. H. G. N. H. J. W. J. F. T. W. R. G. T. R. N. & Son. A. H. E. Anti-Siam (next week). A. M. (next week). A. S. (next week). J. D. M. (next week). J. F. (next week). We are compelled to decline pointing out books and giving addresses. All statements of facts, lists of Tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication. Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

CHRISTMAS WEEK. "The Builder" for the week ending DECEMBER 26th will be published on THURSDAY, 24th inst., at the usual hour.

ADVERTISEMENTS for insertion in that issue must therefore reach the Office before THREE O'CLOCK p.m., on WEDNESDAY, 23rd inst.

ADVERTISEMENTS.

Will shortly be ready. Price 4s bound in cloth. LAXTON'S BUILDERS' PRICE BOOK, for Architects, Engineers, Builders, Contractors, Surveyors, and all the Building Trades.—2nd issue—contains more than 30,000 prices, embracing all the various trades connected with the operations of the Architect, Engineer, Builder, Contractor, and Surveyor; together with 10,000 useful and important notices relating to the same. MORGAN & CHASE, 28, Ludgate-hill, London, E.C., and may be ordered of any bookseller in Town and Country.

The Builder.

VOL. XXVI.—No. 1350.

Our Railways and their Makers.

LOOKING without previous knowledge at the Railways of Great Britain and the Railways of the world, which have followed them, it would scarcely be believed that these enormous works had been conceived and perfected within a third of a century, and that men still in the prime of life were workers at their inception, and remember, as if it were but yesterday, the press and fight of those early days, the growth of great reputations and fortunes in connexion with them, on one side, and total collapse and disappearance for ever on another. Under the title of "Personal Recollections of English En-

gineers,"* the author of "The Trinity of Italy," reviewed some time ago in our pages,—himself an engineer, sketches with a vigorous pen the incidents that attended the introduction of the railway system and the doings of the men by whom it was brought about; more especially, of course, Robert Stephenson and I. K. Brunel. He depicts to the life the hurry of those times; the way in which engineers were created, or created themselves; the ignorance that wasted shareholders' money; the genius and perseverance that nevertheless made the whole a success, although modified. We shall avail ourselves of his pages, and transfer a few of his views, which will be found not very unlike some that have been often expressed in these columns.

Those early times did, indeed, produce strange things. Railways were the cry of the hour, and engineers were the want of the day. If they were not to be found ready made, they had to be extemporised: and so they accordingly were. Long before the school, in course of formation on the works actually in progress, could turn out men able to appear in public as authorities on expenditure, and construction, engineers-in-chief were required by many a group of projectors. So came to the front, military men, accustomed, perhaps, to sketching of country, able with the theodolite, but unacquainted with other requisites of their improvised profession; cautious martinets, formed in the old school of the Royal Engineers, at the time when the Duke of Wellington, as Commander-in-Chief, found such difficulty in making use of these dependents on the collateral authority of the Master-general of the Ordnance, that he took the step of forming the Royal Staff Corps, to have engineers of his own; mining surveyors,

* Personal Recollections of English Engineers, and of the Introduction of the Railway System into the United Kingdom. By a Civil Engineer, Author of the "Trinity of Italy." London: Hodder & Stoughton, 27, Paternoster-row, 1868.

accustomed to the use of the dial; mathematical engineers, good, no doubt, to direct the smithy and the lathe, but unaccustomed to works of magnitude; architects who generally limited their claims to the construction of stations, and who were snubbed on every possible occasion by all who, on any of the above grounds, called themselves engineers. So holdly did these new commanders take up their position in Parliamentary warfare, that many of them established themselves in lucrative herths; engineers by divine inspiration. At a time when the profession of civil engineering is suffering from a cernel sort of "lock-out," it is tantalising to remind them of the golden showers that watered the early growth of the various grades of railway constructors. The Ordnance map was the great guide of the projector of those days; but few, even of those who called themselves engineers, seemed then to be fully aware of the immense advantage to be drawn from the careful study of this admirable chart. Surveys were made at large expense, which were, if not absolutely worthless, quite unnecessary.

As competent engineers-in-chief were at a premium, so also were all the elements of an efficient engineering staff. Young men who could handle the level and the chain suddenly found themselves persons of importance. Engineering, as carried on in those days, involved both hard work and good fellowship. As the period for depositing the plans required by the Standing Orders approached, the offices of the busily-occupied leaders of the profession became scenes of toil or of scramble. Night was economised as the days grow short. An impulse was given to posting, and chaises-and-pair and chaises-and-four were to be seen at not uninfrequent intervals galloping east and west and north, at a speed rarely to be witnessed. "Now, boys," cried the chief of such an office, coming one day into the thick of the work, and springing at a bound on to the mantel-piece, "hurr your night-caps, for the angel a one of them you'll see till after the 30th. Then you shall have a week to lie in bed." Accordingly, for some ten days, the labour of plotting sections, copying plans, numbering and copying references, and the like, went on almost without intermission. At nine in the evening would appear mighty howls of oysters, gallons of ale, and other materials of a rade but hearty repast. A respite of some three-quarters of an hour would be filled up by uproarious hilarity, and then a fierce objurgation from the chief, the moment before the chief reveller, for so scandalous a manner of wasting the company's time, would set all briskly to work again. The quality of the work thus performed was not altogether equal to that which a more sluggish rate of proceeding might turn out. If you prick through a dozen sheets of drawing-paper at once, a very slight deviation from the perpendicular in the needle is enough to make the twelfth plan very different from the first. But this we may pass by.

The men long active in the service of their fellows, as regards the development of the means of intercourse, are now folding their arms in enforced inactivity. The 600 millions which we have spent on our own railways have been lavishly and inconsiderately spent. If the fourth part of that sum, which we may reckon, without exaggeration, as having been made into ducks and drakes, were now forthcoming for the necessary development of the feeders and ramifications of the great trunk and branch lines, an immense impulse to our national prosperity would ensue. There is wisdom in looking back to inquire how the chief industry of the last thirty years came to start in a wrong groove;—how it was that the service of the public was injured for the benefit of private individuals, and that a false direction was given to an industrial development of such unparalleled

importance. The most sanguine ideas of the most sanguine speculators never contemplated the enormous traffic developed and created by the railway system. This gigantic and unexpected excess over the estimated traffic has been claimed by the projectors of railways as a set-off against the enormous excess over the estimates of their construction. The balance has been fortunate, and, of course, to some extent unexpected traffic has caused unexpected outlay. But those familiar with the subject know that comparatively little of the actual waste is thus to be justified. Had the capital of railways been spent by men taking an enlightened interest in its application, and controlling that application with the simple aim of profitable investment, our position at the present moment would have been something very far different from the actual fact.

It has been a happy thing for the credit of the engineers of Great Britain, our author urges, that they were, as a rule, paid by salaries, and not by commission. Had the latter mode of payment, he says, which in many instances has much to recommend it, been sanctioned or insisted on by Mr. Stephenson and his earliest colleagues and pupils, no integrity of private character would have been enough respected to avoid the reproach of outlay without other motives than that of earning large commissions. But was this mode of payment always avoided? We have reason to doubt it. However, the labour was immense, and deserved high pay. The havoc that death has made in the ranks of a profession which might expect to be distinguished by unusual longevity, is most remarkable. Brunel, in the judgment of those who remember the iron energy of his youth, should now be a man in the prime of intellectual vigour. Robert Stephenson might naturally have looked forward to many more years of quiet authority. Locke, Rendel, Moorsom,—how many are the names which a greater reticence of labour and more attention to the requirements of health, might have kept for many years from the obituary! Working by day, and travelling by night, make a constant and unrepaid demand on the vital energy of the brain. The cost of English railways includes the lives of many eminent men.

Stephenson is our author's hero: he knew more of him than of Brunel, his rival. He urges that Stephenson's knowledge of actual work of all kinds gave him the advantage of his great rival, who, possessed alike of hereditary constructive genius, of hold and courageous originality, and of the results of the most scientific training then attainable, had in some measure to make his acquaintance with the practical details of actual work, and with the best method of dealing with master workmen, at the cost of his supporters.

A little incident is given to show the pleasant relations of the two men with each other. The three were travelling together in a railway carriage; Stephenson wrapped in a dark plaid, on the exact disposition of the folds of which he somewhat prided himself. He saw Brunel regarding him with curious eye. "You are looking at my plaid," said he. "I'll bet you ten pounds that you cannot put it on properly the first time." "Very well," said the other; "I have no objection to bet ten pounds. But I won't take your money. I bet ten pounds against the plaid. If I put it on right when we get out on the first platform, it is mine. If I miss, I pay you ten pounds." "Done," said Stephenson, and resumed conversation with Locke, who was also in the carriage. But Brunel sat in a brown study, and said not a word till they arrived at the next station. "Now, then, Stephenson, give me the plaid to try," said he, as he stepped on the platform. Robert Stephenson slowly unwound the garment. Brunel promptly wound it around his own shoulders, with as much composure as if he

had pulled on a great coat. "It is a first attempt," said he, "but I think the plaid is mine." For many a day did he rejoice in its comfort. "But had you never tried before?" said a friend. "No," said Brunel; "but, when Stephenson challenged me, I was not going to give up; so I began immediately to study the folds, and to make out how he had put it on. I got the thing pretty clear in my head before we reached the station, and when I saw him get out of it I knew that I was right: so I put it on at once."

Our author gives his experiences of some of the early contractors. When it was first decided that the most feasible method of executing the heavy works necessary for the construction of locomotive lines was by contract, a school or group of contractors had to be formed in almost the same impromptu manner as a school of engineers. There were materials ready to hand. Special education,—at least the education given by the schoolmaster,—was less requisite in the case of those who thus represented the hand, than in that of those who might be regarded as the head, destined to create the new enterprises. The sturdy self-reliance of the English character, its practical, hand-to-mouth mode of meeting difficulties, a keen eye to the main chance, and a readiness to carry a small amount of available experience to the best market, were the main qualifications that went to form a contractor for public works. Accordingly, the list of competitors was daily lengthened. London builders,—keen, quick men, who had reduced their own branch of business to system; men, very often, brought up to the joiner's bench (by no means a contemptible school of handicrafts),—men who were familiar with the finance of the pay-table, who knew how far bankers would, or would not consent to provide for the recurrent wants of the Saturday night,—men who knew what could be done with bricks and mortar, who were well up in the matter of stone quarries, learned in lime and cement, ingenious in scaffolding,—above all, able to put on the appearance of thorough mastery of the art of building, took the first rank. Nor were these men metropolitan alone; Yorkshire masons, Birmingham bricklayers, miners, lime-burners, and quarry owners, often united the business of a builder with their own. Then there were the relics of the "navigators," who had dug our canals, who had gained experience in the construction of docks,—the road surveyors and contractors called into existence by Macadam and by Telford. Sometimes a land surveyor would quit land-chain and Jacobstaff, to take charge of a body of workmen. Later in the day a civil engineer would prefer the profit to be secured by a good contract, to the smaller certainty of salary or of fee.

It was not until the engineer became practically acquainted with the actual cost of the execution of works on a large scale, whether by the failure of the original contractors, which often threw the execution of every detail of work on the officers of the companies, or by stepping in to undertake the entire responsibility of large contracts, when contractors did not happen to be forthcoming, that the estimates which he formed could become precise. Over and above the prices to be collected from the cost of small works, or from the price-lists of various trades, a considerable amount had to be allowed for contingencies. Five per cent. was usually set down under this head. Thus, although the original estimates, according to which the Parliamentary capitals of the various lines were computed, proved, as a general rule, altogether inadequate, it was not always because the prices were too low, nor was it because the designers wilfully shut their eyes to that which lay before them; but experience was defective. The contracts were generally let below the engineer's estimates; but then came in the question of extras. The astute experience of the old "navvy" would often swell the list of these items, much to the amazement of the engineer. "I will tell you a secret worth knowing," said one of the old Telford school of road-makers to a young sub; "we've a maxim as puts a deal of money in our pockets,—'The more you dissect it the better it cuts up.'" The principle of lump contracts was intended to check this constant "dissection" of work, and consequent multiplication of extras to the benefit of the contractor; and the thirty years of contest between Macintosh and the Great Western Railway is the most striking instance of the difference between the statement of a final account drawn up by the engineer and that claimed by the contractor.

Of the five hundred millions which have been expended on the railways of the United Kingdom since 1830, more than the half, our author thinks, must have passed through the hands of contractors for construction. If, therefore, we allow that a profit of from twenty to thirty millions must have been cleared, by a body of men who have come into recognised existence within little more than the third of a century, we shall be within the mark. If to the actual benefits secured (however they may afterwards have been wasted) we add the power and influence natural to those who had the almost uncontrolled expenditure (so far as the pay-table and the bill-book go) of three hundred millions sterling, it will not be matter of surprise that lordly estates should have been purchased, and noble palaces erected, by men who had known what it was to have to work very hard to make both ends meet. In dealing with contractors, our author says exaggerated severity does not always answer, and that an attempt to enforce an altogether unusual degree of strictness, in the execution of large undertakings, offers great temptations to bribery. The contractor, who sees that more is continually demanded of him than he ever contemplated, and more than he believes to be of any practical advantage, is induced to wink at methods of removing a source of costly and unreasonable vexation, as it appears to him, by incurring an expense which is, no doubt, unjustifiable, but which he may be easily led to regard as the only way of avoiding ruin. Over-strictness is sometimes as demoralising as over-laxity. No small proportion of the heavy cost of the works executed by Mr. Brunel has been owing to the fears entertained by contractors of the power entrusted to the inspectors to render the work ruinously expensive.

While great attention was given from the very first, to the specifications of Mr. Brunel's contracts, there was a marked indisposition, by no means peculiar to this engineer, to supply to the contractors that detailed scientific information, at which they have so much less facility of arriving by their own calculations, than has the designer of the works to be let.

The manner in which the attention of Mr. Brunel's staff was concentrated on the technical maintenance of the specification, and the unexampled finish of the work, produced an undesirable effect on the estimates. Very many of the details of the work were left to the discretion of the engineer, and thus came under the schedule of prices for extra work. The constant care of Mr. Brunel was given for many years to the perfection of the contract specifications. The result of each successive new edition of the printed form was to place the contractor more and more at the absolute mercy of the engineer. Bilateral rights were, as far as careful language could go, extinguished. The right to be paid, at a certain stipulated rate, for work ordered by the engineer, was all that these documents were intended to leave to the contractor. If the former ordered nine-tenths of the work to be abandoned, the latter, who had prepared for the execution of the whole, had no redress. It was provided,—and it was a wise and economical provision,—that the contractor should be paid forthwith, on the measurement of the engineer, from 80 to 90 per cent. of the schedule value of the work executed. But even for this payment, on the regularity of which all his arrangements would depend, the contractor had no legal security. It was stated to be the intention of the engineer to recommend a payment, instead of its being acknowledged to be his duty to certify the execution of a certain amount of work. So "right" did these specifications ultimately become, that nothing but implicit personal confidence in Mr. Brunel, on the one hand, or the belief that the Court of Chancery would set aside any unfair provisions, in case of dispute, on the other, could justify any thoughtful man in entering into a Great Western or a South Wales contract.

An instance of the manner in which the tables were turned on an engineer who, either from inexperience or from ill-feeling, had cruelly outperformed his contractors, is given. The work in question was a bridge, a portion of which was supported on heavy piles. The specification provided for a price per foot to cover all expenses of pile-driving up to, let us say, 50 ft.,—a 10-ft. pile being at so much per foot, a 20-ft. at so much, and so on. At from 40 ft. to 50 ft. a solid bed of gravel was attained, the superincumbent material being soft alluvial soil, so that, by the entrance of the pile-shoe to

its own depth into this solid stratum, which rested in its turn on bog, the greatest possible amount of stability was attained. But the engineer in question was not contented with this result. He had got into very hot water with the contractors and their agents, and he insisted on the use of 60-ft. piles, which could be provided only at a very great expense; and he ordered these piles to be driven 10 ft. into the ground. The result was that many of the piles were shivered in driving, and had to be withdrawn, and that those which were sent through the gravel offered less resistance than would have been the case if they had only entered it. Months were consumed instead of days, the work was, at least, far less satisfactory than might have been the case, and the certificate of the engineer was for an amount less than a fourth of the total cost.

The contractors, annoyed at such a proceeding, and injured by a permanent weekly expenditure without return, consulted an engineer familiar with contract accounts. He visited the spot, and carefully examined the contract. Then he called for the whole of the accounts from the commencement of the work. Observing that the schedule only gave a price per foot for piles driven up to 50 ft., and that it also included prices for timber and for day labour, he charged for the whole of the 60-ft. piling as timber and as daywork,—a mode of drawing up the account which was in exact accordance with the schedule, and which added 3,000l. in one item to the contractor's bill. The right to make this charge in this form was indisputable, for it was the only way in which 60-ft. piles could be carried to account in the exact terms of the schedule. The engineer of the bridge had outwitted himself, and his employers had to pay handsomely for his caprice.

There can be no doubt of the enormous waste which has been incurred in the construction of the English railways. For much of the outlay, the engineers are scarcely responsible. For much they are. Parliamentary and legal expenses represent a price per mile quite adequate to the construction of those light railways of which we are now so much in want. Landowners have thriven largely at the cost of shareholders, first by exacting high prices and enormous residential and occupational damages, and then by funding the value of their whole property so much increased, that in most instances it would have paid them well to make a gratuitous cession of the land required, as an inducement to the engineers to lay out the works through their property. Duplicates and opposition lines have been another source of prodigal outlay. Mr. H. E. Bird, in a careful tabulated statement of the expenditure on 253 railways, up to the close of June, 1867, gives a total of 487,905,167l. expended on 14,000 miles of line. It is highly instructive to remark the different prices of English, Scotch, and Irish railways as set forth in this statement: 9,634 miles in England have cost 405,331,055l., or 42,000l. per mile,—very nearly the price of the London and Birmingham Railway,—notwithstanding the immense experience; miles introduced by subsequent experience; 2,486 miles in Scotland have cost 55,921,649l., or 22,700l. per mile; 1,898 miles in Ireland have cost 26,652,463l., or 14,000l. per mile. To say nothing of the low cost of the railways in the United States, which are far less solidly constructed than our own, but which have served for the development of a large and increasing traffic, at an aggregate cost, at the close of 1867, of 1,654,050,739 dol., for 38,605 completed miles out of a total of 51,325 miles undertaken, it is evident, from the comparison of work and cost in England and in Ireland, that our own waste has been enormous. Had the English railways been kept down to the cost of twice the Irish lines, a condition of which the neglect is due principally or even exclusively to Parliament, our 9,634 miles, at a cost of 270,000,000l., would be earning a gross revenue of 33,000,000l. per annum, yielding a net return of from 6 to 7 per cent. on the capital. To speak of the difference of 135,000,000l. as sheer waste will appear, to persons familiar with the subject, as an understatement.

That wasted outlay would have sufficed to supplement our 9,634 miles of principal line with 45,000 miles of light branch railway. Much of the evil from which we are now suffering results from the weakness that has characterised our railway legislation. It is hard to point to the name of a single member of either House, with the exception of that of Lord Redesdale, who has appeared to watch the national in-

terest. That interest is, in the long run, identical with the welfare of the shareholders; but it is in the long run alone. The present state of the railway share-market shows to what misfortune the unchecked competition of rival companies may drive their proprietors.

Legislation was necessary for the introduction of the new mode of travelling. So much being admitted, the first thing that any statesman would have thought necessary was, to lay down the principles of that legislation. But this was not done. It was thought fit to deal with each case on its merits; that is to say, to open the door as wide as possible to every description of intrigue, of rivalry, and of juggle. The result is to be seen in the present price of what might have been, by this time, a national property of the utmost value. And certainly, whoever else may be to blame, the chief responsibility for profligacy of expenditure rests on the Legislature, which not only sanctioned, but encouraged, a frantic and unmeasured rivalry. We willingly repeat that the Railway Regulation Act of 1868, which comes into full operation on the 1st of April, 1869, empowers the Board of Trade to authorise the construction of light railways, on the two sole conditions that the maximum weight to be borne on a pair of wheels shall be eight tons and the maximum speed twenty-five miles per hour. But this provision, unless attended by a change in Standing Orders, does not authorise the application to Parliament for power to construct a railway originally intended to be "light." It is a boon to existing companies, but it is only an admission of the fact that such a boon ought to be extended to the public.

Bad as the present position of the engineering profession is, our author goes with us in looking hopefully to its future. Certain great questions, which have been neglected until their neglect involves not only cruel waste, but imminent peril, are now demanding solution. The increasing pressure of a population that doubles itself in a century, the increasing difficulty of maintaining health, or even life, in cities that double their population within forty years, calls for the thorough organisation of that service which may be compared to the circulating and the digestive systems of animal life. The water-supply of cities and towns, pure, ample, and efficient in case of fire; the removal and disposition of sewage; the redemption of our rivers and brooks from a neglect that is rapidly converting them into pestilent sewers; the application to agriculture of that mass of chemical fertilising power with which we now poison rivers and estuaries; the drainage of land; the storing-up of that water, of which we are either anxious hastily to get rid, or helplessly destitute; and the production of fertile and certain crops by irrigation; all these are but so many features of one department of the duty of the engineer,—the proper distribution and utilisation of the rainfall. The steam plough has already established its claim to rank as the best servant of the farmer. Portable and convenient steam-engines are fast superseding the more costly labour both of man and of beast. But the farmer is still, to a most unnecessary extent, dependent on the chances of a very variable climate. The engineer is aware that this is entirely unnecessary. He can readily find the means, if consulted, of gathering crops, independently of the weather, and of drying hay and corn independently of the sun. Surely, then, there is a busy and a useful future for the engineer who takes this view of his duties, and who finds himself engaged by those who do the same.

The book which we have thus condensed will be found amusing, as well as instructive reading. Engineers and contractors will recognise in it many portraits, though the name be not written beneath the picture; and legislators will discover hints here and there deserving their attention.

A BURNED CITY OF GEORGIA, IN WESTERN ASIA.—In certain excavations, says a journal of Tiflis, lately made on the banks of the Koura, at about half a mile from its confluence with the Arago, the remains of an ancient city have been discovered. The tops of the houses are covered with a thick layer of earth. The supposition is that the catastrophe by which the place was engulfed occurred 2,000 years ago. A subterranean passage has also been found under the river. The workmen have collected several coins and earthen vases.

THE RISE AND PROGRESS OF ART.*

If we would trace art to its source we must be prepared to take a very long journey into the realms of the past. The designation of the "cradle of the arts" has been properly, perhaps, conferred upon Egypt; but the actual birth or budding forth of the power in man to use his intellect in the creation of forms must be sought for in an antiquity greater even than that of the people of that garish land. We must find our way back, indeed, into those old times when man moved about the surface of the earth in families or tribes, rare and mere specks among the gigantic vegetation of the virgin soil; for when we come upon the caves that bear witness they have temporarily sheltered such nomades, we find the testimony expressed in rude sculptures on the walls and crude ornamentation implements, which, but for this manifestation of an art-power, would be scarcely distinguishable from natural productions. The first bud of art, therefore, must have been in the brain of some young hunter, or, more probably still, in the heart of the woman who loved him, in those hoary times; and even as the lichen covers the stone, the seaweed the rock, and the heather the mountain, this creative faculty has spread and spread among mankind, till it has become the glorious incrustation upon civilization we delight to speak of as though it was a better world or quondam, overlaying the grovelling among common things. Art, art-power, and the art-world are a set of words, watch-words, belonging to a strife, or strain, there has always been in the best minds, since the most primitive of times, to beautify, purify, and exalt our earthly life. Whether born, as we have ventured to surmise, of the most divine of our sympathies, human love, or not, art has adapted itself to all the vicissitudes of man. It has survived dynasties and desolation, neglect and misunderstanding, changes of circumstance, climate and faith; it has bided its time and it has stood forth, according to what was required of it; and after thousands of years of solace and incentive to our race it cheers us still, and ennobles everything within its influence. We are justified in looking upon art as a mistress whose charms will endure beyond the noon-day of the earth, even to its last and most refulgent sunset.

In Germany, where men seem to have a greater capacity for loving and proving all things than elsewhere, some such comprehensive view of the attributes of art has been taken by several writers. Instead of frigidly rejecting as spurious all art previous to Hellenic perfection, they have opened the fold and admitted within its pale, absolutely, all material expression of the ideal ever made by man. They recognize the whole length of the silver cord,—its entire continuity; the whole breadth and depth of the golden bowl,—its ring of true metal that fracture would destroy; and do not capriciously snap either asunder and make selection of fragments as alone worth having. Among these writers we must class Dr. Lübke, whose work entitled "The History of Art" we are about to introduce to the notice of our readers. It has been translated by Mr. F. E. Bunnett, who will be praised or blamed, according to people's predilections, for having retained somewhat of the author's German style; and the broad grasp taken of the subject is enlivened by 400 illustrations, from which completeness it will be seen that this history of art-power has not been undertaken in a fantastic mood, nor completed in a day; although more details in the modern section of the work would be an improvement, as we shall elsewhere show. The author explains that his object was to help the cultivated reader to a proper understanding of art and its productions by showing him its development and historical progress, its unchangeable laws, its principal phases of essential and grand features, rather than by dwelling on intermediate stages and preparations, which could be studied afterwards in still more comprehensive works. We quote his words in continuation of this explanation:—"But my aim especially was to show the inner spiritual connexion in the artistic creations of the various epochs, from the time of the Egyptian pyramids up to our own day, and to discover in them the grand ideas of the advance of the human race in civilization." Dr. Lübke succeeds in doing much of what he undertakes, for when we close his two substantial volumes we find we have traversed the whole wide field

* The History of Art. By Dr. Wilhelm Lübke. Translated by F. E. Bunnett. London: Smith, Elder, & Co. 1868.

of art beginning with the earliest years of mankind, and coming down, by a chronological and geographical sequence of his own arrangement, to the present day.

Our author says of the origin of art that the period of it is as uncertain as the place. "One nation dates the birth of its art a thousand years ago; another is looking for it still to come. Only so much is certain, that in the first stirrings of an impulse to art, under all zones and at all times, there is a remarkable harmony to be observed. It is the original universal language of mankind, the traces of which meet us in the islands of the Southern Ocean, as on the shores of the Mississippi, among the old Celts and Scandinavians, as among the heroes of Homer and in the interior of Asia." Just as we find the bow and arrow in the hands of men all over the globe, so do we find, it seems, a riband-like twist used as an ornamentation everywhere. The first illustration of early art is a Celtic monument; the second, the interior of a Greek grave, showing the recumbent skeleton of a man, surrounded by the arms he wore, the implements he used before he laid down his life, and the various vessels those who mourned him buried with him. From a consideration of these and similar relics, Dr. Lübke passes rapidly on to the art of the Aztecs in Mexico and Central America, and in all sees ideas of an artistic kind. He considers the earliest step taken "by the awakening impulse to art" to be the erection of a hillock over the tomb of a hero; and another, the raising of mighty hooks in combinations that leave a spiritual impression as of awe upon the mind. After this he finds the next weak efforts at artistic creations taking the form of aspirations to erect monuments, with which to connect the adoration of Deity. At first satisfied with the rude monumental column, the mighty form of which was to his yearning mind a symbol of the Supreme Being, man gradually sought to invest such masses with a definite image of Deity, for which purpose he seems to have distorted his own features, as in the colossal head of Tiguamaco, at Lake Titicaca, in Peru. And from these manifestations of the artistic thriving of all nations, the author proceeds to note how mental capacity, individual character, outward circumstances, and the nature and government of countries, have combined to develop art to its glorious prime. Successive chapters on the ancient art of the East, the art of Central Asia, of Western Asia, of Eastern Asia, India, China, and Japan, Greek art, Etruscan art, Roman art, bring us to the art of the Middle ages, with its researches into early Christian art, the art of Islam and the Romanesque and Gothic styles; and thence to the architecture and plastic arts of modern times in the different European countries. A comprehensive survey, surely.

Our author makes a great point of the connexion of artistic creations with the innermost life of nations. Standing upon the banks of the Nile, and looking upon the so-called cradle of the arts, "old Egypt," he points out it was the wonderful stream; its regular, annual rise and subsidence, compelling the inhabitants of the rich valley watered by it to build protecting dykes and embankments, and suggesting to them the formation of canals, that first gave an impetus to science, and raised the people of the Pharaohs above surrounding nations; and to the same extent it was the despotic form of government that fixed the forms that art first assumed, and rendered them unchanging in the lapse of three thousand years. He gives, however, two reasons for this arrest of development:—

"Whatever finer distinctions in the conception of forms, the ingenuity of more modern research may have discovered, the indwelling idea, the range of view, the proportion of plastic industry—ay, even the types and subjects of representation—ever remain the same, thousands of years, fixed and unchangeable as the nature of the Nile valley. The ground for this remarkable fact can only be traced in the position which the plastic art occupied among the Egyptians. This position may thus be briefly designated, that sculpture and painting, whether used in decorating the immense walls and columns and ceilings, with figures and reliefs, or whether they reared their colossal forms in front of the entrance, against the pillars of the forecourts, or in the interior of the sanctuary, in every case they stood exclusively in the service of architecture. It is true that in all places this has been among the primary conditions of the plastic arts; and even among the Greeks sculpture had at first to conform to the laws of architecture. Still, wherever a free development of the individual mind made its way among the people, and the plastic arts began to be inspired by their songs and odes, the chains were soon burst asunder, and the works of sculpture, resting on their own strength, stood apart from the creations of architecture in a beauty of their own. That this spirit of the free development of the individual was lacking among the Egyptians, that, in the true Oriental subjection they blindly followed one despotic will, is the deeper reason why the plastic art

could not rise in this people from its dependent position. By this the boundary is defined which characterises the Oriental turn of mind in general, which fetters all their artistic productions to the inexorable laws of architecture, and stifles in the germ all individual intellectual life. In the same manner, although with national modifications, we shall find this the case with all the other races of the East."

The Euphrates, "the river whose source is in Paradise," and the Tigris were to the inhabitants of Central Asia what the Nile was to the Egyptians, and what the Ganges was to Eastern Asia. In each case the rising of the waters called out man's resources to enable him to maintain his position on the fertile soils that owed so much to this periodical circumstance. The mighty ruins of both banks of the Euphrates are still the marvel of the world. Traces of palace after palace, rising terrace upon terrace, temples and tombs of colossal dimensions, vie with the ten miles of ruins on the Tigris, that proclaim the site of Nineveh, in evoking our astonished admiration. In the sculpture of the Assyrians, however, there is no effort to express thought or feeling; we find in it no aim beyond representing actual existence, reality; and it remains apparently unchanged either in the sphere of representation or mode of treatment from the beginning to the end of their days. The Medes and Persians came under the same influences. First subjugated by the Assyrians, and then conquering them, they intermingled with them too much for their artistic creations to exhibit any remarkably distinctive character. Moreover, the plastic arts were still subservient to architecture: bound hand and foot. In the Ganges district, we find new moulds and grooves of thought emanating from the adoption of Buddhism by the Hindoo people. Instead of the tame repetition of the same ideas over and over again, there is a more spiritual, speculative, self-conscious development apparent in the art-work, as well as an enthusiastic admiration of the beauties of nature. But this is to a great extent over-riden by the bewildering effect of the fanciful creations relating to the polytheism of Brahminism; and it requires a special talent to pick out the graceful tender poetic ideas that sprang out of high conceptions of the dignity and destiny of man, from the luxuriant and motley confusion of more untridled fancies. But on leaving the vast sultry regions of the East, we come upon a people in the south of Europe, in whose hands the plastic arts reached a height of cultivation that has not since been surpassed. Here, again, Dr. Lübke would account for the chief distinctions in the mental conditions of the Greeks by the nature of their country. Spring from the great Asiatic family from which the Indians and Persians were descended, speaking the same language, and having the same manners and religion, he considers that nothing but the peculiarities, the natural wealth and variety of the land, with its "blue-sea floors," of which they took possession, could account for the marvellous strides made by them. Instead of tropical superabundance, the Greeks enjoyed a climate that, though mild, was moderated by sea and mountain air,—a country that, though small, was intersected and ramified by mountain ranges which divided it naturally into a number of small territories, and a soil that, though fruitful, required labour. It would be difficult, he advances, to find conditions more likely to generate mental independence, or an art-power of a purer, nobler type. Then the habits that allowed the un fettered development of the body, and the gymnastics that cultivated power and dexterity, and with these grace, helped in the course of generations to make this people more beautiful, manly, and noble than any other; and their scant though elegant drapery left the harmonious proportions and movements of their limbs ever before the artist as a constant study. Not individual characteristics nor casual forms, however, were sought by Greek artists for portrayal; but out of their wide observation they realised a general type of excellence that, with slight modifications to express such differences as sex, youth, maturity, and age, served their every purpose. We see the fine oval of the face, the low and narrow brow passing almost in continuation into the nose without indentation on the profile, the large straight-cut eye in its broad, deep socket, the full lips and projecting chin in the whole circle of characters they represented. Dr. Lübke, noticing this rejection of individual traits by Greek art, says,—

"It is satisfied with the expression of the highest sovereign will and sovereign mind in Jupiter; with that of lofty womanly dignity in Hera; of heroic manly power in Hercules; and of youthful beauty, either of a relaxed or luxu-

rious character, in Apollo and Bacchus; of perfect grace in Aphrodite; of noble just wisdom in Pallas Athene; of maiden-like vigour in Artemis; of manly adroitness and cunning in Hermes; and other similar creations, in whom the round of human characters and qualities is typically established in broad lineaments, and serve as a general standard. Whatever lay beyond this passed also beyond the power of Hellenic perception; and it would have been perfectly incompatible with the Greek nature to represent individual character in its modern sense."

In the Greek temple plastic art became free of the restraints by which the architecture of the East enchained it. Over and above the sculpture that formed the ornamentation of the fabric, and which was obliged to adapt itself to certain given outlines, there was the personation of the god or goddess within upon which the artist could lavish his unfettered powers. Perhaps from the vagueness or the ideality of the subject, or, perhaps, from the different aspects and attractions it presents at different times according to the state of the mind, or, perhaps, from the actual want of clear notions, many writers upon art express themselves often mistily, moodily, and in a roundabout way, saying and unsaying things, and affecting a sort of dreamy rapture which they express in an inarticulate jargon of what may be called artistic cant.

Somewhat of these complications, and of this veiled style of expression is used by Dr. Lübke in his enthusiastic contemplation of Greek art. Thus on one page he attributes the superiority of the Greek to a personal inner development and the unfolding of a national life with free consciousness; and on another he says no one was allowed to develop his power either for his own personal enjoyment or for the adornment of his own existence, which appears scarcely compatible with the "free consciousness" quoted. In a third it is the contrast between the Ionians and the Dorians, "so radically diverse though dwelling on a common national soil, that invests Greek life with its wonderful depth, its rich value, and its stamp of perfection," and in a fourth, it is the breaking up of the fellowship among the individual states, after the Peloponnesian war, that enabled the individual subject to extricate himself into a freer position, develop his powers with less restraint, and his rich talents with greater versatility; and in a fifth, it was the portrayal of the gods as a glorification of human beauty that gave the Greek artist his magic power. In the same half-contradictory way, though he rejoices over the emancipation of plastic art from the thralldom of architecture, nearly all his illustrations represent Caryatides, and bas-reliefs from friezes and figures from pediments; proving, indeed, that sculpture was never so beautiful as when she was the handmaid of architecture, and never so much her handmaid as in the days of the Greeks.

The chapter upon the art of that wonderful people who appeared upon the face of Central Italy as mysteriously as they faded from it, the Etruscians, is, however, as clear, consecutive, and precise as we could wish. It was they who left the world the legacy of the arch, which, in the hands of their conquerors, the Romans, became the means of a further long stride in the history of architecture. The author gives us examples of their tombs, their *reliefs*, wall-painting, and mirrors, and passes on to the art of the great realistic people who conquered them and the world. It was the Etruscan legacy that enabled the Romans to erect buildings on a larger scale than those of Greece, he points out. "So long as the covering of a stone building could only be effected by mighty horizontal beams, as was the case in the East and among the Greeks, architectural work was limited in its scope, and was dependent on the natural conditions of the stone, which afforded horizontal beams only to a small extent; but after the combination of wedged-shape stones had been devised, which, by the tendency of their various parts to their centre of gravity was kept in a firm span, the art of building was in a great measure freed from natural hinderances, and the courts could be formed with much more size and variety, and the ground-plan with greater freedom than before."

But though the Romans adapted Etruscan discoveries, and invited Greek artists to their capital, he considers art never enjoyed the hearty delight of the people, but remained always a luxury belonging to the rich and powerful. With some obscurity he intimates that architecture was employed to adorn life, ennoble power, and attract the people, "without standing in closer affinity to the Roman character by its application to the practical necessities of life." How this statement corresponds with the tendency to realism in sculpture for architectural purposes, which marked the distinctive peculiarities of in-

dividuals so strongly as to constitute portraiture, we do not see. But Dr. Lübke atones for the insufficiency of some of his general views, and the contradictions into which this shortcoming betrays him, by his true admiration of all noble works when he comes to details. As he paces the sites of the temples, or gazes upon the ruins of the triumphal gates, baths, or amphitheatres, he is as much a Roman as he was a Greek when dwelling upon the matchless conceptions of Hellenic art.

In early Christian art our author no longer sees the influence of geographical conditions at work, but the promptings of a spirit resolved to realise new truths regardless of antique traditions. Thus the Christian artist, in his need for materials with which to embellish his basilica, took all that was costly and possible from the remains of fallen temples, careless of old laws of proportion or arrangement, and placed his gleanings in new combinations that harmonized in his mind with the requirements of the new faith. "The remains of the columns of old temples and courts, most heterogeneous in size, material, beauty, and execution, were placed in the same arcade of the new Christian church. Shafts too long were cut short, and those too short were heightened by higher bases or capitals; among the capitals themselves in the same colonnade, all conceivable shades of Corinthian, Composite, and Ionic forms would alternate, so that ancient architecture appeared chaotically let loose in its fundamental elements." Painting was seized as a facile means of expressing the new ideas, and acquired great prominence in those times; while plastic art, especially in relief upon sarcophagi, represented scenes from the Old and New Testaments with much of the same feeling with which it had illustrated the old mythology. Mosaics and ivory carving were the vehicles, too, of many noble inspirations at a very early period. But, with the removal of the seat of government from the banks of the Tiber to the shores of the Bosphorus, came new expressions in Christian art. All traces of antique traditions were effaced by the adoption of Byzantine principles. The rectangular basilica was supplanted by a polygonal pillared structure with mighty arches, upon which rose a central dome, which grand feature, however, by the addition of a choir for the exigencies of the service, was not always maintained as a centre. This "non-centralising element" of the choir at the east end Dr. Lübke considers "an irrefutable testimony to the disunion between ritualistic object and architectural design." Byzantine forms had but little of his sympathies, but he admires the rich splendour of decorations blazoning with gold-coloured marbles and mosaics, with which the interiors of its domes and niches and internal wall surfaces were adorned, the abundance of which was one of the peculiarities of the style; and gives very interesting details of some of the principal buildings of this period.

The art of Islam is described as being as largely affected by the nature of the land as it was by the teachings of Mahomet, who forbade all figurative representations. The roving life of the Arabians, the boundless wilderness of the desert, the expanse of sky in which glittered the stars of the northern and southern hemisphere, gave birth, the author considers, to a frame of mind as much inclined to fantastic extravagance as to keen, one-sided speculation; and, because there was no distinct horizon line, no variety in the forms of nature on which his eye could rest, the imagination of the son of the desert revelled in the formless, and passed from one idea to another without repose. When this impassioned race began to overrun the world in their fervour of religious ecstasy, they had, then, no national art; and when they did not adapt Christian churches to their own mode of worship, they obtained Christian architects from the Byzantine court to build their mosques. But as time passed, we find they introduced in the halls and arcades of their buildings the pointed arch, the horse-shoe arch, and the keel arch; a vaulting peculiar to themselves, consisting of separate niche-like vaulted calottes projecting over each other, sometimes likened in its effect to that of stalactite caves; and that rich wall decoration composed of the mingling of animal and vegetable forms, with entwining geometric figures that we call Arabesque; the brilliant whole forming an architectural style as distinct as any other, and infinitely more fanciful. The author whose steps we are now following, thus paradoxically speaks of it:—"It lacked that

definite stamp which only appears when the imagination, restrained by reflection, produces pure creations. Instead of this, the architecture of the Arabians presents the same combination of striking contrasts as clings to their whole mental nature; a bold, cold exterior, with a fantastically decorated interior; monstrous confused masses, and a magic complexity of ornament; death-like stiffness and inexpressible rich life." If we were disposed to be captious, we might ask whether the last two conditions can be reconciled in this manner.

The Romanesque style was the result of the remains of antique culture acting upon the minds of the Germanic races endeavouring to express Christianity. They accepted the Basilica, but altered its proportions to such an extent as to give it a new character. The nave was divided from the choir by transepts, which gave the ground-plan the figure of the Cross; and the choir was extended to seat the large number of monks requiring accommodation. In some churches the ritual requirements called for a second choir, and occasionally a second transept; and in others provision was made for nuns by the erection of galleries at the western part of the nave. Two towers formed the leading feature of the western portal.

Many ground-plans, illustrations of bases of columns, capitals from Gurk, Horpitz, and Heiligen Kreuz; friezes from Wiener-Nustadt, and Schwarz-Rheindorf; views of the cathedrals of Worms, Treves, Spire, and Limburg; Palermo, S. Marco Venice, Modena, Peking, and numerous monastery churches; fragments of faultless cloisters, marvels of portals, towers, snatches of other details of beauty, place this style before our eyes. Again, sculpture and painting became altogether subordinate to architecture, and if we may believe the wall-paintings at S. Savin, Schwarz-Rheindorf, St. Michael at Hildesheim, and Siena, the relief from Aquila and Pisa lost none of their power in so doing. The assimilation of antique traditions with Christian necessities being perfected, the Germanic mind began to make progress in new directions. Chivalry, a freedom of inquiry in religious matters, attended by a deeper devotion, a feeling of reverence for the female sex, the revival of the nation's poetry, all helped to bring about an entirely new spirit, "a presentiment of a fresh spring," which architecture expressed by the free, bold, graceful forms which we call Gothic, but which in Central Europe has been called "German," and "old German," although it was France, moved by the mighty social revolution of the Crusades, that first worked them out. Now, the pointed arch, before used superficially, became part of the construction of all edifices. The cathedrals of Rheims, Beauvais, and S. Maclou, Rouen, in France; the exquisite townhalls of Ypres, and Oudekerke in the Netherlands; a selection of German churches, a dazzling gable from S. Stephen's, Vienna, Münster townhall, and the hall of the Artushof, Dantzic, in Germany; glimpses of the cathedrals of York, Worcester, Salisbury; details from Exeter, Wells, and Westminster, in England; the cathedral of Drontheim, in Norway; the cathedrals of Siena, and the churches of Certosa and S. Petronio, Bologna, with a bit of the sweet Palazzo Buonaparte, Siena, in Italy; and the cathedrals of Burgos and Toledo, in Spain, are given as illustrations of this period of art. Dr. Lübke dwells long and luminously upon the plastic productions of this age, which kept pace in their development with the national mind. He says of them,—

"An animated striving, similar to that which we have seen in our considerations upon architecture, long laboured at the remodeling of the old forms; and about the middle of the thirteenth century, a new style had resulted, which was indeed in every respect different from that which Romanesque art could have produced. Scarcely, however, had this form reached its perfection, than it spread as rapidly and uncontrollably as Gothic architecture had done over the whole Christian world of the West, and was adopted with one accord by all; thus affording testimony of how completely it expressed the feeling of the age. The whole of the fourteenth century adheres resolutely to the new style of art, which on this very account soon became conventional, and often degenerated into external mannerism, just as the tender homage of the Minnesingers was speedily transformed into courtly etiquette."

Much as we should like to tell our readers of the sumptuous sculpture, the wall paintings, the altar pictures, the rich glass-painting, the miniatures, the illuminations, given as samples of the art of those times, we must pass on, as we wish to notice the scantiness with which the creations of the moderns have been mentioned. Our regret is lessened, however, by the conviction that the indication we have given of the con-

tents of the work will induce those interested in art to read it. We turn over the teeming pages devoted to the Cinque-cento period and its palaces, its marvellous sculptures and thrilling paintings, the German wood-carving of the fifteenth and sixteenth centuries, magic work in bronze, feeling as we gaze upon so much of man's industry and intellect, as though we were in one of the treasure-houses of the world till our attention is arrested by the German estimate of our own position among art-wealth producers. England, in the nineteenth century, it sets forth, has no great importance in the artistic cultivation of architecture. Smirke's Covent-garden Theatre and Barry's Houses of Parliament are the only two buildings whose fame has reached the historian of art. "The most original and valuable of the later productions of English architecture," he says, "are the numerous large and small country residences in which a free picturesque element is successfully introduced." Three English architects only out of our present list are mentioned, and these are not associated by the faintest allusion with their works. Again, we are accredited with only three sculptors worthy of note, besides Gilson; and in a short catalogue of our recent painters, about a dozen in number including several who have laid down the brush for ever, we miss some of our chief artists. This shows us it is easier to take a comprehensive view of the past than of the present: the latter is too vast, too full, too varied for measurement by mortal man. While acknowledging the difficulty, Dr. Lübke generalizes in this way:—

"The interest which different nations take in the development of the art of the present day is of characteristic importance. Foremost stands Germany, from whence the recognition of art, rich as it is in future promise, emanated. . . . Next to the Germans, the French grasped the antique with similar enthusiasm, in order again to bring back art to seriousness and depth, to moderation, and to beauty. . . . Since the liberation war there has been again in Germany, as in France, a national art which conceives and fashions its special tasks in its own distinct style. Belgium and Holland have also possessed since that period a revised culture of national art, and England has displayed, more than in former centuries, the stirrings of an independent artistic power, which has arrived at able results in many branches of art. The South, on the other hand, is strikingly behind other lands in artistic production. Neither in the Pyrenean peninsula nor in the Italian have any important works been recently produced."

When we have had shown us, in this compact manner, so much of what man has essayed to do and succeeded in doing in all ages and in all places, and we look upon the brilliant mass of brainwork, impressed with its earnest striving, its gradual attainment of eminence, and its still ripening power, we feel a conviction that if this were taught in our schools, if the young, let them be ever so rough and rude, were shown this mighty panorama of man's endeavour and success, their lives would take more elevated tones. In all probability some aspiration would shape itself and fill many a breast otherwise callous. No one could sit down content with dirt, disorder, idleness, or grovelling, who knew of all this industry, this beauty, and poetry achieved by other men. Surely every one would long to add a link to the glorious chain, and so he lifted up out of their unsavouriness, unstrained, laziness, or sordidness, as the case might be. We cordially commend Dr. Lübke's comprehensive work, not the less because we find in it the basis for such a popularization of the history of art.

THE ARMOUR AT SOUTH KENSINGTON.

THE MEYRICK collection of armour and arms is now set up in the long gallery bounding the gardens of the Horticultural Society. The armouries were called in Mr. J. R. Planché, Somerset Herald, and under his careful direction the whole has been set up chronologically; Mr. C. Pierce and Mr. C. C. Black having been his chief assistants. Each reign is marked out by banners of the livery colours of the Royal Houses, separated by a slight fence formed with weapons of the period,—a capital idea, as thus, while mistake is prevented, the *coup d'œil* is not interfered with. The general effect is very fine; the collection, indeed, has never been seen properly before, and an artist may go into each bay, and for the first time, so far as we know, feel certain that everything around him belongs to the period concerning which he is in search of information. Many lessons are quietly taught by this arrangement, and if it do not lead to the reform we have long called for in the national collection in

the Tower of London, we shall be as much surprised as we are that the jumble there has been allowed to exist so long as it has been. As an example of the sort of lesson to which we refer, look at the breastplates. Arranged, as they are, chronologically, the gradual alteration in the form which took place, serving to mark the exact date of a specimen, is at once observable. In the first instance they are globular, afterwards somewhat flatter, and then they are seen to have a line running down the centre. In a succeeding reign, this front line becomes pointed close up to the neck; gradually the point comes lower, until, in the time of Elizabeth, it is seen only in the shape of a recession of the breastplate at the waist. With the pistols, again, by keeping those of each reign together, any distinctive peculiarity is at once obvious; thus, while in a previous reign all the handles are seen to have a globular termination; in the reign of Charles II. the globe is elongated.

To go a little into detail: the first bay is appropriated to works of early art, some of them unmatchable; the other bays range from Henry VII. to William III. Foremost in the first bay will be observed the gilt bronze coating of a shield, made by the Britons (or, as we would rather say, the Gauls), in imitation of the Roman scutum. This priceless and beautiful work was found in the bed of the River Witham, Lincolnshire, with several broken swords and spear-heads of bronze, and presented to Sir S. Meyrick by the Rev. H. W. Sillithorp. The umbo, or boss, is studded with pieces of red cornelian. "The ornament," Sir Samuel remarks, "is just such an attempt to rival Roman art as would be made by a less civilised nation." During the recent examinations the fact has been arrived at that the rude figure of a lion was originally pinned on to the face of the shield: the pin-holes are visible, but it requires a peculiar position to detect the form. Above the shield is a British or Gaulish helmet matching it remarkably. A few corroded sword-blades, hoses of shields, and a spur or two, form the total of the military remains as yet discovered of the Saxons, the Danes, and the Normans. Of their personal ornaments, there exist ample and rich collections, but from the perishable nature of their body armour, which was principally composed of rings or small plates, of various forms, stitched upon leather or linen, no authentic specimen has descended to us. Within the last ten years, four or five helmets of the twelfth and thirteenth centuries have been discovered; but previously to the death of Sir Samuel Meyrick in 1848, no armour was known to exist in England of a date earlier than that of the helmet and gambutes of Edward the Black Prince, preserved by good fortune rather than good guardianship in Canterbury Cathedral. Amongst the head-pieces exhibited, is the jousting helmet of Sir Richard Poynter, who died in 1375, and which was formerly suspended over his tomb in Hereford Cathedral. It was presented to Sir Samuel by the dean and chapter! A masked horguinet, with a vizor made to represent a human face, with formidable monstaches, is curious. This species of helmet, taking altogether more the shape of a human head, had its name from its being of Burgundian origin.

In this same compartment is the beautiful ivory saddle, engraved all over with love verses in old German, and with the figures of the two personages whose sentiments they express carved in high relief and in the costume of the time.

The collection includes twelve mounted figures in full panoply; some of them as in the act of tilting.

The earliest complete suit in the Meyrick collection, the first mounted figure in the gallery, dates from about 1445, the reign of Henry VI. Although the era of complete plate is assigned with good reason to the previous reign of Henry V., and the armour of that time possessed characteristics which could not easily be mistaken, it is a singular fact that in no public or private collection in England, France, or Germany, we know of, nor in the works that have been published illustrating the armouries of Russia, Spain, and Sardinia, is there to be found a suit which could be confidently ascribed to an earlier date than 1425. The tilting helmet, saddle, and shield of Henry V. are almost out of sight, over his tomb in Westminster Abbey, and helmets and spurs of that period are to be met with occasionally. Some basinetts will be found in the present collection, but not a fragment of the long steel coats that were worn at Harfleur or Agincourt has been as yet identified. In the Tower of London, in the Amhras Collection at Vienna, and elsewhere, the earliest suits present

the same features as those to be observed in this mounted knight. The headpiece is the salade—so called from the Italian *salada*—introduced to England apparently in the reign of Henry VI., though the basinet continued to be worn with and without the vizor. The peculiarity of the salade consists in its covering only the upper half of the face, a horizontal aperture being made for the sight, as in the earlier tilting helmets, and projecting considerably behind, where it terminates in a peak like the Knight's chapeau, which was usually worn over it. The lower portion of the visage is guarded by a piece called the hanse col, rising above the chin, and almost meeting the rim of the salade. The breast and backplates are of exquisite form and workmanship, and are fluted in the most tasteful manner, imitating the gatherings of some textile fabric. The sollerets, or steel shoes, are sharply pointed, a distinguishing characteristic of this epoch, and the outlines of all the pieces extremely elegant. It is of German manufacture. On the left arm is a fine shield, also German; the notch on the side was called the *bouche*, and was made for the passage of the lance. It does not appear before the reign of Henry IV. in England. The bright suit, stamped with the Nuremberg arms, denoting the place of its manufacture, was brought from Vienna by the French General Amielle, and is assigned by tradition to Maximilian king of the Romans. The black and gold one is said to have belonged to an Elector of Bavaria. We must not attempt, however, a complete account; that will, doubtless, be given by our contemporaries of the daily press at the proper time. But we must briefly point out the fluted suit, date about 1495; the singular puffed and slashed suit, in imitation of the dress of the day, A.D. 1510; and another, with cuisses, ribbed and engraved with a masterly freedom, in the very best style of the German school; the black armour of a Knight of St. George of Havana, A.D. 1525; and the suit of Genoese armour, with raised white ornament on a black ground, the prototype of the embossed armour, which indicated the rapidly approaching confession of its intility as a personal defence by the elaborate art lavished on its decoration.

We repeat the expression of our desire that artists will make good use of the opportunity now open to them. In an account that was written of the armour exhibited amongst the Art-Treasures at Manchester in 1857, Mr. Planché tells a story which is not without its lesson. Sir David Wilkie consulted him respecting the now well-known picture of John Knox preaching the Reformation. He was desirous, he said, of being very correct in the costume he had introduced, and requested a candid opinion upon it; the picture being then finished, and ready for removal to the Royal Academy, for the purpose of exhibition. On its being pointed out to him that he had introduced in the gallery of the church, military personages wearing the barred helmets of the time of Charles I. in the reign of Mary Stuart, he replied that his reason for so doing was, that these persons were to be supposed as having visited the church with a desire to be unknown; and yet he had actually selected the open headpiece of the seventeenth century, through the bars of which the face was distinctly visible, in preference to the helmet of the sixteenth, the closed vizor of which would have defied scrutiny! The glaring absurdity of this anachronism was, notwithstanding, allowed by the painter to remain, and to be disseminated by the burin of the engraver, although it might have been remedied in half an hour, with as much advantage to the effect of the picture as to its historical accuracy. This reminds us of one more creditable to the taste of another Royal Academician. Mr. A. Cooper, while at work on the "battle of Bosworth," consulted Meyrick as to how King Richard III.'s horse should be caparisoned. "In silk housings, embroidered with the royal arms," was the answer, "covering the steed from his ears to his hoofs." "Oh!" exclaimed the mortified artist, "that will never do for me: my principal object is to paint White Surrey, and if I cover him from head to foot, as you describe, I may as well not paint him at all." "But," rejoined the antiquary, "you tell me the moment you have chosen is that in which Richard made his last desperate charge. Now, as this was at the close of the battle, the caparisons of the horse would probably by that time have been cut and torn to shreds, and the colour and anatomy of the horse in that case might be rendered sufficiently visible for your purpose." Cooper jumped at the sug-

gestion, and what was the result?—the silken housings rent to ribbons, streaming in the wind, and adding to the horse, tell of the fury of the fight, and satisfy the archaeologist, while they display the peculiar genius of the painter, and give additional effect to the picture.

Amongst the fire-arms at South Kensington, dating from the commencement of the sixteenth to the close of the seventeenth century, will be found the dragon, so called from the head represented at the muzzle, and from the use of which the troops now known as dragoons derived their name; a hand-mortar of the time of Elizabeth, for throwing grenades; a snaphance, a blunderbuss, wheel-lock pistols, and dags of various dates. Here is also a matchless cross-bow of ivory, of the time of Henry VI., carved with figures in the military and civil costume of the period, and shields of arms, amidst which that of Bavaria is conspicuous; and, as a curiosity, notice the bâton of the renowned Duke of Alva, presented to him by Philip II. of Spain. It is of steel, hollow, to contain the muster-roll of the army, and covered outside with Arabic numerals in gold, with divisions of silver on a russet ground. These are the results of calculations, according to the system of warfare in the sixteenth century, by which the general is apprised what number of men would occupy any given space.

Two of the chief treasures in this collection are the targets of the Emperor Charles V., and of Francis I., King of France, with which we must end our notice of this part of the collection. The first is the work of Hieronymo Spacini, a Milanese artist, whose name is engraved in the centre, around the spike underneath the two gilt cinquefoils. It is of steel, and ornamented with forty-eight gilt engravings, on a groundwork of niello, arranged in four concentric circles. The innermost represents the twelve signs of the Zodiac; the next, twelve subjects from classical mythology; the third, twelve incidents in the life of the Emperor; and the fourth, as many illustrations of Holy Writ. As the latest historical event represented on it is the submission of the Landgrave of Hesse, which took place in 1547, it is presumed that it was made about 1550. The companion to this valuable relic, the target of Charles's great contemporary Francis I., was exhumed in France, and has suffered greatly from the pickaxe, which was struck through it. The design is attributed to Giulio Romano, or his contemporary Primaticcio.

Half a dozen lines and then, with renewed congratulations to all concerned in giving the public this exhibition, we close our account. A second gallery contains a number of examples of Eastern arms and armour, some very fine ivories, a case or two of miscellaneous antiquities, and a few pictures. A small frame amongst the latter may or may not attract attention; it contains two miniatures by Holbein,—one, King Henry VIII.; the other, Anne of Cleves. Without information they would be looked at with careless eyes. We have seen a good many portraits of these individuals, some of them better than these. With what different feeling, however, must they be regarded when it is known that by these portraits were brought about their marriage. It was at sight of this very miniature, in 1540, that the king fell in love with the lady whom he designated, when he saw her herself, a Flanders mare, and put away from him a few months afterwards!

SEMAPHORE STREET SIGNALS.

The semaphore signal-post, that has been erected by Messrs. Saxby & Farmer, railway-signal engineers, to the order of Sir Richard Mayne, with the authority and sanction of the late Secretary for the Home Department, at the south end of Parliament-street, Westminster, has excited some attention. The signal-pillar is of cast-iron and hollow; the rods and cranks by which the signals are worked, and the gas-pipe by which the lights are supplied, being adjusted and carried up in the inside of the pillar. It is 24 ft. high from the level of the street refuge upon which it stands. The base of the pillar is octagonal in form, and about 20 in. in diameter at the bottom. It tapers upwards, and has projecting mouldings returned round the top of each of the sections from which it contracts. The upper portion of the shaft is round, and has a spiral head, from about half height to the neck. At the top there is a box, from which lights issue, corresponding, as regards the colours shown by them, with the

position of the semaphore arms, displayed immediately below them: red for stop, and green for caution or walking pace, for vehicles or horses while passing over the crossing. The stop position of the semaphore arm is the horizontal, and the caution position the angle of 45° at its junction with the pillar. The mode of working will be the same by day and night: the same action will turn on a green light and drop the arm, or will show a red light and raise the arm to the horizontal position. The arms are 4 ft. long, 12 in. broad at the outer ends, and 8 in. broad at the necks. The complete apparatus should show four arms, and four lights to correspond with them; but in this experimental pillar, it has not been considered necessary to take power to stop the traffic in one of the four intersecting streets. There are accordingly three semaphore arms, and three magnifying discs of 6 in. diameter, which will each show red or green lights at night, in accordance with the position of the arms. The intended action of the apparatus is this:—When the signals are in their normal condition, that is, the semaphore arm dropped or a green light displayed, all vehicles and horses will be required to pass at a slow pace over the crossing. When the three arms are raised to the horizontal position, and red lights are displayed, the traffic, as regards vehicles and horses will be stopped across the end of Parliament-street, and between Parliament-street and Bridge-street, in each direction, in both cases. The traffic from Great George-street, to the right or left of the crossing, and on the west side of it, will not be interfered with. The signals are seen from the entrance to Birdcage-walk, from Westminster-bridge, from the end of Whitehall, and from Old Palace-yard, which is a great advantage as contrasted with the uplifted hand of the policeman, not seen until the crossing is reached. The arms are 18 ft., and the lights 20 ft. above the ground level. The pillar is about five tons in weight, and is set down about 4 ft. below the surface. Its foundation is a bed of concrete 6 ft. square, and a stone of about 4 ft. square, and 14 in. thick.

The whole of the apparatus for working the signals, including the arrangement for changing the colours of the lights, is concealed, excepting a horizontal bar about 9 in. long, which is pulled out from the side when the signals are set to "stop." The idea of applying the semaphore and colored light system of signalling, as commonly employed on railways, to the regulation of street traffic, originated with Mr. Knight, superintendent of the South-Eastern Railway, who made the recommendation to a select committee of the House of Commons, in 1866. He recommended it for the protection of authorized foot crossings; for narrow side-streets to stop the traffic in one of the directions; and for streets wholly or partially closed for repair, and the adjoining streets to which the traffic may be diverted.

DEATH OF THE REV. J. L. PETIT.

It is with deep regret that we announce the death of the Rev. John Lewis Petit, B.A., the well-known archaeologist and artist. His writings, his lectures at the Architectural Exhibition, and his bold and effective architectural sketches, in colours and pen-and-ink, are familiar to most of our readers. Some of his papers and a *fac-simile* of one of his pen-and-ink sketches will be found in earlier volumes of the *Builder*. Mr. Petit's death, ten days ago, was most unexpected, and, comparatively, sudden. A week or two since he visited London, and on his return to Lichfield, whilst engaged in his favourite pursuit of sketching, caught a slight cold in the neck. This speedily took a dangerous form, from which he never recovered.

He was born at the commencement of the present century, and was nephew of Louis Hayes Petit, M.P. Studying at Trinity College, Cambridge, he took his B.A. degree in 1823. He was a frequent contributor of papers on architecture and archaeology to various journals, and at the time of his death was engaged upon an illustrated description of Howden Church. Amongst his published works we may mention "Illustrations of Church Architecture," in 1841; "Remarks on Architectural Character, and on the Principles of Gothic Architecture as applied to ordinary Parish Churches," in 1846; "A Description of the Abbey Church, Tewkesbury," in 1848; "Lectures on Architectural Principles," and "Lectures on Architectural Studies," in 1854.

ARCHITECTS' CHARGES IN GERMANY.

On a former occasion, in giving an account of the biennial meeting of German architects held at Hamburg in September last, we briefly referred to this subject, promising to return to it so soon as the particulars should reach us. We are indebted to the courtesy of an occasional correspondent residing abroad, for a copy of a journal which enables us to elicit the subjoined information.

It appears that previous to the year 1855, the charges for professional labours were so arbitrary and various all over Germany, that the Architectural Society of Hanover determined to attempt the task of fixing those charges, and in issuing them obtained the adherence of all its members to the new rules; but their exertions did not rest here. Thanks to the insertion of the charges in various architectural publications, and in sundry professional pocket-books and almanacs, they obtained more and more voluntary adherents, until, in the year 1864, a second scale was issued at Stuttgart, for the use of those practising in Southern Germany. This was followed in the year 1867 by a third scale, issued by the Society of Architects and Engineers of Prague. But the Stuttgart rule found most favour for the time being, it being understood that the whole subject should come on for general discussion at the Hamburg meeting last autumn. Three distinct propositions, based on different principles, were accordingly brought up at the meeting, to be discussed and framed into one law, which should be binding throughout Germany. They came from Hanover, from Stuttgart, and from Berlin, although all three were founded upon the basis originally propounded by the former of those cities, namely, a general per-centage of four and a half, with modifications.

- I. According to the greater or lesser amount of artistic execution.
- II. According to the amount of the contract; and
- III. According to the greater or lesser amount of time and labour which may devolve upon the architect in superintending.

Hanover divided the former of these modifications into three heads, namely,—

1. Plain country-houses.
2. Middle-class town-houses; and
3. Costly private residences, public buildings, &c. &c.

Berlin made a similar division; whilst Stuttgart submitted five heads, namely,—

1. Town and country houses of a plain character.
2. Ordinary town-houses, and the plainer class of public buildings.
3. Houses of a better class, and somewhat larger public buildings.
4. Edifices of monumental character, mansions, &c.
5. Decoration and monuments.

The second modification, namely, that of varying the per-centage according to the amount, was also variously advocated. Hanover submitted eight scales of charges, as proper remuneration for works ranging from 75*l.* up to 150,000*l.*; Stuttgart had also a graduated scale for works from 600*l.* to 120,000*l.* in value; whilst Berlin, agreeing in the main to the Hanover scale, suggested that the highest charge should be on sums under 450*l.*, and the lowest on sums over 30,000*l.*

The third modification was that according to the time and labour expended. All three proposals agreed in holding that the charges should vary according to the phases through which a building, or a proposed building, had passed, although they differed in the classification of those phases. Hanover divided them thus:—

1. Sketches and rough estimates.
2. Working drawings and exact estimates, together with the necessary details, supervision, &c.

Stuttgart had three divisions:—

1. Sketches, plans, and estimates.
2. Details.
3. Supervision, and settling accounts of extras and omissions.

Whilst Berlin divided "time and labour" into no less than six heads.

We will not trouble the reader with the details of the discussions which these propositions called forth; he will probably be sufficiently contented to know the results, which were these:—

With regard to the classification of buildings, the Stuttgart division, which we have given above, was adopted. Coming to the second

head, that of a sliding scale, decreasing in proportion to the amount of contract, the meeting adopted the Hanoverian tables; whilst the third question, that of time and labour, was passed in favour of the Berlin proposals. But the question of four and a half per cent. on the costs, as basis to the modifications above given, did not finally pass without a very animated discussion. As a starting-point, it was agreed to suppose the erection of a town-house of the value of 30,000 thalers (about 4,500*l.*), and the amount of time and labour devolving upon an architect in such a case, was carefully gone into. Stuttgart demanded a remuneration of 1,936, Hanover 1,359, and Berlin only 1,200 thalers, being 6, 4, and 4 per cent. respectively; and it was only after a lengthened discussion that Stuttgart was outvoted, and the Hanoverian scale of 4½ per cent. was adopted,—a measure which Berlin was of course not unwilling to consent to.

THE TECHNICAL INSTRUCTION MOVEMENT.

A LECTURE on technical instruction has been delivered by Mr. John Plummer at the Bedford Institute, Bethnal-green. The Rev. Septimus Hansard, rector of Bethnal-green, presided. The lecturer described the condition of technical education on the Continent, and the advantages gained by Continental industry thereby. His thought primary education was the great want of this country. Let that be looked after, and scientific education would take care of itself. He recommended the study of mathematics, and explained the working of the Government Science and Art Classes, the Royal School of Mines, Whitworth Scholarships, &c. In responding to the customary vote of thanks, Mr. Plummer gave a short account of his career as a prize student of the Spitalfields School of Design, and was followed by the Rev. Chairman, who described the success of the Bethnal-green science classes, and the probable popularity and usefulness of the museum now erecting in Bethnal-green.

A public meeting has also been held in Poplar, at the All Saints National Schools for the purpose of inaugurating evening science classes for instruction in practical geometry and mechanical and architectural drawing, under the regulations of the Science and Art Department. Mr. Swiss, a first-class certificated science teacher, will conduct the classes, and an influential local committee has been formed to carry out the object. The Rev. T. W. Nowell, the rector, occupied the chair; and after a few introductory remarks, introduced Mr. Backmaster, who referred to the educational objects of the Department and the importance of scientific knowledge in developing the industrial resources of the country. He asked for earnest co-operation and sympathy in the work which had been commenced in that district. After speeches from some of the working men present, the meeting separated.

MIDDLE-CLASS SCHOOL, LONDON.

On Tuesday last, the Lord Mayor laid the chief stone of the new school about to be erected in Cowper-street, City-road. The superficial areas of the whole site is about an acre and a third. The buildings will be constructed of white Suffolk bricks and relieved by stone cornices. The architect is Mr. E. N. Clifton, and it is expected that the portion of the school already begun will be finished by August next. This block will form a rectangle of about 114 ft. by 60 ft., fronting Cowper-street, and it will consist of class-rooms and dining-room; in fact, of the rooms absolutely essential to the conduct of a school attended by 1,000 scholars. At a subsequent period, when the funds have been raised, it is proposed to continue the Cowper-street elevation by building a large and lofty room in which all the scholars may be brought together simultaneously. The buildings will leave a very large area available as a playground. The estimated cost of the block already begun is 16,000*l.* The addition of the large hall will make the cost as much again. This is independent of the cost of the land, part of the Finsbury estate of the Ecclesiastical Commissioners, and purchased from them for about 30,000*l.*, including two houses let on lease, from which a rental will be derived. The basement of the first block will contain a dining-

room for 400 or 500 scholars, living too far off to go home to dinner, and for whom a dinner will be provided at a cost of 6*l.* per head, and adjacent to the dining-room will be the necessary kitchens and cooking apparatus. On the ground floor five long rooms will be set apart for hats and cloaks. The remaining rooms on this and the two upper floors will be class-rooms, of which there will be seventeen, varying in size, but on the average large enough for a class of sixty boys. To facilitate marching out of the playground into the school, an inclined plane is substituted for steps; and to prevent serious accidents on the staircase, it is to be a square one, with flights of eight steps on each side, and a large corner landing between each flight; so that it will be all put impossible for a boy to fall down more than eight steps. Mr. Tite, M.P., had a prominent part in the ceremony. A site has been purchased in Southwark, upon which it is proposed to erect a branch school for the south side of London.

ACCIDENTS.

At Leominster Waterworks the arch of the newly-constructed reservoir, near the Newlands, has given way, in consequence, it is stated, of the large quantity of soil placed upon it, and the arch not having been built sufficiently strong. The cost of rebuilding it is estimated at about 300*l.*

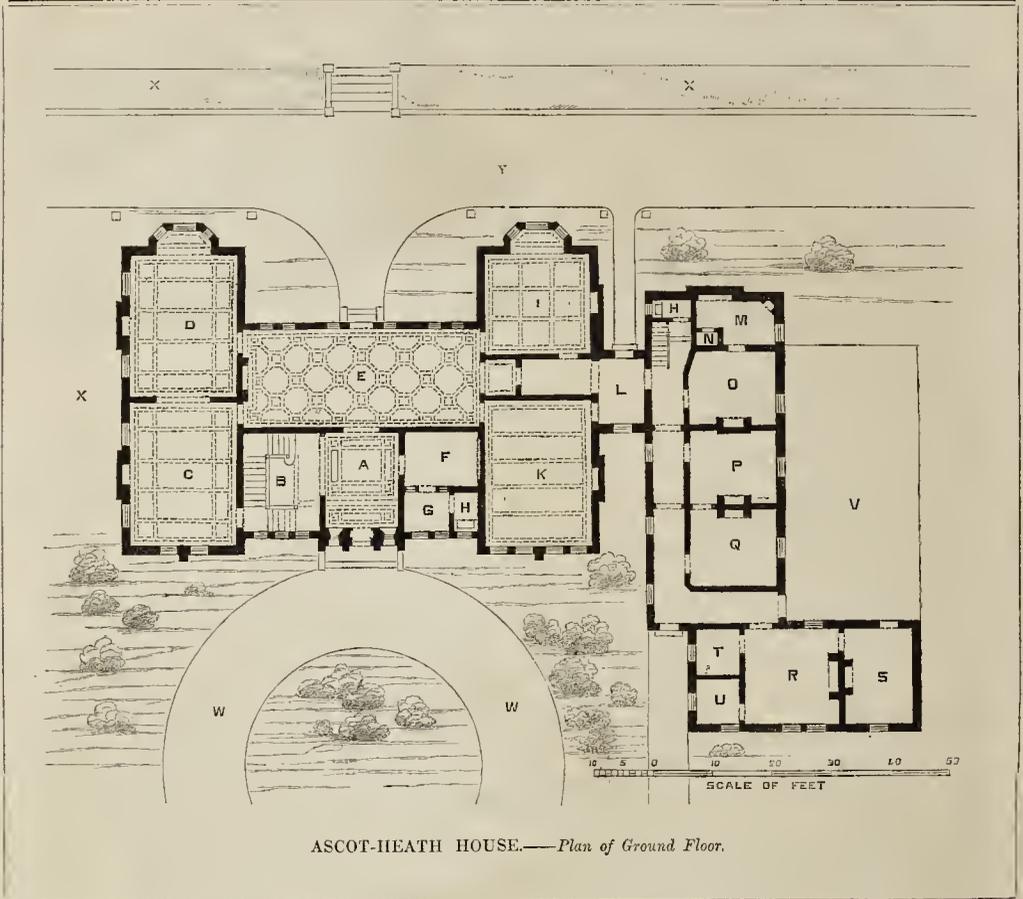
At Ileanor Church the wall opposite the chancel window has fallen, a great quantity of earth falling with it, as well as some grave-stones. To an onlooker the church appears to be in a dangerous position, being little more than a yard from what is now the edge of the bank; but it is said to be built on a good and sure foundation.

At the Killing Shambles, Sheffield, about 12 yards of a high brick wall, opeed with stone, the boundary towards Chandler's-row of the works of Messrs. Charles Chambers & Co., Castle-hill, has fallen, hocking up Chandler's-row with earth, bricks, and stone, to a height of 20 ft. or more. The outside of the wall, towards the "clammings-houses" and the killing shambles, is perhaps 40 ft. in height; but inside it is much less, owing to the higher level of the ground. For a long time past the wall has given signs of insecurity. The wall has cracked and bulged in several places. From the height of the ground inside the pressure on the wall must have been very great, and the bricks have also been considerably loosened by the percolation of the surface drainage water.

At Above Eign, Hereford, a house near the Ox-farm, and in the occupation of a working man, has fallen. The cottage in question was one of a couple standing alone and facing the trumpet ring; and it appears that a cutting had been dug alongside of it by some men in the employment of Mr. Inghes, builder, for the purpose of taking the pipes necessary for conveying the city water to the back of the premises; and it is to this circumstance that the disaster is attributable. The two houses were erected about fifty years ago. They were built without foundations to them, and the cutting mentioned scarcely exceeded 18 in. in depth.

SERIOUS ACCIDENT AT THE THAMES EMBANKMENT.

ABOUT twelve o'clock on Friday night an accident occurred at the portion of the works of the Thames Embankment between the Temple Gardens and Blackfriars Bridge. This portion is technically known as No. 3 Contract. The whole length of the contract had been piled and made watertight, and 100 men were at work within the wooden wall. The night men were just resuming work when the accident happened. A very strong wind had brought up an immense tide, and the roll of the waves was such as to shake the stant piles and bend them like reeds. An alarm was given. The night men hastily scrambled out, and at the same moment the water broke through the piles, which snapped asunder with a loud report. In an instant the whole trench was filled throughout its entire length, and an immense amount of damage done to the works. All the floating stagings were destroyed, and also a wooden bridge used for the purpose of filling the large barges of the scavenging contractors.



One of the engines used in the driving of the piles was thrown down and sank.

The work of removing the floating timber, the piles, and such portions of the puddling as were not destroyed by the water, has given employment to a large number of men. Many of the piles are broken short off at a considerable depth below the head of the river, and the work of extracting these stumps will be a slow process; and, until they are removed, no progress can be made with the resumption of the works. The cause of the accident was, primarily, an unusually high tide and heavy wind, which the hacking and struts are said to have been by no means sufficient to resist. The embanking of the section near the Temple Gardens and the approach to Blackfriars was so far complete as to have entirely excluded the water within the area between the piling and the land. Now, however, the whole of the area is covered at high tide just as before a single pile had been driven.

THE EASTBOURNE GAS-WORKS.

The new works commenced in May were formally opened on Saturday, the 5th of December. The coals are brought on to the works by the railway siding, and unloaded into smaller trucks, which are then raised by a hydraulic lift, and conveyed on an elevated tramway into every part of the coal-stores, which are situated on each side of the retort-house. The retort-house is built for eighty-four clay retorts, each 10 ft. long. The works are also provided with,—an annular condenser; two engines, which work the two exhausters, as well as the water, tar, and liquor pumps, and the hydraulic lift; a scrubber, 10 ft. diameter, by 20 ft. high; two purifiers, 12 ft. square, by 5 ft. deep (the two purifiers from the old works will be used in addition to

these); a brick gas-holder-tank, containing a holder 100 ft. diameter, by 24 ft. deep; a station meter; a governor; tar and water tanks, &c.; and a manager's house and offices.

The works were constructed under the superintendence of Mr. A. Williams, of Bankside, London, the company's engineer.

ASCOT HEATH HOUSE, BERKSHIRE.

This house, recently finished, occupies a pleasing and well-elevated site, near the race-course, and overlooking, at some distance, the railway, from which it is accordingly seen to great advantage on the south or garden front. The view we have selected for illustration is, however, the north or entrance front. The building is of red brick, relieved by Bath stone dressings and white brick string-courses, and the interior finishing is of simple, comfortable character, without display. The ceiling panelling, we may observe, is formed by nothing more elaborate than moulded deal ribs, put on after the plaster-work, and fixed through to the joists; and the effect is satisfactory, while the cost is insignificant. The ground-floor plan, which we are enabled to give, will explain itself sufficiently as regards detail; but a few notes on the general motive may be of interest.

The entrance being northward, and the garden southward, according to rule, there is an old lawn eastward, on which the side windows look from the drawing-rooms. Westward stand the offices, with access from the same approach as the house, and no outlook upon the garden. The central feature of plan is a gallery, 40 ft. by 16½ ft., one side of which faces the garden, with an extensive landscape beyond. A small entrance-hall opens upon the middle of the gallery, on the opposite side, affording space towards the north

front for the staircase on the one hand, and the cloak-room and gentlemen's lavatory on the other. Both staircase and cloak-room are attached to the entrance-hall, and not to the gallery. The usual family rooms are then disposed at the ends of the gallery, the doors of the dining-room and library opening from one end, and those of the drawing-room and morning-room from the other, the dining-room and library being placed, of course, towards the offices. These four apartments, therefore, can at pleasure be thrown open to the gallery, to form one extensive suite; it having been an essential part of the programme to provide for occasional receptions of a special character, without any sacrifice of the domestic simplicity and convenience of the dwelling for every-day uses. The communication with the gallery from the offices, in pursuance of this idea, is by a door in a recess, itself ornamental, and intended to be partially closed in by curtains. As the result of this leading principle of disposition, although the rooms, individually, are in every respect of the usual proportions and forms for family use, the aggregate suite for receptions attains the extent of nearly 150 ft. of available length, with the ordinary breadth of a room throughout. The upper floors contain the usual bedrooms. The workmanship is said to reflect credit on the builders, Messrs. Longmire & Brnge of London. The architect is Professor Kerr.

REFERENCES.

A. Hall.	N. Safe.
B. Staircase.	O. Butler's Pantry.
C. Drawing-room.	P. Store-room.
D. Morning-room.	Q. Still-room.
E. Saloon.	R. Kitchen.
F. Cloak-room.	S. Scullery.
G. Lavatory.	T. Pantry.
H. W.C.	U. Larder.
I. Gentleman's room.	V. Outbuildings and yard.
K. Dining-room.	W. Approach.
L. Servants-room.	X. Lawn.
M. Butler.	Y. Terrace.



ASCOT-HEATH HOUSE, BERKSHIRE.—PROFESSOR KERR, ARCHTCT.

W. H. WAINWRIGHT, ST. PAUL.

Spangell.

THE NEW BILLS IN PARLIAMENT.

THE time prescribed by standing orders for depositing plans and sections has expired. The total number of private bills lodged was 130, against 124 last year, and 179 in 1867. This number is not an indication of the number of bills that may be petitioned for, inasmuch as a large number of private bills, such as abandonment and finance bills, do not involve the purchase of property or the execution of works requiring plans and drawings.

The plans for the Metropolitan Tramways Bill, which Messrs. John Noble & Co. have brought forward for several years in succession, are, as already noted, again lodged, and now with a hotter hope of a successful result. The same promoters have in former sessions succeeded in obtaining their bills for Dublin and Liverpool. Another bill will be brought in for street tramways from Picnic to Lambeth, by Vauxhall Bridge, and from Lambeth to Peckham and Greenwich. It is now certain that gas and water hills, affecting the metropolitan supply of these important necessities, will be brought in of such a nature as to fully reopen these questions. As regards gas, indeed, it is known that the Board of Trade will either promote a bill directly, or through the Metropolitan Board of Works, the object of which will be to secure to metropolitan consumers, generally, such advantages as were secured to the consumers in the City of London by the bill of last session. By the Metropolitan Improved Water Supply Bill, for which plans have been lodged, the water question may be expected to be again fully discussed. The objects of this Bill are the storage and purification of the waters of the Thames above Medmenham, and the construction of the necessary reservoirs and works for bringing the water to the metropolis. The plans have also been deposited for a West Surrey Water Bill, and for Water Bills for Edinburgh, Greenock, Manchester, Keighley, Oldham, and various other towns.

There are comparatively few bills to be introduced by what are called the great railway companies, that involve new works of importance.

Plans have been sent in for works for Belgrave and Chelsea, and for Westbourne Park. One of the most important drawings lodged is that which schedules the property in Westminster to be taken for the Government offices, to which we have drawn attention.

RAILWAY MATTERS.

FROM the return, recently issued, of the number of accidents and injuries to life and limb which have been reported to the Board of Trade as having occurred on all the railways open for traffic in England and Wales, Scotland, and Ireland respectively, during the year 1867, we take the total of the United Kingdom:—

Passengers killed or injured—	Killed.	Injured.
From causes beyond their own control	19	639
From their own misconduct or want of caution	17	8
Servants of companies or of contractors killed or injured—		
From causes beyond their own control	15	62
From their own misconduct or want of caution	99	23
Persons killed or injured whilst crossing at level crossings	10	2
Trespassers	57	5
Miscellaneous	1	1
Total	299	795

The total number of passengers conveyed in the year, in the three kingdoms, exclusive of season-ticket holders, amounted to 237,633,113.

The miles of railway open at the end of the year were 14,247, being an increase of 393 on the mileage of 1866.

The number of miles open in 1852 was 7,336, or about half the mileage of 1867.

The number of passengers conveyed in 1852 was 89,102,765.

The Doncaster and Hull railway, now in an advanced state towards completion, will shorten the route to London from the north. The line starts from a point near the Staddlethorpe Station on the North-Eastern, or the Old Hull and Selby line, and branches into the South Yorkshire line near to the Thorne Station. The new branch, which is about fifteen miles in length, effects a considerable saving in the distance which has at present to be travelled by those desiring to reach Hull and Goole from Doncaster, Sheffield, London, and the south. According to the present route,

passengers from Hull to London have to go *via* Selby, Milford Junction, Knottingley, and thence by the Great Northern, or by Boston, Louth, Grimsby, New Holland, and there cross the river. It will also open up a vast agricultural district, famed for potatoes and other produce, and place it within reach of the London and country markets. The engineer is Mr. Harrison, of Newcastle. The contractors for the bridges, &c., are Messrs. Butler & Pitt, of Stanningley, near Leeds; those for the line being Messrs. Brassey & Field.

ROADMAKING.

Sir,—Mr. Morgan, in his letter to you, says,—“I have the formation properly drained and well rolled before laying on the material, which consists of broken stone, 10 in. deep in the middle, and 8 in. deep at the sides (width of road not specified). . . . the broken stones laid on in three separate coats, each coat being well raked, watered, and rolled until it has become consolidated.”

The foundation of a new road ought most certainly to be well drained, but *not* well rolled before the metalling is laid on.

In making a new road, regard must be paid to the sort of subsoil on which it has to be made; and this must be borne as a motto,—a dry foundation; a smooth, impervious surface.

Nothing serves better for a foundation than slag, cinders, or other hard foundry refuse, 6 in. or 8 in. deep. Such stuff will not rot, but it will always remain a disintegrated body. Then it therefore acts as a natural drain.

Lacking the cinders, the next best foundation is a coat of 3-in. stones, from 6 in. to 8 in. in depth, not rolled; for unrolled they will act as key, or bond, for the metalling of 2-in. stones, which is to form the surface.

Rolling the foundation coat will destroy this key or bond for the subsequent coats, and will, in a degree, fill up all the interstices, which prevents the foundations serving as an auxiliary or natural drain.

Broken stone ought not to be laid either 10 in. or 8 in. in depth on the foundation layer, for the reasons given in my former letter. From 2 in. to 3 in. are quite sufficient, laid on in one coat. (I am advising as to *making* a road.) If Mr. Morgan would try the non-yielding power of a crust of consolidated metalling of 3 in. depth, he would agree with me. After the foundation of cinders or slag, 2 in. or 3 in. of metalling then should be laid on (the depth in the centre of the road should not exceed 3 in.), and the road brought up to a neat convex surface.

Now, coal-tar is an antiseptic or preservative; it is also a liquid cement; it is also impervious to moisture; it is, comparatively speaking, cheap. Then I should specify that hot coal-tar (for applying cold tar would be like attempting to spread frozen butter on new bread,—it could not be evenly distributed) should be spread over the road's surface. The tar should not be heated where everybody could be choked with the smell and smoke, but in some suitable place. To destroy as much as possible what is to some the unpleasant smell of the boiling tar, and to add to its binding qualities, distilled pitch, at about the rate of 2 lb. to 30 gallons of tar, should be boiled with it.

There can be no rule as to the quantity of pitch, as the quality of tar varies so much; in some places it is very thick, in other places it is very thin; perhaps owing to the more or less quantity of ammonia. I am writing now of tar, which at a temperature of 45° will weigh 12-16½ lb. per gallon, or 78-81½ lb. per cubic foot. To dry the tar as soon as possible, there should also be mixed with it about 3 lb. of sulphur to 30 gallons of tar. The tar might then be placed in an old water-cart, the distributor of which should hang very low, almost touching the road's surface, that the tar might not splash about; and if the road were dry, and there was a prospect of dry weather for forty-eight hours, the hot tar so prepared should be laid on in a moderate quantity, and then the road should be well rolled. Now, sir, I am neither a disciple of Mr. Adam (or Middleton) nor Telford. By both systems England's roads have been improved; neither system should therefore now be abused, and yet neither system will do now; any more than the musket by which she,—dear Old England,—has obtained such a *prestige* amongst the nations, and which, please God, shall never be made less. It, together with pipe-clay, pig-tail, hair-powder, and cross-straps, has given way to

the smart rifle, close-cut hair, and the waist-belt.

Telford's system of making a road was cumbersome, expensive as to time, and expensive as to money.

Mr. Adam's, or rather Middleton's (for he adopted and carried out Middleton's system admirably served its purpose; yet “lifting,” which was its novel feature, will not do now, as I have already pointed out.

A road's surface, however well formed, unless treated with tar as I have specified, must be pervious to moisture; then the moisture, penetrating the metalling, would lodge on the foundation specified by Telford; and, acted upon by frost, would “blow” the road, while in my plan it would drain off.

I specify a loose and yet a firm foundation to carry off any water that might per chance penetrate the road's surface, and also to act as an auxiliary drain for land-springs; and a water-proof surface, made waterproof by a cheap material—coal tar.

In the case of roads already made, and which therefore would receive their coat of metalling in the winter, when coal tar could not be used; the roads in the spring or summer, when there is a prospect of dry weather for a couple of days, should be swept clean of all dust (for that would absorb the tar), and then the tar applied, as already described.

The metalling would last longer, the road could be kept cleaner, and for a considerably less sum of money than now: there would be better roads. Tar, treated as I have specified, is far superior to asphalt; it is cheaper, and it is not affected by heat.

“A sprinkling of finely-sifted road-scrappings may be used to facilitate the setting of the stones.” I disagree with Mr. Morgan. Why should mud be scraped off a road, finely sifted, and then put back again? Mud on a road, finely sifted or not, is “matter in the wrong place.”

And now for Mr. Baylis's letter in your last issue.

Mr. Baylis says that “the last generation of engineers” acknowledged the superiority of Telford's roads. Yes; but that is no reason why the present race of engineers should acknowledge the superiority of the system, or the present race of ratepayers either.

He also says that I—“Pro”—take exception “to the laying on of 6 in. of metal at one time. That was part of Telford's practice in making new roads.” As Mr. Baylis appeals unto Telford, by Telford shall he be judged. Telford's specifications are for *making* a road. Now, between *repairing* a road and *making* a road there is as much difference as between repairing a suit of clothes and making a suit of clothes. The London roads have been already made (after a fashion); they want now to be repaired,—in some cases, it is true, almost remade,—yet the term *making*, as Telford used it, cannot now be applied to them; for he made roads where before there were none, and therefore, regarding the London roads or any other existing roads, his advice as to *making* a road cannot be followed.

Mr. Baylis has “known 12 in. of metalling put on in one coat.” I have no doubt Mr. Baylis has known people out their throats, yet that is no reason Mr. Baylis should cut his throat.

I have given reasons why a coat of stone should only be a stone thick; yet Mr. Baylis does not question those reasons, but merely reiterates his advice to put on a 6-in. coat. I challenge him to give his reasons for putting on the thicker coat, and to name the places in town or country where such a coat is required.

“If you take the first coat of a well-constructed pavement, and the annual wear and tear, and compare it with a Macadamised road under similar circumstances, you will find the advantages are materially in favour of a pavement.” If Mr. Baylis's advice as to road-making and repairing he followed, I have no earthly doubt that the road will be cheaper, if it is at once paved with blocks of copper. I wonder if it is possible to ascertain the annual cost of the London roads at per mile.

Of course “paved surfaces are not always slippery”—who said they were?—but of whatever material they are constituted, if they are at all wet, they are slippery, and they are wet at least nine months out of twelve.

And again, who said that “we want an elastic surface that will obstruct heavy weights at every foot as they advance,” that Mr. Baylis should be led to remark that we do not want such a surface?

He agrees with me that “lifting weakens the

foundation of a road," yet he says, "I should lift if necessary, and the road was strong and would bear it." I should be glad to see the two sentences reconciled.

I did not recommend coating a road while it is "ankle-deep in mud." Of course, the mud should first be removed, of whatever depth it might be.

Calling the advice of laying on a thin coat of stone "absurd," is very easy to do; but that is not reasoning. Let the *reductio ad absurdum* argument be used first, if you please.

If the quarry in which the stones are quarried is at all fit for its object, no dirt whatever is collected in the course of quarrying them, carting them, or breaking them. How can there be when every stone has to be handled by the quarryman as he flings it into the cart? If they are then placed in a suitable depot for breaking, they certainly cannot get dirty by their being broken, and they certainly cannot get dirty by their being shovelled into the carts that they may be taken to the place where they are to be spread.

It must be patent to all that my system—this system I recommend—is infinitely cheaper than any other existing system. I have given my reasons for asserting that it is infinitely better. For many years one system has been alone tried; it has been proved, to every one's dissatisfaction, that it is bad; then, let the system I now lay before you be tried.—Let it be fairly and properly tried; and, sir, both you and I will live to be earnestly thanked for its publication. But before it can be properly tried, the managerial part of the present system must be altered; that is as bad as the state of the roads. Why should bodies of illiterate, unbusiness-like men, of no social standing, have the unlimited, irresponsible control of large sums of money taken from the rate-payers for the repair of roads; while the same men, or men superior to them, acting as boards of guardians, have a central board of control to direct, limit, and guide their powers? Ought there not to be, both for town and country, a similar board of control for roads? Turnpikes are being rapidly abolished and the roads hung on highway boards, which are notoriously incapable of managing the work they have already (I speak generally).

We should find it curiously interesting if we had a return from the recently constituted country highway districts, of the position or situation held by the different surveyors before they held their present appointments.

If London had one recognised Chief Surveyor of Roads (a Sir Richard Mayne or a Mr. Bazalgette amongst the road-makers), and London were divided into suitable districts, each district possessing a surveyor under the chief surveyor, I think Londoners would not only have better roads, but cheaper roads.

And if, regarding the country, there was either a Government Board of Control with a chief surveyor, who should also act as auditor of accounts for one, two, or three counties; or lacking that, a County Board of Control, with a chief surveyor, acting also as auditor, there would be better roads, and cheaper roads; and in both cases there would be order where now is chaos. Pro.

HOW TO KEEP OUT THE WET.

Sir,—I shall be glad of advice from any of your practical readers on the following subject.

I have built a house of slaty rubble, with an outer casing of brick, well bonded. The brick is a fire brick, exceedingly hard, of a light colour, which on being broken has the appearance of being composed of a kind of granite sand. The walls are 2 ft. thick, and are all built with Abergawne lime. The house is in a very exposed position; and in the first hard rain, the front of the house exposed to the weather became apparently saturated with wet, and has let in streams of water.

Since then I have had that side of the house pointed with Portland cement between the bricks; but even this does not keep out the wet, which finds its way through the walls nearly as badly as ever.

Is Ransome's Patent a cure for this? Or is there anything that can be put on over the brick facing which will keep out the wet except paint?

The windows of my house are of Bath stone or Portland stone, and these are found to be utterly inadequate to keep out the wet; the

Bath stone especially letting in the rain as if it were a drip stone.

Is there anything fit to build with in this climate except stucco or cement painted?

ANTI-SHAM.

From all parts of the country such inquiries as this reach us, and to a much greater extent than was the case a dozen years ago. Why is this? In reply to "Anti-Sham" we may repeat what we have often said before, that in some cases, where properly applied, the soap and alum process has had excellent effect on brick walls.

SOUTH KENSINGTON MUSEUM.

WHENEVER I am tired with every-day life, I find nothing brightens me up like a little dose of art: so to-day, being in the frame of mind referred to, I spent a couple of hours in the South Kensington Museum, my constant refuge in such cases. There I found, as usual, much that is fresh; notably, electrotype reproductions of the silver tables, one dating from 1680, the other from 1700, and of the gold-plate, lent recently by her Majesty the Queen, and which have been made under the direction of Mr. Geo. Wallis. For all artistic purposes, they are equal to the originals. The earlier table, which has twisted columns for legs, very much larger at the bottom than the top, oddly enough had these legs the wrong way up, I hear, when they came to the Museum, the capitals being viewed as bases. I was delighted with the terra-cotta life-size coloured bust of Dante. It is called Modern Florence work, I think. It has all the appearance of being a Medieval work, with the stains and damages of apparent age upon it. I was perfectly mystified for a minute, till I remembered the clever young sculptor who had misled the wise men of Paris and elsewhere, and, looking behind, I found this Dante was Bastianini; he died, just lately, and very sorry I was to read of his death; it seemed so sad to quench so much talent. This bust in the Museum stands in the left-hand or lean side of the first grand hall, in one of the openings to the side aisle, and just beyond those antique terra-cotta amphoræ encrusted with marine shells. What a singular effect this encrustation has. It gives the appearance of unfinished Dresden or Palissy work. In the corner of a glass case close by, on the right, there is a most carefully-worked jug in brown earthenware, inscribed "John Samuel Clach, born Jan. 16, 1781." Farther on is a case of Copeland porcelain. How fine it is! how delicate the rose-ground jewelled tazza! An adjoining case shows the work of Binns, of Worcester, and very capital most of it is. The Art-Union of London, by their "Norman Conquest," has supplied the subject with which one of the vases is decorated. E. W. Cooke's Venetian glass is a rich collection. What a delicate creation is the tall white spirally lined goblet and cover. The modern Venetian close by looks to me very coarse by comparison,—even that opal bowl which is turned up for admiration. Straight on, in a case against the wall, is a charming "child's head carved in wood by Mark Rogers." Coming out into the hall again, but quite close, in a glass case, the Staffordshire earthenware small host of Handel is clever; and this double pair of cream-white Leeds earthenware, 1770, are admirable. The Bow jug, in corner of case, is of wonderful fin, and semi-transparent, porcelain.

More in the middle of the same side, the two large Majolica vases seeming to be made of out and folded coloured paper, are worth looking at for their oddity. It is horrible taste, but the work is so well done: they are of the sixteenth century. Going into the second hall, where the large plaster casts are, the first thing that attracts the eye is the Abyssinian collection still there. These things make me wretched. The poverty of the articles in the farther case; the beggarly "tippets"; the poor sword with its uncomfortable handle, notched and rusted blade, worn-out scabbard and wretched band, and such a buckle! the poor priest's dreadful dinner-knife too: what could a people who knew nothing better than these things do against English civilization! And then Theodor's intended present to the Queen. I suppose it was proprietary, and therefore was the best he had to give; but what wretched rubbish it is. The one grand robe, worn on the 8th of April only, and "probably to encourage his troops," was got up in a grand hurry, evidently, for in many places

the "tacking-threads" have never been taken out.

The bequest from Mrs. Louisa Plumley to the S. K. M. did not entrance me much. It is wrong to look at gift-horse, &c.; but surely the collection is not strong in respect of art. There are certainly two Pasticci and one Cosway, but I think very inferior to what I have seen; and, as to the Essex enamels, I care but little for any of them, excepting the Gervartins after Vandyc, which, in my humble opinion, is a gem, and worth all the others put together. The "Ecco Homo," however, must not be overlooked. The wrought-iron gates by Barnard, Bishop, & Barnard, of Norwich, from Paris Exhibition on loan, disappoint me notwithstanding your good words concerning them. The work is rough and unfinished, and the long bas-relief panels are stiff and ugly. Turning to the Prussian gates beside them, oh! what a humiliating contrast (excuse the spleen). And, as I am grumbling, I think S. K. M., which sets up to teach the whole world, should do something better than this sentences (in the description of that beautiful Turkish pulpit from a mosque recently pulled down): "Many traces . . . are still traceable upon the woodwork; but so disfigured by the coarse work of later ages." . . . How cleverly done are the plaster casts of the "eleventh or twelfth century" Norwegian doorways. But for their being darker in colour than the original, it would be impossible to distinguish them as imitations, were they not labelled. The very veins in the wood, at the edges where the softer part had worn away, are given; and small holes looking as if worm-eaten.

By the way, what a nice, honest, semi-English letter that is from D. Juan den Brink, of Rotterdam, in your last, anent painting on zinc. Surely an editor's must be a pleasant occupation when it brings such gratifying little bits of recognition and appreciation even from distant lands.

ART-LOVER.

BOSTON CHURCH BELLS AND CHIMES.

The famous tower of St. Botolph's Church, Boston, is now furnished with a *carillon*, or a set of chimes, on a very extensive scale, of which I give a short descriptive account.

The set of chimes consists of the old peal of eight bells, in the key of E flat, the weight of the tenor as recast with additional metal being 27½ cwt.; a new series of thirty-six smaller bells tuned to the chromatic scale, and an assemblage of mechanism. The tower also contains a clock, which strikes the quarters,—à la St. Mary's, Cambridge,—on two of the larger bells of the new series, G and F, and the first and fourth of the old peal, E flat and B flat, the hour being struck upon the tenor.

The new series of bells, thirty-six in number, were made by H. Van Aerschoot, of Louvain, who recast the tenor of the old peal, in 1867-8; while Messrs. Gillett & Bland, of Croydon, constructed the chime mechanism during the same period.

A fund for defraying the expense of the undertaking was raised partly by public subscription, commenced by Mr. William Simonds, Mayor, A.D. 1865, and partly by a bazaar held in 1868.

Several conflicting and absurd statements respecting the bells and chimes having appeared in certain public journals, I will now add two or three remarks.

The bells forming the new series are well cast, and, generally speaking, in tune one with another, and also with those constituting the old peal. But the quality of tone of the former is not truly homogeneous with that of the latter. This is attributable to many of the bells in the new series, especially those in the lower part of the scale, being made rather too small and too thin for their respective notes. Hence the comparative weakness and peculiar character of the sounds produced.

With regard to the machinery, I may observe that, instead of a wooden barrel, the pins of which are fixtures, the finest *carillons* in Europe have each a hollow metallic cylinder, which is so constructed, as I stated long ago, that any appropriate tune or tunes can easily be set upon it by any intelligent musician. And as the pins of the cylinder are movable, by merely turning the nuts of the screws, new tunes can be substituted for the old ones on the same cylinder as often as you please. The machinery of the chimes at Boston, however, has a mahogany barrel, so that whenever a new tune is required, it will be necessary to send to London for some one to "prick the

barrel," that is, to insert new pins into certain points of its circumference at measured intervals.

Here, however, it is but fair to note that Messrs. Gillett & Bland have carried out the work according to their designs and specifications, and to the satisfaction of the committee. Moreover, the same may be said of M. Van Aerschoot.

The chimes committee and others are entitled to much praise for the time and attention which they have devoted to the undertaking; and it is to be hoped that, in the course of a few weeks, the inhabitants of Boston may have cause to say,—

"Soon your sweet chimed the appointed hour will tell, For here to music Time moves merrily."

I should state that the cost of the undertaking will be about 1,300l. THOMAS WALESBY.

THE NICOLSON PAVEMENT.

SIR,—I am neither a bricklayer nor a road-maker, neither a carpenter nor a bricklayer, yet your journal is duly read by me every week; and it is my wish that the greater interest were felt, generally, among non-professional readers, in the many subjects of public utility that are treated of in the Builder. When in America I read, for the first time, in some of the Western cities, for the Nicolson pavement. Many a ten minutes or a quarter of an hour have I stood to witness the beating down and evening of the street beds, the stepping of the small oblong wooden blocks; and, finally, the pouring over them a composition of what kind I know not. Compliments began to be made before I left as to the greater cost of the Nicolson pavement above other kinds; and many a warm and angry controversy has taken place in municipal councils on that subject. The newspapers have recently stated that it does not last more than half a dozen years.

SHEARON.

A SCALE FOR DRAWINGS IN PERSPECTIVE.

IN answer to Mr. Strong's inquiry, it will be well first to review the principles on which perspective drawings are made. To make a geometrical drawing of a building of say 60 ft. in height, we should require a surface of 60 ft. multiplied by the width of such building, but such would be a waste of space; we therefore find it to be expedient to make a drawing of perhaps 1/2 of the full size, and which is, in fact, a drawing of an imaginary model made to the scale of the drawing.

In perspective we are compelled in like manner to draw a representation of an imaginary model made to a scale to suit the size of our paper. If a model were made, and if we conceive an imaginary transparent substance, through which we can pass threads at pleasure, and which we shall consider to be our paper, and designate "The Picture Plane" and if the picture-plane be erected near to or touching one corner of the model, and a point in space, and on the opposite side of the picture-plane be made to represent the eye of the spectator, and designate the point of sight, and to be sufficiently distant from the picture-plane to prevent the vanishing lines from decreasing their ordinates too rapidly; then if we were to strain a thread from each point in the model to the point of sight, the intersection of such threads with the picture-plane would be points in the picture; and if we could by some means change our transparent picture-plane into paper, we could complete the picture by drawing lines connecting the points we had already obtained.

All straight lines which in the model are horizontal and parallel with the picture-plane are vanishing lines; and if we take two such which are perpendicular co-incident, and which on the model are so many feet (taken from the scale that the model was made from) apart, then such lines produced till they touch the picture-plane will at such place be the same number of feet apart, and which will be the scale of the perspective; if the next point of the wall containing the two lines touch the picture-plane, then the picture will be the same scale as the model, if it come within, the perspective will be on a smaller scale; if without, on a larger.

Having a perspective and the scale given to us, we can ascertain as before, any heights we may wish for; but for horizontal distances we shall first require the height of the "horizontal line," which will be at the height that the two horizontal lines appear, which are of the same height but divergent on plan, and a straight line in our picture; we next require the distance of this point of sight from the picture, which should have been stated by the artist on his scale, and its relative distance from right to left; we next require to draw a plan, and by producing the vanishing lines on the picture till they cut the horizontal line we obtain the vanishing points, which will enable us to draw the vanishing lines on our plan; we can then in the picture drop perpendiculars from each point to a strip of paper and transfer such to the plan of the picture-plane, and the intersection of lines from the point of sight through the points transferred, and produced to cut their respective vanishing lines, will enable us to re-draw the plan, the scale to which will, as before, be determined by its position regarding the plan of the picture plane. HENRY AMBROSE.

SIR,—Your correspondent of December 13th asks if there are any means by which we can make a scale to measure perspective drawings, which could also be applied to measure perspective from nature. I am afraid the problem is as difficult to solve as the squaring of the circle. A drawing which is perspective properly speaking, has as its lines and planes undergoing such great varieties of foreshortenings that the difficulties in the way of a scale seem insurmountable.

I strongly suspect that the drawing alluded to was not a perspective view, but an isometrical projection instead. It is unfortunate that the mistake is often made in using the term "perspective" for an isometrical drawing,—a thorough misnomer,—and yet frequently met with in old books, and in some modern ones. Isometrical, as its derivation implies, signifies "equal measurement." An isometrical projection, sometimes incorrectly called "a bird's-eye view," can be measured by a scale attached to the drawing, because the foreshortenings are uniform, which makes this mode of projection so extremely useful in certain cases to both the architect and engineer, especially for small detail drawings. J. S. R.

A CAUTION.

SIR,—Allow me, through your columns, to caution others against undesirable visitors. The name of Rogers having been brought up to me this evening, I directed my servant to enquire his business. He applied for the address of the secretary of the Architects' Beneficial Society. I directed my servant to look after my coats, &c., in the hall, but before she could descend the visitor had hastily decamped. Having received several of these visits, I wish to caution others, that they, too, may be on the alert. THOS. CHAS. SORBY.

THE DUTY OF MEMBERS OF A BOARD OF WORKS.

SIR,—Referring to page 918 of your last number, any member of a Board of Works having a pecuniary interest in any contract executing under the Board of Works of which he is a member, forfeits his seat, and subjects himself to heavy penalties should he vote on any question before the Board; and which the latter would, no doubt, enforce on receiving information and proof. J. C.

A BLACK STAIRCASE?

SIR,—I should feel much obliged to any of your readers if they could inform me, through the medium of your journal, of any modern staircase, erected in either a small or large house, of slaty or ebonyed wood, the place and date of erection: if also they could refer me to any staircase of black marble entirely erected in any mansion. I am quite aware of oak, mahogany, ash, stained deal, stone, white marble, various coloured marbles, gilt iron, and bronze staircases; but an ebony or entirely black marble staircase I do not know. The effect of either, contrasted with gold and colour in the ceiling and walls, must produce that feeling of repose, richness, and solidity which satisfies the best taste. K. K.

WATERING STREETS.

SIR,—Will some of your readers be kind enough to state their experience as to the best mode of watering the streets of towns, and as to the practicability or otherwise of the hose and jet system? A SCRIBER.

THE MACCLESFIELD SCHOOL OF ART.

The anniversary general meeting of this school has been held in the Town-hall, which was crowded by its members and friends. Upon the platform and on the sides of the hall were hung numerous specimens of drawing, the work of the pupils of the school. Many of these were marked by a high degree of artistic merit, proving the excellence of the instruction given, and the amount of progress made. The most interesting features of this display were the designs for textile fabrics, applicable especially to the silk trade. It was admitted that in this specifically useful department the school had made, within the last two or three years, great advance, an advance calculated to exert much beneficial influence upon the local manufactures of Macclesfield. Mr. Henry Brocklehurst presided. The report of Mr. Ford, the master of the school, to the committee, &c., on the condition of the school, for the year ending November 30th, 1868, said,—

"During this period the artistic progress and designing capacity of the school have been very encouraging and gratifying. For the last six months the school has gradually enlarged the sphere of its operations, endeavouring to fulfil the hope expressed in last year's report, that we may expect that ere long the designs of the students may be produced in the fabric." We have tried hard to accomplish this, both by technical study in the history and designing practice, and the culminating point of our success for the year is the novelty of announcing that no less than the large number of sixty sketches or designs produced in the school have been purchased by a few of the leading firms of the town. This number cannot be compared with any previous year, inasmuch as it is the first in which the students' works have been sold and manufactured.

"This year, in March last, seventy-three students presented themselves for examination in 167 subjects, in which fifty-nine students were successful in seventy subjects; twenty being distinguished by the mark 'excellent,' and gaining boxes of colours, boxes of instruments, and scientific books; and the remaining fifty-eight gained certificates.

Comparison of results for the last three years,—1866,

16 successful and 3 prizes; 1867, 50 successful, and 15 prizes; 1868, 70 successful, and 20 prizes."

"To provide the staple branch of the silk industry and other industries of the town with efficient power and skilled designers, who would work with taste and practical knowledge, the school must be considerably enlarged, and possess suitable apparatus. To enlarge the school the Government would grant 2s. 6d. per superficial foot, or about 300l., and the approved plans have been estimated at 1,200l."

A testimonial, in the form of a good sum of money, was presented to the master at the meeting.

The committee of the school are shortly to bring forward the question of rating the town, in order to carry out technical instruction in connexion with the present school. The master has already studied the practical part of the silk business, and the success of the designs that are being manufactured is attributed to this fact.

ROYAL ACADEMY OF ARTS.

On Thursday, the 10th inst., being the 100th anniversary of the foundation of the Royal Academy, at a general assembly of the Academicians the following awards were made:—

- To Frank Holl, the two years' travelling studentship in painting.
To Herbert M. Marshall, the one year's travelling studentship in architecture.
Silver Medals were awarded
To Arthur Stokes, for the best painting for the life.
To Miss Kate Aldham, for the best copy made in the School of Painting.
To Edward T. Haynes, for the best drawing from the life.
To John T. Carter, for the best model from the life.
To Thos. Brock, for the best restoration of a portion of the frieze of the Parthenon.
To William E. F. Britten, for the best drawing from the antique.
To Thomas Brock, for the best model from the antique.
To Edward Locke, for the best specimen of perspective and sepiography.
To Philip Westlake, the 10l. premium for a drawing made in the Antique School.

After the presentation of the medals, the members and associates of the Academy met at Willis's Rooms, King-street, to celebrate its centenary of existence. The Royal Academy was founded on December 10th, 1768. We believe that in the course of the ensuing year the new rooms at Burlington House will be open to the public for an exhibition of the works of all Academicians and associates from 1768 to 1868.

THE PAYMENT OF ARCHITECTS.

It having been brought under the notice of the Council of the Institute of Architects that many public bodies, interested to carry out important works in the metropolis and elsewhere have lately endeavoured to arrange for the payment of the architects to be employed on such works by a fixed sum in each case, which sum has been less than the usual rate of remuneration recognised by the Institute, the Council have communicated to the members of the Institute the following resolution passed on Monday, the 30th of November, 1868:—

"That it is the opinion of the Council that the remuneration of architects by a payment of 5 per cent., with the modifications pointed out in the rules for professional practice and charges of architects, drawn up by this Institute in January, 1862,—is doubtless the law on the subject, and is the general practice throughout Europe and America. That it is, therefore, most desirable that these charges should be adhered to as far as possible, and that as little deviation should be permitted therein as the circumstances of any individual case will allow."

A LABEL ON THE PROFESSION.

At least we hope it is. Competition designs for a town-hall for Sydney have been submitted, and the Corporation having made their selection and awarded the three premiums offered, assertions are publicly thrown about that some of the architects besides those named, the Sydney French, besides some rhymes, conveying this charge, gives a full-page cartoon, headed "Rewarding the Prizes; or, Municipal Fiddle-winking" (whatever that may mean), wherein two architects are shown pointing out the merits of their respective designs to a fine fat, stupid old fellow, and at the same time putting into his hands, placed conveniently behind his back, one a bag marked 100l., the other a bag marked 150l. Is this a joke? If so, it is a bad one. Anyhow, the sooner the architects of Sydney put the matter correctly before the public the better.

THE TOWN HOUSE OF LORD SALISBURY.

The old town mansion of the Marquis of Salisbury, in Arlington-street, Piccadilly, is now being pulled down, and the site will be entirely cleared. Early in next year a new mansion will be commenced from the designs of Mr. Slater and Mr. Carpenter. One of the fronts will be in the Green Park, the other in Arlington-street. The block of buildings next the Park will be a private residence for the family. The main block will include grand reception-rooms, dining-room, and hall. Messrs. Lucas, Bros., are the contractors.

THE ARCHITECTURAL REMAINS OF INDIA.

It is satisfactory to hear that the proposal of Government to preserve records of the architectural remains in India is in course of being carried out. The *Bombay Builder* reports the proceedings at a meeting, held on the 3rd of November, to decide on a suitable object for the first efforts of the moulding, drawing, and painting party, which have been under training for this purpose for about six months. Dr. Wilson suggested Mount Aboo, and the ruins and remains in its neighbourhood, as possessing much artistic and antiquarian interest; Mr. Burgess, who exhibited a beautiful set of photographs recently taken at Palitana by Messrs. Sykes and Dwyer, was of opinion that this strange and wonderful city of temples should be first explored and copied. Dr. Bhuu Dajee offered some interesting and valuable suggestions. But, in consideration of the difficulty of getting to these places, it was finally agreed that the first attempt, which will necessarily be of an experimental nature, should be made at the temple of Ambernath, near Callian. This is of itself an interesting specimen of architecture, and its proximity to the School of Art here, the headquarters of the expedition, makes it desirable as a training-ground. The architectural draughtsmen who have been trained for this purpose by Mr. Molecey, the decorative painters from the atelier of Mr. Griffiths, and the moulders and modellers from that of Mr. Kipling, will accordingly proceed thither. Signor Domenico Mattei, an Italian formator who has had great experience in moulding large architectural works, will be the chief moulder for the present; while Mr. G. W. Terry takes the general supervision of the first essay, from which we confidently expect most interesting results. In process of time, as the staff gets to be thoroughly organised, it will be sent further afield, and the remains suggested at the meeting will be taken in hand.

IMPROVEMENT IN RAILWAY JOINTS.

MESSRS. JAMES ECKERSLEY AND DAVID MARTIN, two mechanical engineers, at present residing in Edinburgh, have invented and patented a new form of cast-iron chair, which bids fair to introduce a new element of strength and stability into the present mode of constructing railway joints. Their improvement consists in the first place of inserting, in a peculiarly constructed joint-chair, two cast-iron keys or wedges, which are driven home from opposite directions against the rail, and which are tied together with a single bolt and nut in a direction parallel to the rail; and, secondly, of casting on the inner surface of one side of this chair two projecting pins, which pass into elliptical orifices at the extremity of each rail opposed to the plane of the wedges, thus giving the necessary and secure provision for the expansion and contraction of the metals. The leading idea of the invention would, therefore, appear to be a combination of the chair with the fish-joint. It has long been a problem with railway engineers to discover some method of jointing more secure and economical than the present unsatisfactory process of "fishing" the rails; in fact, it is well known that a large proportion of the accidents which occur is due to the rupture of the rails at the suspended fish-joints. This problem the patentees profess to have solved, not only by reducing the risk of rupture to its lowest possible quantity, but at the same time by effecting a great saving in the cost of construction, and of maintenance in the permanent way. It can be applied without any difficulty to our present lines of rail; it has, we believe, successfully stood a comparative test on

the line of the North British Railway, near Portobello, for the last four or five months; and, also, it has been introduced by Mr. Cadell Bruce, G.E., on the railway at present constructing between Ballater and Braemar.

WORTH CHURCH, SUSSEX.

At the last meeting of the Royal Institute of British Architects, Mr. M. D. Wyatt stated that he had received a communication from Mr. Nisbett, well known as an antiquary, stating that the old church at Worth, in Sussex, was threatened with "restoration," and soliciting the intervention of the Institute to preserve this most interesting specimen of a purely Saxon church. The speaker expressed a hope that the subject would receive the attention of the Committee for the preservation of ancient remains in this country. Professor G. G. Scott and Professor Lewis bore testimony to the extremely interesting character of that church. The former gentleman stating that although there were two or three unfortunate cracks in the structure, he believed it would stand for 500 years longer without anything being done to it. The subject was referred to the Committee for the Conservation of Monuments. Attention was drawn in our pages some months ago to the proposed works at the church.

SCHOOL-BUILDING NEWS.

Malvern.—Madresfield School has been formally opened. The school is a plain Gothic red brick building, situated on the western side of the village church. It consists of a school-room, 18 ft. by 48 ft., and 25 ft. in height, and the schoolmaster's house. Mr. F. Preedy, of London, was the architect; and Mr. T. Garbutt, of Malvern Link, the builder. Mr. G. Streeter was clerk of the works. On the northern side of the church a house for the sexton of the parish has also been erected.

Great Horton.—The Schools belonging to the Primitive Methodists have been reopened, after having been enlarged. The schools, as they now stand, with the addition which has just been made to them, are on the plan of the letter T, the vertical line showing the building of 1860, which is one story high, and the horizontal line showing the recent addition, which is two stories high, 86 ft. by 22 ft. The lower story is joined to the large room of 1860 by an ornamental arch springing from coupled columns, and together they form a room having an area of 3,026 superficial feet, and 17 ft. high, the upper floor being divided into thirteen class-rooms. The left-hand corner of the T is filled by the two-story building of 1863, and the right-hand corner by a new building corresponding with it, 26 ft. by 16 ft. two stories high. These are also intended for class-rooms. The building is ventilated, and is heated partly by hot water and open fire. The architecture is Tudor. The architect was Mr. J. C. Hope, of Bradford, under whose superintendence the different works have been carried out by Messrs. T. Fearnley & Sons, masons, and Messrs. Ansley & Nowell, joiners; the executors of the late Mr. Mitchell, plumbers, Messrs. Cordingley & Sons, plasterers, and Mr. David Smithies, slater; and the cost of the whole, exclusive of the land and the previous erections and enlargements, is about 1,100*l.*

Plympton (Devon).—A National School building for about 100 children is in course of erection in this village, from a design by Mr. James Hine, architect, Plymouth. The site, on the south side of the ancient castle, and immediately adjoining the village-green, was given by the Earl of Morley. The style of the building is Early Pointed. The materials of the walls are local stone, freestone, and Lee Moor brick. Mr. Verren is the builder.

Ellenhall (Staffordshire).—A new schoolroom has been erected and opened at Ellenhall, for the education of the children of agricultural labourers. The schoolroom has an open timber roof, stained and varnished, and the exterior is built of pressed white bricks, with blue brick bands.

Gaddeley.—The new school has been opened here: it is of pressed red brick, with Bath stone windows and doorways. There is a clock-room attached, over which is the bell-turret; a traceried window in the north end adds very

much to the appearance. The interior of the room is lined with pressed bricks, tuck-pointed; the roof is open-timbered, and the woodwork is stained and varnished. The contract has been carried out by Messrs. Herbert, of Leicester, builders, under the superintendence of Mr. R. W. Johnson, of Melton and Leicester, architect.

Grimston.—The new parish school was opened a few days since. It is of brick, with stone dressings, and occupies a good situation facing the village green, from which it is divided by a cast-iron palisade fence. A bell-gable, on the west side, has one of Naylor & Vickers's cast-steel bells; and a large porch at the south end forms a cloak-room. The site was given by the Earl of Aylsford, and the building has been erected by subscription. Mr. R. W. Johnson, of Melton and Leicester, was the architect employed; and the contract was taken by Messrs. Whit & Woodford.

Books Received.

"PIECES of Pleasantry for Private Performance." By J. R. Planché. T. H. Lacy, Strand. We have had occasion on another page to speak of Mr. Planché's doings as an antiquary amongst the armour; here we find him as the genial writer of three elegant little pleasantries for drawing-room use during the Christmas holidays, on Christmas Eve, New Year's Eve, and Twelfth Night. They are titled respectively, "Stirring the Padding," "The Compliments of the Season," and "The King of the 'Bean,'" the latter being the most elaborate, but all within the capabilities of a "Limited Company." They are written with grace and wit, without a questionable word or thought, and will serve to make some merry evenings in many houses. They are appropriately dedicated to his friend of many years, Lady Molesworth, "one of the most genial geniuses of the Drawing-room."—Miss Mary Eliza Rogers is contributing to the *Art-Journal* a valuable set of papers on "Jewelry and Goldsmith's Work in Syria and Palestine," profusely illustrated with drawings by this very clever young lady herself. Her book, "Domestic Life in Palestine," is probably known to many of our readers. The article in the current number of the *Art-Journal* is particularly interesting, and includes an account of the Syrian mode of making the well-known filigree scroll-work. Her concluding observation is, that "the individuality of Oriental work is quite refreshing to one accustomed to see the ornaments which are manufactured by the gross, and by machinery, in Western Europe."

Miscellaneous.

SUICIDE OF AN ARCHITECT IN THE RIVER LEA.—Mr. Richards, deputy coroner, held an inquest last week, in Hackney, respecting the death of Mr. William Tabert Spring, aged nineteen years. Mr. Frederick Marrable, Whitehall-place, said that he was an architect. The deceased was related to him by marriage. He resided at 10, Camden-road, and was the son of the garrison chaplain at Bombay. He was an architect, and he had been articled to witness. His articles would have been completed on the 28th of December, 1869. For some time past he had been very desponding and strange in his manner. He was not in love. He was always sober and steady. The jury returned a verdict of suicide while of unsound mind.

OXFORD ARCHITECTURAL SOCIETY.—At the meeting of this Society, which was held on the 9th inst., Professor Westwood exhibited an Anglo-Saxon manuscript of the Four Gospels, of a date not later than the tenth century. Bound with the volume was a Lectiory, also in a fine state of preservation, and at the end, in a somewhat later hand-writing (about the year 1000), a copy of the letter from Fulco, Archbishop of Rheims, in which reference is made to Grynabald, whom tradition has associated with Oxford. There was good evidence to show that the book was probably written for the rich Abbey of Hyde, near Winchester. A lecture was delivered by Mr. E. J. Payne upon the Romans in Spain, in which he showed how much of the Roman customs and language had been preserved; and at the same time many other works, especially some fine aqueducts.

CRYSTAL PALACE.—The Christmas pantomime this year will be produced on Monday, the 21st of December, the Monday before Christmas Day, to afford the 25,000 season-ticket holders and schools and young persons home for the holidays the opportunity of witnessing it before the influx of visitors always drawn to the Palace during the first few days of the holidays. The pantomime this year has been undertaken by Mr. E. T. Smith, assisted by Mr. P. E. Hopkins. The scenery has been painted by Mr. Fenton and assistants. The scenes are more numerous and varied than have hitherto been undertaken at the Palace. The usual Fancy Fair will extend the entire length of the two naves.

DISCOVERY OF SUBTERRANEAN GALLERIES IN LIVERPOOL.—A good many generations ago the then Earl of Derby obtained leave from his sovereign to build a castle in Liverpool. On more occasions than one subterranean means of communication between the castle and different points of the river beach have been discovered, none of these, however, surpassing in interest one which has been brought to light in the area of the Exchange buildings. Here a deep excavation is being made for the cellars. In the course of this excavation, which is all through rock, a well-marked gallery has been opened up. It is cut in the solid rock, is fully 6 ft. in height by 3 ft. in width, and its crown is about 6 ft. below the surface of the natural ground. It runs almost directly north from the site of the castle, from which the Exchange is distant about 200 yards or more.

NEW HARBOUR WORKS AT CARNARVON.—The first stone of the proposed new harbour works at Carnarvon has been laid by the mayor, Mr. Llewelyn Turner. The proposed new harbour is on the north side of the town, near to the station of the London and North-Western Railway Company. It is not intended to supersede the accommodation already afforded, but will be an addition to it. At the same time the improvement of the present harbour is also contemplated. The estimated cost of the portion of the plan now about to be carried out is 24,000*l.*, which will be obtained from the Public Works Loan Commissioners under the Passing Tolls Act. The estimated cost of the entire works is 50,000*l.* Mr. Frederick Jackson, C.E., supplied the plans; and the contractors are Messrs. Bagbird & Jones; and the works are to be completed in about two years.

RESTORATION OF WORCESTER CATHEDRAL.—At a recent sitting of the chapter, the dean, at the request of the bishop, laid on the table a design for a new episcopal throne, prepared by Mr. Gilbert Scott, which throne he requested to have placed in the rearranged choir, as a memorial of his connexion with the diocese. Mr. A. H. Reynolds, provincial grand master of the Freemasons of Worcestershire, attended on the same occasion, and presented a design for a new stained-glass window, to be placed in the north side of the west transept, as a contribution towards the restoration of the cathedral from the Masonic body of the county. At the same time also a box, containing eight bags for the collection of alms, supposed to be the work of ladies of the congregation, was presented through the secret, the Rev. W. Rayson. In the great east window the inferior glass of four of the bottom lights has been replaced with new stained-glass. The restoration is, though gradually, yet steadily advancing.

THE LIVERPOOL PLUMBERS' ASSOCIATION.—The annual *soirée* and ball of the Liverpool Plumbers' Association has taken place in the large concert-room, at St. George's Hall. There were between 500 and 600 persons present, and the chair was occupied by Mr. S. R. Graves, M.P. There were also at the principal table.—Mr. W. Rathbone, M.P., Mr. James Samuelson, and the following master plumbers:—Messrs. Radcliff, Gardner, Merrick, Jackson, Casement, Dutton, Anderson, and Rogers. Shortly before eight o'clock, tea and other light refreshments were served up. The tables having been cleared, Mr. John Fairclough, secretary of the association, gave a short explanation of the objects of the gathering. He said that there was a benevolent fund in connexion with the association, and that owing to the stoppage of Barned's Bank they were left without resources to meet the calls made upon them by widows and orphans. The members of the association hoped that an appeal to the public would not be in vain, and that the ball would result in an increase to the means of the benevolent fund.

SOUTH WALES INSTITUTE OF ENGINEERS.—The general annual meeting of members was held at the Drill-hall, Merthyr, on Thursday, the 10th. The chair was taken by Mr. Beddington; and, after some preliminary business, the discussions on the paper read at the last meeting by Mr. Cope Pearce, on "Mechanical Ventilation," was resumed, and continued at considerable length. The discussion on the "Patent Fuel" paper, by Mr. Bassett, was also continued, and on "Over-winding," this latter subject formed the great feature of the day.

GAS MADE BY THE AIR-PUMP.—Atmospheric air charged with vapour from petroleum refuse, a kind of "gas" not unknown in this country, but now tried in America, and, of course, claimed as an American discovery, has been brought into use in Canada. An air-pump sends a stream of air through a cask of petroleum or paraffine refuse, and the "gas" thus made goes at once to a gasometer and fills it ready for use. The gas is said to be so pure and inodorous that it gives no warning of leakage, and it burns brilliantly. Private dwellings are provided with the apparatus, and make their own gas, as, perhaps, they draw their own water, by a little pumping!

PORTRAIT PAINTING.—Mr. Charles Mercier has just now completed, for the Junior Carlton Club, a whole-length portrait of Lord Napier of Magdala, which is calculated to advance the artist's reputation. The General is represented as giving orders in the field, the battle going on in the background. The head is very forcibly painted, and is understood to be a good likeness. Mr. Mercier will be remembered as the painter of the portrait of the King of the Belgians, presented to his majesty in commemoration of the reception given in Brussels to English Volunteers. This portrait has been engraved, and it is intended, by the sale of proofs and impressions, the artist having given the copyright to the committee, to raise a fund for prizes to be shot for alternately in Belgium and England. Amongst Mr. Mercier's works, a picture of the Rev. Thomas Wright (the prison philanthropist), in the "Condemned Cell," stands prominent.

MINCHESTERHAMPTON COMMON: A RIVAL TO MALVERN.—A limited building company is being got up for the erection of a hotel and villas on Minchinhampton Common, which is said by many of the medical faculty of Gloucester, and the West of England generally, to be an exceedingly healthy locality. The project is not one of money so much as of sanitary profit. The projectors are said to have no pecuniary interests at stake; and even the architect, Mr. Maberly, and the solicitor, decline all preliminary compensation for work done, or to be done, before the company are fairly at work. The site of proposed buildings has been secured for 500*l.*; and the buildings will cost 6,000*l.* in their complete form, according to the architect's plans, but it is proposed only to begin with one half of the sum. On the other hand, 12,000*l.* may be expended on the site taken, if the project be successful. Mr. A. Booth, of Gloucester, timber merchant, having by medical advice gone to Minchinhampton Common, and thereby, as he conceives, saved his life, has been the prime mover in the matter.

ELECTRIC TELEGRAPHS.—A Parliamentary paper with this heading has just appeared, and gives the Board of Trade returns concerning the names of all railway companies in the United Kingdom which construct or use electric telegraphs as part of their undertaking. These returns show that there are in England and Wales 904 telegraph stations or places from which messages are sent used for the public, or the public and the purposes of the railway jointly, and that 717 stations are used for the purposes of the railway only. The plant for these telegraph-grounds lines for the use of the public, or of the public and railways jointly, and 1514 miles of the same used for the purposes of the railway only. There are 7,353 miles of wire for the former, and 4,279 miles for the latter purposes. The total figures for the United Kingdom show 3,381 stations or places from which messages are sent open for the use of the public, or for the public and the railways conjointly; 738 stations used for the purposes of the railway only, the former class having 21,761 miles of posts and underground lines, and 90,668 miles of wire; and the latter 285 miles of posts, &c., and 4,969 miles of wire, the submarine cables representing a total length of 4,695 miles, with 8,146 miles of wire.

THE FINANCIAL POSITION OF THE UNDERGROUND RAILWAY.—The directors of the Metropolitan Railway Company have issued a circular to the shareholders in consequence of various statements in relation to the affairs of the company, and of various letters from the proprietors requesting information. The directors state that the company are in a position to maintain, if not to increase, the dividends which have heretofore been declared.

THE UTRECHT INDUSTRIAL EXHIBITION.—A meeting has been held in the Manchester Town-hall,—the mayor in the chair,—for the purpose of discussing the questions connected with the Industrial Exhibition proposed to be held in Utrecht next year. Baron Mackay, a Dutch nobleman, described the facilities afforded by the Dutch Government to intended exhibitors, by allowing the importation of articles free of duty, &c. He also dwelt upon the importance of the Exhibition both in a social and commercial sense. Mr. Strass, the vice-consul of the Netherlands, the Rev. S. A. Steinthal, and Mr. J. Maclure gave similar information to the meeting, and urged similar arguments upon it, the latter two gentlemen respectively moving and seconding the appointment of a local committee to co-operate with the Dutch association, which was carried unanimously.

METROPOLITAN IMPROVEMENTS.—At the meeting of the Metropolitan Board of Works on Friday, the 11th, it was decided that the Board contribute one-half of the cost of improvements to be effected by widening a portion of Narrow-street, Limehouse, at an estimated cost of 3,500*l.*, and by providing a new line of communication with Threes-Cott-street, at an estimated cost of 11,000*l.*, such contribution not to exceed 7,250*l.* The Board also contributed 4,007*l.* 10*s.*, half the cost of an improvement to be effected by the Commissioners of Sewers of the City, by setting back Nos. 66, 74, and 75, Newgate-street.—Mr. Shaw opposed all grants for improvements in the metropolis. The Board had not money to pay for improvements, and the burden of local taxation had increased to an extent beyond which the bulk of the ratepayers were able to contribute. He thought the Government should contribute towards public improvements, particularly as the Board owed the sum of 7,000,000*l.*—Mr. Collinson said the interest of 4,000,000*l.* was secured on the main drainage rate, and the remainder on the coal duties.—The solicitor reported that the Board had arranged for a loan of 50,000*l.*, for contributions to improvement. The costs attending the loan amounted to 119*l.*

ARMY FILTER-VAN FOR INDIA.—How to supply pure water to an army, whether in camp or on the march, in hot climates, is a question which has never been solved until the present time. Messrs. E. H. Bayley & Co., of the Steam Wheel Works, Newington Causeway, however, are producing an apparatus which seems to meet the desideratum. Their filter-van, which is specially designed for our army in India, holds 250 gallons of unfiltered water in a tank, enclosed in a wood casing, by which the water is kept cool in the hottest weather. The water is drawn in through suction hose, screwed on. A well-cistern is attached beneath the tank, through which the water passes to the filters. At the bottom of the well is a sediment trap, in which mechanical impurities settle, and whence they are drawn off by a cock at the bottom; in the same way also are impurities collected and drawn off from the filters. The filters are composed of a layer of sand, a body of charcoal, and another layer of sand. They are cleaned by attaching an air-pump to the sediment cocks, and sending a stream of atmospheric air through them. The water passes to the filters through sponges, and thence upward through the filtering material, flowing over into a receiver, from which it is drawn off pure by cocks at the tail of the van. The tanks and filters can be examined through man-holes. By employing the ascension principle of filtration, a much better result is believed to be obtained than by the downward system. Each of the two receivers will hold 25 gallons, which ensures a constant supply of 50 gallons of pure water. If the water be very bad it can be passed from one filter to another; the filters are also so arranged that they can be used singly or together. We understand that our military authorities are investigating the merits of Messrs. Bayley's filter-van, and that the Commander-in-Chief has himself inspected them with much interest, accompanied by a party of distinguished officers.

BLASTING GRANITE.—In one of the granite quarries, near Penryn, worked by Mr. W. Hosken, a large mass of good sound granite, after being carefully cleared of all obstructions, has just been moved from its natural bed some inches, by 50 lb. of blasting powder, confined in a bole 12 ft. deep and 61 in. in diameter, bored in the rock. The stone measures, at least, 40 ft. by 40 ft. by 12 ft., which equals 19,200 cubic feet, or 1,280 tons, taking 15 ft. cube as equal to one ton.

ROYAL GALLERY OF ILLUSTRATION.—Mr. and Mrs. German Reed's entertainment will again be presented on December 23, when Mr. Burdand's clever production, "Inquire Within," will be given. During the absence of Mr. John Parry, Mr. Frank Matthews will take his character, and a *debutante* of much promise, Madlle. Rosa D'Erina, will appear, not only in "Inquire Within," but as the heroine of a new musical extravaganza, which will be brought out under the title of "The Last of the Paladins."

THE ROYAL MAUSOLEUM, FROGMORE.—The Royal Mausoleum at Frogmore is now completed—the granite sarcophagus being placed in the centre of the floor of the building, with the marble recumbent statue of his Royal Highness the Prince Consort, by the late Baron Marochetti, resting on its cover. The sarcophagus, which is of Scotch grey granite, stands upon a black marble plinth, with four ironze angels—also the work of Baron Marochetti—at each angle. The black marble is from Belgium, and is a gift of the late and the present King of the Belgians. All that now remains to complete the decoration of the building is to place three more pictures and three more statues in the vacant niches.

PREVENTION OF SMOKE IN THE POTTERIES.—A conference of delegates from the various governing bodies of the Potteries and Newcastle, has been held at the North Staffordshire Hotel, Stoke, for deliberation on the best mode of carrying out the Smoke Prevention clause of the Sanitary Act. After some discussion, resolutions were agreed to, to the effect, that it is desirable that the different local authorities of the Potteries and Newcastle under-Lyme districts agree upon one uniform mode of procedure in carrying out the law in relation to the consumption of smoke; and that it be a suggestion that for the present, after allowing a reasonable period, to be hereafter decided, for getting up heat, emissions of black smoke from chimneys of furnaces attached to steam-boilers, bakers' ovens, and smiths' fires, exceeding three minutes continuously, or an aggregate of ten minutes in any one hour, be proceeded against. A resolution was also passed as to the mode of procedure recommended to be taken by the local authorities in all cases of complaint.

PRESERVATION OF WOOD.—Many attempts have been made to increase the durability of wood by the injection of certain solutions, especially that of sulphate of copper. On this subject the Academy of Sciences has received an interesting paper by M. Maurice Boucherie. He states that, when properly effected, the injection of the above-mentioned solution is always beneficial; and that the best way to perform it is by displacing the sap and then letting the wood dry in the air. To prove this assertion, M. Boucherie sent in with his paper a few samples of railway sleepers laid down in 1847, after being prepared in the way mentioned. They had been taken up but a short time ago, and in excellent preservation. They were found to be harder to saw than any common dry wood; their resistance was equal to that of green wood, and their elasticity had been preserved unimpaired. Our author contends, however, that it is not the excess of sulphate of copper to which they owe their excellence, but to the combination of oxide of copper with the cellulose of the wood. To show the truth of this, he remarks, that if the latter material, or linen or cotton cloth, be impregnated with cupric solutions, and afterwards washed in much water until none of the metal salt be left, it will nevertheless be found that such substances will remain unimpaired, however long they may be buried in the earth; and that if they be afterwards treated with ammonia, oxide of copper will be obtained from them. It is well known that the continual contact of the iron chair with the sleepers is injurious to the wood, and yet in the present case it has not been so, the wood having been used when perfectly dry, after being saturated with the copper solution. The latter is rarely absorbed if the wood contain more than 6 per cent. of sulphate of iron.—*Gaitgnani.*

THE LIVERPOOL INDUSTRIAL BUILDING COMPANY (LIMITED).—The first ordinary meeting of the shareholders of this company has been held in the Odd Fellows Hall, St. Anne-street, Liverpool; Mr. James Samuelson, hon. arbitrator, in the chair. The report of the provisional directors was read, and passed unanimously. It states that, "so far a nominal capital has sufficed to carry on the company's affairs; but it is in contemplation to purchase land, and erect a few well-built villa residences for workmen, for which customers can be found, who will, however, only be able to pay for them by annual instalments." The balance-sheet shows a net profit to date (November 2), of 259*l.* 7*s.* This has been derived from *bona fide* work done to order. The company consists of working men, along with a few gentlemen who are anxious to aid them in their efforts to elevate their position, and try their fortune as master builders. From the balance-sheet it appears that, up to the present time, 584 shares have been taken up, and the deposit of 5*s.* per share paid upon them. The shares are 1*l.* each, and the nominal capital of the company is 5,000*l.*: and there are about sixty shareholders. The provisional directors are all working men, and six working men,—a bricklayer, a plumber, a painter, a plasterer, a mason, and a joiner,—along with a managing director, have been elected as directors for the coming year.

CONCRETE HOUSES.—Much has been said and written of late as to the advantage of using Portland cement concrete as a substitute for brick and stone in the erection of various kinds of buildings. We believe the Duke of Northumberland has been the first to practically test this mode of construction in the North, by ordering the erection of a cottage of three rooms, scullery, and other conveniences, at Church Bank, Alnmouth. The site is on a sand-hank close to the seashore, and contiguous to an old cemetery once connected with the main land, but now, at certain times of the tide, an island. The necessity for the erection of the cottage has arisen from the intention of the inhabitants of Alnmouth to use the cemetery again (after many years of disuse) for the purposes of sepulture. The Duke has inclosed the ground, and is building the cottage at his own expense, and a small oratory is to be built at the expense of the inhabitants of Alnmouth. The material used in the construction of the cottage is Portland cement and gravel from the seashore. The foundation is on the sand, 6 in. thick and 18 in. wide. On this there is a base course, and above the walls are 9 in. in thickness. Part of the erection is two stories in height. The roofs are all flat, and are constructed entirely of concrete and old wire rope. The ceilings are divided into panels by ribs at right angles, and require no plastering. A wall on the upper floor is supported on a concrete beam, 13 ft. span; a large cistern is formed under the roof of the pantry for rainwater. The sides of the cistern being the walls of the bed-room will severely test the imperviousness of the material. The building is nearly complete. No wood is used except for doors, and no iron, except about five shillingsworth of old wire-rope.

TENDERS.

For erecting house and office on St. Helen's Park Estate, at Ore, near Hastings, for Mr. Joshua Williams. Messrs. Habershon, Brock, & Webb, architects:—

Mansley & Rogers.....	£3,150 0 0
Simpson.....	4,430 0 0
Scrivenor & White.....	3,174 0 0
Patman & Fotheringham.....	2,985 0 0
Longmire & Burge.....	1,807 0 0
Nightingale.....	2,860 0 0
Longhurst.....	2,625 0 0
Hughes.....	2,580 0 0
Howell.....	2,560 0 0

For rebuilding machine-rooms, &c., at the clothing factory of Messrs. Hyde & Co., clothiers, Oxford. Mr. Codd, architect:—

Baker.....	£3,920 0 0
Dover.....	3,780 0 0
Jones & Co.....	3,775 0 0
Cable & Co.....	3,592 0 0
Hall.....	3,570 0 0
Cowley (accepted).....	3,220 0 0

For the erection of a portion of the church of Our Lady and St. Helen, Southend, Essex. Mr. T. Goodman, architect. Quantities supplied:—

Brown & Robinson.....	£2,157 0 0
Axford.....	2,125 0 0
Deacon.....	2,100 0 0
Wicks, Bangs, & Co.....	1,790 0 0
Wheeler.....	1,770 0 0
Patman & Fotheringham.....	1,754 0 0
Wilkins & Son.....	1,700 0 0

For alterations in forming class-rooms for the boys and girls, at the Whitechapel Society's Schools. Mr. G. H. Simmonds, architect:—

Hicks & Son.....	£318 0 0
Outwater & Son.....	310 0 0
Little.....	286 0 0
Jacobs.....	293 0 0
Reed & Son.....	286 0 0

For house, corner of lower plot, Nightingale-lane, for Mr. J. K. Farlow. Mr. R. P. Noddy, architect:—

Woodward.....	£3,320 0 0
Webb & Sons.....	3,279 0 0
Newman & Maslin.....	3,128 0 0
Lathey, Brothers.....	2,973 0 0
Adamson & Sons (too late).....	2,859 0 0
Myers & Keddell.....	2,845 0 0
Turner & Sons.....	2,807 0 0
McLacklan.....	2,870 0 0
Morter.....	2,843 0 0
Brown & Robinson.....	2,820 0 0
Colls & Son (accepted).....	1,837 0 0
Thompson.....	2,780 0 0

* Withdrawn in favour of Colls & Son.

For house at Chislehurst, for Mr. F. W. Freese, Messrs. Parr & Strong, architects. Quantities supplied by Mr. Joseph Fox. Messrs. Sheard & Hanstock's patent combination:—

Price.....	£2,120 0 0
Brown & Robinson.....	2,100 0 0
Robinson.....	2,093 0 0
Hill & Keddell.....	2,040 0 0
Longmire & Burge.....	1,995 0 0
King & Son.....	1,988 0 0
Arnand.....	1,921 0 0
Foster.....	1,837 0 0
Rose.....	1,753 0 0

For Montgomery County Gaol extensions. Quantities supplied by Mr. Joseph Simmonds:—

Yard.....	£3,384 0 0
Treasure & Son.....	2,491 13 6
Yates.....	2,459 9 7

Accepted, for the erection of a warehouse, Branch-road Batley, for Mr. Joseph Fox. Messrs. Sheard & Hanstock, architects:—

Mason's Work.....	£158 0 0
Cordingley.....	161 5 0
Brooke.....	8 12 9
Senior.....	21 16 0
Thompson.....	21 16 0

Accepted, for the erection of a warehouse and houses, in Station-road, Southill, for Mr. Isaac Colbeck. Messrs. Sheard & Hanstock, architects:—

Mallinson.....	£740 0 0
Fetty & North.....	439 0 0
Thornton.....	50 0 0
Senior.....	39 10 0
Hey.....	50 0 0

Accepted, for the erection of a power-loom shed at Brookroyd Hill, Batley, for Messrs. Parr & Ramsden, Messrs. Sheard & Hanstock, architects:—

Willans.....	£780 0 0
Sykes.....	199 0 0
Lobley.....	31 5 0
Bagsbaw.....	86 5 0

TO CORRESPONDENTS.

N. H. J. W. (let us have the further information referred to)—M. A. (Act for Red to Brompton has been obtained. Parish of Chelsea having given up the rates for a certain period, another Act to legalize this is about to be applied for)—J. B. Cumberland (any person may write C.E. after his name. Join the Institution of Civil Engineers)—K. K.—P. & D.—A. Former Correspondent, India—H. A.—B. M.—O.—J.—A.—R. B.—X.—O.—J. L.—M. A.—A.—J. S. E.—F. E. M.—F. R. S.—J.—W.—J. F.—F.—R.—H. A.—R. R.—W. K.—E. F. N.—D.—J.—van den B.—H. M.—W.—R.—C.—G.—J.—O.—W.—B. & Co.—J. C.—A. N.—J. N.—E. & B.—J. L.—H. C.—R.—H. C.—J.—W. P. (next week)—J. B. C. (next week)—R. O. (next week)—J. B. (next week).

We are compelled to decline pointing out books and giving addresses. All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. *Note.*—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

CHRISTMAS WEEK.—"The Builder" for the week ending DECEMBER 26th will be published on THURSDAY, 24th inst., at the usual hour.

ADVERTISEMENTS for insertion in that issue must therefore reach the Office before THREE O'CLOCK p.m. on WEDNESDAY, 23rd inst.

NOTICE.—All Communications respecting Advertisements, Subscriptions, &c., should be addressed to "The Publisher of the Builder," No. 1, York-street, Covent Garden. All other Communications should be addressed to the "Editor," and NOT to the "Publisher."

The Builder.

VOL. XXVI.—No. 1351.

Architecture and Earthquakes.



HE appalling accounts of physical convulsion that have, within the past few months, succeeded each other with such unwonted frequency, have a special importance to the architect.

The long line of upheaval, in which the volcanoes of the Andes afford so many vents for the subterranean fire, may be considered as in movement. The waters of the Baltic have given an unusual indication of sympathy with some geological change, to which we called attention in No. 1,344 of the *Builder*.^{*} Vesuvius has been pouring forth ashes and lava with an intensity of action without parallel since the earthquake of 1853, not excepting the long eruption which succeeded that terrible shock. And even in England, so long considered to be beyond the region of earthquakes, symptoms of that mighty terror have been felt, from Millford to Blackheath. A second shock has been, yet more recently, reported. However slight the movement (and to those familiar with the more frequent and more violent phenomena common in the South of Europe it has seemed but a very feeble echo of alarm), it has yet given a distinct note of warning. To say nothing of the 300 earthquakes, some reference to which has been discovered in the annals and chronicles of this country, we have positive evidence, from geology, of the former intensity of the subterranean force in our island. Dykes of trap, columnar ranges of basalt, mountain upheavals of igneous rock, are familiar to all geological students. And of the seventeen distinct systems of mountain upheaval traced by the French geologists, from that of *La Vendée* to that of *Tenarus*, the one which has given the present superficial form to South Wales is that which is most strongly characterised by the destructive energy of often-repeated shocks. It is peculiar to this system of upheaval, wherever it has been traced, that no stone can be quarried from its rocks of sufficient size for building, except in the form of the most paltry rubble. The vibrations which raised the mountain chains of this system have been such as to disintegrate the strata, and to rive every bed of stone into a thousand seams.

While thus, in the very slight movements which have recently been observed in this country, we see no cause for unreasonable alarm or for idle panic, there can be no doubt that we have indications of the possible recurrence of a period of geological movement in the district of the British Isles. There is no sound reason for supposing that the internal source of activity has become feebler of late years. Long periods of rest have often intervened between outbursts of volcanic activity. When the fearful eruptions of Vesuvius, which overwhelmed the Campanian cities in A.D. 79 (recorded in the memorable words of Pliny), broke forth, the mountain had been, as far as historic memory could reach back, as tranquil as the craters of Auvergne, or the trap hills of Cardiganshire and of Pembrokeshire, are now. The

upheaval of the Pyrenees took place after the deposit of the upper chalk, which underlies the clays and sands of Hampshire, Kent, Essex, and Middlesex; and four distinct mountain systems are of date posterior to the Pyrenees. The rise of the Tuscan mountains is later than the formation of the Pleistocene geological deposits,—an event, so to speak, of yesterday. The depression of a portion of the shore of the Tagus, 113 years ago, was an event that brought modern Europe face to face with an intense and acute throch of the irresistible and mysterious power of earthquake.

The practical hearing of these considerations is this. How far is the style of building now prevalent in Great Britain fitted to resist shocks of earthquake, if such should become more frequent? To some extent, of course, this is a question of degree and of detail; and, so far, incapable of any exact solution. But it is, nevertheless, the duty of every architect who regards his own fame to look the question in the face, and to consider whether any precautions, hitherto not regarded as necessary, should be taken in his future work, due regard being had to the suggested contingency of earthquake.

Against the danger in its most acute form, it need hardly be pointed out, no architectural or engineering skill can for a moment avail. When the earth becomes like a storm-tossed sea, or when unfathomable gulfs suddenly open beneath the feet, whether by the riving asunder of a line of ravine, or by the yet more awful downward movement of a larger or smaller area of land, man feels his utter helplessness. In all the grandest movements of nature, when nature may be said to be angry, the force of human resistance is inappreciable. The fury of the cyclone overthrows buildings that are well able to resist the ordinary outbursts of tropical storms. The thunderbolt is as irresistible as it is sudden. The surge of the sea, driven by submarine shock on the shore, finds before it a city, and leaves behind it a mass of indistinguishable wreck. "Temple and tower went down" in a few seconds before the shock of the Calabrian earthquake in 1858, and 30,000 human beings are said to have perished in their ruins.

But apart from the consideration of these rare and awful catastrophes, against which no human skill or precaution can avail, the question of providing against what may be called ordinary terrene disturbance deserves attentive consideration. A certain amount of prudence, for instance, might make all the difference between the infliction of a slight damage on a city of the magnitude of London, by a moderate shock of earthquake, such as is almost of monthly occurrence in some of the Creek islands, and its reduction to a mass of ruins.

Man hocomes emboldened, by habit, to look almost any danger in the face. In situations where he is exposed to that peril which, of nil, most powerfully affects the human imagination, he has learned so to build as to run the least possible risk when his house is shaken over his head. The best form of shelter for countries subject to earthquakes, no doubt, is the simple protection of a tent. On a dwelling supported on poles, and tied to the soil by cords and stakes, the earthquake has less power than the wind, when the latter rises to a storm. In antiquity, and even to the present day, the countries, with which we are most familiar, that are most subject to earthquakes, are those in which the climate most freely permits of habitual abode under canvas, or rather under goats' hair. An earthquake, of the same degree of intensity, would be a very different calamity, if it occurred in a Bedouen camp, from that which it would be if it took place in Whitechapel.

Races that have felt the need of a more permanent home than the tent of the Arab, or the wattled, thatched, or paper-roofed houses of some of the Malay tribes, have sought to pro-

tect their dwellings from sudden overthrow by the art of the joiner. There can be no doubt that a most important structural principle is involved in this method of construction. A well-framed box will bear an amount of knocking about, without injury, that would not only overthrow a pile of bricks or stones dependent on weight and on friction for its stability, but shake to pieces any ordinary masonry. Even an ill-framed, and carelessly-constructed box, would resist an enormous amount of vibratory force. Framed wooden houses, therefore, have been naturally, and very successfully, adopted by the inhabitants of districts subject to earthquakes. With our cooler blood, and more practical views of comfort, we are inclined to wonder how any men can make, or even keep, their dwelling-place where the earth rocks beneath them at almost every change of the moon. Still, if they will live there, we cannot deny that their wisest plan is to make their houses as much as possible on the principle of great wooden boxes, pinned and pegged together, so as to endure a large amount of shaking, in any direction, without actually coming to pieces.

The next step in the attempt to produce architectural works that shall be capable of resisting ordinary shocks of earthquake is, the introduction of timber into masonry. This is a style of construction that was formerly prevalent in our own country. Each year, alas! witnesses the destruction of one or more relics of ancient, timber-trussed London. In Gloucestershire, in Devonshire, in many a far country district, are to be found noble relics of this durable style of building. The blackened oak-hemms, contrasting sharply with the whitewashed walls which they aided to support, are among the most picturesque features of some of our old country-houses. So much strength, or we might more properly say so much tenacity, was given to the walls of a house by the free use of strong and sound hard timbers, that our old architects were wont to amuse their opportunities, more especially where ground was of value. Old, timber-hill, London presented a series of gabled ends of houses to the street, story overhanging story, so that the foot-passenger walked almost as much under shelter as he can do in the "rows" of Chester at the present day. Fancy the dismay of a modern contractor on being ordered to make the floor of his drawing-room hang, unsupported by pillars, over the kitchen area, and the floor of the bedroom above to project over the width of the pavement!

Whatever was the original cause of the introduction of this method of building into England, there can be but little doubt that the use of solid hard-timbers was, in other countries, resorted to with the express purpose of resisting earthquakes. On no other principle can we account for the introduction of the comparatively perishable material of cedar into the marble walls of Solomon. "The great court round about was with three rows of hewed stones, and a row of cedar beams, both for the inner court of the House of the Lord, and for the porch of the house."^{*} Thus, when we read of the occurrence of an earthquake that rent the altar itself, we hear of no damage being suffered by the well-banded Temple wall.

One very evident danger, it is true, attended on the profuse introduction of bond timber into houses. It was the same danger that has driven our architects to replace the immemorial covering of thatch, precious as are its qualities of securing coolness in summer and warmth in winter, for the more rapidly-conducting, but fire-proof, roof of slate. The danger of fire is considerably increased by the external use of wood. This material has, therefore, gradually disappeared from our external architecture, and the security which bond timber would afford in the

* See *Builder* for November 7th, 1868, p. 810.

* III, Reg. vii, 12.

case of any moderate shock of earthquake has been to a great extent abandoned.

Another change, consequent on the gradual increase of personal security that has accompanied the growth of modern civilization, has rendered the work of the English architect less able to resist a casual shock than that of his remoter predecessor. When the founders of noble families began, in the tenth and eleventh centuries, to build houses for themselves and for their descendants, they took care to make them strong. For a man's house to be his castle, it would then have been quite idle to depend on the protection of public law. Thick walls were required to keep out unwelcome visitors. The sudden raid of a jealous neighbour, the simple process of ejection which some competing claimant might at any time find means to serve, the surprise of the brigand, of any rank and with or without any pretext, had to be guarded against by means of that prevention which is better than cure. Thus we find that solid and lofty keeps arose, like that of the Papal Palace of Avignon. Thus we find that the Irish chiefs, at a time when all Celtic buildings were circular in plan, ran up their places of shelter into towers, and multiplied those remarkable structures which, notwithstanding the unquestionable Christian emblems carved on many of them, have caused such great, and such unnecessary, puzzle to the antiquary.

Men who have seen emblems of Pagan worship, or of what they call "Arkie" significance, in these simple fortresses of the Celtic chiefs, can hardly have been aware how Pisa, Lucca, Bologna, and other Italian cities, during the stormy Middle Ages, were mere groups of lofty turrets—round and square.

Again, in larger and more important buildings of somewhat later date, such, for instance, as Bandon Castle, we find the walls to be as much as 9 ft. thick. In a palace once belonging to the Spanish viceroy of Naples, which is now converted into an hotel, the walls of the lower story, on a level with the shore of the Mediterranean, are 15 ft. or 16 ft. thick. When men were obliged to build with reference to military defence, they piled together such masses of masonry as were adequate to resist, not only the battering-ram, but the more energetic force of earthquake. Few buildings of any magnitude are to be found in Southern Italy which do not present, in some part or other,—in the level roof if not in the walls,—a system of cracks, which for the most part are repaired by some bituminous cement. These black and shapeless scrawls are the handwriting of the earthquake. They are evidence at once of the repeated onrush of the hidden telluric force, and of the power of good masonry, strong walls, and well-set lime, to resist this force, in such a manner as to suffer the minimum degree of damage.

Now, in the greater number of our modern buildings, in our engineering works as well as in our palatial structures, we have fallen into the habit of regarding merely statical equilibrium. We have left out of sight everything like dynamical stability. We have not needed castles. Knowing that no structure, except such as is specially designed for military purposes, can resist the force of gunpowder, and looking to the law and to the police for the maintenance of the public peace, we have filled the fronts of our shops with plate glass, and have pierced the slight walls of our houses for lights that may obliterate the memory of the iniquitous and pestilent window-tax. We have felt that if a house were strong enough to bear the strain of a quadrille in the drawing-room, it was adequate for all the purposes of our law-abiding and non-volcanic habits.

While comfort, space, light, and ventilation have thus been the objects sought by the architects of our bettermost sort of houses, to the exclusion of any military strength, or capability of resisting any sudden violence (such, for instance, as the shock caused by the explosion of a powder-mill, or by the inflammation of an escaped quantity of gas), the security of the humbler dwellings has been equally diminished. Visit what part of England you may, you find that the low, small, thatched cottages which were so numerous, and so picturesque, as well as so uncomfortable, at the commencement of the century, are disappearing. For the most part they are replaced by dwelling-places which, in their sanitary qualities, are as much superior to their predecessors as they are inferior to them in their artistic merit as points in a picture. They are also far safer as regards fire. On the other hand, the destruction that

would be caused in streets and rows of such small, tidy, slate-roofed, well-ventilated, and nterly ugly and tasteless houses, as grow up around all our centres of manufacturing industry, would be terrible, in case of any serious shock of earthquake, as compared with that which would be endured by the small, poking, pictorial, wood-boned old cottages. Where cheapness is the first consideration, one cannot have everything. As to the picturesque, we must not grumble at its sacrifice if the result be, as it is in the cases to which we refer, the improvement of the public health. But if the case should occur, which we have had several hints may occur, we shall find that our structural economy has cost us very dear indeed.

If London were visited by such a shock of earthquake as that which alarmed Naples in 1858, what would be the result? It is easy to reply. In the southern city a great terror seized the population. Hardly any one remained beneath a roof for three successive nights. Delicate women slept in the streets in their carriages; and, close by them, slept the *lazzaroni*, coiled up in their baskets,—the large flat panniers in which they carry fruit, or vegetables, or fish. The barbers made a good time of it, for every one rushed to be bled—the first medical remedy, in the Italian practice, for sudden fright. But no lives were lost; no appreciable damage was done. Further south, as before mentioned, the results were fatal and terrible; but at Naples the shock was just intense enough to frighten any one out of his senses, to re-open a few old cracks, and to form a certain number of new ones, in houses of a certain magnitude, and to do but little further harm. We may take this, then, as an illustration of such an earthquake as is seriously alarming, without being fatally destructive. Now, if a shock or two (there is always a *replica*, which is more dreaded than the first shock) of this intensity were suddenly to visit London, what would be the condition of the metropolis within four-and-twenty hours? St. Paul's would, we firmly believe, be left standing. The great masses of masonry would still appear its dome. The river bridges would probably have been little, or even not appreciably, injured. Some other large buildings might have resisted the shock—Somerset House, Westminster Palace, other important structures in which the walls had not been pressed down to egg-shells,—perhaps a few private dwellings, if any such were to be found, in which the main object of the builder had not been to use only as little material as could possibly hold together, when assailed by no violence greater than that of a moderate gale or the passage of a brewer's dray. For the rest,—it would have been *Londonum fulv*.

That such a trial awaits our modern architecture no one can predict. That it may not, we must all pray. But that it is probable, no one can deny. Is it not, therefore, the duty of all architects, and of all builders, taking a wise precaution for the future, to consider whether they should not, either by the introduction of a well-devised system of bonding, or by a careful and liberal calculation of the strength of their walls, provide for the stability of our habitations, in case the hints, of which we have already had more than one, should prove to be the precursors of a somewhat more serious shock?

The ink was wet on the preceding page, when the announcement of the outburst of a "colossal eruption" from the summit of Etna was flashed through the telegraphic wires. The simultaneous activity of Etna and of Vesuvius is a rare occurrence. Signs of internal movement continue to be reported from every part of the world. The terrible earthquake of San Francisco was felt in Iceland. The shocks experienced in this country lead us to wait with interest for the next intelligence from Iceland, as Scaptar Jokul is our nearest volcanic neighbour. The early set ice on the Neva was broken up, a few days since, by a tidal wave for which there was no wind to account. The waters of Lake Ontario have shown a disturbance similar to that observed in the Baltic. A period of activity in snhtranean energy, hitherto unknown to the present generation, appears to have commenced, and the upheaval of new craters of elevation, such as those which took place comparatively recently in the case of Montt Jurillo, in Mexico, and of Monte Nuovo, in Naples, is far from improbable. The attention of geologists has been long turned to certain phenomena of depression and of elevation on the coasts of the Baltic. It is not without a strange feeling of awe that we note the multiplying rumours of "earthquakes in divers places."

THE EDUCATION OF THE SURVEYOR. THE INSTITUTION OF SURVEYORS.

An ordinary general meeting of this Institution was held on the 7th of December; the President (Mr. John Clutton) in the chair.

Mr. William Sturge, of Bristol, read a paper entitled "The Education of the Surveyor." He said—

The subject of the paper I propose to read to the Institution this evening is one which appears to me to be much in accordance with the principal object of the Institution,—that of promoting the interests and raising the character and position of the profession.

I would state at the outset that I propose to treat principally of the education requisite for my own branch of the profession,—that of the land surveyor. The practice of the building surveyor is of so much importance and so distinct as to require a different education, and I trust that some member of that branch may be disposed to read a paper upon it on a future occasion.

The present state of education for the profession of a surveyor cannot, I think, be considered satisfactory, or adequate to its requirements, especially when we consider the diversity of knowledge required for competent practice in its various branches, the extensive range of subjects it embraces, and the magnitude and importance of the interests committed to its care. In many cases surveyors have had no special education whatever; and, at most, the run of a surveyor's office as a pupil for three or four years, with the addition, in some cases, of a year or two spent with a practical farmer, has hitherto formed the staple of the surveyor's special education. But valuable, and indeed indispensable, as are these advantages, and successful as they have proved in the example of many eminent members of the profession, I cannot think that they are sufficient to enable the surveyor to keep pace with the advancing knowledge and the more exacting requirements of the present day, but that some special course of study is desirable to qualify him for the multifarious duties which will devolve upon him in the course of an extensive modern practice. I propose in this paper to indicate how it appears to me the special education of the surveyor can be improved, and to consider whether any particular course of study is advisable for the attainment of this end.

The only point I would remark on, in reference to the scholastic education of the youth intended for a surveyor is, that special pains should be taken to well ground him in mathematics, not so much in the higher branches—though these will be in his, as in other cases, be useful as a mental training—as in those which will be of the greatest service in the practice of his future profession. Among these I would mention Euclid, which will not only tend to give him mathematical precision, but to strengthen his reasoning powers; algebra, to enable him to understand those mathematical formulæ in which are expressed the laws of so many branches of science; mensuration, both of superficies and solids; and trigonometry.

As soon as the youth leaves school, whether public or private, his special education for his profession should commence in earnest; and the question at once arises, in what that special education should consist, and what are the means most likely to conduce to the greatest proficiency.

And, first, I would discuss the expediency of completing the education of the youthful surveyor at one of the Universities, Oxford or Cambridge. I am aware that it is increasingly the practice of professional men to give their sons a University education; and in some, though probably not in many instances, the practice has obtained amongst surveyors. No doubt it has its advantages. The habits, manners, and associations are formed amongst gentlemen, many of them of the landed interest, whose acquaintance may be professionally useful in after-life. The surveyor's son may be a reading man, and may pass with honours the examinations for his degree,—a distinction which will give him a position in after-life. But, on the other hand, the practice has its disadvantages. Several of the most precious years of the young man's life are spent in an education by no means specially adapted to his future profession,—years which he can ill spare, even for University advantages and honours. If he acquire the manners and tastes of gentlemen, he may also acquire the desultory and expensive habits, if

not the vices, of too many of his associates; and, instead of reading, he may waste his time in frivolity and dissipation. Even if he avoid these evils, the taste and habits he will form will probably render the drudgery of a surveyor's office peculiarly distasteful to him. On the whole, then, I arrive at the conclusion that the balance is against a university education for the surveyor. I think, however, that the quality of his education should be put to a thorough test; and with this view I would recommend that, on leaving school, he should pass the matriculation examination of the London University, which is of a severe and searching character, and is resorted to by young men from the best schools in England,—even by many who intend to pursue their studies at Oxford or Cambridge. Having thus matriculated, the young man need not as a matter of course continue his studies at the London University, though he can afterwards proceed to take his degree if he be so inclined. As an institution especially adapted for the education of surveyors, I may mention the Royal Agricultural College at Cirencester, where a good rudimentary knowledge of geology, agricultural chemistry, and other kindred subjects may be obtained, which cannot fail to be a useful foundation for professional knowledge. The entire course of lectures at this institution occupies, I believe, about two years.

Let us now suppose the young man, of eighteen or nineteen years of age, about to enter on the task of acquiring a practical knowledge of the profession of a surveyor. I would mention, as a preliminary of more importance than is often attached to it, that of obtaining a good practical knowledge of accounts. This branch of a commercial education is wholly neglected in our classical and mathematical schools; and many boys enter upon their professional studies who scarcely understand an ordinary cash account, much less the mysteries of double entry, or the somewhat complicated bookkeeping of the firm or the estate. Yet a practical knowledge of accounts is as necessary to the land agent or farmer as to the merchant or tradesman. Without it, the land agent cannot present his annual accounts of a large estate to his employer, with that clear statement and analysis of receipts and expenditure which will exhibit the general result at a glance, whilst it will account for every item in detail. Without this knowledge, too, the land agent must rely entirely upon his accountant; and, honest as it is hoped and believed are the great majority of this class of persons, yet instances of dishonesty not infrequently occur; and it is obvious that they are far more likely to occur when the accountant knows that his principal is ignorant of accounts, than in cases where he knows that his books will be periodically and strictly audited. This knowledge is also of great use to the land agent, who has to keep the accounts of a home farm and to present a clear and detailed account of receipts and expenditure, and of profit and loss. I believe that a few months spent in an accountant's office is the best mode of acquiring a sufficient knowledge of accounts for these purposes, as well as those habits of neatness in handwriting and figures which we all like to see in our account-books, but which are not often learnt at school. If these objects can be thus obtained, I do not think the time thrown away.

I will now suppose the young surveyor, article as a pupil in one of our leading offices in town or country. On the one that he makes of the next few years will mainly depend his chances of success in his profession. He is pretty much his own master; and whether he acquires much knowledge or little will depend mainly upon himself. He will find the partners of the firm too much occupied in business and too much from home to be able to devote to him much personal attention. How, then, is he to acquire the theory and the practice of his profession? As for the theory, the surveyor's library is but scant, and there are no courses of lectures on professional subjects, as there are for the student of law or medicine; yet there are works which may be read with advantage, and as the time for reading after office hours is but limited, the pupil should devote himself to such a course of reading as bears directly upon his profession. Amongst these I may mention treatises on geology, botany, agricultural chemistry, agriculture, estate management, life leases, reversions, &c. I treat that one object to be kept in view by this Institution will be the formation and selection of a professional library for the

benefit of members and students of the profession.

But it is on the practical knowledge to be obtained, by having what is sometimes called the run of the office, that the pupil must in great measure rely; and here I cannot too strongly impress upon him the fact that much will depend upon himself. If he performs the duties assigned to him in a listless, perfunctory manner, as a mere machine, not throwing his mind into his work, he will soon find that his employer will take little interest in him, that he will not communicate his knowledge, and the pupil will at length leave the office without having acquired one-half the knowledge that he might have done; but, if, on the other hand, he throws his mind into his work, and makes himself as useful as he possibly can, he will soon find that his employer will take especial interest in him, that he will be glad to have his company on his journeys, when valuable opportunities will arise of acquiring knowledge of the business in hand. The pupil may thus become the confidential assistant, who may be trusted with the conduct of important details, and thus he may early acquire a practical knowledge and a confidence in himself to be obtained in no other way.

The pupil will find the profession of which he has to make himself master divided into several branches, all more or less connected but diverse in character. These may be arranged under the following heads, viz. :—

1. Chain surveying, mapping, and levelling.
2. The valuation of land and other property.
3. The management of landed estates.
4. The improvement of landed estates, including land drainage, the erection of farm-houses and cottages, and the laying out and disposal of building land.

And, 1st, as to chain surveying, mapping, &c. In the days of my pupillage, thirty years ago, this formed a large branch of business, to which the time of pupils was principally devoted. The surveys for the Tithe Commutation, then in progress, afforded full scope for employment in this important department, and the opportunity of acquiring, by practice, quickness and accuracy in the field. The completion of the tithe maps, as the standard of measurement, have so far reduced the extent of this branch of business, that, except in offices that specially devote themselves to it, the pupil has now little opportunity for the study and practice of the art. To acquire accuracy and speed, requires several years' practice, and it is a question whether the pupil's time may not be better employed. Yet a knowledge of field work is very useful in after-life, as it enables the surveyor to test the quality of the surveys made for him by those whom he may employ; and if the pupil have time and opportunity, he will do well to acquire it. A practical knowledge of levelling is absolutely necessary for the purposes of land drainage and irrigation, and should on no account be neglected.

I now come to the second head,—the Valuation of Land and other Property. To acquire an accurate knowledge of the value of land is, perhaps, the most important part of the surveyor's education, that in which he will find the greatest difficulty, and to which he must devote the most patient attention. During his pupillage he must expect to do little more than lay the foundation of that knowledge which only long practice and experience can so far mature as to entitle him to the confidence of the public. But it is of the greatest importance that the foundation thus laid should be sound. Suppose the pupil placed in the office of an eminent judge of land. Let him embrace every opportunity of accompanying him in his valuations. Let him not rest satisfied with recording the field values, but let him inquire into the indications on which the judgment has been formed, and the reasons for the conclusions arrived at. Let him not, however, be a mere copyist, even of the most eminent master. Let him study the elements on which the value of land depends; let him classify the various descriptions of soils, according to the amount and description of produce, the course of husbandry, the expense of cultivation. Let him learn to assign the maximum and minimum values to each class of land, and to understand the reasons why these values are applicable. Let him minutely study the indications, both general and special, of fertility and barrenness in soils. On this subject I may mention, by the way, he will find an admirable paper by Mr. Bravender, in the *Journal of the*

Royal Agricultural Society (vol. v.), entitled "On the Indications of Barrenness and Fertility in Soils." Let him study the quality and description of herbage on grass land (here a knowledge of botany will be found very useful), and the depth and texture of the soil and sub-soil of arable land. After all his pains he cannot reduce the science to a certainty, he must be content with an approximation. He will make mistakes. Happy is the surveyor who can say, that in the course of a large practice he has made but few!

The next branch of the profession to which I have to refer, is the management of landed estates. Were one to judge of the management of landed property by the description of persons to whom it is to a large extent entrusted, one would be led to suppose that it requires no special training or qualifications whatever. By far the greater part, probably, of the landed property of England is under the management of solicitors, who are usually little more than receivers, without much knowledge of the details of management. The stewardship is often given to a relation or personal friend of the landowner, not on account of the acquaintance with his duties, but as a means of affording him a livelihood. Military men are great favourites, though in what respect their previous habits have fitted them for estate management it is hard to understand. The fact is, the effects of good or bad management upon an estate are not all at once developed, and, therefore, good management is not always appreciated. But let not the young land agent think that he has nothing to learn. The more the details of estate management are examined, the more attention and skill will they be found to require. The fair rental of farms, the necessary amount of capital, the choice of tenants, the covenants of leases, are all matters needing much judgment and knowledge. The oversight of the tenantry, too, as regards the management of their farms, and the fulfilment of their covenants, requires considerable tact, in order to exercise a firm authority, and to command the respect and good feeling of the tenants, without descending to a system of espionage or becoming too familiar with them. The oversight and management of repairs will be found to require much practical experience, and more study than is often devoted to it. The surveyor should require some knowledge of building and of measuring work, the quality and use of different kinds of materials, and the most economical mode of executing work. A large estate requires considerable administrative talent in the arrangement and superintendence of the duties of subordinates and workmen. The care of woods and plantations also calls for much skill and attention to develop the growth and to increase the annual produce. In fine, he may be described as a model land agent, who knows how to make the most of an estate without racking the rental, how to select and encourage good tenants, how to combine improvement with economy, and how to promote that mutual confidence between landlord and tenant which ought ever to exist on every well-managed estate.

My fourth head, the Improvement of Landed Estates, is yearly becoming of more importance, owing to the increasing spirit of improvement which prevails. It is, therefore, worthy of the special attention of the young surveyor. It is, however, a question for consideration how far this branch of the profession can be combined with general practice. Every surveyor ought to be well versed in the homestead requirements of farms of various extent and description, so as at least to be able to sketch the general plan of a homestead. But the detailed plans, working drawings, specifications, and estimates require the knowledge of an architect,—a knowledge which needs as much time and attention to acquire as the general practice of the surveyor. Few can devote sufficient time to obtain a practical knowledge of both professions; and I am, therefore, inclined to the opinion that the erection of farm-houses must be regarded as a specialty, requiring a particular education distinct from that of the land-agent and valuer. The same remark applies to the art of scientific land drainage, which in its highest sense requires special study, and is, perhaps, best carried on as a distinct practice.

I will now suppose the young surveyor to have spent three or four years as a pupil in an office of extensive practice; that he has made the most of his time and advantages, and has acquired a fair knowledge of his profession. He should now make himself acquainted with the practical details of farming; and, with this view, he should

spend at least two years under the tuition of a first-class farmer, partly, perhaps, on a heavy and partly on a light soil. The knowledge thus acquired will be found of great value in after-life. Without it, indeed, the surveyor, however competent in other respects, will find himself at a disadvantage, especially in his oversight of the farming of the tenantry on estates under his care, and in settling and dispensing the covenants of leases.

Let not the surveyor, who has gone through the whole of the training indicated in this paper, and is now about to enter into practice, think that his education is complete. Perhaps there is no profession that depends so much upon a long course of practical experience for the attainment of a matured skill and judgment. The education of the surveyor must be lifelong. He must never be too old to learn, and to be conscious that he is liable to error. He who is most awake to the mistakes he has made will be most likely to avoid them in future, whilst he who will never admit that he is wrong will probably repeat his mistakes to the end of the chapter.

A mere knowledge, however, of the profession will not suffice to command success, unless accompanied by habits of business, knowledge of men, and tact and address in his intercourse with others. In these respects the surveyor must educate himself; without these qualifications a man of sound and varied knowledge may be beaten in the race by another of inferior acquirements who possesses them. If the surveyor would be a man of business, he must learn the art of executing whatever he has in hand with skill, decision, and despatch. Let him avoid those dilatory habits which have been the bane of some able men in the profession, and let him act upon the maxim, never to put off till to-morrow what can be done to-day. He should also endeavour to acquire that business tact with which some men are naturally more gifted than others, and which mainly consists in a knowledge of men, and of the mode of laying your views before them so as to command their assent; or, in short, of saying the right thing, in the right way, and at the right time. The talent of administration is another point of great importance; without it, indeed, no large business can be properly carried on. It may be defined as the talent of so arranging the duties of the office as to get through the greatest amount of business with the least waste of power, and of so classifying the various departments under responsible heads, as to avoid confusion, and to relieve the principal officers of detail. With some men this talent is a natural gift, and has contributed largely to their success in life: other men of undoubted talent and unwearied industry find that for want of it their business is always a burden, and always in arrear. If, therefore, the young surveyor have not the natural gift, let him spare no pains in its acquirement.

I will now add a few words on the moral principles which should regulate the young surveyor's professional character. Let him be sure that in his profession, as well as in all others, "honesty is the best policy" let all his transactions be marked by candour and straightforwardness; let not advantage in negotiation tempt him to swerve from the strict truth, and no zeal for the interest of his client induce him to descend to meanness or trickery in order to attain his end. In a word, let him never depart from that course of unimpeachable integrity without which even the highest talent and attainments will fail to command respect, or to place him in the first rank of the profession.

I append a few remarks as to the extent to which this institution may render aid in promoting the education of the surveyor. The profession cannot expect, in the present day, to obtain from the Legislature any charter or peculiar privileges, such as those enjoyed by the professions of law and medicine. It will always remain open to all comers; and it will always be competent for any person to call himself a surveyor, whether educated for the profession or not, if he can only induce the public to place confidence in him. The policy of the institution should, therefore, be to require a high standard of education, both general and special, as a qualification for membership, in order that the fact of being a member may be an earnest of superior competence and skill, as well as of good character. There will always be, as there are at present, especially in the country, men who, from long experience as practical farmers, have attained to a fair knowledge of the value of

land—more particularly in their own localities—and the regularly trained surveyor must always expect to encounter competition from men of this class. Whilst it cannot be denied that amongst them are to be found some men of superior ability, yet, as a rule, they are deficient in general knowledge of the profession. The aim of the Institution should be to maintain a standard of membership sufficiently high to ensure an average superiority of its members over other practitioners. In short, membership should be considered a distinction, not only by the profession, but by the public at large.

The test of fitness for membership must, however, be practical, and not theoretical. I do not see it possible to institute an examination in professional knowledge, however desirable it may be thought by some. The only men in the profession capable of conducting an examination are too much occupied to undertake so arduous a duty; and unless it were well done it were better not to make the attempt. The test of fitness for membership must therefore be found in evidence of practical competence and skill.

Although I do not think an examination practicable, yet I believe this Institution may in various ways, indirectly, promote the education of the surveyor. The establishment of a professional library would be a boon to students of the profession. The reading of papers on professional subjects, and the free discussion of them at the ordinary general meetings, would tend to throw new light on many subjects now but imperfectly understood. To make these papers and discussions as generally useful as possible, both to town and country members, a journal might be published and circulated containing the various papers, with condensed reports of the discussions thereon. This journal might be made a useful medium of correspondence on the topics thus introduced, and as a channel for advertising estates. Widely circulating among the profession, it might be made self-supporting.

I have endeavoured in this paper to indicate, I fear but imperfectly, the course of training which appears to me to be the best calculated to fit the surveyor for his important duties, and the mode and extent to which this Institution can aid in promoting this object. If my remarks should prove of any value in improving the education of our sons and of our pupils, I shall feel that I have contributed some trifles towards one of the objects of this Institution,—that of promoting the interests and raising the tone of the profession.*

A GREAT BUILDING CASE IN IRELAND.

Doolin v. Dixon.

A REMARKABLE action brought to recover the sum of 11,500*l.* alleged to be due for building work executed at St. Peter's Roms Catholic Church, Phibsborough, Dublin, has just been concluded, without a conclusion.

The plaintiffs are Mr. Walter Doolin, of Westland-row, builder, and Mr. William Doolin, of Great Brunswick-street, building surveyor. The defendants are the Rev. James Dixon, and the other members of the community of Vincentian Fathers at Phibsborough and Castleknock. A contract was entered into in the year 1857 with the plaintiffs, who were then in partnership as builders, to carry on the work of the new church commenced by the Rev. T. McNamara, then head of the Order in Ireland, under the superintendence of Messrs. Hadfield & Goldie, then the architects. The contract was based on a schedule of prices, no specific sum being contracted for; and it was stipulated that the works were to be measured from time to time under the direction of the architects, whose decision was to be final.

It was admitted that 14,000*l.* had been paid on account of the work; and the defences were twofold, viz.,—that the contract was not entered into by defendant, nor was he bound by it; and that so far from there being just cause of action, the sum paid was in excess of the value of the work done.

The architect, Mr. Goldie, had given a certificate for 3,997*l.*, as against their claim of 11,000*l.* odd, but even this the defendants refused to pay. It was alleged that the tower had sunk and was

* A discussion followed, in which Mr. P. D. Tuckett (a former pupil of Mr. Sturge), Mr. J. H. Lloyd, Mr. Huxkinson, Mr. Eves, and others, took part; and was summed up by the President, who related the experiences of his own education. The meeting was then adjourned to Monday, January 11th, when a paper by Mr. R. B. Grantham, G.E., will be read, entitled "Arterial and Agricultural District Drainage, and the Laws connected therewith."

dangerous. In opposition to this, evidence was given by Mr. Goldie, Mr. J. H. Owen, Mr. T. N. Deane, and others, that the subsidence was an almost unavoidable consequence of a central tower, carried up in connexion with lower and lighter structures; great difference of opinion existed as to the fact of the subsidence being equal on each of the four piers, or partial as regards two of them. Evidence was given on this point as to the plumbing of the lower walls, the four piers, and the levelling of the bases, as not showing any absolute deflexion either from the horizontal line of the bases or the perpendicular line of the shafts. As to the exact amount of subsidence, no definite evidence was given, but from 1 in. to 1½ in. seems to be generally assumed by the witnesses for the plaintiffs' rebutting case: the actual fact of subsidence is evidenced by the fracture or deflection of the clearest string-course in the transepts and apse.

After a hearing of thirty-four days, and the expenditure of an enormous sum of money, the jury found themselves unable to agree on the question of the liability of the defendant, and were discharged. The denial of liability on the part of the Community, because the particular brother who gave the original order had been removed to another country, seems to us scarcely creditable. It is a matter of serious importance to builders and others having dealings with religious communities.

As an instance of the expenditure that has been made, the investigation of one item of 3*l.* 10*s.* cost at least 300*l.*

A sum little less than 5,000*l.* was included in the plaintiffs' demand, for "beds and joints," and resisted by the defendant on the ground that it was not customary to charge for them, and that the schedule of prices did not contain such an item.

The messengers on either side differed on the whole to the extent of 6,000*l.**

SKETCHES AND STUDIES.—INSTITUTE OF PAINTERS IN WATER COLOURS.

It is well understood that the general function of what is called a hanging committee is to disappoint most of those who are dealt with by these much-abused officials. Do the artists, or do the public, ever consider that a great part of the want of success which is annually lamented in this respect, is due to the conflict of discordant conditions which press upon the mind at the same time? Not only does each picture demand a place where it can be seen, and seen in the proper light, and without inconvenience of posture in the observer; but further, each picture objects to be "killed" by its neighbour. Thus arrangement on definite rule becomes as perplexing, and finally as impossible, as the attempt to carry out systematically any inflexible scheme of botanical or zoological classification has hitherto proved itself to be.

Something of the same difficulty attends the toil of the critic, who would give a conscientious account of such an exhibition. He seeks to compare, to classify, to link together in his mind, the various branches of art illustrated by the works before him. He will look at one time at heads or larger figures; then perhaps at the smaller and more stirring groups. Here the landscapes will form a gallery apart, and even among these, sea-pieces, mountain scenery, architectural pictures, and rural scenes, will each demand a separate rank. Cattle stand apart, so do flowers and fruit pieces. And then, when all is done, when the gallery has been paced over and over, and reduced to intelligible order in the mind of the critic, the reader has to pull all this carefully constructed guide-book to pieces; he will object to run, in the present collection, for example, from 1 to 230, because these are two pictures by Mr. Lucas; or even to turn from the gen of the Exhibition (No. 339), the "Interior of a Coffee-house at Cairo: Arah Mnsio;" to the equally well painted, though not equally pleasing, picture (255), "Horse Fair at Damascus, Mount Lebanon in the Distance" in order to compare two pictures which are in some sort pendants to one another, from the delicate and unwearied pencil of Carl Wrenner.

The least troublesome mode, after all, appears to be the most practical; and to stroll along the well-covered walls, noting the pictures as they strike the eye, as it is the proceeding which is

* Full reports of this trial will be found in the *Irish Builder*, November and December.

most natural to nine visitors out of ten, will indicate the order which it is most convenient to describe. The exhibition may be said to hold together rather more than is usually the case. If there are few of those pieces which it is impossible to forget, because they arrest the gaze of the passer-by with an imperative claim, there are, on the other hand, fewer than is usually the case below a fair mediocrity. The general idea, too, of water-colour sketches, appears to have been more distinctly grasped by most of the artists, in the present instance, than has been the case in some exhibitions to which we have called attention in former years. There is, indeed, a wide stretch from the exquisitely finished work to which we have already alluded, which it is pure misnomer to call a "sketch" or a "study," to the characteristic charcoal sketch, No. 181, by W. Bennett, in which is jotted down, in language intelligible to the artist or to the seaman, but hardly to the landsman who is neither one nor the other, the very rush and tumble of the Channel billows hurried by the wind. Yet within these extremes, each marked by its own excellence, lies more promise of the formation, one of these days, of a recognised school of water-colour painting than some recent efforts might have led us to anticipate.

Strolling, then, through the room, Mr. Thos. S. Boys arrests the eye by a bright bit of colour, the brick gables of the old house over which impends the turreted tower at the Hôtel de Ville, at Bergues (No. 22). Mr. Augustus Bonvier will claim a longer pause before his "Shopping at Cattaro" (No. 26). Under the unsuggestive title "An Interior" (in No. 35), Mr. Harrison Weir has given us a bright hay horse, with black, sleek, glossy legs, only a little too hollow in the back; a pony which is a real pony; a semi-dismounted, cat; and ducks that do all but quack. Let the visitor who admires animal painting of this high order neglect his ease, and step across the room to No. 297, by the same artist, which bears the quaint, but not inappropriate name, "About Supper-time." The venerable and white-whiskered felon who watches the rabbits in the distance looks as if he had long enjoyed the benefit of that widespread English superstition which extends the protection of the Sixth Commandment to the fox. Then let him pass on to 310, "The Early Bird," who has happily escaped the compromising attentions of Reynard.

Mr. J. G. Philip's (No. 37) is hard to name, but not hard to admire. The dancing path made by the sunbeams over the water, and the red tints reflected from the ferruginous limestone rock, form a charming bit of nature, though it is named "Tolpead." The next number, "Torno, Lake of Como," by Charles Vacher, is at once a companion and a contrast to the English scene. Close by, "The Ambassador's Dressing-room, Knole," by D. H. McKewen, presents as happy an example of the normal application of water colours as is to be found in the gallery. Closely viewed, this picture is a rough sketch. Observed from the proper distance, it gives drapery and furniture all the aspect of reality. Glancing at the name of this artist on the title-page, we observe that he has contributed no fewer than twelve pictures. Following the numbers in the catalogue itself, we find nearly every one of them to be soored with a mark of admiration. We note (65), "A Trout Stream, North Devon;" (81) "The Venetian Bedroom, Knole;" (90) "The Moine Mountains, Co. Down;" (102) "Stepping-stones on the Lligwy;" (369) "A Salmon Stream, N. Wales;" and (375) "Evening on the Lligwy."

Though thus led away, we must return to praise Mr. Edmund Warren's most charming work (34), "Avenue at Wootton, Surrey." If he had never painted an avenue with similar effects before, this picture would be talked about.

(No. 66), Mr. W. L. Leitch's "Ben Chnlich," in Perthshire, is remarkable for the glow of the heather bloom, when seen from the right distance. "The Church" (No. 67), by Andrew Gow, leads one to look again for the name of the artist, and to note the promise of his No. 270, called "Gallants," where the strained politeness of the how of the hean, and the demure glance of the pretty girl at the window, are very natural and nice. There is a charming bit of Gothic work, overgrown with ivy, to be seen in Mr. B. R. Green's No. 69, "The Baptistery, Canterbury Cathedral." From this we naturally turn to the interior (No. 75), by Mr. Skinner Prout,—

"Midst the forms, in pale proud slumber carved,
Of warriors on their tombs,"

where the crimson cushion on the pulpit lights up the scene. The study for the cartoon, "The Triumph of Justice," by the late E. H. Welner, has the post of honour on this side of the gallery. Mr. Welner, untimely cut off, scarcely realized in his later works, the promise of his early days.

Mr. Whymper's "Old Barn" (No. 89), Mr. Mogford's "Embayed on the Cornish Coast" (No. 92), Mr. Penley's "On the Capel Corig Route to Snowdon" (No. 93), and Mr. L. J. Wood's "Part of Whitby Abbey" (No. 94), close neighbours as they are in position, and widely different in subject and in treatment, are each pleasing. From the sweet peasant face of "Phoebe" by Mr. Henry Tidey, lingering for a moment to watch the attention of the robin in the "Writing Lesson," given by Mr. Kilburne (No. 95), we look on to the expressive glance of "Haidee" (No. 113), and then pass on to two highly characteristic portraits by Guido Bach—a "Rhine Peasant Girl" (No. 178), with blue, dreamy eyes, and "A Sclavonian," whose eyes, also blue, twinkle keenly with that life of which the experience is yet unknown to the maiden.

We have also to note the tottering old *canonico* and the brisk artisan in (103) "Doorway of the Cathedral at Assisi," by W. W. Deane; "The Cloud and Mist Sweeping over the Lake of Lucerne" (108), by the same artist; the frightened peasant woman in (116) Mr. E. H. Gordon's "Fall of James II. of Scotland;" Mr. J. Skerim's "Catching the Moth" (No. 132); Mr. Whymper's "On the Thames" (No. 146); Mr. Mopstone's Welsh scene" (284), with mist clearing off the mountains; Mr. Bennett's "Devonshire Mill" (No. 303); "Now Jump!" a clever contrast of character, by V. W. Bromley (No. 363); Mr. Beaver's "Rough Cattle" (No. 391); Mr. Weigall's "Old Pilot" (No. 412); Mr. Cattermole's "Reading the Fathers" (422); "The Study of an Old Woman" (No. 453), by the late E. H. Welner; and some capital drawings by Mr. James Paley, the excellent secretary of the Institution. Time and space alone prevent a longer list, or a more minute detail, of the many noteworthy items of this interesting exhibition.

THE GAIETY THEATRE, STRAND.

THIS new theatre, which has been built under the superintendence of Mr. C. J. Phipps, architect, on the site of the Strand Music Hall, and of some adjoining properties, which give it a frontage, more or less extensive, on the Strand, Exeter-street, Catherine-street, and Wellington-street, was successfully opened on Monday evening last. The front of the Music Hall remains almost as formerly; a few modifications, however, have necessarily been made on the ground-story, by the formation of the approach to the stalls and boxes of the theatre. The rooms over this entrance, and the new building extending along the Strand and Catherine-street, as far as the Owl office, will form a restaurant, entirely distinct from the theatre, but with a corridor of access from every tier of the theatre. This arrangement, which is on the model of some of the Continental theatres, will be found convenient by many, although, for our own part, we see no reason for connecting theatrical amusements with eating and drinking. The entrance in the Strand leads by a few steps to the level of the stalls, and by a spacious staircase to the balcony or grand tier, and the upper boxes. Another entrance, also on this level, is in Exeter-street, on the other side of the stalls, which, though designed specially as a private entrance for the Royal Family, is available as an exit-way in case of sudden panic, there being a stone staircase from the entrance to the highest floor of the theatre, with communication on every level. There is also a corridor running under the back of the pit, solely for the use of the stalls' occupants, so as to get from side to side without crossing the audience. The entrances to pit and gallery are in Catherine-street, and the stage entrance is in Wellington-street. The auditorium includes a balcony, the front forming a semicircle of 24 ft., opening out by arms of a contrary flexure a width of 43 ft. to the proscenium column. Behind this is a tier of private boxes, as at the Adelphi, upper boxes, and a gallery above. The columns supporting the various tiers are carried up to a sufficient height above the gallery, and from the cap spring a series of pointed arches, supporting cornice and ceiling.

These arches, which at first sight suggest the Leicester-square Alhambra, give great completeness to the design, but on occasions when the house is very full will be found in the way by those of the audience who are at the back of the gallery. While on this point we may suggest that some alteration is needed in the upper boxes on each side nearest the proscenium, as the stage is not visible there from a certain number of the seats. As, however, the house is calculated to seat 2,000 persons, this may not often be of consequence.

The proscenium pillars are all of stone. The dimensions of the auditorium are as follows:—

	ft. in.
From curtain to balcony tier	38 6
Ditto upper circle	45 0
Ditto gallery	47 6
Width of proscenium	30 0
Height of ditto	29 0
Height from centre of pit to ceiling	54 0
Depth of stage from curtain	41 0
Width between walls of stage	61 0

The staircases are of stone. The floors of the boxes and corridors are formed of iron joists and concrete, faced with cement. The floor of corridor of the upper boxes, by the way, whence a view of the stage is obtained, should be covered, as the material is cold. The ironwork necessary for this construction has been manufactured by Messrs. W. & T. Phillips, of the Coal Exchange, at their works in Belgium, and constructed by them at the theatre. The box-fronts, together with the arches and cornices, are executed in patent plaster on canvas, and fixed, by Messrs. George Jackson & Sons, of Rathbone-place, from the architect's designs. The iron balcony front was executed by Messrs. Hart, of Wych-street. The lighting of the auditorium is by a sun-burner, manufactured by Messrs. Strode & Co., who have also executed the float-lights. These consist of a series of argand burners reversed, and burning downwards, the products of the combustion being taken away in an iron cylinder, running parallel with the front of the stage, and carried up inside the brickwork behind the proscenium columns. By a contrivance, should a glass break, that particular burner falls down and shuts off the gas. The coloured glasses, called medians, are worked on levers in front of the lights, on the same principle as the switch-lights on railways. In every division of the audience refreshment-rooms and resting and cloak rooms, for both ladies and gentlemen, are provided. The stage has been constructed by Mr. G. E. Tasker, the clerk of the works. There is a depth of some 20 ft. under it, for sinking large scenes, and a height above of 50 ft. All the departments of the stage are very complete. There is a convenient green-room, and the dressing-rooms appear to be sufficiently numerous.

The whole of the coloured decoration of the auditorium and the lobbies has been executed by Mr. George Gordon. The same gentleman has also painted the act-drop, which is a framed view of a palace on the Grand Canal, Venice. A very noticeable feature of the decoration is the frieze over the proscenium, designed and cleverly painted by Mr. H. S. Marks, 30 ft. long by 4 ft. 6 in. deep. It represents a king and queen of Mediaeval times, with surrounding courtiers, watching a mask which is being performed before them. On each side of this frieze, over the proscenium boxes, are lunettes in the arches,—the one on the left represents lyric, and the other epic poetry,—designed by the same artist. These pictures are works of art. The general builder's work has been done by Mr. Simpson; and the gaswork (except as mentioned above) by Messrs. J. Jones & Son, of Bow street. The capitals of the columns, the cornice, and much of the ornamentation are Early Gothic in character; the coloured ornaments are flat, without shadow; and the result is a very handsome interior. The bottom part of the main columns which carry the series of arches already mentioned, and the ceiling, is hidden by the private boxes at the back of the balcony, a defect to logical eyes; nevertheless, we must congratulate the architect on the production of a very handsome theatre. The traditional green curtain, it should be noticed, has given place to one of maroon colour.

The principal piece produced—a comedy drama from the French, entitled "On the Cards,"—enables Mr. Alfred Wigan to display some most admirable acting. The piece, however, in its present shape is not a good one,—a matter for regret. For the Operetta, with which the evening opens, "The Two Harlequins,"

and the extravaganza, "Robert the Devil," with which it closes, Messrs. T. Grieve & Son have painted some exquisite scenery. For fifty years, as Mr. Hollingshead, the lessee, mentioned in the course of a brief address to the house, Mr. Thomas Grieve has painted scenery for the London stage. How great is the debt the play-goer owes him.

CHARING CROSS RAILWAY.—NEW STATION.

FEW public works are ever conducted in the sight of so many thousands of daily spectators, or make such rapid and palpable progress, as has been the case with those which have been for a few months past in course of progress near the Waterloo junction of the Charing Cross Railway. The daily traffic has continued uninterrupted during the construction of three of the longest platforms, partly covered, connected with any railway station in or near the metropolis, exclusive of the terminal stations. The difficulty and danger incidental to the completion of one of these platforms have been enhanced by the circumstance that it is between the lines, and has been prosecuted during the passage of hundreds of trains in each direction daily. The Waterloo junction station, to which we are referring, for the accommodation of the passengers by the South-Western Railway, and for the more convenient interchange of traffic between the South-Western and South-Eastern Companies, is now happily near completion, and will be opened in the course of next week.

The new station has no architectural pretensions. The waiting-rooms, booking-offices, and other conveniences, are provided in the basement of a viaduct running through house property of a mean character, and over narrow back and side streets. The platforms are raised on the top of the viaduct, on which space could not be provided for waiting-rooms or other accommodation admitting of architectural effect. The north side of the viaduct was widened for the length of the platform which has been provided upon that side. It is 532 ft. long, by 18 ft. wide. A line of rails divides it from the middle platform, which is 435 ft. long and of the same width, the middle platform being double, and serving at its two sides trains passing in each direction. There are covered lengths upon each of these platforms, of 200 ft. and 204 ft. each, the whole width. The third platform, on the south side, commences near the west ends of the two others, which are opposite each other, and extends round a curve to the end of the Waterloo platform. This platform is 337 ft. long and about 15 ft. wide. A booking-office is provided upon the platform for the passengers from Waterloo Station, who, passing to the junction end of the platform, descend by an inclined plane to a passage under the Charing Cross line, and to the stairs conducting to the north and middle platforms. The general booking-offices and waiting-rooms, which are compact and well arranged, are on the ground level. The present Blackfriars Station will be abolished on the opening of the Waterloo Junction Station. The coverings of the platforms are very neat, but will necessarily be cold, from the exposure, being open at the ends. The roofs are flat, and about 11 ft. in height from the platform to what is usually the eaves, but is in this case the highest part of the roof, the dip being in the middle platform inwards to a longitudinal gutter, and of the side platforms towards the outer or back edge. The roofs are carried upon ranges of neat cast-iron columns, with handsome openwork cantilevers on each side, supporting the main cross bearers, which carry pultrines that are boarded and covered with No. 14 gauge zinc; and the under edges of the pultrines are covered with match-headed boarding, which constitutes the ceilings. The platforms are of earthwork, faced with brick walls; they are 3 ft. above the rails, and an easy step down from the floors of the carriages. The columns stand upon brickwork pillars, about 2 ft. square, carried up to within about 18 in. of the ground level. The engineer has done well in having substituted iron for timber for the columns; and the Blackfriars Station, which is now being dismantled, furnishing a remarkable illustration of the perishable nature of such timber as has been used in that particular structure, when placed underground. The station was only erected about five years ago, but this has sufficed for the portions of the

pillars supporting the roof and the struts underground to have decayed so much as to have pulverized, almost to the heart in many instances, upon their exposure to the air. These rotten timbers are of about 8 in. scantling.

A single line of rails furnishes an actual junction between the South Western and the Charing Cross lines; but this will not be need for ordinary traffic, and all passengers interchanging from one line to the other will require to change carriages at the junction.

The work has been designed and executed under the direction of Mr. Peter Ashcroft, the company's engineer. The interlocking switches and signals are upon the system patented by Mr. F. Brady, of the South Eastern, and now in course of adoption by the South Eastern Company. The block system of signalling is invariably in operation on the line. The whole of the work has been executed by the company's own working staff.

ON THE DRYING PROPERTIES OF VARIOUS KINDS OF HOUSE PAINT.*

WE now come to the dryers, such as litharge, manganese, &c., and their action is very remarkable in causing the paint to absorb oxygen quickly and decidedly. For example—two cubic centimetres of linseed oil absorbed, in 30 days, 2.45c.c. of oxygen; but the same quantity of manganese dryer absorbed 21.45c.c. of oxygen; while a mixture of the two, consisting of 1.56c.c. of linseed and 0.44 of the dryer, absorbed 30.826c.c. of oxygen. That is, the absorptive, or, as a painter would say, the drying power of the mixture is far greater than the sum of the powers of the two oils, since 1.56c.c. of linseed oil absorbs of itself 1.985c.c. of oxygen, and 0.44 of the manganese dryer 4.719c.c. of oxygen in 30 days, the sum of the two absorptions being 6.714c.c. But the mixture really absorbed 30.826c.c., or more than 4½ times as much as the same fluids absorbed when exposed separately.

Experiments, scientifically conducted, have also shown, that, in preparing his dryers, the painter wastes both good materials, fuel, and time. He boils his oil too long, and maintains the temperature too high.

The usual mode of preparing dryers is to heat the linseed oil in an iron pot until it appears to boil. The surface is skimmed from time to time, and after from three to six hours, about one-tenth, by weight, of litharge is added, and the heat is maintained five or six hours longer; or 100 parts of very old linseed oil is heated about six hours, when six parts of litharge and about three of burnt umber are added. The heat is continued six hours longer, when the liquid, after being left quietly to cool, is decanted. For the manganese dryer, the oil is heated at the so-called boiling point during five hours; peroxide of manganese is thrown in, and the boiling continued for eight hours. We have already seen that the boiling is not the formation of vapour, but the escape of gas-bubbles due to decomposition.

Chevreul's experiments prove that pure linseed oil is more siccativous after three hours' boiling than if not boiled at all; but is less siccativous after five hours' boiling than after three. The oil boiled during three hours with one-tenth of litharge is much more siccativous than if heated without the addition of this oxide: so that the drying property is not conferred on the oil by the action of heat, as some have supposed, but it is by the mutual action of the oxide and of the oil, assisted by a high temperature, that the drying properties are developed. Litharge is more siccativous than manganese; and what is very curious is, that litharge, heated once with oil, is more active than fresh litharge. It is still more curious, that manganese that has been heated several times with the oil is more active than fresh manganese. But this excess of activity in the oxides is no longer exerted on oil that has already been boiled five hours. All the experiments proved that the drying property of linseed was injured by a prolonged heating at high temperatures; and the remarkable and unexpected result came out, that linseed, exposed to the temperature of from 100° to 175° Fab. during six hours in contact with 10 per cent. of manganese, can be used immediately in painting without the addition of any other dryer. Linseed oil alone, exposed to a similar moderate

temperature, improves in its siccativous property, but not sufficiently so to dispense with the manganese. A very energetic dryer is obtained by boiling the oil for three hours only in contact with 15 per cent. of the metallic oxide.

Every one knows what is expected of good paint. In the first place, it should be sufficiently liquid to spread under the brush, and sufficiently viscous to adhere to the surface, even though it be vertical, without running, or becoming unequally thick in different places. In the second place, it should become solid within a reasonable time after being applied. Thirdly, the solid should adhere strongly to the surface.

We have seen that lead and zinc paints become solid by the absorption of atmospheric oxygen. But as pure linseed oil also becomes solid by exposure to the air, the drying of the paint is not due to the presence of a dryer, or of the oxide of lead or of zinc. It is true that the dryer acts by increasing the absorptive power of the oil for oxygen gas. The lead and zinc oxides have also drying properties, and we must not neglect the influence of the surfaces that are to be painted. Paint dries at different rates on glass, wood, and metal; it dries better on some kinds of wood or of metal than on others, of course under similar conditions of experiment.

Take glass, for example. Surfaces of glass were coated with linseed oil, also with the oil containing a little white antimony, and with the same compound with the addition of a little litharge. The linseed dried quickly, the antimony compound not so quickly, while in the third compound the presence of the litharge seemed to neutralise the retarding effect of the antimony. The following table shows the results:—

	Linseed oil.	Linseed oil and oxide antimony.	Linseed oil and litharge dryer and oxide antimony.
	Days.	Days.	Days.
First coat dried in	17	26	21
Second " " "	17	8	9
Third " " "	9	0	2
Total	43	43	32

It appears from this table—1. That a glass surface does not allow the paints to solidify so readily as a surface formed of the solid oil or paint. 2. That the antimony oxide is anti-siccativous, which effect is corrected by the litharge. 3. That in the second coat the glass seems to be still exerting a retarding action on the oil, but this is not so evident in the antimony paint. 4. That the influence of the litharge dryer is evident in reducing the time required for the drying of the third coat. This influence seems to depend not only on the presence of the litharge dryer in the viscid paint, but also on its presence in the solid surface on which the fresh paint is laid.

The influence of the kind of surface employed on the drying of paint is well shown in the case of oak. On oak surfaces stained brown, three coats of linseed oil took forty-six days to dry, oil with a litharge dryer seven days, oil with a manganese dryer still less time. It was also found that linseed oil and white lead and linseed oil and white zinc dried more quickly with a manganese dryer than with a litharge dryer. On a surface of clean oak the first coat of oil took a very long time in drying. On the twenty-second day it was soft and pasty beneath the surface; the oil had sunk into the pores of the wood, and thus prevented it from absorbing the oxygen required for its solidification. This explains why oil dries more quickly on a painted wooden surface than on a porous one. On a porous surface the dryers seem to act with great effect, probably from covering the wood and preventing the oil from sinking into the pores. Their influence is shown in the following table:—

	Linseed oil and white zinc.	Linseed oil and litharge dryer and white zinc.	Linseed oil and manganese dryer and white zinc.
	Days.	Days.	Days.
First coat dried in	66	6	5
Second " " "	6	5	3
Third " " "	6	5	3
Total	78	16	11

This also shows that a surface of linseed and white zinc allows the paint to dry much more rapidly than a surface of porous wood does. A

* By Mr. Charles Tomlinson, F.R.S. See page 909, ante.

similar effect is produced when the paint is laid on an old surface of paint. The paint itself also becomes more siccative under the influence of time and atmospheric exposure.

It appears from experiment that paint dries more quickly on poplar than on oak, and more quickly on pine than on poplar. In the experiments on metallic surfaces the most remarkable results were obtained on lead. The first coat of linned oil dried very quickly on this, as also the first coats of lead paint and of zinc paint. The zinc paint dried first, then the linned oil, and lastly the lead paint. The zinc paint, however, tended to retard the drying of the subsequent coats. A newly scraped surface of lead acted more energetically than one that had been tarished by exposure to the air, but the lead covered with one coat lost its influence in hastening the drying of the subsequent coats. The first coat of oil on bright lead was only ten hours in drying. In short, we get this remarkable result, that lead is siccative with reference to pure linned oil, while white lead itself, a siccative body, is anti-siccative with respect to linned on metallic lead. The influence of various metallic, vitreous, and wooden surfaces is thus summed up by M. Chevroul:—

FIRST COAT.

On Copper.—Oil dried more slowly than both oil and white lead, and oil and white zinc.

On Brass Wire and Zinc.—Oil dried as rapidly as oil and white lead, but more rapidly than oil and white zinc; but on the brass wire the drying was more rapid than on zinc.

On Iron.—Same results as on zinc; but oil and white zinc dried more quickly on iron than on zinc. This is analogous to the fact noticed with lead. The oil and white lead dried more slowly on lead than did the oil and white zinc.

On Porcelain and Glass.—Oil dried a little more quickly than oil and white zinc, and oil and white lead a little more quickly still.

On Plaster.—The oil and white zinc paint dried in about equal times.

On Poplar and Mountain Ash.—Oil dried more slowly than oil and white lead, and also than oil and white zinc.

THREE COATINGS.

On Copper, Brass Wire, Zinc, Iron, Lead.—Oil and white lead dried more quickly than oil and white zinc. This was also the case on porcelain, glass, plaster, poplar, and mountain ash. In the case of the woods, linned oil was found to dry more quickly on ash than on poplar, and more quickly on poplar than on oak.

Some of these surfaces may, however, be regarded as indifferent, as respects their influence in quickening or retarding the drying of paint; but the temperature and other circumstances modify any general conclusions that may be drawn on the subject. Paint dries more quickly at from 77° to 82° Fah., than from 59° to 64° Fah., other things being equal. This explains why, in practice, the proportion of dryer varies with the temperature. In winter it is customary to add from three to nine, and even ten per cent. of dryer to the linned; in summer not more than half, one and a half, or two per cent., and it may even be left out altogether in the last coat. The drying property of linned oil is nearly always increased by the addition of white lead, and in most cases by that of white zinc. If the compound be not sufficiently siccative, it can be made so by the addition of a dryer, whether of litharge or of manganese, due respect being paid to the varying conditions of the surface, number of the coats, whether first, second, or third, temperature of the air, and the amount of natural light present.

But the influence of the lead or manganese dryer, as will be gathered from the foregoing details, is not so important as is generally imagined. It can be dispensed with in the second and third coats, and even in the first if the temperature of the air be favourable. Linned oil by exposure to light and air loses its yellow colour and becomes siccative, so that it can be employed alone with white lead or white zinc without detriment to their purity. If white zinc be associated with the sub-carbonate of zinc, the dryer may be dispensed with altogether.

Paint owes its lustre and smoothness to the oil alone. If oleic acid were mixed with metallic oxides in such proportions as to form solid chemical compounds, and the acid were to pass quickly from the liquid to the solid state, the result would not be a smooth, uniform oleate; but

when the drying oil passes slowly into the solid state, in consequence of the gradual absorption of oxygen, and the changes pointed out by Malder, the very slowness of the process allows the oily molecules to arrange themselves into a symmetrical compound, which would be transparent were it not for the opaque particles of the white lead incorporated in the compound. If these opaque particles are not in excess, the molecular arrangement is such that the paint dries into a surface that is lustrous, and even brilliant, in consequence of the mirror-like reflexion of the solidified oil.

No notice has yet been taken of the action of the turpentine, which is added by painters, in order to diminish the viscosity of the paint, and to allow it to spread more easily under the brush. If the surface is to be polished, a large proportion of turpentine is used; if it is to be varnished, as much turpentine is added as will render the paint very fluid, but not too fluid to work with; if the paint is to be very durable, and is to be neither polished nor varnished, only a small proportion of turpentine is to be added. As turpentine dries to a great extent by evaporation, one of its chief uses is to hasten the drying of paint. Thus, three layers of linned oil on glass dried in twenty-five days; but when about 30 per cent. of turpentine was added to the oil, the mixture dried in twenty days. This drying effect is promoted by a previous exposure of the turpentine to the air. When both oil and turpentine have been previously exposed, the drying takes place still more quickly. Exposure to air has a similar influence on the other ingredients of paint, even on the white zinc.

This exposure in the case of turpentine favours the combination with atmospheric oxygen and the consequent resinification of the liquid. Exposure in the case of a porous body like white zinc may also lead to the physical absorption of oxygen, and thus hasten the drying. If this physical effect were really obtained in the case of white zinc and white lead, Chevroul thought it likely that the presence of other solid bodies in the paint might have a similar effect. But before putting them into the paint, their influence as surfaces was tested. When linned oil was laid on white lead three coats dried in seven days; but on sulphate of zinc they occupied eighteen days in drying, twelve being required for the first coat and two for the second; white lead is therefore more siccative than the zinc-sulphate. In both cases the first coat acted as a dryer to the second. When a mixture of sulphate of lead and white lead was used as the surface, the oil dried almost as quickly as on white lead alone. It has already been shown that the addition of the litharge and manganese dryers made the linned oil dry more quickly; that is, it became more capable of absorbing oxygen from the air. It is remarkable that this absorptive power is increased by the addition of solid bodies such as sand. Linned oil mixed with white lead dries more quickly than the oil alone, so that white lead is a dryer or siccative. Oil mixed with sulphate of lead dries very slowly; but a mixture of oil, sulphate of lead and white lead, dries as quickly as oil mixed with white lead only. Hence the presence of white lead confers extra drying power on sulphate of lead. Carbonate of zinc acts as a dryer, when added to oil or white zinc; and the mixture dries more quickly than oil mixed with white zinc only. Oil mixed with zinc carbonate sets more rapidly than with zinc white; but it forms a semi-transparent, not an opaque paint. As zinc carbonate renders oil and white zinc more siccative, it might be substituted for the manganese dryer, which has the disadvantage of imparting colour to zinc white. Two paints were prepared, one consisting of 100 lb. of linned oil, 75 lb. of zinc white, and 25 lb. of zinc carbonate; the other of 98 lb. of oil, 2 lb. of manganese dryer, and 100 lb. of white zinc. With each of these paints a door was painted. Four hours after they had been applied both paints appeared to be equally set; but the surface coated with the first paint was whiter than that coated by the second; the whiter paint was, however, the less adherent.

In conclusion, I venture to think that the question, "Why does paint dry?" has been fully answered, and that the intelligent house-painter will find, in the details thus brought together, some material for the improvement of his useful art. The only object of science is the discovery of truth; but the truths of science form a rich resource for the technologist. He finds in them the only proper basis for real improvement; and the Society of Arts is, I think, never better employed than when it brings the

man of scientific theory into direct contact with the intelligent man of practice. The time is happily passed away for ever when the so-called practical man boasted of his independence of all theory. He now knows that, by such a self-imposed blindness, he placed himself at least half a century behind the intellect of his age. Every art that depends on chemistry seeks the aid of science; and, in working out technical results on a large scale, scientific truth is often assisted; just as, by the same righteous law of reflex action, the results produced on a small scale in the laboratory, apparently for the benefit of science alone, are often reproduced on a large scale in the factory to the advantage and profit of the whole community. I repeat that the Society of Arts can never be better employed than in acting as the medium of communication between the man of theory and the man of practice.

THE INSTITUTION OF CIVIL ENGINEERS.

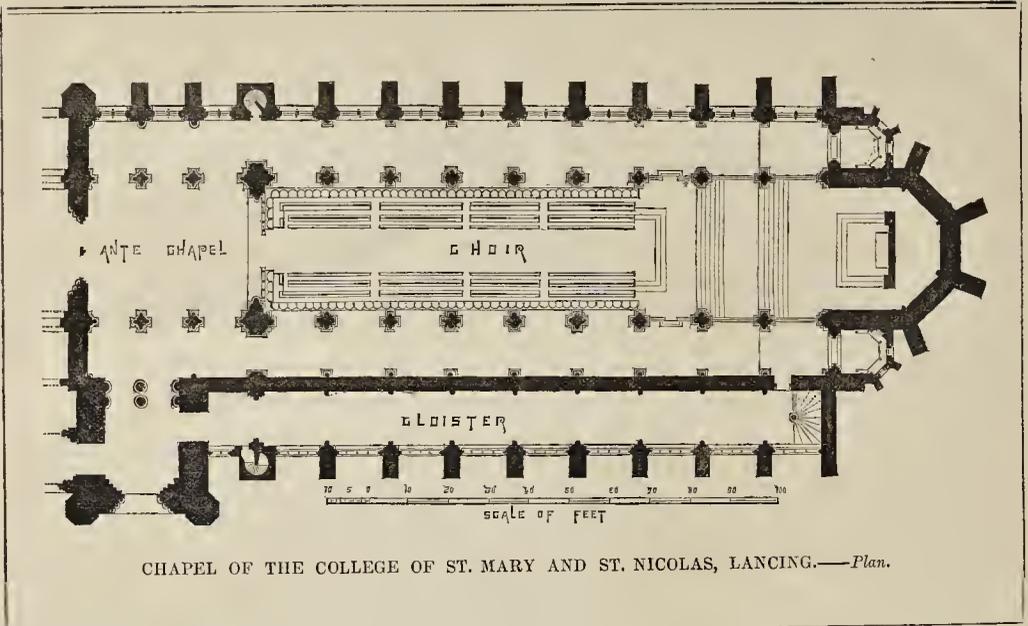
At the meeting, December 1st, Mr. C. Hutton Gregory, president, in the chair, the paper read was "Description of the River Witham and its Estuary, and of the various Works carried out in connexion therewith, for the Drainage of the Fens, and the Improvement of the Navigation," by Mr. W. H. Wheeler. It was stated that the Witham was originally a tidal river, navigable by ships of considerable size as far as Lincoln, a distance of nearly forty miles from the estuary. It was this portion of its course, from Lincoln to the outlet, flowing through a low fertile tract of land, and on which the skill of the engineer had been employed to make it subservient to the purposes of drainage, that formed the subject of this communication.

Reference was made to the works carried out in the year 1825, under the advice of Sir John Rennie, at a cost of about 40,000l., by which the channel between Skirbeck Church and Hob-hole Sluice had been straightened, and the course of the river had been contracted. Thirty years after the commencement of this work, 300 acre of the reclaimed land had been sold for 10,000l., and been embanked by the purchaser; while a few years ago, two other marshes had been embanked by the Commissioners, and had been let on lease at a rental of 310l. per annum, the area, including foreshore and bank, being about 160 acres.

The system of parallel training walls, constructed of faggots, clay, and chalk, had been adopted to a great extent for the Fen rivers, and had been found to answer better than any other plan. The manner in which these training walls had been carried out, on the rivers Welland and Witham, was then described.

In conclusion, the general results of the enclosure of the Fens were briefly reviewed; and it was observed, that the appearance and prosperity of this large tract of land, equal in extent to many counties, when contrasted with what it was a century ago, was a striking proof of the ingenuity and industry of man, and reflected the highest credit on the skill of the engineer, and the enterprise of the people.

On the 15th instant the paper read was "On Machines employed in Working and Breaking-down Coal, so as to avoid the Use of Gunpowder," by Mr. S. P. Bidder, jun. It was stated that the object of this communication was to direct attention to the "winning" of coal by mechanical appliances, with the view of obviating the loss in production and the danger to the colliers which were incidental to the use of gunpowder. Several inventions for this purpose were described; and it was remarked that the great defect in all these machines was their limited expansive power. Machines for cutting grooves or slots in the coal had also been tried, but it was said only with partial success. After considering these systems, the author had, in conjunction with Mr. John Jones, devised a machine which had been submitted to actual trial on a working scale at the Ilarecote Colliery, where the results were so satisfactory, it was said, as to induce the proprietors to make arrangements for its immediate adoption. The machine consisted of a small hydraulic press of 12 tons power, to which was attached a pair of tension-bars, bent in the form of a connecting-rod or hinge-strap. These were placed one over the other in the bore-hole, and between them, at the extreme end, there were a clearance-box and two metal pressing-hocks, between which was



forced, by the action of the hydraulic press, a split wedge 15 in. long, causing a lateral expansion of 3 in. The ram was then withdrawn, and a second wedge was inserted between the two parts of the first wedge, and was forced up until sufficient expansion was obtained to break the coal. It was found that the press could be applied and the blocks brought down in less time than was consumed by firing and waiting for the smoke clearing.

THE STUDY OF ART.

In a recent address to the Female School of Art, Mr. A. H. Layard, M.P., said to those students who intended to follow art as a profession to gain their living, or to help others to do so, "Let me urge on you the extreme necessity of doing thorough good work, of doing nothing carelessly, and going thoroughly through these schools." Unless thoroughly grounded they would never do good work. Young people had a tendency to fancy they could do more than they really could, to imagine themselves artists as soon as they could draw passably, or put in a bit of colour. A lady, who was then a distinguished amateur, came to him some years back to ask advice on her course of study. She followed it, and went to South Kensington, but came back to him complaining that the teachers had set her to draw straight lines for two or three days. He told her the story of how Giotto, the great Italian master, when asked by the Pope's Nuncio for an ensample of his skill, simply struck a circle on paper with one vigorous sweep of his pencil; and so pacified her. Some months after she came to him again, and acknowledged the benefit of the course of thorough training. That eminent sculptor, Mr. Gibson, told him that one day he went into his study, and there found an American physician with his daughter, who, the father said, used to be continually getting hands and feet from his dissecting-room and modelling them, and at last insisted on going to Rome, and studying under Mr. Gibson. Now that gentleman did not take pupils, for he found they generally came to teach him, instead of learning from him; but he told the lady to call next day, when he set her to model in clay a bust of Medusa. Next day he went and found an uncommonly good copy; but he thought, "If I tell her it is 'an excellent copy, I shall turn her head.'" So he said, "Not bad, but you can do better; try again," and defaced the copy. Next day she did better, and the advice and defacing were repeated. The third day he really was surprised to see what she had done, and took

her as a pupil, on account of her spirit of perseverance and willingness to be thorough. She was now a most distinguished sculptress—Miss Hooper—and stood a high chance in the competition for the design of the national monument to the late President Lincoln. After his hearers had mastered first principles, he would urge on them to turn to the cast, and particularly to the study of the human figure. Once mastering that the eye could never go wrong. The better they drew from the cast, the better designers they would be. History showed that the very greatest designers of ornament were very great painters—Raffaello and Benvenuto Cellini. But even when they could draw from the cast, they must not throw off selections, and plunge into picture-galleries to select for themselves; for instead of doing good, our museums and picture-galleries were really likely to do harm to pupils' tastes. Unless a museum was correctly and scientifically arranged, it did not point out what was really good and useful in art, and what was only curious and interesting on account of the epoch in which it was produced. In the British Museum statues and basso-reliefs were mixed up without much discrimination; a little was done, but even the most practised observer, not an intelligent connoisseur, would get misled. The same thing existed in the National Gallery when works were arranged chronologically; a chapter of the history of the human mind, of civilisation, of progress, was presented to the eye; but it did not follow that what was merely curious was admirable as a copy. He would further advise them not to begin art as a trade too soon; to pursue art, even when at the head of domestic establishments, to hold together and help others taught in the same institution, and let the school form a nucleus around which mutual interests should be developed. He was glad to see the attention they were giving to designs for manufacturing purposes. Mr. Samuelson had stated, in a recent work on technical education, that, in consequence of the influence of the town were not only equal to, but superior in design over, those of all Europe. He was sorry to hear that the study of wood-engraving had ceased in the institution, for he believed it would furnish an important branch in art for the exercise of female talent. Some of the past engraving produced in the school need not fear competition, and literary men especially might be of service to those who took up that branch of labour. He cautioned them against a false tendency to heaviness in shadows very much encouraged of late by certain works from the other side of the Channel, which, though "taking," was not good art. He urged them, as much as

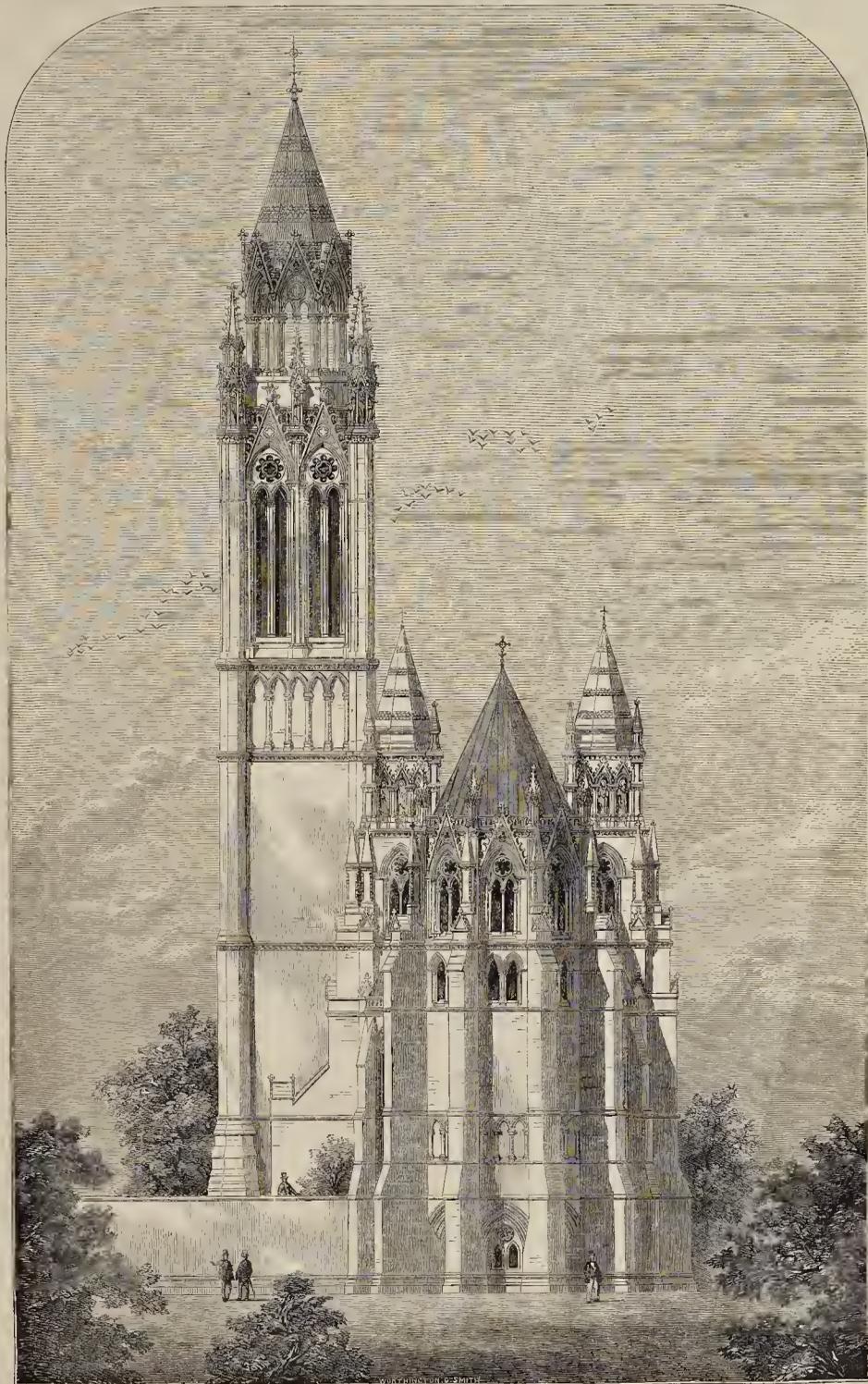
possible, to study from nature, and to study also modelling, which would teach them an accurate knowledge of form. He wished that they had better models, and that the patrons of the institution would lend, whilst they were out of town, pictures of value to serve as copies to the students. To amateurs he pointed out that art taken up for pleasure might be made to turn to a thousand beneficial purposes; that it meant usefulness, and, to the enjoyment of that, happiness—the enjoyment of the beautiful—the greatest and purest of all enjoyments. It would furnish constant modes of pleasant occupation, fresh sources of happiness to oneself and to others. He instanced the success of an author's work through the designs made by his wife, the illustration of sketch-books, which, unlike the gushing passages in private journals, might be kept and shown. He spoke of the use that a smattering of drawing had been to him at Nineveh, of the household elegancies that could be contrived at small cost, of the influence of the Beautiful on childhood, and, finally, of the service done to a country by the diffusion of taste.

THE CHAPEL OF THE COLLEGE OF ST. MARY AND ST. NICOLAS, LANCING, SUSSEX.

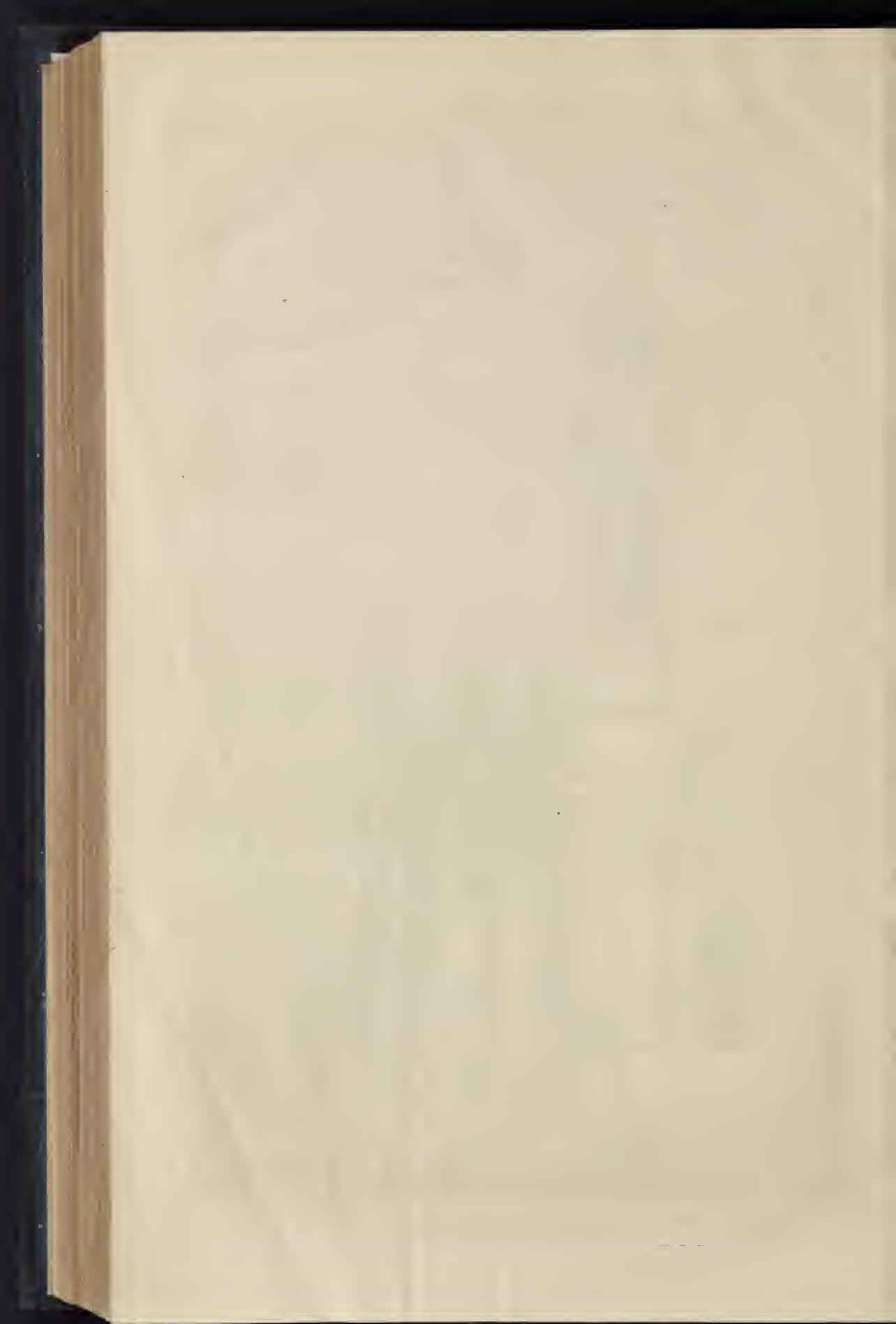
A FEW months ago we mentioned that the first stone of the chapel for this college, where some 300,000l. are to be spent, had been laid, and we fully described the design.* We now give a view of the intended chapel and the plan of it, and briefly recapitulate a few particulars. The chapel, it will be seen, is on a large scale, and will probably be as long time in erection. It is to be carried up as the funds come in, without, if possible, stopping the works at all. The chapel consists of an apsidal choir 170 ft. long, inside, and 30 ft. wide, with an ante-chapel of the same width and 45 ft. long, north and south aisles, north-western and north-eastern towers, and a great campanile at the south-west angle about 350 ft. high. The height from the choir floor to the underside of the groining will be 87 ft. The ground falls greatly from west to east, and the total height of the apex to the ridge of the roof will be about 150 ft. Beneath the chapel there will be a crypt, 20 ft. in height in part, and 30 ft. at the east end.

The chapel is intended to serve as a place of worship for the three great Sussex schools on occasion of grand gatherings of the college. Mr. Slater and Mr. Carpenter are the architects.

* See p. 692, ante.



CHAPEL OF THE COLLEGE OF ST. MARY AND ST. NICOLAS, LANCING, SUSSEX.
MESSRS. SLATER & CARPENTER, ARCHITECTS.



THE TECHNICAL INSTRUCTION
MOVEMENT.

Nottingham.—The mayor has distributed the prizes gained by the students of the Government Science Classes in this town, at the Mechanics' Institution, Lincoln-street. There was not a large attendance. Mr. R. Enfield said he did not think the classes were doing all the good that they ought to do in the town. The subjects that were treated of had a direct bearing on the local trade, and he felt sure that many a man in Nottingham would do his work a great deal better if he only knew exactly the sense of the subject he was dealing with. He had very often regretted that the extraordinary, he would almost say the unparalleled skill of the mechanics in Nottingham, should have so little guidance by scientific knowledge in making them produce the best possible results, and in making the best use of the talents they possessed. He had not the least doubt but that a great number of their talented mechanics were wasting hours, and ruining their health, in struggling after matters which other people had solved before them. It was a great thing to know, in the first place, the principles on which they were working, but it was important also in the second to be acquainted with what other men had done before them. These things they learned from the sort of teaching they received at those classes.

London.—Mr. Buckmaster has delivered a public address in the Subscription-rooms here. He spoke strongly of the indifference of the labouring classes to all questions of social culture, especially those which required any intellectual effort. There was also, he said, "a great want of sympathy and hearty belief in education on the part of employers, and the estrangement and separation of classes was becoming wider and deeper every day. It is useless, he said, to throw all the blame on this class or that class. Every class was responsible for a state of things which, if not checked by a deeper and broader Christian philanthropy and a higher cultivation and refinement of feeling, will ultimately shake the foundations of society. My hope of the future, he added, is in social reforms, in the promotion of education, of temperance, and co-operation, among those whose lot it is to live by manual labour." A committee to consider how the scheme could be best carried out was appointed. Captain W. C. Copperthwaite, steward to Earl Fitzwilliam, occupied the chair.

Oldbury.—Mr. A. M. Chance has distributed prizes and certificates at the National Schools, Oldbury, to competitors in connexion with the Science and Art Department. A number of the certificates were for animal physiology and others for drawing. Mr. Chance strongly urged the necessity of improving the education of working men, and he quoted Switzerland as an example of a continental country where great efforts were made for the education of the humbler classes. Had Switzerland one-fifth of the resources they in England had, it would occupy a far higher position in the industrial world. In some Continental nations education was made compulsory, but he doubted whether Englishmen would consent to be driven.

THE MARQUIS OF BUTE ON SCIENCE
AND ART.

This young and powerful nobleman, who only the other day came of age, has fairly taken the public by surprise by the sensible and excellent speech on art and science which he delivered at the annual distribution of prizes to the students of the Cardiff Schools of Science and Art, in connexion with the free library there. The Marquis was in the chair. In the course of his very able speech he said:—

"What we contend for is, that the use of art is to make people better,—to make them better by setting before their eyes material objects formed in beauty and in truth,—to take the senses, those gates of death, and to make them channels for communicating the comprehension of the beautiful and the true. It is impossible to deny, and to attempt to deny it would be untrue, that upon the average man the ever beautiful phenomena of nature have a great effect. When the Psalmist gazed in admiration upon nature, and the feelings which rose within him made him exclaim, 'How wondrous are Thy works, O Lord,—in wisdom hast Thou made them all.' His was but a creature of the experience of nearly all humanity. There are, indeed, few, if any, upon whose souls the magnificent and lovely spectacle of nature has not an effect to elevate, to purify, to secretly, almost unconsciously, to persuade towards good."

"Art is at present mostly,—I fear I must say almost always,—employed for ecclesiastical purposes. There is

hardly a building erected for worship nowadays in which there is not some attempt made at art. The apostles of art will endeavour to carry out its principles in their dwellings, and in the articles of their daily use. The architecture of houses, particularly of the humbler kind, is quite deplorable. As for the furniture, crockery ware, or plate, it is almost impossible to get it good. A rich man may get a bedstead, or a washstand, or a chest of drawers in good deal, but only by having it specially designed. There are few even then who can do the design, and then there are hardly any workmen, even in London, capable of carrying it out nicely. The most lamentable want of taste is, perhaps, to be seen in jewellers' and silversmiths' ware, and there seems to be most hope about the glass and china. This state of things is one against which the lovers of art must struggle, by endeavouring as much as possible to encourage only the good, or, where that is not possible, the least bad.

I would now wish to speak of the state of art in Cardiff. The immense and sudden increase of the town's material property has been but slightly accompanied by any development of taste for, and encouragement of, art. I am, personally, painfully alive to the fact that the estate is very far indeed from setting anything like an example of art. All I can say is, that that is a defect which I hope to see remedied in time. The establishment of these schools shows, I faintly hope, the desiring of a better way. It is a day which all who love art will do their best to hasten. There is hardly any one who has not got it in his power to assist in some way in the great apostrophe of art. Every one who builds a house, by endeavouring to keep the plain principles of art; every one who keeps a shop, by the manner of its decoration, by the arrangement of his goods, by the character and taste of the wares he transacts; every one who lays down a carpet, or paper a room, or furnishes it, or decorates it—nearly all have it in their power to labour in some way or other, however humbly, for the extension of art, if they have the power to affect it in any way."

COMPETITIONS.

Melbourne Chapel, Derbyshire.—The trustees, after consideration, have finally decided upon the selection of the design tendered in competition by Messrs. Wilson & Wilcox, of Bath, architects. There were eighty competitors. The works are to be commenced immediately.

Kennington School District.—The parishes of Kennington and Westminster jointly are about to erect new schools at Asford, Middlesex, for their pauper children. The following gentlemen have been invited to send designs: Mr. Thomas Ailton, Mr. Burden, Mr. H. H. Collins, Mr. E. Fowler, Mr. Williams, and Mr. H. Saxon Snell. Each competitor is to receive 50l., the one chosen being employed to carry out the works.

THE SUBURBAN VILLAGE AND GENERAL
DWELLING COMPANY.

The works upon the Longborough Park village, under the new management, are said to be favourably progressing, giving promise of a speedy commencement of building operations. The roads have been marked out, and contracts for their construction, with sewers, are being invited by the directors. The proposal is to establish, on completion, a village capable of containing 7,000 inhabitants, who will have dwellings constructed to secure domestic comfort and sanitary requirements. The efforts of the company are directed towards providing for the working classes a house of their own, upon better terms than the ordinary building societies. The scale of repayments extending to twenty-one years, gives the opportunity of doing so at a smaller payment than is generally asked for rent in the crowded localities of London. A selection of plots and class of house was made on the 10th inst., on which occasion all who had paid their calls or instalments, according to priority had a choice. Above 100 were chosen, and will be taken possession of upon completion.

THE SHEFFIELD CORPORATION BATHS.

A CONTRACT has been entered into by the Sheffield Corporation with Mr. Sparrow, builder, Astercliffe, at 1,250l., for the erection of public baths. These baths, says the local *Independent*, are to be near the Borough Bridge, on land the property of the Corporation, situated between the river and the projected new street, which is to be called New Mowbray-street. The new building, when completed, will comprise, on the ground-floor, a waiting-room and ticket and towel office, and a plunge-bath 55 ft. long by 35 ft. broad, or about twice as big as the one at Glossop-road Baths. It will be lined with pressed glazed bricks, giving the appearance of porcelain. The water will gradually increase in depth from 4 ft. at one end to 6 ft. at the other, and will be all the time passing away at the surface through a

slance valve tap, with wheel. The water will be renewed twice a week, the waste water being turned into the sewer. The contents of this bath, when full, will be about 57,000 gallons, and the annual consumption will be about 73 million gallons. At the sides of the bath there will be thirty-two dressing-boxes. In the upper story there will be a living-room and two bedrooms for the attendants, and twenty-four slipper baths, supplied with hot and cold water. A gallery on this story will run round the area of the plunge bath below. In the roof there will be two tanks, each 48 ft. 6 in. long, by 5 ft. 6 in. in width, and 3 ft. 6 in. high, and containing about 6,000 gallons of water. The roof will be slated, except over the plunge-bath, where it will be of glass, supported on wrought-iron pillars. In the cellar there will be a room to wash towels, and a boiler for the supply of hot water.

The frontage of the building will be in the Italian style of architecture, with arched windows, and doors, and will be built of ornamental uncoloured bricks, with projecting pillars. The height, from the ground to the parapet, will be 24 ft.

The contract for the mason's, joiner's, and slater's work is let to Mr. Wm. Sparrow; the contract for the ironwork (boiler, tanks, and columns), to Messrs. Newton, Chambers, & Co., Thorncliffe Ironworks; and the contract for the plumbing department to Mr. Wm. Bissett. The whole of the contracts amount to about 2,050l.

The plans have been drawn up by Mr. S. F. Holmes, the borough surveyor; and Mr. H. Mannmann, of Mr. Holmes's office, officiates as clerk of the works.

BATLEY GAS WORKS.

The district supplied by the Dewsbury and Batley Gas Company comprises the boroughs of Dewsbury and Batley, and the townships of Southill Upper, Southill Nether, and Thornhill, and contains a great number of woollen factories. The almost unparalleled increase of Dewsbury and Batley during the last ten years has compelled the Gas Company to enlarge their works by establishing branch works near Batley, and they have further increased them this year by the addition of a telescope gas-holder, 120 ft. diameter and 64 ft. high. The tank is constructed of asphal, and puddled; and the work has been executed by Mr. Brier, of Dewsbury. The gas-holder is supported by twelve massive cast-iron columns, tied together at the top by wrought-iron lattice girders; the gas-holder is from the works of Mr. Benjamin Whitehouse, West Bromwich. A tar and ammoniacal liquor tank, 52 ft. diameter and 20 ft. deep, has also been added. The whole of the works have been erected and constructed from designs prepared by and under the superintendence of Michael Sheard, of Batley, C.E., at a cost of nearly 13,000l.

RAILWAY MATTERS.

For several years past there has been a project of bridging the Mersey in the neighbourhood of Runcorn, and by so doing reducing the distance from Liverpool to London to about four hours. The site selected for the proposed bridges was that narrow neck of water which separates Runcorn from Widnes, and now that the enormous span of arches which connect both the Lancashire and Cheshire sides of the Mersey has been completed, and, in fact, nearly ready for traffic, a sad mishap has overtaken the exertions of the London and North-Western Railway Company, by which a long delay will be necessary, before the "short run" between Liverpool and London can take place. It appears that for some time past the parties who were constructing the bridges over the Mersey were of opinion that there was a shelving bottom, and that in order to support the masonry an embankment of earth, well pressed, was necessary. This was done, but a few days since the embankment supporting the Widnes side of the bridge gave way. The embankment was made up of a good deal of clay with an admixture of light soil. The late heavy rains had, no doubt, washed away the greater portion of the light soil, and the clay being thus divided into fissures, gradually gave way, and while nearly all the labourers were at dinner, came down with a low rumbling sound. A singular feature in connexion with this accident is, that one of her

Majesty's inspectors of railways had just inspected this portion of the bridge, fourteen engines having been brought down from Crewe for the purpose of testing the firmness of the bridges. The inspector pronounced everything in proper condition.

The first trial arising out of the Abergele railway catastrophe has just taken place at the Manchester Assize. The action was brought on behalf of the three children of Wm. Townend Lund, a Blackburn manufacturer, who lost his life on that melancholy occasion. The liability was not denied, and the jury assessed the compensation at 1,450*l.* for each of the three children of deceased, making a total of 4,350*l.*

The traffic receipts of railways in the United Kingdom for the week ending December 6th, amounted, on 13,355 miles, to 719,698*l.*, and for the corresponding week in 1867, on 13,039 miles, to 689,975*l.*, showing an increase of 316 miles and of 29,723*l.*

CONCRETE BRIDGES.

In a description given in the *Builder* about three months since, of the works on the Metropolitan Extension Railway between Paddington and Brompton, an allusion was made, in passing, to an interesting experiment in progress across a wide cutting upon the Metropolitan District line, near Brompton Station. We are now able to report the results of the experiment, which was to test the tensile power of concrete. They are such as seem calculated to lead to the more extensive use of this description of building material. The structure to which the test was applied is an arch formed entirely of concrete, of 75 ft. span, and only 7 ft. 6 in. rise. It was 3 ft. 6 in. deep at the crown, and of a uniform width of 12 ft. The materials and proportions employed were 6 of gravel to 1 of Portland cement, and dependence for cohesion was placed rather upon thorough mixing of the materials than ramming. The tests successfully borne by this erection were 170 tons, distributed equally over the top, and a train of seven trucks, weighing 50 tons, passed over it. There was practically no deflection under these weights.

ST. MARTIN'S SCHOOL OF ART.

The annual distribution of the prizes to the students of St. Martin's School of Art, took place on the 15th inst., at the school, Castle-street, Endell-street, Long-acre. It seems that, at the examination held in March by the Science and Art Department, eighty-five students presented themselves, and worked out seventy-nine papers successfully in geometry, perspective, free-hand, and model drawing, for which certificates and twenty-seven prizes were granted. The works of forty-three students, advanced and elementary, executed during the year, have been marked satisfactory. Seven free studentships have been awarded for the most satisfactory works sent up during the year. Mr. E. F. Clarke has been awarded the gold medal for architectural design for a cathedral, with dome, in the Mediaeval style (the gold medal is one of ten offered by the Department of Science and Art, to be competed for by all the art schools in Great Britain and Ireland); the second prize, 5*l.*, offered by the Plasterers' Company, was gained by George Jepp, for a design for an ornamental panel.

Lord Houghton, who presided, presented these and various other prizes to the successful candidates, and then addressed the meeting on the faculty of imagination:—

"What were the elements of art" (he asked, in the course of his observations); "the foundation and meaning of it? It was the use of the imagination of mankind. This was not specially confined to any high or gifted class. Sometimes it was to be found among the very lowest class, who were largely endowed with the faculty of imagination. There were nations which might be called imaginative nations as compared with others, and amongst the efforts and products of that imagination had been the desire growing up in the human mind to represent, by means of drawing and of, he might say, manual exercises, to represent in the outward world processes which were going on in the mind and imagination of the individual. There was no doubt that the very highest faculty of this kind, in which the most beautiful thoughts were transmuted into the most beautiful forms, was given by Providence to very few. It had perhaps in the history career been given nationally only to one people—to the inhabitants of those small peninsulas stretching out from Europe into the Mediterranean, and which now formed the Hellenic kingdom: that wonderful people, so small as almost to be politically overlooked—in the general history of the world almost insignificant, yet, nevertheless, by the omission of

the artistic spirit within them, had rendered themselves the immortal founders of the greatest artistic truth amongst mankind. It was that little Greek people whose spirit they saw represented, imitated, followed, taking all kinds of casual forms, through the whole history of the modern world."

Mr. Digby Wyatt, Mr. O'Neill, and Mr. W. Lloyd also addressed the meeting, and thanks were voted to Mr. W. L. Casey, the head master, and to the Rev. R. G. Maul, the hon. secretary.

A CHRISTMAS CAROL.

HAIL, gracious Morn! Hail, Day of days!

Whereon the Lord of Righteousness,
Compassionating human woe,
And ignorance, and wickedness;

Descended from His "high estate,"

And came, "as man with men to dwell,"
Upon this earth He form'd so fair,
But which their passions made a hell.

And having taught, and toil'd, and striven,
To give His people nobler aims

Than self-aggrandisement,—self-love,
With all its gross, debasing claims;—

And having shown, by His own life,
The beauty of sweet love and ruth,
He meekly seal'd with His heart's blood,
His gentle Gospels high-soul'd truth.

Evil and Sin, indignant, rose,

And strove to quench this too pure light;
Which shone contrasted with their deeds,
Like clear noonday 'gainst blackest night.

And as, in ages past, they honed

And crucified Truth's outer shrine,
So now, with thick perverting clouds,
They seek to hide its light divine.

All useless their Satanic wiles!

They with themselves shall pass away;
But God's pure Word of Truth shall shine
"More brightly to the perfect Day."

And while we celebrate the eve,

That brought th' Incarnate Word on earth,
We'll strive to spread abroad the gifts
Bestow'd by this mysterious birth:

By generous heart and open hand;

By sympathy with suffering men;
By sorrowing words for his misdoers;
But ne'er contempt: for, say who can,

Had he been tempted in like way,

He had pass'd scathless through the fire?

Yet, while we palliate his faults,

Plant on our own virtue-standard higher;

Remembering that our Master taught

Each blessing brings a duty, too;

And every talent we receive

Entails a work for us to do.

And if remembrance grow to deed,

With earnest striving to fulfil

His blest commands, then, as in heaven,
So upon earth, is done His will.

Thus may we hope to swell the strain

Of "Glory be to God on high!"

While "Peace on earth, Goodwill toward

men,"

Angels re-echo through the sky!

R. F. H.

NEW METROPOLITAN MARKETS.

SIR,—Agreeing in the observations which have appeared at different times in your paper on the all-important subject of market supply and accommodation of the metropolis, I crave your permission to add a brief suggestion or two for the benefit of the promoters of such useful undertakings, the railway companies, and the public generally, which, I venture to think, will not be deemed unimportant. The light-traffic passengers would be stopped by the obstruction of the goods heavy traffic, which not only would cause great confusion and mischief to the railway, but prove a great nuisance to the neighbourhood of the station, in conveying the goods from the terminus to the market-place.

An underground branch is the imperative remedy; but, to obtain such an expensive accommodation, the market site must be central, to command the supply from the United Kingdom and abroad; if not, the movement in favour of new metropolitan markets will not come within the fair scope of commercial enterprise, because it appears to be lost sight of by the

general promoters of the movement to create markets in London, that the command of the supply must necessarily be the principal object to look to, on the evident principle of no supply no market. In a word, to command unlimited supply, you must have corresponding convenience and attraction. The markets proposed to be erected in different quarters of gigantic and every-day increasing London, should command the most open, commodious, and central situations in their respective localities; and they should have underground branch railways attached to them to carry into these their enormous consignments from all quarters of the interior of the kingdom and the sea-coast, without a moment's delay or interference with the passenger traffic of the various metropolitan railways.

Any market proposed to be erected without realizing these two leading principles,—the one to command supply, the other to make the heavy traffic disappear from the surface, with the assistance of underground branches,—will prove, not a public boon, but a great nuisance, and, judging from recent experience, a frightful danger, and should be strenuously opposed by the London metropolitan railway companies, by the Legislature, by the vestries, and by the public in general. We must look to the press to direct the movement in the right way.

In conclusion, all future markets must have a branch underground railway; and the first market to be erected ought to be a great general market for flowers, fruits, vegetables, meat, fish, game, and poultry. With such a market, provided with all the new requirements of civilization, aided by telegraph and railways, an enormous importation into England would take place of all the richest vegetable products from the South of Europe, Algeria, &c., which are now unknown to the generality of the inhabitants of this wealthy country.

I need scarcely add, that such a change would operate beneficially in a moral, as well as a physical sense, in the sumptuous habits of our middle and working classes. As Brillat-Savarin has truly said,—"*Dis-moi ce que tu manges, je te dirai qui tu es.*" BELGRIAN.

SKUNCHIONS.

MR. POWELL, in his observations on the Triangular Lodge, Rushton, says (p. 879, ante),—"The skunchions (shields?) were from Pipwell." The word skunchion, sconcheon, or scuntion, is in daily use among masons in some parts at least of Scotland, and is applied to the internal jambs of openings in outside walls, and to the jambs of openings in inside walls. In the "Imperial Dictionary" it is thus given:—"Sconcheon. (Fr. *Sconsoin*.) In architecture a term probably originally applied to the angle formed by the meeting of the planes of the window-jamb, and wall of a room; but now used to denote the whole side of any aperture, formed of roughly-dressed stones."

"Sconsoin," used to designate the internal arch of a window, is evidently the same word.

In rubble walling the scunchions are looked upon as most important members of the structure,—specified to be out and in bond,—and unless closely bedded, so as to correspond in solidity with the external "rybets," or jamb-stones, the wall is likely to settle more on the inner face than the outer, and, consequently, hinge outward.

From the above you will see that the word has nothing to do with escutcheons, and the guesses of your correspondent, and of Parker's "Glossary of Terms," and Elmes's "Dictionary," are equally at fault. W. R. CONSON.

A BLACK STAIRCASE.

SIR,—In reply to your correspondent "K. K." he can see such a staircase as he mentions at the Duke of Hamilton's Palace, at Hamilton, in Lanarkshire. The staircase allude to is a large one, and is built entirely of black marble, highly polished. The effect is very solemn and imposing, although, perhaps, somewhat funereal. This staircase is not the principal one in the palace, and it was erected by the late duke—at a very great cost (my guide mentioned 40,000*l.*); the expense having been much greater than was expected owing to the difficulty in cutting and polishing the marble,—the same person telling

no that the polishing of each baluster alone cost 27l. I cannot vouch for the accuracy of these statements, but such were the sums mentioned to me.

The staircase is one of the great sights in the palace, and is certainly worth seeing, as well as the glorious art-collections, brought together chiefly by the late duke, and embracing many fine "old masters" and a large collection of objects of *virtu*, &c.,—an assemblage of art treasures that would go a great way to make another South Kensington Museum.

J. S. R.

In reply to "K. K.," at the Star Hotel, Lewes, there is a staircase brought from Slough—place of oak, but as black as ebony. "K. K." might find the staircase worth seeing. London, Brighton, and South Coast railway. N.

DISTRICT SURVEYORS' DISTRICTS.

Sir,—It has often occurred to me that if a map of London were published showing the fifty-eight districts, and numbered thereon to correspond with the surveyor's list, it would be found very useful to the building trade. The many new districts created of late years, coupled with the vague information to be obtained from price-books as to the boundaries of each surveyor's district, render it questionable at times to whom "notice of commencement of works" should be sent. A map of this kind might very well be attached to all future price-books.

J. B. COLWELL.

ARCHITECTS' FEES.

In the case of *Widdows v. Fuller* in the Court of Exchequer, on December 11th, Mr. Granton appeared for the plaintiff, and Mr. H. James for the defendant. This was an action brought by an architect to recover the sum of 40l. 12s. 2d., being the amount of his charges for drawing plans and specifications and making out bills of quantities for a house proposed to be built by the defendant upon some land he had recently purchased at Sparesbrook, in Essex. The defendant denied that he had ever given the plaintiff any instructions to draw out the plans, but paid 5l. into court in satisfaction of the plaintiff's claim. The jury returned a verdict for the plaintiff for 19l. 15s. beyond the sum paid into court.

THE ROMFORD SEWAGE CASE.

THE Bill, before Vice-Chancellor Sir J. Street, December 10th, was filed to restrain the Local Board of Romford from conveying the sewage of the town and district into the river Rom, to the damage or annoyance of the plaintiff (Master) and other residents. The case has been on several occasions before the Vice-Chancellor and the Master of the Rolls, as *Vacatice* Judge, and the former had in May last granted an injunction restraining the Local Board from conveying the sewage into the river unless the same was sufficiently deodorised. The plaintiff during the Long Vacation, considering that the Local Board were not deodorising the sewage sufficiently, applied to the Master of the Rolls for a sequestration, and his Lordship made the order, but suspended its enforcement to give the Local Board a further opportunity of removing the nuisance. The plaintiff, in Michaelmas Term, applied to the Vice-Chancellor for leave to enforce the sequestration, but the application has stood over from time to time, with a view to an arrangement, the Local Board stating that they were endeavouring to obtain land at some considerable distance from Romford on which to establish and carry on permanent works for the purpose of getting rid of the sewage by irrigation. The plaintiff now moved again for a sequestration; but an arrangement was entered into, with the sanction of the Vice-Chancellor, by which it was agreed that the cause should be set down for hearing, *pro forma*, on the 1st of April, and that a decree should then be taken for a perpetual injunction restraining the Local Board from carrying the sewage into the river, the Local Board having liberty to apply at Chambers for extension of time, and undertaking, in the meanwhile, to use proper means for deodorisation, at a cost not exceeding 15l. a week, if the plaintiff should require it, to employ his nominees to effect the deodorisation, and to pay the plaintiff his costs of the suit.

ST. JOHN'S, DUMFRIES.

This new church has been consecrated. It was erected from the designs of Mr. W. Slater and Mr. R. Herbert Carpenter; and one of the chief contributors to the building fund is the Duke of Buccleuch. The plan consists of a wide nave, with lofty clearstory, and narrow side aisles, square-headed chancel, and a tower and spire on the north-west angle. It seats about 700 persons. The nave has five bays; the arcades are (and, in fact, the whole church is) exceedingly simple in character; they have two orders, in Dumfries and Prudham stone, resting on cylindrical shafts of Prudham stone, with carved capitals. The chancel arch has richer arch-mouldings, resting on three attached shafts. Each bay of the clearstory has three lancet lights. The west wall has a great triplet,

with traceried rose window over. The roof of the nave has moulded tie-beams and king-posts, with curved moulded braces and wind-braces: the total height being 65 ft. The chancel roof has curved and moulded braces. At the east end of the chancel is a triplet of broad and lofty lancets, with an arcaded recesses below. The whole is built and faced, inside and outside, with Dumfries stone, and bands of Prudham stone at the opening of windows, &c. The paving is of Caithness stone, and the roof-covering of green Silbichwaite slates. The tower and spire are 120 ft. high and 18 ft. square. The lower stage forms the north porch, and has deeply-recessed and moulded doorways, with curved tympana. Above are the ringing-floors, &c. The tower batters slightly, and rises without buttresses to the doubly-corbelled cornice under the spire. The lofty-stage has two simple recessed lancets on each face. The spire has cusped arches, with arched and moulded canopies over them, forming, as it were, a crown round the spire. Many of the windows are filled with stained glass, by Clayton & Bell, the principal ones being the east lancets of the chancel and the west lancets and rose of the nave. The whole of the works have been executed by Messrs. Crackstone, of Dumfries, Mr. Paffrey being the clerk of the works.

THE NEW PUBLIC HALL IN IPSWICH.

The New Public Hall, the principal entrance to which is from Westgate-street, is now completed and opened. The site was extensive, and the frontage on Westgate-street has been utilised by building houses and shops fronting the street, whilst the hall has been set back completely away from the noise of the street traffic. Mr. Frederick Barnes, of Ipswich, architect, was employed to make the designs for the buildings, and in accordance with his plans the Public Hall and other buildings have been erected.

The main entrance to the hall consists of an arcade, 15 ft. wide and 16 ft. high, with a stained wood ceiling, and it is closed at the street by iron gates. On either side is a polished granite column, rising from a stone base and ending in a stone scroll,—placed there, we presume, for ornament, for they make no pretence whatever of supporting anything, not even the balcony of a club reading-room above. The hall has sitting accommodation for 1,500.

In determining upon the proportions and general characteristics of the hall, the architect studied those of St. James's Hall, London. The height from floor to ceiling is about equal to the width, whilst the length is, within a foot or two, double the width, the actual figures being,—width, 50 ft. in the clear; length, on the floor, 95 ft., or from the back of the orchestra recess to the back of the gallery 126 ft. The hall is divided longitudinally into seven bays by pilasters, which project 4 in. from the walls and are 30 ft. high from the floor, with enriched capitals, above which are an entablature and ornamental cornice corresponding in style with the capitals of the pilasters. From the cornice springs the ceiling, on the arrangement and decoration of which some care has been bestowed. The ceiling springing from the cornice spans the width of the hall in the form of an ellipse, divided by enriched ribs, corresponding with the pilasters, into seven bays. Running down the length of the ceiling are two enriched bands, the ornamentation of which, of course, is entirely in character with that of the other decorations of the ceiling: these intersect the ribs which span the width of the hall; and in each of the seven centre divisions thus formed is an elliptical dome 13 ft. by 10 ft., and 5 ft. high; and from the centre of each dome is suspended a glass gasolier with sixteen jets. The hall is lighted in the daytime by seven semicircular-headed windows on each side above the cornice, the ceiling being formed in arches above them, these arches being groined into the main elliptical arch, ornamental perforations being made in the groins to assist in the ventilation, for which further provision is made in the centre flowers of the domes of the ceiling. The walls are of a pale pink tint, and are relieved by white pilasters. All round the hall is a panelled wainscoting of pine, 6 ft. high from the floor, having an ornamental capping and base, and this wainscoting is varnished. The cornice is white, and its members are picked out with vermilion and ultra-marine, whilst the ceiling is a pale buff or dark cream colour, slightly ornamented with scrolls and honey-

suckles in claret colour. The colouring was done by Messrs. Stearn & Son, of Ipswich.

The orchestra is at the lower end of the hall, and is in the form of a niche, 32 ft. wide, 42 ft. high, and 16 ft. deep, and the platform projects 10 ft. into the hall, so that from the back of the recess to the front of the platform is 26 ft. It is arranged with tiers of seats rising one above another, with desks, which are fixtures. At the opposite end of the hall is the gallery, which extends back over the main entrance lobby, and the stalls in this gallery form some of the best places in the hall. The front of the gallery is serpentine in form, and is divided into panels filled with ornamental ironwork.

For heating the hall two of Garney's stoves are placed below the floor close by the orchestra, and in the ante-room at the other end are two other stoves, all supplied by Mr. C. J. Meadows, of Ipswich. There are also means for warming the ante-rooms.

The total cost of the buildings, including the hall, has been about 14,000l. The contract for the ball was 4,700l., but extras have brought the amount up to about 6,000l. exclusive of the furniture. Mr. E. Gibbons, of Ipswich, was the contractor.

CHURCH-BUILDING NEWS.

Halesworth.—In the course of the last ten years, Halesworth Church has several times been restored and enlarged, and the last restoration having been completed, the church has been formally re-opened. The enlargement, we have now to notice consists of an addition to the south aisle, and a new south porch, which have been erected in accordance with the prevailing style of the building. The walls are faced with flint, with stone dressings. The interior is filled with uniform open benches. The nave is narrow, and is divided into four bays, in the clearstory being three-light windows, which admit plenty of light, but are wide for their height. Some attention should be paid to the clearstory (which, by the way, extends to the east end of the chancel), and to the roof of the nave, which is now plastered. The two aisles on the north of the nave have timber roofs. The windows in the north aisle have three lights, and are filled with cathedral glass, with a narrow edging of clear glass, and those of the new south aisle exactly correspond. Mr. Francis, of London, was the architect for the newly completed enlargement of the south aisle (which gives considerable additional sitting accommodation); the carpenter's work was performed by Mr. James Smith, the masonry, &c., by Mr. R. Balls; and the glazing, &c., by Mr. John Owles, all of Halesworth. The churchyard, in which there have been no fresh interments since the opening of the cemetery, is being planted out at the expense of Mr. John Read.

Huddersfield.—A new church, at Septon, near Huddersfield, has been consecrated. The site on which the church is erected is Septon Cross, and has been given by Mr. A. F. Beaumont, M.P., together with a plot of land for a parsonage-house, and a sum of 300l. towards the investment fund. The style of architecture is the Early English. The accommodation in the edifice is, for adults, 328, and children, 144. The cost is estimated at 3,800l., and there are 300l. to be raised.

Batley.—A new church has been consecrated here by the Bishop of Ripon. It stands on an elevated site not far from the Baths, Batley. It is dedicated to St. Thomas, and has cost about 6,000l. The structure consists of nave, side aisles, chancel, tower and spire, is an example of the Geometric Decorated Gothic, and has been erected from the designs of Mr. Sheard, of Batley, architect. The nave is 52 ft. high, 75 ft. long, and 23 ft. wide, and the chancel 33 ft. long by 20 ft. in width, the former being divided into five bays. The tower is 20 ft. square, at the south-west corner of the nave, and 150 ft. high to the top of the vane. On the north side of the chancel is the organ-chamber and vestry. The material used in the construction of the building is deep stone from the local quarries for the walls, and Finsdale stone for the dressings. Internally the woodwork is of deal, stained, and varnished, the roof open-timbered, and the seating accommodation is in open stalls. The capitals of the columns of the nave, supporting the clearstory, are carved. The cost of the structure and fittings is some 6,000l., part of which amount has still to be raised. The con-

tractors for the various works required in the erection of the church were Messrs. Copley & Co., masonry; Joah Willans, joinery; J. Hey, plastering; Thornton & Thompson, slating; and J. H. Senior, plumbing, &c. A feature of the church is the painted east window, of five lights, presented by Mr. Michael Sheard, the architect, in memory of his daughter Gertrude. The artists were Messrs. A. & W. H. O'Connor, of London.

Sheffield.—The work of restoring Beighton Church commenced about fourteen months ago, and so little remains except the tower of the original structure that it may almost be said to have been rebuilt. The gallery at the west end has been removed, and the western arch thrown open. The high-backed pews have been replaced by open benches of pitch-pine stained. Nearly the whole of the interior fitting of the church has been renewed. The floor of the chancel, which has been raised, is laid with Minton's tiles. The ancient entrance to the "Rood Loft," which was discovered when the plaster was being removed, has been restored. A Norman arch over the pointed arch separating the nave from the chancel was discovered, and has been rebuilt after the style of the original, except that the mouldings are of a richer character. The screen between the north aisle and the vestry, which is made of the old oak taken from the roof of the church, is carved. At the west end of the south aisle a stained glass window has been placed by a parishioner. The peal of six bells has been re-bung, as it was found the woodwork was much decayed. The Tudor roof has been replaced by one raised to the original pitch, and the north door, which has been closed more than half a century, has been thrown open. The architect was Mr. Rollinson, of Chesterfield, and the contractors for the whole of the work were Messrs. Ash & Clayton, of Sheffield.

Swansea.—The Seamen's Church has been opened for divine service. The new building, which is of Norman style, was designed by Mr. B. Bucknall, architect. It is a plain building. The church will accommodate about 300 people, and the entire cost of erection, including internal fittings, is about 925*l*. The work was commenced last April, the Messrs. Bucknall being the builders.

Dulwich.—Since 1858, when Dulwich College came under a new régime, much of the land belonging to it at South Dulwich has been built upon. The old chapel has been found to offer insufficient church accommodation for the increasing population, and the governors of the college, therefore, gave a site for, and 1,500*l*. towards, a new church and parsonage. The residents contributed liberally, and Mr. Tite, M.P., gave 1,000*l*. The new church, Gothic, of the thirteenth century, designed by Mr. Barry, of the firm of Banks & Barry, and built by Messrs. Perry & Co., of Stratford, is dedicated to St. Stephen, contains 550 sittings, and may be enlarged to hold 180 more persons. It has been consecrated by the Bishop of Manritius, acting for the Bishop of Winchester. The church has cost 7,930*l*., and the debt before consecration was 2,570*l*.

Bradford.—A meeting of the Bradford Church Building Society has been held for the purpose of taking steps for completing the fund for the erection of another new church in this town. Mr. H. W. Ripley, M.P., has presented a site of ground for a new church at Ripleyville, a suburb of the town, and the society intend to erect thereon a new church in memory of the late Mr. Charles Hardy, brother of the late Home Secretary. The sum of 2,500*l*. had been already offered in donations, and a sub-committee was appointed to collect a similar sum in other donations. The society has already been instrumental in erecting eight churches in the town in as many years, and it is intended to complete the original scheme of ten churches.

Shottisham.—The work of restoring the parish church has this year been carried a step further. The tower has now been restored from top to bottom, a new string-course parapet and coping being added, and a new west window, together with four belfry windows, inserted. The old porch on the south side has been pulled down, and a new one substituted. The south wall, nave, and chancel have been refaced; four new windows (in the Early English and Early Decorated styles), have been put in—three in the nave and one in the chancel; and new plain oak doors have been placed in the nave and chancel. The work done to the church during something like a year and a half has cost about 1,200*l*., and the expense will be defrayed chiefly through the liberality of the rector, by whom a

new commodious school-room is now being built. The whole of the new work was executed by Mr. Henry Luff, of Ipswich, builder, under the supervision of Mr. Edward Hakewell.

Kilminster.—The parish church of St. Mary, after having undergone extensive enlargement and repairs, has been re-opened for public worship. A north aisle, opening into the nave by means of four arches on octagonal pillars, has been added. Old pews, with high straight backs, have been supplanted by benches of stained deal, and a new roof of open woodwork has been placed over the entire building. The flooring has been entirely renewed, the aisles being paved with encaustic tiles supplied by the Poole Pottery Company. A heating apparatus, by Haden, has been placed under the floor of the central aisle, near the west end. The organ and choir occupy the south transept. The tower is separated from the nave by a new screen of pitch pine, and a new pulpit of carved oak has been placed on the north side of the chancel arch. The works have been carried out by Messrs. Clark, of Bruton, under the directions of the architect, Mr. St. Aubyn, of London. The estimated cost is 1,200*l*.

DISSENTING CHURCH-BUILDING NEWS.

Birkenhead.—The Hamilton Presbyterian Church, situated in Laird-street, Birkenhead, has been opened for divine service. The site, at the junction of Laird-street with the Upton-road, prevented the use of side windows, there being sufficient land only for the erection of the building itself. The architect was consequently obliged to adopt the mode of lighting from the roof by means of clearstory windows. These run throughout the entire length, supported upon the principals. The roof is in one span, without columns or supports. In addition to the clearstory lights there are windows at each end of the building. The church is 68 ft. long by 42 ft. wide, and 40 ft. high to the ceiling. The floor space, together with a gallery at one end, gives sitting accommodation for 620 persons. The gallery is approached by two staircases from Laird-street, and the principal entrance and vestibules are also from that street. The style is Late Geometric Gothic. The principal elevation to Laird-street is entirely of the stone of the neighbourhood, with a little red stone, in bands and arches, introduced to give effect. The sides, which may ultimately be built against, are of plain brick. There is a temporary vestry at the back, where it is contemplated at some future time to erect a lecture-hall and keeper's house, land having been left for that purpose. The heating has been effected by a hot-water apparatus supplied by Mr. Clarke, and the contract for all the other works has been carried out by Messrs. R. Anderson & Sons, under the superintendance of Mr. James N. Crofts, architect. Mr. Turnbull was the clerk of works. The site is the gift of Mr. John Laird, M.P.; and the cost of the building and other expenses (about 2,500*l*.) have been nearly all provided by contributions from friends to church extension of all denominations.

Macclesfield.—The Park Green Chapel has been re-opened, after cleaning and repair, with alterations to accommodate an increased number of Sunday scholars. The chapel is lighted with Kidd's patent hydro-carbon light, furnished by Messrs. Rigby & Son, of Manchester. The old burners have been removed, and it is found that, with a considerably less number, a much better light is obtained by the new process, which is a simple and inexpensive one. Each light is supplied with a carburettor charged with an explosive carburetted fluid, the heated vapour from which mixes with the gas, increasing the light whilst greatly reducing the consumption and cost of gas.

Callercroats.—The foundation-stone of a Primitive Methodist chapel and school-rooms at Callercroats has been laid. The present building, which projects considerably into the road, having been found to be too small, the Duke of Northumberland placed a suitable site at the disposal of the trustees, on the understanding that the present structure would be removed after the erection of the new premises. The new building is to be entirely of stone, and in the Gothic style. Accommodation will be provided for nearly 400 persons. The whole of the seats will be open, and a convenient platform will be affixed at the west end. The school-room will accommodate from 300 to 400 children. Mr. Thomas

Oliver, of Newcastle, is the architect, under whose superintendance the work will be carried out. Mr. Henry Andrews is the clerk of the works, and Mr. Thomas Turnbull, of Birtley, is the sole contractor.

Stockton.—A new Methodist Connexion Chapel in Norton-road has been opened for divine worship. The new chapel measures 41 ft. by 35 ft. It is to accommodate 500 sitters, and has school and class rooms attached which will further accommodate 300. The whole cost of the premises will be 1,500*l*.

STAINED GLASS.

St. Mary's, Collaton (Torquay).—The church of St. Mary the Virgin, Collaton, near Paignton, has recently had an east window, placed in memory of the Rev. J. B. Hogg, the founder of the church, by his widow. In the three principal lights of this window are represented,—1. Our Lord bearing the Cross; 2. The Crucifixion; and 3. St. John leading away the Virgin Mother to his own Home. In the central compartment is also introduced the figure of St. Mary Magdalene, huddled low at the foot of the cross; and in the first compartment those of the other two Maries. The two quatrefoils above are filled with representations of angels; and the highest quatrefoil with the emblem of the Lamb of God. A small separate light near the roof contains the emblem of the Virgin. In the first compartment the palm-tree appears, and in the last the sycamore. The work was designed and executed by Messrs. Ward & Hughes, of Loudon.

St. George's, Ramsgate.—A stained-glass window has been placed recently in the north side of this church, in memory of the late Mr. M. A. Daniel, eldest son of Mr. M. F. Daniel, and late midshipman on board Her Majesty's ship *Shannon*. The window was prepared by Messrs. Warrington, of Loudon, and is executed in the architectural style of the fifteenth century. The canopy consists of the passion-flower, the blossoms being blended with leaves. The subject of the drawing is taken from 1 Samuel i. On one side the scene delineated is the death of Jonathan, while upon the other side a messenger from the battle-field is represented as showing to King Saul the crown lately worn by his royal son, the sight of which causes him to weep. The inscription (in Elizabethan characters) at the foot of the memorial, is written in steel grey, with initials in gold.

Knaresborough Church.—A window has been placed in the south aisle of the parish church of Knaresborough, in memory of the late Mr. and Mrs. Powell. The subjects represented are the six works of mercy mentioned in Matthew xvi. 37, 38, 39, 40.—Feeding the hungry, giving drink to the thirsty, receiving the stranger, clothing the naked, visiting the sick, and the prisoner. The window has been designed and executed by Messrs. O'Connor.

St. Cuthbert's, Carlisle.—A stained-glass window has been presented to this church by Mr. Ferguson, of Carlisle. It has been executed by Messrs. Ward & Hughes, of Loudon, under the superintendance of Messrs. Cory & Ferguson, of Carlisle. The window consists of three panels, or compartments, surrounded by a gilded border. In the lowest of the panels is a representation of the Stoning of St. Stephen; the middle one is devoted to the subject of the Conversion of St. Paul, after Day's picture; while in the top compartment is the figure of St. Paul, preaching from the Areopagus at Athens. The circular bead, surmounting the whole, is of pattern glass, to accord with the pictures, the prevailing tone of which has been made somewhat dark in consequence of the proximity of buildings outside, but the sombre hues are frequently relieved by the brighter tints of ruby and blue.

Walker Church, Newcastle-upon-Tyne.—This church has just been enriched by the insertion of two memorial windows of stained glass, from Mr. Baguley, of Newcastle. They are Early Pointed in character. One contains the "Parable of the Good Samaritan," the other, "Our Saviour Blessing Little Children," with an angel beneath. Both subjects are surmounted by canopies of foliage. The windows are erected at the west end of the church, which has just been enlarged and re-opened.

Banbury Church.—A memorial window, designed by Messrs. Heaton, Butler, & Bayne, of Loudon, has lately been placed in this church, in memory of the late Mr. Eugene Spinney, Mns.

Bac. Oxon, organist of the church. This window is set up by the choir, with the help of friends and pupils.

St. Patrick's, Hove (Brighton).—A large memorial window has just been placed in this church. It is from designs by Mr. Butterfield, of London. The subject is suggested by the words—"For they drank of the rock that followed them, and that Rock was Christ," which appear below. In the centre (the window is one of three lights) stands the figure of Moses in the act of striking the rock, from which is flowing water, with which the surrounding figures are quenching their thirst. The tracery of the window is filled only with geometrical designs: the absence of subject in the upper part serving to bring the main subject more prominently forward.

Ripon Cathedral.—It is intended to erect a stained-glass window in Ripon Cathedral, as a tribute of esteem and veneration to the late Archbishop of Canterbury. Upwards of 1000 were subscribed at the meeting towards the cost of the window. The deceased prelate was the first Bishop of Ripon.

Books Received.

British Almanac and Companion, 1869.

CHARLES KNIGHT'S little volume still stands at the head of the almanacs. It is as full of information "as an egg is full of meat." "Companion" includes good papers on "Free Public Libraries of Great Britain," by W. E. Axon; "The Exhibition of National Portraits, 1868," by James Thorne; "Technical Education at Home and on the Continent," by John Plummer; and the usual account of "Architecture and Public Improvements." We take a passage from the paper on technical education:

"Even with our present defective system, a good scientific education is not beyond the reach of the workman who, possessing a fair amount of primary knowledge, perseveres in his attempts to reach the higher branches. At the present time, in Bostallack Mine, near the Lead's End, is a young working miner who recently carried off the gold medal in Mineralogy in the examination of the gold medal in Science and Art. It is such men whom employers naturally select for the post of foremen. They might not always be so fortunate, but they would always stand in the estimation of the artisan community. Mr. Kitson, describing an ironworks manager, proceeds by him from France, said that the man in question was a good mathematician and a good chemist. He understood the theory of mechanics, as well as the practice of it; he was also a thorough draughtsman. As a metallurgist, and in his knowledge of chemistry, he was superior to all the other managers. The value of such men in our industrial processes is incalculable. It has been stated by a competent authority, that it would be worth the while of the Birmingham jewelry trade to give 2,000*l.* per annum to a man like Dr. Percy, for the purpose of inducing him to reside in that town. A more scientific manner of conducting the various processes in the jewelry manufacture would lead to greater economy and cheapness of production. One instance, for example, of an improved scientific method of filtration, the water formerly thrown away, after being used for gold-washing purposes, has been made to save the expense to those who have acquired a knowledge of the new process. Another instance, even more suggestive, is furnished by Dr. Percy. He states that one of the most interesting, difficult, important, and novel processes in metallurgy, the Birmingham about the year 1849; and that the Swedes and Germans thought they had that process entirely to themselves, but it was taken up by a friend of his, who laid the foundation of the system now generally employed in the town."

We have the same quarrel with the review of architectural progress as on some former occasions for the absence of the slightest acknowledgment of great indebtedness (almost necessarily) to our own columns.

VARIORUM.

The yearly part of "The British Workman," for 1868, includes a number of large and remarkable wood-engravings; as good, indeed, as anything of the kind that is to be had, and at a cost almost nominal. The coloured print of an Indian Prince that forms the cover is an excellent work. The publishers of the "British Workman" (Seely & Co., and Partridge) also issue "The Band of Hope Review," "The Infant's Magazine," "The Children's Friend," and some other similar publications, all noticeable for the very good wood-cuts, in their several degrees, with which they are illustrated.—Foremost amongst the numerous books for children, old and young, that have been published this year by Messrs. Routledge & Sons, must be placed "Pictures of English History," ranging from the earliest times to the present period, and comprising no fewer than ninety-three pictures, four on a quarto page, printed in colours by Kronheim, and accompanied with a familiar description. These

pictures, though not beyond criticism, are well calculated to impress on young minds the leading incidents in the history of the country.—"The Child's Picture Book of Wild Animals" (Routledge) is another set of prints, in colour, by Kronheim, each with a simply-written (but long words divided) and amusing account. The pictures are open to the objection that each animal being drawn to fill a page, the wolf is made to look as big as the elephant, the leopard as large as the tiger. A few words, however, to the young recipients of the book will set this matter right.—Still turning over the products of the Broadway, Ludgate, we pick out "The Doctor's Ward," by the author of the "Four Sisters," as an amusing tale for girls; and "The Boy Foresters," as calculated innocently to amuse their brothers. Nor will we omit to mention "The Child's Illustrated Poetry Book" (well-known simple rhymes), and the "Adventures of Joshua Hawseppe, Master Mariner."—"Merry Tales for Little Folk" (Lockwood & Co.), is a pretty little volume of well-known tales, such as the White Gas, Tom Thumb, and the Fair One with the Golden Locks, edited by Madame de Chatelein, and illustrated with some 200 little woodcuts.—"Mary's Every-day Book of Useful and Miscellaneous Knowledge," by Frances E. Burbury (Longmans, Green, & Co.), has instruction for its chief object, but the matter is so put together and mixed up with illustrative stories, as to be amusing reading for the children for whom it is intended. A little book of "Questions on Mary's Every-day Book," is published separately, and will be found useful by instructors.—"The Mark" is the title of the Christmas number of *The Quiver*, published by Cassell & Co., and contains some interesting stories with illustrations.—The Christmas number of "London Society," too, will amuse the readers for whom it is intended. The older folks find the type a *little* small.

Miscellaneous.

NEW BUILDING ACT.—The Metropolitan Board of Works has approved of the action taken by the Building Act Committee in having prepared and inserted in the proposed draft Bill for the Amendment of the Building Act, certain clauses relative to the inspection and supervision of public buildings, the flagging of streets less than 40 ft. wide, and the inspection of the formation of new streets.

ACCIDENTS.—While a plumber was looking after his tools at the vitrol works, Cattedown, Plymouth, he fell into a pan of boiling oil of vitrol, and was so dreadfully burnt that he shortly afterwards died. The boilers were not protected by rails.—While a slater was walking on the roof of a house in Oswaldtwistle, Blackburn, his foot slipped and he fell headlong to the ground, a depth of 30 ft. to 40 ft. He was terribly mutilated, and death ensued in a very short time. Deceased was not accustomed to slating work, but was anxious to teach his son the trade, and was engaged in doing so when he fell.

THE DELAY IN THE COMPLETION OF THE HOLBORN VIADUCT.—There are still great complaints on this subject. At a meeting of the Court of Common Council, Mr. Deputy Fry made a statement which was not satisfactory to those by whom the complaints had been originated. Mr. Henry Potter, of Farringdon-street, on behalf of the aggrieved parties, writes: "Our complaint was,—1st. That many months have elapsed without anything comparatively being done to complete the viaduct. The piers for the bridge across Farringdon-street were finished more than twelve months ago, yet to this day there is no appearance of the bridge. So with other portions of the work. "2nd. That no adequate provision had been made for the public during the progress of the works. Because many months ago they might have opened the footway on the south side of the viaduct, east and west of Farringdon-street, by erecting, at a small expense, temporary staircases to each side of Farringdon-street, and thus have enabled the public to avoid the danger of passing amongst the vehicles where now they have twice in the length of 100 ft. to do so. And in a street which will be 80 ft. wide when finished, all the passengers have to get through openings 3 ft. 2 in. wide as best they can, making it so bad for trade in the immediate neighbourhood as almost to ruin all retail businesses."

GAS.—The Bath Gas Company have decided to reduce the price of their gas 6*d.* per 1,000 ft., viz., from 9*s.* 6*d.* to 3*s.* The company have also agreed to reduce the charge for the public lamps 5*s.* for each lamp per annum.—The inauguration of the new gasworks at Brandon, which have just been completed, was celebrated by a public dinner at the Chequers Inn. The works have been erected under the personal direction and superintendence of Mr. Wilton, late chief gas engineer to the Continental Union Gas Company, who happened to come to reside at Brandon for the benefit of his health, just at the time of the formation of the Gas Company, and who offered his services as engineer gratuitously.

NEW PROPPELLING POWER FOR STREET RAILWAY CARS.—A Detroit gentleman, named Wilder, has recently invented a new propelling power for street-cars, concerning which the *Detroit Free Press* says—"Mr. Wilder's invention is destined to revolutionise the whole system of street-railroad appliances for attaching a locomotive engine to the forward car in such a manner that neither steam, smoke, nor cinders can escape; and the noise made by the machinery is not so great as that produced by this working of a Wheeler & Wilson's sewing-machine. The boiler is located upon the platform, and occupies a space of 20 in. in diameter, with an altitude of 3 ft., while the engine is completely hidden under the body of the car, and protected from dust, frost, snow, &c., by a casing of wood and galvanized iron. All four of the wheels of each car are driving-wheels. The engine has a capacity of 6-horse power; and, as the shaft makes two and a half revolutions to one revolution of the wheels, the latter will reach 15-horse power. This increase of force is calculated to be of great advantage in starting the car and in turning corners. The economy of working, by comparison with horse-cars, is said to be great.

OPENING OF NEW CO-OPERATIVE BUILDINGS.—

At Allerton, the co-operative principle, which was introduced into the village of Allerton little more than a year ago, is evidently making progress. A provision-shop was at first opened upon a small scale, and now, upwards of 400 shares at 1*l.* each having been taken up, the business has increased to such an extent that their receipts will amount to at least 50*l.* a week. The society, finding that they required more accommodation, decided upon the erection of new premises in which to carry on their business, and those buildings are now completed and opened. The site is in the centre of a rapidly increasing population. There is a spacious room on the ground floor, 24 ft. 6 in. by 31 ft. 6 in., which will be used as a store-room. The next floor, which is of the same dimensions, is what will be the sales-shop. There is also a large room, which is intended for public meetings, lectures, concerts, &c. In the rear of these premises, and in connexion therewith, there are three cottages. The architect was Mr. James Bairrow; and the following were the contractors:—Messrs. Jewett & Jackson, masons; Mr. Thomas Lund, joiner; Mr. J. Firth, plumber; Mr. John Hill, slater; Messrs. J. Noble & Co., painters; Mr. J. Atkinson, plasterer. The total cost of this erection is 1,000*l.*—A large building, called a Co-operative Hall, has been opened at Cleckheaton. It is the property of the Cleckheaton Industrial Self-Help Society, and is situated in the most central part of this thriving little town. The building has a frontage to the street of 58 ft. in length, and its height is 48 ft., there being four stories, including the cellaring, which will be used for the warehousing of goods. On the next floor there are four shops for the four branches of business carried on, namely, one for the shoemaker, another for the butcher, another for the draper, and another for the grocer. The third floor consists of large show-rooms, and the top story is one spacious room, which will be used for public meetings, concerts, lectures, &c. This room is capable of accommodating 600 people, and will supply a desideratum which has long been felt. It is lighted by gas, four chandeliers being suspended from the ceiling, and is ascended by a wide staircase, the entrance being in the front. All the rooms are heated by hot air. The building is erected in a mixed style of architecture. Mr. S. Overend, of Dewsbury and Cleckheaton, was the architect. The contractors were Messrs. Drake & Hartshill, masons; Mr. Jonathan Allott, Cleckheaton, joiner; Mr. Joseph Morton, Cleckheaton, plasterer; and Mr. Wm. Ratcliffe, Cleckheaton, plumber.

THE ARMOUR AT SOUTH KENSINGTON.—The Meyrick collection, of which we gave an account in our last, will be open to the public on this, Saturday, the 26th inst.

SANITARY COMMISSION OF FALMOUTH.—An inquiry instituted by the Government has been held during the last few days. After hearing evidence, Mr. Taylor, the inspector proposed that the town and parish boards should amalgamate for the purpose of sewerage, and then they could work without the loss of time entailed by a divided jurisdiction. He further advised the local authorities to drain without delay, and to avoid draining into the harbour if possible, adopting in preference a system of irrigation by pumping up the sewage for that purpose.

SIAM.—The acting British Consul at Bangkok, Mr. Alabaster, reporting to the Foreign-office on Siam in 1867, says,—"There must have been a very considerable importation of British machinery, but the greater part of it was not reported for duty, being for the Government and ministers. A large sugar-mill and distillery, a saw-mill, British ship-yard, and dry dock have been in operation throughout the year. Iron bridges have been erected over some of the creeks. Gasworks have been constructed in the palaces of the king and prime minister. A new steam rice-cleaning mill has been added to the four large mills already existing.

MR. M. DIGBY WYATT.—Mr. Digby Wyatt is not yet knighted, but is about to be so, probably at the next Privy Council. In reply to some inquirers, the immediate ground for the bestowal of this honour is the work done in buying, selling, negotiating, building, &c., during his tenure of office (to the extent of considerably beyond a million sterling in amount), for his India Office masters; but no one will doubt that what he did for the 1851 Exhibition, and his other labours towards spreading abroad a knowledge of art, assisted in causing the proposition to be well received at Court. We cordially congratulate Mr. Wyatt on this well-deserved recognition of abilities, and continuous efforts in a right direction.

TWENTY-SIX PERSONS KILLED IN A CHURCH.—A violent storm broke over Belgium a few days back, and committed great ravages in almost all the towns in the kingdom. At Tournai the roof of the townhall was partly carried away; at Namur some lives are said to have been lost; at Mons chimneys were blown down and houses damaged, and several booths from the fair field were carried away; at Bruges the church, the hospital, and the theatre, in addition to some factories and private dwellings, suffered considerably. Also at Fritzlur, near Cologne, the tower of the church was blown down during mass, and several persons hurried under the ruins. Sixteen corpses had already been got out, but ten more were known to be still there.

LEAD.—The quantity of lead ore raised and sold in the United Kingdom last year was 93,432 tons, of the value of 1,158,066l.; the quantity of lead produced was 68,441 tons, of the value of 1,337,509l.; and the quantity of silver obtained was 805,394 oz., of the value of 215,400l. About two-thirds of the production of lead are obtained in England, about a fourth in Wales, and the remainder in Scotland, Ireland, and the Isle of Man. The mean price of lead ore at the Holywell sales in 1867 (rejecting a few low-priced parcels) was 12l. 17s. 6d. a ton. The average price in the Loudon market of English pig and sheet lead was as follows:—For English pig, 19l. 11s.; English sheet, 20l. 12s.; English pig (W. B.), 22l. 1s.; all three lower than in 1866.

MEDICAL OFFICER OF HEALTH FOR ST. PANCRAS.—A special and very fully attended meeting of the vestry of St. Pancras was held for the purpose of examining and making a selection of three candidates to go to a final ballot for the appointment of medical officer of health and examiner of gas, in the place of the late Dr. Hillier, who had held it since the adoption of the Metropolitan Local Management Act. The salary has been reduced from 400l. to 300l. a year, and the officer is to reside in the parish. There were fourteen candidates, some of them of high standing in the profession, but who declined to pledge themselves to reside in the parish. The gentlemen selected to go to the ballot for final election were:—Thomas Stephenson, M.D., M.B., &c.; W. J. Smith, M.B., M.R.C.S., &c.; and J. T. Dickson, M.B., M.R.C.P., &c. Ultimately Dr. Stephenson was elected.

NEW DISCOVERY IN GUN-COTTON.—It has been discovered, in the course of some experiments at the War-office Chemical Establishment, Woolwich, that gun-cotton fired by concussion exerts a force equal to that of nitro-glycerine, or nearly ten times that of gunpowder. Thus, whereas gun-cotton fired by simple ignition, puffs off harmlessly when unconfined, exerting no destructive force whatever upon the body upon which it may be resting, the same quantity of gun-cotton exploded by concussion will shatter blocks of granite, break up thick iron plates, and blow down or destroy any body in contact with it.

WELLS CATHEDRAL.—After the fall of two niches or canopies in the west front, which took place in the early part of this year, Mr. Ferrey, the diocesan architect, was requested to make a careful survey of that portion of the building. His report states that, owing to decay, naturally resulting from the lapse of six centuries, together with the imperfect repairs in times past, this marvellous work of architectural and sculptural art is in imminent peril. It is difficult to form an exact estimate of the cost of restoration, but it is calculated that from 5,000l. to 6,000l. will be required properly to repair (without replacing statues) the characteristic features of this "grand screen." We believe that the Dean and Chapter are also very desirous to make a fitting restoration of the Chapter-room.

TOTAL IMMERSION OF THE CELEBRATED SALMINE OF WIELICZKA.—The famous sal-mine of Wieliczka, ten miles from Cracow, which has hitherto brought a net revenue to the Austrian Government of upwards of 6,000,000 florins (600,000l.), is threatened with total destruction by a stream of water. The mine contains a subterranean village of about 1,000 inhabitants. The water flowed at the rate of 120 cubic feet a minute, and had already almost filled the lower passages, rapidly dissolving the salt. These passages contain extensive stables and provision magazines, decorated with statues of salt, which used to be illuminated on festive occasions. The latest accounts, according to the *Poll-Mall Gazette*, state that the wells which were to have prevented the further inroads of the water were nearly finished when it was suddenly observed that rills already worked their way right round the height of 70 ft., and about 40 ft. more, which by this time, no doubt, have long been filled up, were all that were required to complete the total immersion.

THE RESTORATION OF BATH ABBEY.—The Duke of Cleveland presided over a meeting of the citizens of Bath, held recently, at the Guildhall, for the purpose of promoting this object. After an address from the Chairman, the Rev. Prebendary Kemble, the rector, read a report, which states that,—

"The substitution of a stone groining in the nave and its aides for the plaster ceilings of Bishop Montague is now very nearly completed, and adds a noble feature to the church. The funds required to pay for this portion of the work have not yet been raised. There is a deficiency of about 1,100l., which the committee are very anxious to receive before Lady Day. The past year has not been solely devoted to this work. The ceilings in the transepts have been perfected. The organ has been built in the place originally proposed for it by Mr. Scott, and a faculty has been obtained for the alteration in the internal arrangements, in accordance with his recommendations. The lighting and heating of the church have also been taken into consideration under Mr. Scott's advice. It has now become necessary to determine upon the future fittings of the church, and to raise the funds needed for this third and final portion of the undertaking. Three windows have been filled with stained glass during the past year, and the committee are now able to report that friends have given, or promised to give, stained glass for all the windows in the aisles of the nave, one in the south transept, and three in the choir, making a total of seven. No further progress has been made in filling the compartments of the west window. Once more the committee appeal to the public for renewed contributions."

From a statement made by the Treasurer it appears that the cost of the first portion of the work, 5,346l. 15s., has been wholly provided for, but that a further sum of 350l. is required to meet necessary but unforeseen expenditure. The second portion is estimated to cost 5,500l., and of this 945l. remain to be raised. The third portion of the work, which will most likely be commenced in the ensuing year, will cost about 5,000l., and of course this remains to be provided. Since the last meeting about 1,400l. had been raised, and the Treasurer hopes to be able to pay the cost of the second portion of the work by March next, until which time the contractor has promised to wait for his money. The report was adopted, and a resolution passed pledging the meeting to renewed efforts to proceed with the remaining part of the work.

PUNISHMENT FOR EMBEZZLEMENT OF TRADE UNION FUNDS.—At the Central Criminal Court, a bricklayer, of the name of William Blackburn, has been sentenced, under the new Act, to six months' imprisonment, with hard labour, for embezzling the funds of the Operative Bricklayers' Society, of which he was treasurer. The prisoner had absconded on the day after the passing of the Act of last session, leaving a deficiency of 17l., part of which he admitted he had appropriated to his own purposes, and the remainder, he said, he had lost.

A CHAPEL BLOWN DOWN.—During a strong gale recently, the new Wesleyan chapel, just erected (but not quite finished), at Littlemoor, Pudsey, was blown down. The roof, which was covered with blue slates, was first blown down, carrying with it the side walls and the floors. The end walls were left standing, but one of them was considered so dangerous that steps were taken immediately for removing it, by order of the architect, Mr. C. E. Taylor. The foundation stone was laid on the 2nd of May. The damage is roughly estimated at 400l. to 500l.

LESSONS FROM GRAVESTONES.—Few botanists have paid any attention to our rock-loving lichens, consequently the literature of the subject in this country is at a very low ebb. This is greatly to be regretted, for the beautiful party-coloured films and patches of vegetation so common on architectural remains and exposed rocks are well worthy of close study. Lichens are known to be amongst the first objects which disintegrate rocks and stones, but the time required for their germination and growth has long been a vexed point. Recently an English botanist has hit upon the idea of noting the growth of lichens upon the dated monuments and gravestones of country cemeteries, and has found that it requires a period of twenty years for a lichen to acquire a moderate or adult size on a squared stone; the growth of these pretty rosettes of gray and yellow colour, so ornamental to our architectural remains, is, as might have been expected, excessively slow.

OPENING OF BARROWS NEAR BRIDLINGTON.—The open weather has permitted the Rev. Canon Greenwell, of Durham, and others, to carry out a full examination of two of those rare "long-harrow" which are now generally regarded as being the places of sepulture of the earliest (or long-headed) race of Britons of which traces have hitherto been found. The first barrow, which was upon the Dotteril Park, on the estate of Lord Londesborough at Rudston, near Bridlington, yielded but one long-headed burial, and that at the east end. The harrow, however, had been used by a later round-headed race for burial. With one body was a very peculiarly formed (howl-shaped) urn, but the harrow yielded very little pottery, and but few flints. The second harrow was upon the estate of Mr. Creyke (of Rawcliffe), near Rudston. It contained many broken-up bodies, of which it was impossible to form any other opinion than that the disjuncting had taken place at the time of death, and (as in the cases of the other long-harrow) pointed to the practice of cannibalism. The skulls were markedly dolichocephalic,—the supposed true type of the long-harrow burials.

THE BURNING OF A LUNATIC ASYLUM.—At the destruction by fire of the Ohio Lunatic Asylum, Columbus, six lives were lost. The fire was first discovered in one of the rooms at the north-east corner of the east wing of the building. The east wing was devoted entirely to the use of the female patients, and the ward or section where the fire originated contained some fifty of them. In the ward where the fire originated were some of the most mischievous, and some sick ones. All efforts to induce these to leave their rooms were unavailing, and the few citizens who had reached the place, and the attendants, were obliged, at the risk of their own lives, to rush in and drag them from the horrible fate that awaited them. The roar of the flames, the rolling clouds of smoke, the cries, screams, shouts, laughter, and dancing of the demented women, whose madness seemed increased by the wild and exciting scenes around them, made up a picture terrible to look upon. Six of the female patients died of suffocation and inhalation of the flames, and there were rumours of many more having lost their lives. One of the patients, in a spirit of mischief, lighted a bit of paper, it is said, at the gas-burner in the hall, just after the attendant had passed through, and set fire to her bed, so originating the fire.





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